



EXECUTIVE CHAMBERS
HONOLULU

GEORGE R. ARIYOSHI
GOVERNOR

February 22, 1984

Ms. Letitia N. Uyehara
Interim Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Based on the recommendation of your office, I accept the revised environmental impact statement for the Kekaha Sanitary Landfill expansion project on Kauai as satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes.

This environmental impact statement will be a useful tool in deciding whether this project should be allowed to proceed. My acceptance of the statement is an affirmation of its adequacy under applicable laws and does not constitute an endorsement of the proposal.

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

With warm personal regards, I remain,

Yours very truly,


George R. Ariyoshi

cc: Department of Public Works
County of Kauai

**Revised Environmental Impact Statement
KEKAHA SANITARY LANDFILL EXPANSION PROJECT**

DEPARTMENT OF PUBLIC WORKS
COUNTY OF KAUAI

DECEMBER 1988

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REVISED
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
KEKAHA SANITARY LANDFILL EXPANSION PROJECT
KAUAI, HAWAII

This Environmental Document is Submitted
Pursuant to Chapter 343, HRS

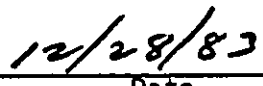
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PROPOSING AGENCY:

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County of Kauai
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Lawrence Kitamura
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Date

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DECEMBER 1983

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SECTION 1
SUMMARY

The Department of Public Works of the County of Kauai is proposing the development of an island-wide sanitary landfill for the Island of Kauai. The project requires a 135-acre expansion of the existing landfill at Kekaha. It is designed to accommodate the island's solid waste generated over a minimum 20-year span from 1984 to 2003. Kauai's existing system of refuse transfer stations and vehicles will also require expansion.

The County has conducted an extensive island-wide search for a new landfill to dispose the ever-increasing tonnages of solid waste generated by the resident and tourist populations. A recent comparative analysis of the leading candidate sites identified an expansion of the existing County landfill site at Kekaha as the preferred alternative. A development plan and an operation plan have been prepared for the expanded site for the best use of the available cover material and the acreage available for expansion. The development plan provides for the minimum 20-year landfill life plus an estimated additional 10 years for a total life of approximately 30 years.

The site of the existing landfill and the proposed expansion project is located on the flat, sandy, coastal plain northwest from the town of Kekaha and between the Kaunualii Highway and the ocean shoreline. The expansion areas are State lands under the control of the State Department of Land and Natural Resources and currently leased as agricultural lands for pasture, seed corn and seed sugarcane. There are no known endangered species of flora or fauna in the area. A survey of the site did not indicate any archaeological sites in the area. The water table in the area is low and has brackish water. Rainfall in the coastal area is relatively low. These conditions reduce the production of leachate and the requirement for leachate control. There are no nearby residents in this agricultural area. No persons will be displaced by the project or be affected by proximity to the landfill.

The proposed landfill expansion areas beyond the present County landfill are in either a State Agricultural District or in a Limited Subzone of a State Conservation District. A portion of the expansion areas is located within the County's Shoreline Management Area.

The primary beneficial impact of the project will be to ensure the continued good public health conditions on the island. The present landfills at Hanalei and Halehaka will be filled to capacity within the next year. The smaller landfill at Kekaha has a remaining life of only seven years at the present rate of use and much less when it becomes the only landfill on the island. Expansion of the Kekaha site will permit safe and efficient disposal of the island's solid waste for the next 30 years.

The primary adverse impacts are the usual noise, dust, air pollution and litter associated with even a well run landfill. The remote location of the landfill on the southwest coast of Kauai requires an expanded refuse transfer system of refuse truck-trailers to move the waste from the regional solid waste transfer stations to the landfill. An additional transfer station will be required in Lihue at a location yet to be selected. The completed landfill will form a long, low mound on the landscape of the coastal plain. The landfill expansion will eventually require some lands currently under cultivation for seed corn and seed sugarcane. The off-site and on-site costs associated with the landfill expansion are relatively high and will have an adverse impact upon the County's budget.

The use of daily cover material to enclose each day's cell of compacted refuse will mitigate much of the on-site impacts of litter, odor, air pollution and noise. Buffer zones will separate the landfill from the Kaunualii Highway and the ocean shoreline. The on-site and off-site personnel and equipment will be closely supervised and controlled to ensure cost-effective operations. The design for the completed landfill is to maintain a low elevation profile. It is the intention of the County to landscape the final grade with morning glories that readily adapt to a

sandy surface. An alternative for the completed landfill is its possible use for light agricultural crops. This may be accomplished by the importation of 6 to 12 inches of topsoil.

The "no action" alternative is not viable because of the urgent public health requirement for a new landfill. Alternative landfill sites have been under intensive investigation by the County in recent years. The selection of the expanded site at Kekaha followed a comparative analysis of five alternative landfill systems, using evaluation criteria of cost, landfill life, environmental impacts, leachate control and closure (ultimate use). A resource recovery study is now being conducted by the County. If implemented, resource recovery would greatly decrease the annual tonnages of waste requiring disposal but an expanded landfill site at Kekaha would still be required for long-term use.

SECTION 2
DESCRIPTION OF THE PROPOSED ACTION

2.1 PROJECT OVERVIEW

The Department of Public Works (DPW) of the County of Kauai is proposing the development of an island-wide sanitary landfill for the Island of Kauai. This project requires the expansion of the existing sanitary landfill at Kekaha and is designed to accommodate solid waste refuse generated over a minimum 20-year span from 1984 to 2003.

This section of the EIS presents the project background and a description of the proposed expansion of the existing Kekaha sanitary landfill. It also includes brief descriptions of the existing, island-wide system of refuse transfer stations and refuse transportation which will also require expansion.

2.2 PROJECT BACKGROUND

The County of Kauai is developing an island-wide system of refuse transfer stations for collection of regional solid wastes and a sanitary landfill system to receive and dispose of wastes from the transfer stations. These island-wide systems implement the recommendations of the Kauai Solid Waste Master Plan completed in 1974. The objectives of the Plan were to eliminate the many open dumps that existed at the time and to provide for the safe and sanitary disposal of the growing tonnage of solid waste. The open dumps have been eliminated on Kauai. Transfer stations are now in operation at Hanapepe and Kapaa and are planned for construction at Hanalei, Koloa and Lihue. The County has now methodically narrowed down the search for an island-wide sanitary landfill to an expansion of the existing site at Kekaha. This site will meet the solid waste sanitary landfill requirements of the County for the minimum 20-year period 1984-2003, plus an estimated additional 10-year expansion capability.

Solid waste collection and disposal activities on Kauai include both public and private operations. The Department of Public Works of the County of Kauai has responsibility for administering the County solid waste management system. The County's refuse collection system presently consists of three collection crews and two transfer stations operating out of three baseyards, at Hanapepe and Kapaa (sites of the transfer stations) and Hanalei. There is one commercial refuse collection firm on the island. Refuse is also hauled directly to the landfills by individual residents and organizations. The County presently operates a system of sanitary landfills around the island. There are now operating sanitary landfills at Kekaha, Halehaka, and Hanalei.

The bulk of the municipal refuse on Kauai originates in the major population centers, particularly around Lihue. Centroids of waste generation, based on a four-region model of the island, are located near Hanalei (Princeville), Kapaa, Lihue, and Waimea. Refuse is received 7 days per week at the landfills, with heaviest usage occurring at the beginning and end of the week, with lower usage at mid-week. It is found that approximately 123 tons per day are received at the landfills. This figure does not include construction/demolition and earth fill materials now being disposed in both the County sanitary landfills and in the several commercial landfills now available for such materials. However, such materials may continue to be disposed in the planned sanitary landfill system. The additional 20-year acreage required for the construction/demolition and earth fill materials is approximately 4.5 acres. The landfill PER design has ample space to accommodate the anticipated construction/demolition and earth fill materials over the 20-year period. Furthermore, we may expect that a portion of the construction/demolition and earth fill material will be diverted to other private commercial sites designated for such use. They are a small percentage of the overall waste and are not included in the per capita projections of municipal waste requiring a sanitary landfill. The per capita production of municipal solid wastes on Kauai was computed to be about 5.5 pounds per day, based on 365 days per year.

Refuse projections (Table 2-1) to the year 2003 were made, based on the assumption of a 1.5 percent annual increase in the per capita refuse production rate and using the population forecasts developed by Kauai County from U. S. Census Bureau data. The projected population growth rate averages 2.4 percent per year through the year 2003. The solid waste projection shows that the quantities of refuse will more than double in the next 20 years.

Each of the existing landfills has some capacity for expansion but, with the exception of the Kekaha Landfill, all will be filled by 1983. The existing Kekaha landfill has an expected remaining life of about seven years at its present rate of use. The County is developing a system of regional transfer stations to replace the existing regional landfills as they are filled. These transfer stations will be integrated with the proposed island-wide sanitary landfill at Kekaha for efficient and sanitary solid waste disposal.

The DPW has been actively pursuing the acquisition of an island-wide sanitary landfill for Kauai. The Kauai Solid Waste Master Plan (1974) identified the central landfill requirement as one of primary importance. It proposed a site (Kipu No. 1) near Kipu for further investigation. At the request of the property owner, Grove Farm, an adjacent and smaller Grove Farm site was investigated earlier in 1977 but proved to be inadequate in size and too close to Huleia Stream. The two sites (Kipu No. 1 and Kipu No. 2) were investigated in detail in 1979 but were not acceptable due to their relatively short landfill lives and adverse environmental impacts.

An island-wide search for acceptable landfill sites was then begun. In February 1980, a report entitled "Identification of Potential Landfill Sites" was completed. The report presented brief data on 15 candidate landfill sites selected after a review of the available physical and social data on the island. It recommended five sites for further investigation. The May 1981 report entitled "Site Feasibility Report" evaluated these sites and included input from the public, the County

TABLE 2-1

REFUSE TONNAGE PROJECTIONS, 1980-2003*

	Population ¹ Residential/ Hotel	Refuse ² Tons/Cap/Yr	Refuse Tons/Year	Refuse ³ Tons/Day
1980	39,117/5,511	1.01	45,074	123
1984**	43,010/6,060	1.07	52,690	144
1985	45,006/6,228	1.09	55,844	153
1990	50,000/7,055	1.17	66,752	183
1995	55,000/7,983	1.26	79,356	217
2000	64,400/9,029	1.36	99,860	274
2003**	68,960/9,737	1.42	111,961	307

¹Escalated growth rate of 2.4 percent per annum. Population based on 75 percent room occupancy.

²Escalated @ 1.5 percent per annum.

³Based upon 365-day year. Does not include construction/demolition wastes.

*SOURCE: Final Report, "Resource Recovery From Solid Wastes - Phase 1," July 30, 1982, by W. A. Hirai and Associates.

**Additional projection added to the original table to include the use period 1984-2003 for the new landfill system.

Council and the owners of the site properties. The report recommended Kekaha-Makai (hereinafter referred to simply as Kekaha), Numila, Kumukumu and Kekaha-Mauka as landfill sites, in that order of priority. Subsequent site investigations at Numila indicated inadequate soil cover, removing that site from further consideration. Kekaha-Mauka was also dropped from further consideration as a site because of many relative disadvantages, including loss of a large area of productive agricultural (cane) land. Kipu No. 1 (hereinafter referred to as Kipu) was selected for further study because of its excellent location relative to refuse generation and more recent design considerations.

Figure 2-1 locates the County's existing and proposed solid waste facility sites. Existing and future refuse transfer station locations are indicated, except for the proposed Lihue transfer station which has not yet been identified with a specific location. Also indicated thereon are the three candidate, island-wide, sanitary landfill sites (Kumukumu, Kipu and Kekaha) which were analyzed in a Preliminary Engineering Report (PER). The PER analyzed the island-wide sanitary landfill potential of each of the three sites, together with two combinations of sites (Kumukumu-Kekaha and Kipu-Kekaha). The comparative analysis of each of the five systems over the minimum 20-year period clearly indicated that an expansion of the existing Kekaha Landfill was the optimum alternative. The comparative analysis evaluated on-site and off-site development and operation and maintenance costs, landfill life extension, leachate control, environmental impacts and closure (ultimate use) concepts for each of the five candidate systems.

Following selection of Kekaha as the preferred site, additional field data was obtained. A revised preliminary landfill design and a cost estimate were prepared and have been included in this section of the EIS.

2.3 PROJECT DESCRIPTION

2.3.1 Landfill Site Characteristics

Figure 2-2 indicates the location of the proposed Kekaha Landfill site, approximately 1.3 miles northwest of the town of Kekaha. The proposed

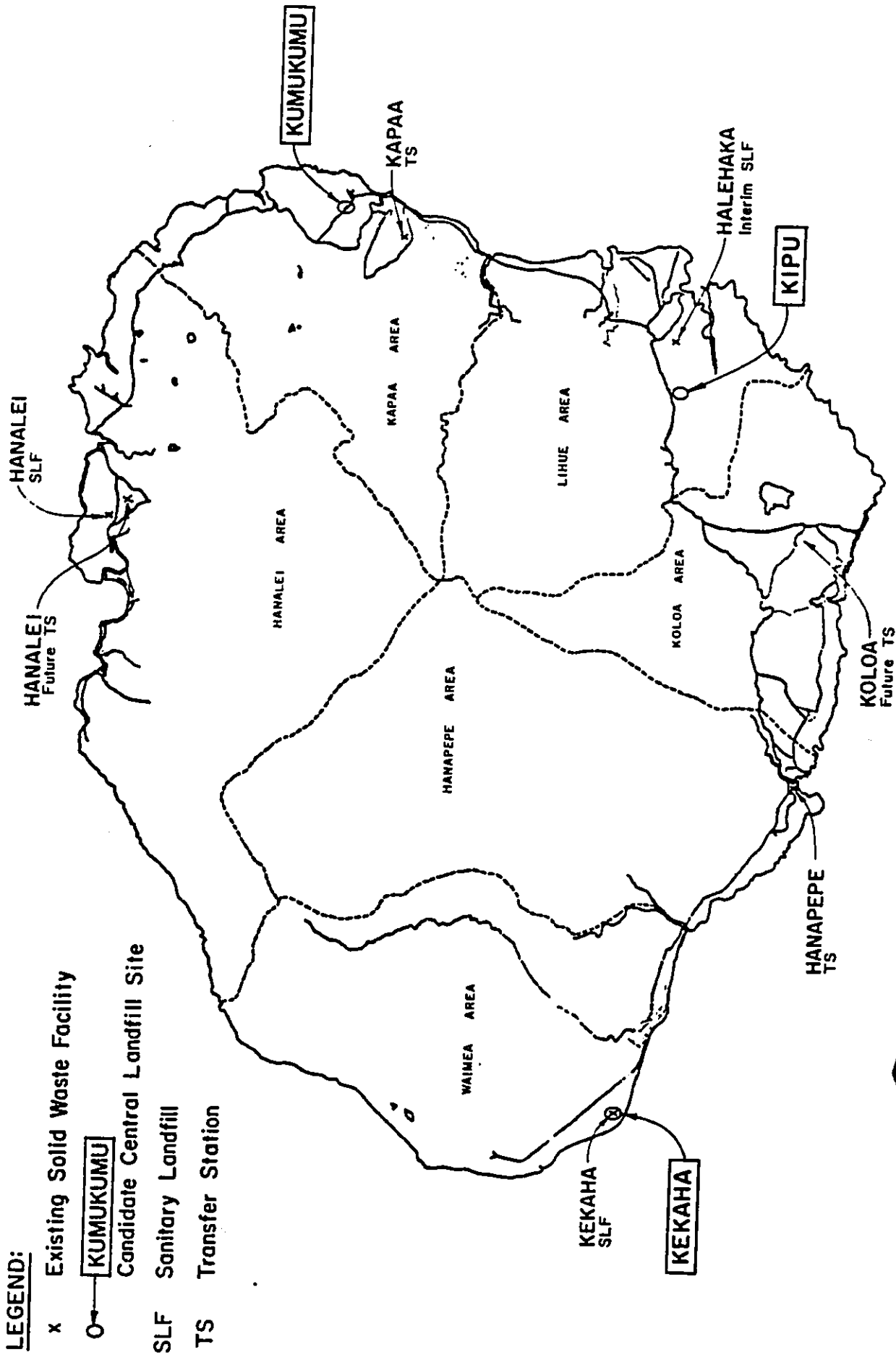
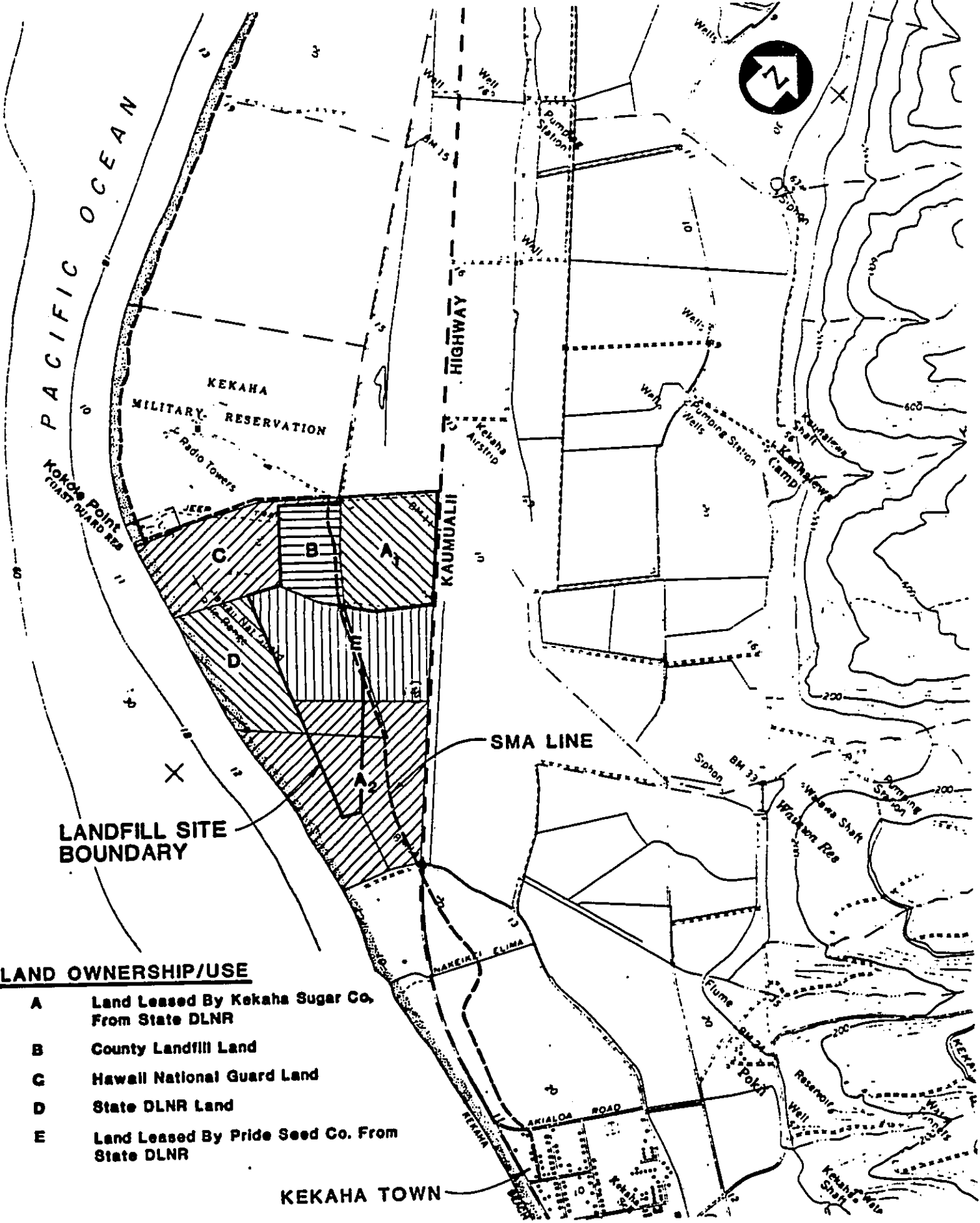


FIGURE 2-1

SOLID WASTE FACILITY SITES



- LAND OWNERSHIP/USE**
- A Land Leased By Kekaha Sugar Co. From State DLNR
 - B County Landfill Land
 - C Hawaii National Guard Land
 - D State DLNR Land
 - E Land Leased By Pride Seed Co. From State DLNR



FIGURE 2-2
**VICINITY MAP
KEKAHA LANDFILL SITE**

160-acre site would be a 124.3-acre expansion of the existing 35.7-acre site ceded to the County for landfill use and now in use as the sanitary landfill for the western sector of Kauai. The owner of the site and adjacent lands is the State of Hawaii (Department of Land and Natural Resources). As indicated on Figure 2-2, the landfill site includes the existing County landfill and land leased to the Kekaha Sugar Company and Northrup King Company (Pride Seed Division). The Hawaii National Guard rifle range and a drag strip bound the site on the makai side. These activities would not be affected by the landfill. The site has a low annual rainfall of 18 inches/year.

An existing access road to the site extends off Kaunualii Highway, the main coastal highway. The site is low, flat and sandy. Scrub brush, kiawe trees and grasses cover the site which is already heavily littered with solid waste, including junk cars. The site is within a Limited Subzone of the State Conservation District. The County's Shoreline Management Area (SMA) includes a portion of the proposed landfill as indicated on Figure 2-2.

The existing landfill operation excavates the sand (elevation approximately 11 feet above mean sea level - msl) down to the water table, approximately 3 feet above msl. Solid waste is added with a daily cover of sand until an approximate elevation of 24 feet msl is reached. No special leachate control system is used in this area of low rainfall and brackish groundwater. The site is well drained since the sandy soil is permeable.

Methane gas monitoring and control should present no significant problem at the site since there are no gas accumulating structures on or near the site and none are planned. The very low rainfall and brackish water at the site will make the development of an impermeable bottom and cover liner unnecessary. Methane gas generated within the landfill will therefore escape through the permeable cover and into the atmosphere without reaching explosive concentrations.

The landfill development plan at this site is to expand the existing mode of landfill operations to the larger area with an increase in height to a final elevation of approximately 37 feet msl. Sufficient cover material (excavated sand) is available on site to meet the landfill cover requirements. The closure of the landfill would be progressive as the design height is realized, with a vegetation cover being added to ensure against erosion of the landfill mass. The Kekaha Sugar Company has recently obtained a Conservation District Use Permit from the State Department of Land and Natural Resources to use 61.2 acres of the proposed Kekaha landfill site for commercial agriculture. The Northrup King Company (Pride Seed Division) has subsequently indicated an interest in a long-term lease of 43.6 acres of the 61.2 acres. Phasing of the landfill increments would be accomplished to permit existing lease holders to maintain their State leases and field operations as long as possible, until the County's landfill need requires use of the land. At that time, the State can invoke the withdrawal for public purpose clause in the current leases.

This site is especially attractive because it is an existing and approved landfill site, capable of expansion. The site has a large capacity, available cover material and brackish groundwater which eliminates the need for a leachate control system. It is not in a flood zone so no special drainage design is required as well. The low amount of leachate generated in this area of very low rainfall would probably eventually migrate to the ocean. The open coastal waters along this shoreline provide good circulation and would further dilute any leachate reaching the ocean. Current State regulations prohibit disposal of any hazardous waste in Hawaii landfills. Therefore, the well diluted leachate would also be non-toxic.

2.3.2 Landfill Site Development

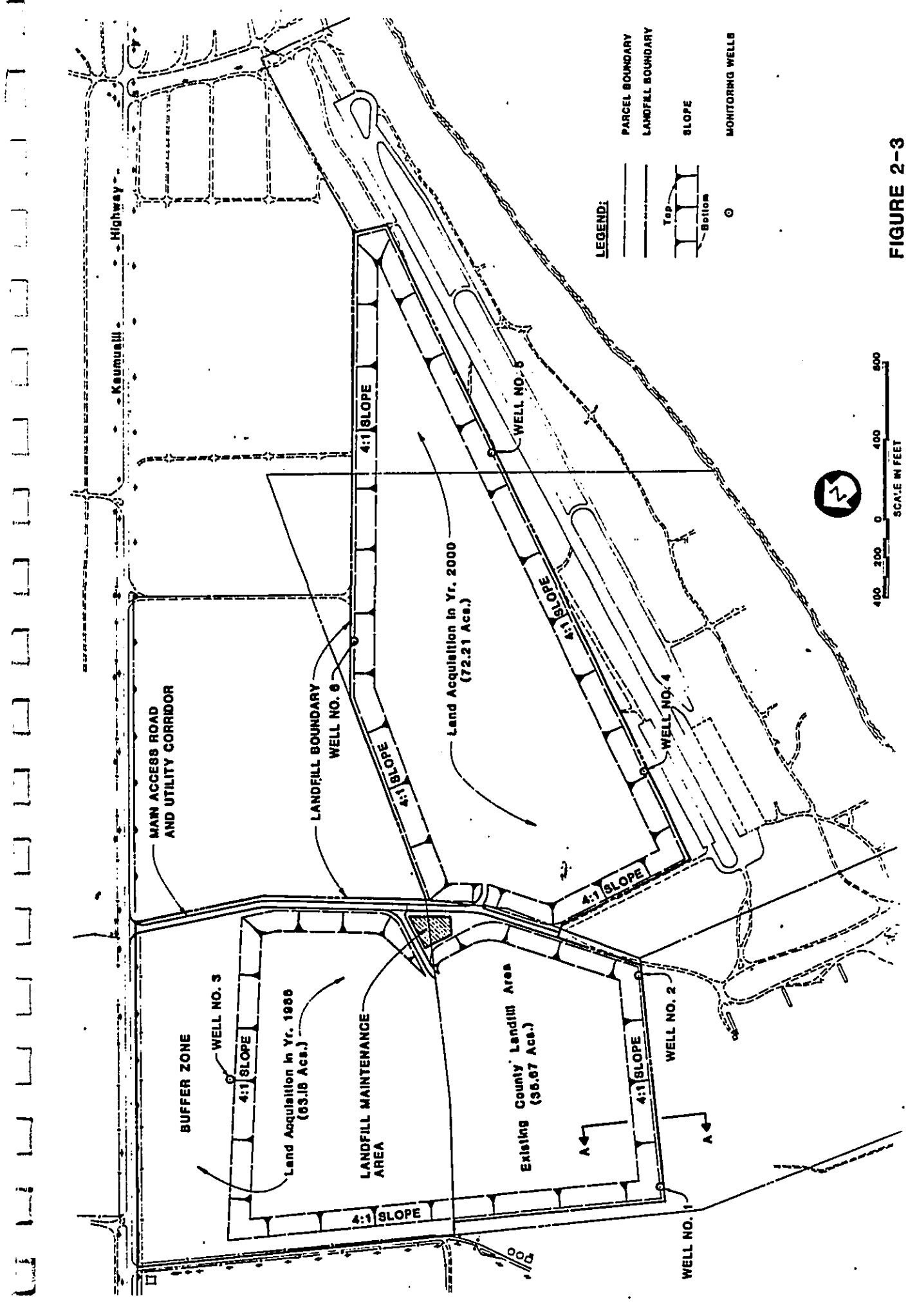
In September 1982, the Department of Public Works initiated some field measurements at the Kekaha Landfill site. Several test pits were dug to determine the water table elevation and soil characteristics. Land survey measurements were also taken to verify the existing topographic data obtained by photogrammetric means. The water table measurements at the

site were at elevations of approximately 3 feet above mean sea level. They were taken over a period of several days and at varying tide states. There appeared to be no coupling of the tidal variations in the ocean water elevation with the water table elevations at the site since they remained essentially constant.

Approximately 2.5 feet of loose sand was encountered at the surface of the test pits. The loose sand was underlain with well compacted sand down to the water table. Adjustments in water table and ground elevations were included in the preliminary design of the landfill. The bottom of the solid waste in the proposed landfill will be kept one-half foot above the water table.

Figure 2-3 indicates the proposed development plan for the expanded Kekaha Landfill. The preliminary design selected will provide a useful life for the site in excess of the minimum 20-year period. The excess has been identified on the site as a much needed expansion area for use beyond the 20-year period for an estimated 10-year extension of the landfill life. This useful life of the landfill will be extended significantly, with a much reduced annual cost, if a County resource recovery program is initiated and the landfill refuse input volume is reduced by low volume ash.

One of the design considerations was the uninterrupted use by others of the lands adjacent to the landfill site. The existing roads through the landfill to the National Guard Range areas, the drag strip and the shoreline recreation areas will be maintained without interruption. The existing agricultural leases to the Kekaha Sugar Company and the Northrup King Company for seed sugarcane and seed corn growing will be retained as long as practicable by planning for use of this leased land last. The upper elevation of the completed landfill can be made suitable for similar seed crops. The area will be available as sufficient replacement acreage at the time the present seed crop areas are required for landfill use. Figure 2-4 indicates a section (Section "A-A" from Figure 2-3) through a side slope of the completed landfill. The proposed landfill will reach a

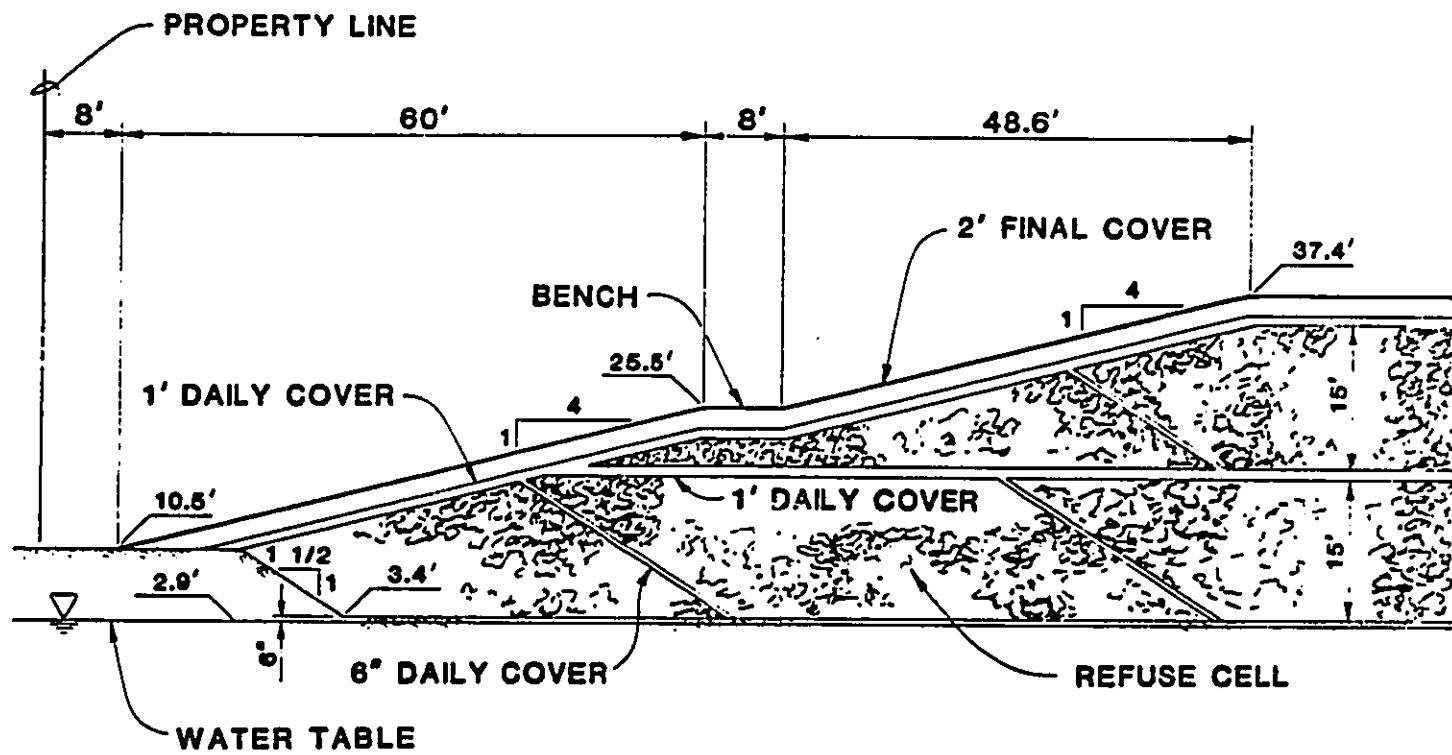


LEGEND:

- PARCEL BOUNDARY
- - - LANDFILL BOUNDARY
- Top
- Bottom
- SLOPE
- MONITORING WELLS



FIGURE 2-3
DEVELOPMENT PLAN
KEKAHA LANDFILL SITE



Section "A-A"

NOTE: All elevations are above mean sea level.

SCALES:

Horiz. 1" = 20'
Vert. 1" = 20'

FIGURE 2-4
SIDE SLOPE
KEKAHA LANDFILL SITE

height of approximately 37 feet msl or approximately 13 feet higher than the present landfill height of 24 feet. The increased height will permit the use of two lifts of cells, each 15 feet high, which is the optimum height for efficient landfill operations and use of the available land.

The sandy and flat soil at the landfill site does not pose any drainage problem. The site is well drained and will remain so in this dry area when the landfill is in place. Although there is no leachate control requirement in this area of low rainfall and brackish groundwater, several groundwater monitoring wells will be installed adjacent to the landfill (Figure 2-3) for periodic monitoring to insure that any unforeseen water quality degradation would be detected. Methane gas within the landfill will not be a problem since it will be continually vented to the atmosphere through the permeable cover and there will be no structures where the gas could accumulate in hazardous concentrations.

A buffer zone of several hundred feet has been established between the landfill and Kaunualii Highway. The existing access road from the highway to the present landfill has been retained. It will be improved to a 24-foot width with an asphaltic concrete pavement for all-weather use. A landfill maintenance area is centrally located near the existing landfill. It will include a small operations building next to a truck weighing scale. The building will include power, telephone, water and sanitary (cesspool) facilities. Shower and washup facilities will be provided for landfill personnel. The desired electric power and water lines will extend along the landfill access road from the existing lines along the highway. An existing 2-inch water line inside the western boundary of the landfill extends to the National Guard Rifle Range area. This will have to be abandoned and replaced with a new line extending to the rifle range from the new landfill water line.

Complete fencing of the landfill is not required. The relatively remote area does not require security fencing. A chain link fence would be highly vulnerable to the corrosive sea air environment and too expensive to

install and maintain. A movable anti-litter fence is planned, however, to control wind-blown litter near the working face of the landfill.

Clearing and grubbing operations would be required over much of the landfill to remove the trees, shrubs and grasses prior to excavation and use of the cover material. The existing litter over much of the site also includes debris of all types, including abandoned cars, that has accumulated through the years. The removed vegetation can be burned in the bottom of the areas excavated for the landfill so that the ash will be covered in the landfill operation. This will require a variance from the State Air Pollution Control Regulations such as those variances authorized under agricultural burning permits. If a variance is not obtained, the removed vegetation will be buried in the landfill. Much of the debris can be disposed in the landfill. The abandoned vehicles will have to be moved from the increments under development at the landfill site.

A new, large scale (1" = 50') topographic map of the site is required with 2-foot contour intervals for the preparation of the more detailed landfill plans. Engineering plans and specifications are required for the initial on-site development tasks, including utilities, access road, operation building and the initial detailed operation plan.

2.3.3 Landfill On-Site Operation and Maintenance

Figure 2-5 indicates the operation plan for the landfill over the 20-year period 1984-2003. Figure 2-6 indicates the sequence of tasks for an orderly development of the landfill by increments which are typically two lifts high, 150 feet wide and of varying length. A lift height includes 15 feet of refuse in the cell plus 1 foot of cover for a total lift height of 16 feet. Figure 2-7 illustrates typical cell construction.

The clearing and grubbing of the existing vegetation and debris will proceed as the first task in the development of an increment. The increment is then excavated to a depth 0.5 feet above the water table which is typically at approximately 3.0 feet msl. Refuse is then added to the

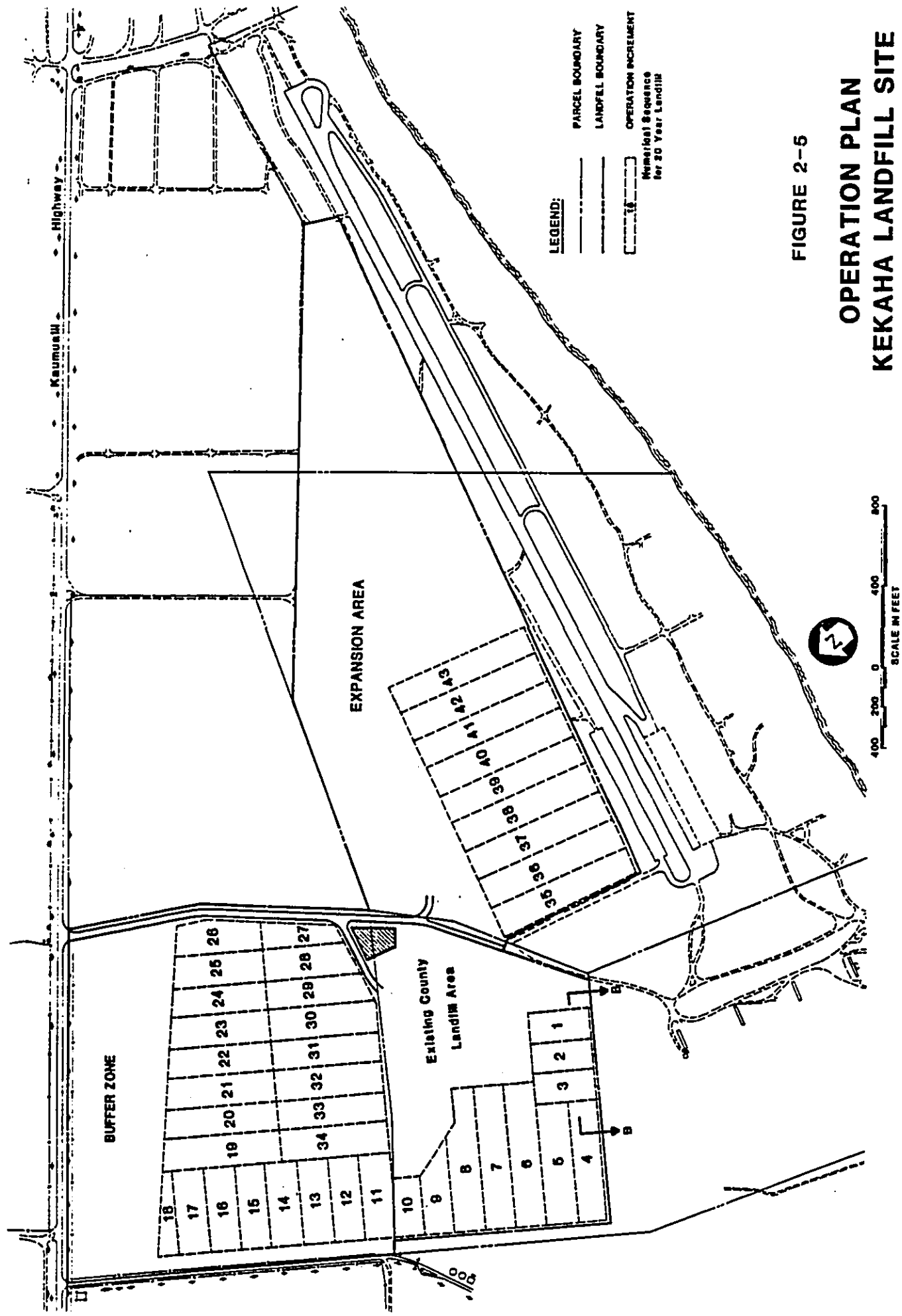
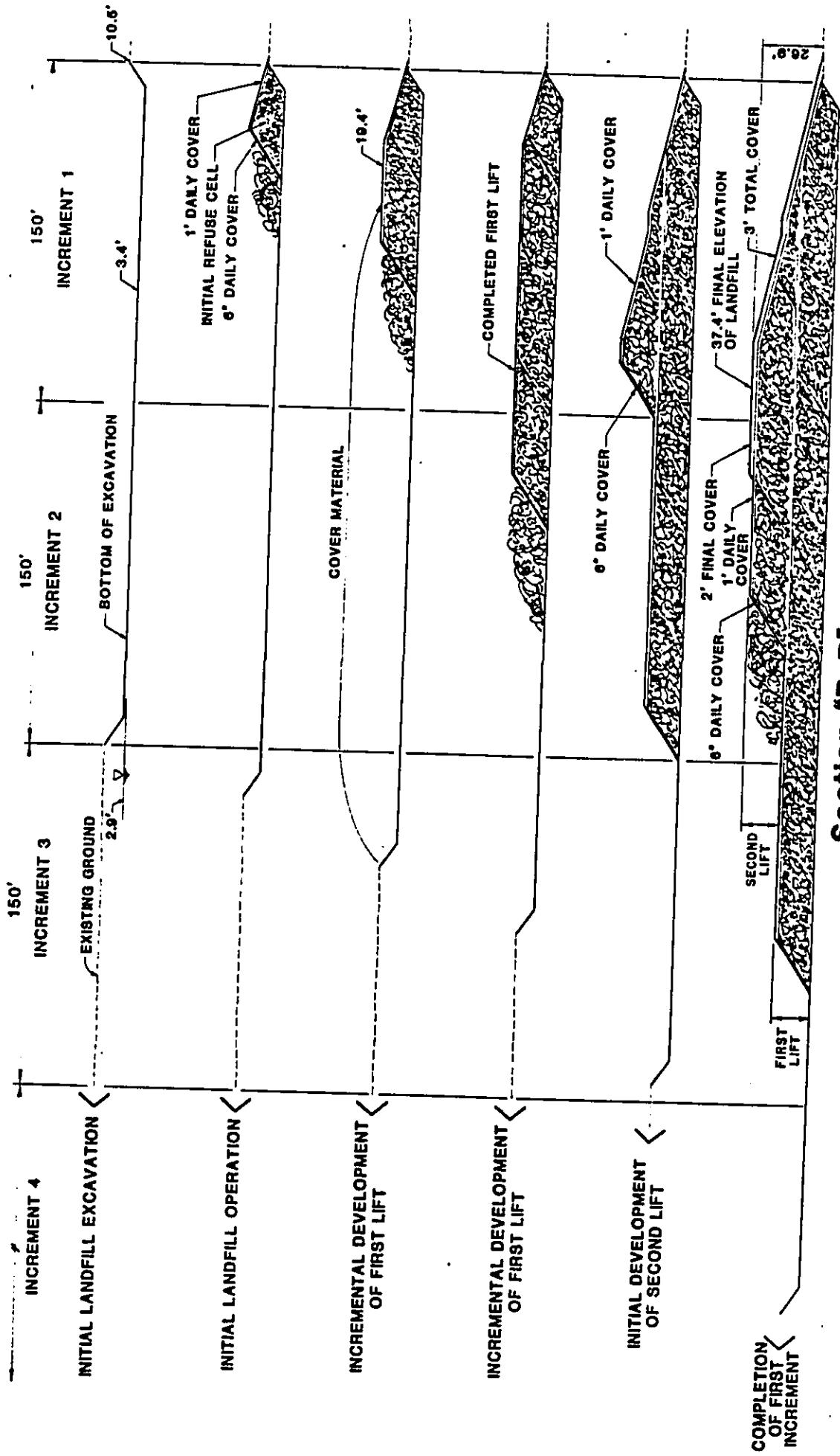


FIGURE 2-5

**OPERATION PLAN
KEKAHA LANDFILL SITE**



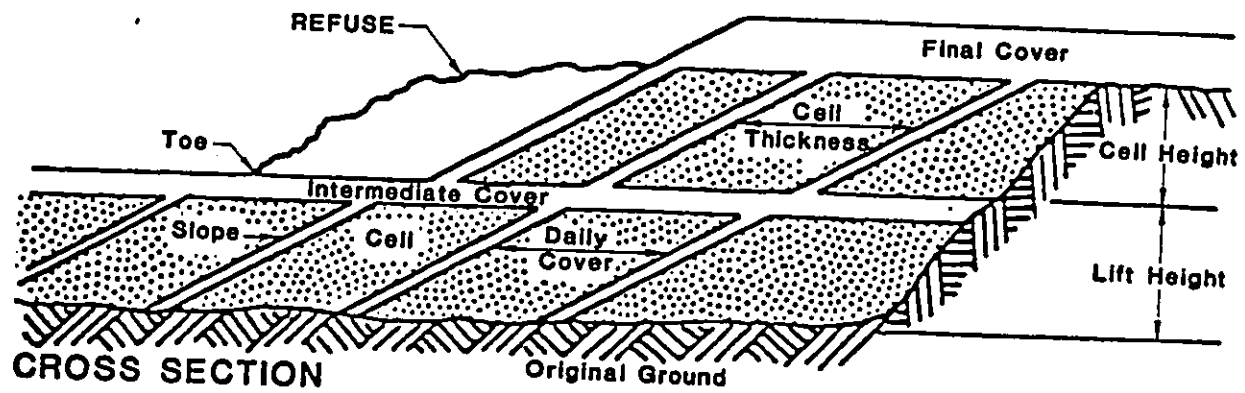
Section "B-B"

GRAPHIC SCALES IN FEET

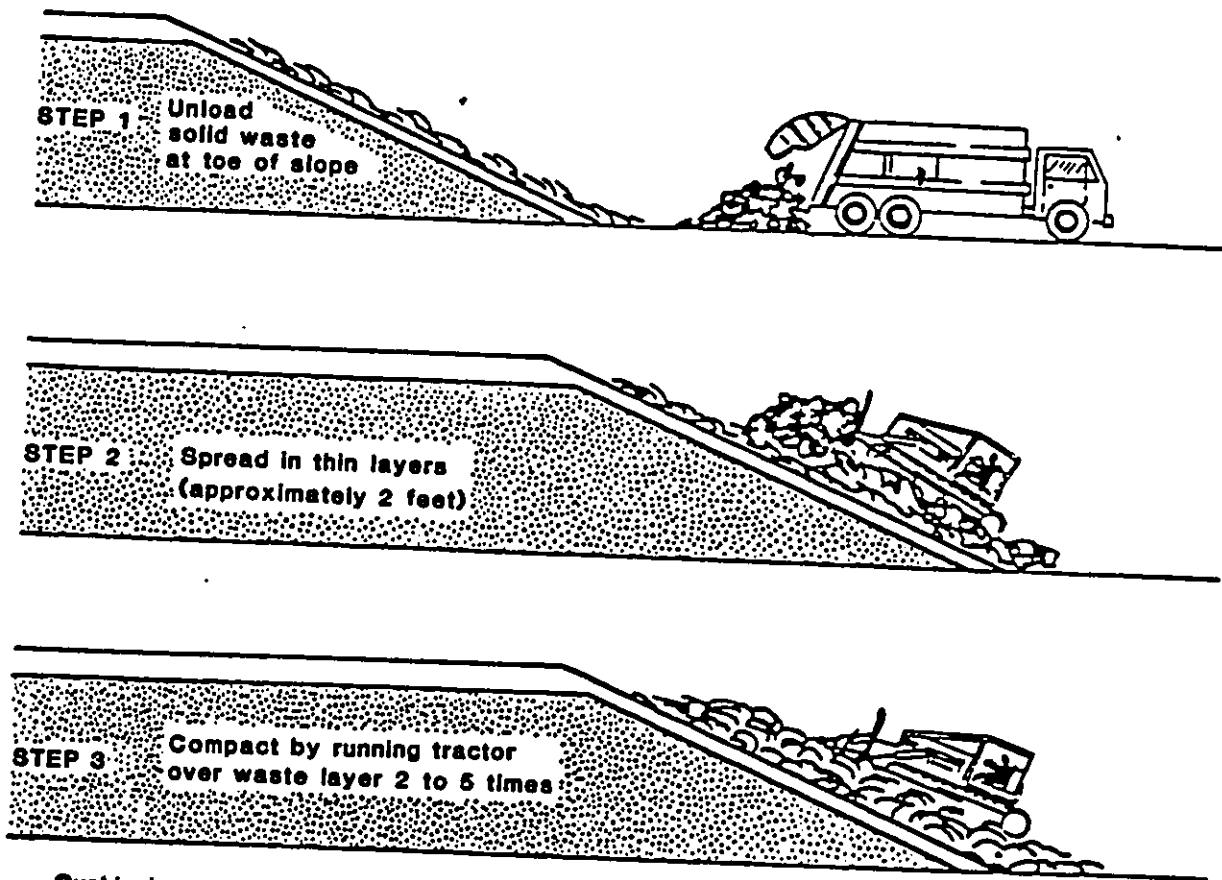


FIGURE 2-6

**LANDFILL INCREMENTAL DEVELOPMENT
KEKAHA LANDFILL SITE**



The cell is the common building block in sanitary landfilling. Solid waste is spread and compacted in layers within a confined area. At the end of each working day, or more frequently, it is covered completely with a thin, continuous layer of soil, which is then also compacted. The compacted waste and soil constitute a cell. A series of adjoining cells makes up a lift. The completed fill consists of one or more lifts.



Cushioning and bridging can be reduced and greater volume reduction achieved if the waste is spread in layers less than 2 ft. deep and is then compacted by a tracked, rubber-tired, or steel-wheeled vehicle that passes over it 2 to 5 times. The equipment operator should try to develop the working face on a slope between 20 and 30 degrees.

SOURCE: Sanitary Landfill Design and Operation, EPA, 1970

FIGURE 2-7
CELL CONSTRUCTION

excavation using the area method of spreading onto the excavation bottom. The refuse is then shaped by a bulldozer into a cell height of 15 feet. The bulldozer will spread the refuse in 2-foot layers up a slope of 1 vertical to 1.5 horizontal. The bulldozer tracks will compact the refuse to an approximate density of 1,000 pounds per cubic yard. The working face of the landfill will be kept relatively narrow (50 feet or less) for reduced litter and a better ratio of refuse to cover material. The cell length should approximate the cell width for the most efficient use of the cover material. The cover material would be brought to the working face by bulldozer or scraper from the excavation operation for the next increment. Daily cover is planned. This would consist of a six-inch layer of material over the working face and a one-foot layer on top of the cell. Cells are developed along the length of the increment and then parallel to each other in three adjacent rows to complete the first layer or lift of the increment. Upon completion of two increments to the level of the first lift, the second lift of cells with identical cover material will be placed on top of the first lift of the first increment. A final top of two feet of cover material will be placed on top of the daily cover for a total of three feet which is thick enough to support either the proposed landscape vegetation of morning glory vines or, with the addition of topsoil, the growing of seed crops as presently practiced in the area. This sequence of landfill operation by increments is then continued in an orderly progression around the landfill site as shown by the numerical sequence of the increment layout on Figure 2-5.

The landfill operation will be conducted seven days a week with an eight-hour shift each day. Although the main landfill input will be from the County's tractor-trailers hauling from the transfer stations, private refuse haulers and privately owned vehicles will be permitted access for dumping refuse at the working face. No large trees or demolition material will be permitted in the landfill. They will be diverted to other sites for disposal as directed by the County. Incoming trucks will be weighed at the scales to aid in the record keeping for the landfill.

The County work force of equipment and personnel can accomplish all of the landfill operation and maintenance tasks without outside Contractor support. The equipment will include two bulldozers and one 14 CY self-propelled scraper for earth-moving operations. Two equipment operators and a landfill supervisor will operate the landfill. The existing landfill area near the planned maintenance area will act as an interim stockpile to receive excess excavated material and to supply added cover material as required. The landfill earth moving operations will be minimized, however, by moving cover material directly from adjacent increments as required rather than from a central stockpile. Ramps for temporary access roads to and from the working faces on the different lift levels can be readily developed for each increment. Temporary litter fences can be moved with the progressive working face as required.

2.3.4 Off-Site System Development

The County presently owns four refuse packer trucks for neighborhood refuse collection, two truck-tractors, five refuse trailers and two refuse transfer stations for its refuse collection system. It is planning to develop two new transfer stations at Koloa and Hanalei in 1983.

The proposed Kekaha Landfill system will require an additional refuse transfer station in Lihue to complement the existing transfer stations in Kapaa and Hanapepe and the two planned for Koloa and Hanalei. The packer trucks will deposit the collected refuse at the nearest transfer station and the tractor-trailers will bring the refuse to the Kekaha Landfill. Due to the increased transport distance, two additional truck-tractors and three refuse trailers will have to be purchased to keep a trailer at each station and three on the road, with one truck-tractor in reserve.

As part of the landfill system analysis, cost projections over the 20-year period have been prepared for the integration of an expanded solid waste transportation system with the proposed landfill expansion. These projections were based on County Department of Public Works' estimates for salaries, tools and supplies for the current fiscal year. These costs were then escalated in accordance with the percentages used in the 6-year

operating program prepared for the Solid Waste and Disposal Section, DPW. County off-site landfill operations are assumed to run 7 days a week and 8 hours a day. Equipment replacement costs were estimated using a 100,000-mile life for collection trucks and a 300,000-mile life for transfer vehicles (truck-tractors and refuse trailers).

Mileage calculations were developed for movement of generated refuse from the refuse transfer stations at Hanalei, Kapaa, Lihue, Koloa and Hanapepe. Generated refuse tonnages for each transfer station were developed from the projected populations (resident and tourist) for each area. Mileage calculations were translated into projected truck-tractor and refuse trailer transportation costs, repair and maintenance costs, and purchase costs for new and replacement equipment.

2.3.5 Kekaha Landfill System Implementation Plan

Table 2-2 presents the implementation plan for the 20-year period of landfill operation between 1984 and 2003. The initial 1983 excavation and stockpiling in preparation for the landfill operation in 1984 would be by County landfill personnel. The 1984 landfill operation can continue as an expansion of the present landfill operation while on-site development of the access road, utilities, operations building and scales is underway.

Table 2-2 also indicates the progressive landfilling of the increasing tonnages of refuse over the minimum 20-year period 1984-2003. The landfill increments completed to closure with two feet of final cover are listed by numerical sequence numbers, as indicated on Figure 2-5. The estimated annual costs are shown in 1984 dollars. The actual annual costs will, of course, depend upon tasks completed for specific years and the prevailing construction cost escalation or index for that year. On-site development costs are for those initial tasks required at the landfill to prepare the site for the expanded operations. The on-site operation and maintenance costs are those annual costs for labor and equipment at the site, including periodic replacement of the bulldozers and scraper. The off-site operation and maintenance (O&M) costs include the annual costs for both the operation

TABLE 2-2
IMPLEMENTATION PLAN - TWENTY YEARS
KEKAHA LANDFILL SYSTEM

Year	Refuse Tonnage Landfilled	Landfill Increment Completed	ANNUAL COSTS (1984 \$)			Total	Key Events
			On-Site Develop.	On-Site O&M	Off-Site O&M		
1983			63,000			63,000	Prepare new topo map. Soils investigation Engineering Design CDUA, SMA Permits Clear, grub, excavate and stockpile increments 1 and 2.
1984	53,690	1,2	301,000	165,081	610,895	1,076,976	Initiate landfill development (access road, utilities, opera- tions building, scales, etc.) Initiate landfill operation. Purchase 2 truck-tractors and 3 trailers. Construct Lihue transfer station.
1985	55,844	3,4		166,914	330,857	497,771	
1986	58,026	5		153,673	334,475	488,148	
1987	60,207	6		156,597	335,017	491,614	
1988	62,389	7,8		169,779	340,937	510,716	Obtain approx. 63 acres for landfill from DLNR by Executive Order.
1989	64,570	9,10		637,314	342,127	979,441	Replace 2 bulldozers.
1990	66,752	11,12		166,468	677,812	844,280	Replace 4 truck-tractors.
1991	69,273	13,14		167,636	508,149	675,785	Purchase 1 truck-tractor and 1 trailer.
1992	71,794	15,16		167,905	389,745	557,650	
1993	74,314	17,18		167,364	393,191	560,555	
1994	76,835	19,20		852,043	397,397	1,249,440	Replace 2 bulldozers and 1 self-propelled scraper.
1995	79,356	21,22		175,482	711,050	886,532	Replace 8 trailers.
1996	83,457	23,24		174,533	407,216	581,749	
1997	87,557	25-27		187,836	939,157	1,126,993	Purchase 1 truck-tractor and 1 trailer. Replace 5 truck- tractors.
1998	91,658	28,29		180,606	458,363	638,969	
1999	95,759	30,31		659,592	463,130	1,122,722	Replace 2 bulldozers.
2000	99,860	32-34		204,550	470,181	674,731	Obtain approx. 72 acres for landfill from DLNR by Executive Order.

TABLE 2-2 (CONTINUED)
 IMPLEMENTATION PLAN - TWENTY YEARS
 KEKAHA LANDFILL SYSTEM

Year	Refuse Tonnage Landfilled	Landfill Increment Completed	ANNUAL COSTS (1984 \$)			Total	Key Events
			On-Site Develop.	On-Site O&M	Off-Site O&M		
2001	103,894	35,36		198,632	559,851	758,483	Replace 1 trailer.
2002	107,927	37,38		200,496	643,260	843,756	Purchase 1 truck-tractor and 1 trailer.
2003	111,961	39-42		230,523	774,356	1,004,879	Replace 6 truck-tractors.
<u>TOTALS</u>							
20 Yrs	1,575,123	42*	364,000	5,183,024	10,087,166	15,571,190	

*Increment 43 would be excavated.

of the refuse transfer stations and the operation, maintenance, and replacement of the truck-tractors and refuse trailers.

The planned incremental development of the landfill will require obtaining the land required for expansion in two increments. In 1988, the first landfill expansion increment of 63 acres of pasture land now leased to Kekaha Sugar Company will be required by the County. In the year 2000, approximately 72 additional acres will be required for expansion. This second expansion increment will require land now leased to the Northrup King Company (Pride Seed Division) and the Kekaha Sugar Company for seed crops. It will be possible at that time for seed crop cultivation to be transferred to the top of the acreage already landfilled.

SECTION 3
DESCRIPTION OF THE ENVIRONMENTAL SETTING

3.1 GENERAL SITE DESCRIPTION

The Kekaha sanitary landfill expansion project is located in the coastal sector of the Mana Plain, approximately 1.3 miles northwest from the town of Kekaha. The relatively low, flat site lies between the main coastal highway and the shoreline. The 160-acre site includes the existing 35.7-acre County landfill. The vicinity map (Figure 2-2) indicates the landfill site, bounded by the Kekaha Military Reservation, lands leased from the State by the Kekaha Sugar and Northrup King Companies, the Hawaii National Guard Rifle Range and State lands retained under State DLNR control. The site has many advantages: remoteness from populated areas, a dry climate, proximity to the main island highway, available cover material on-site, the existing County landfill, adequate buffer areas on all sides and the required expansion areas under control of a government agency, the State Department of Land and Natural Resources.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Geology

The Hawaiian Archipelago is a chain of seamounts, atolls and islands lying mid-Pacific on the northern edge of the Tropic of Cancer. Spanning the Pacific Ocean, it is 1,500 miles from Kure Atoll at the northwestern end to the Island of Hawaii in the southeast. Geologically, Hawaii is the largest and youngest island and is still in its growing stage. Elevations among these exposed mountain summits vary from a few feet above sea level to 13,800 feet. The lower elevations are found primarily among the older northwestern islands. There are eight major islands which lie in the southern end of the archipelago. Of these, Kauai is the oldest and northernmost.

Kauai is the remnant of a huge shield volcano that began its volcanic activity in the early or middle Pliocene epoch of the Tertiary period. The island grew rapidly and possibly by the end of the Pliocene growth was

complete. Its original shape has been greatly altered through time by the forces of erosion, faulting, collapse and weathering. Despite the weathering process, Kauai's shield volcano is still the dominant feature. Known as Mt. Waialeale, its highest peaks are Kawaikini and Waialeale which respectively rise 5,243 feet and 5,148 feet above sea level.

The proposed project is located on the Mana Plain on the southwest coast of Kauai below an ancient sea cliff. The plain was formed by marine erosion when the sea was at a higher level than today. The land rising sharply above the plain is a former sea cliff that cuts into the Kauai volcanic shield.

The plain is composed of the deposition of alluvium washed down from the dissected uplands of Puu Ka Pele, calcareous and earthy lagoon deposits and calcareous beach and dune sands. The greater part of the inland area below the sea cliff is mostly younger noncalcareous sediments. Towards the coast the composition of the plain changes to older noncalcareous sediments. On the coastal edge are modern beaches of calcareous sediments while deposits of sand blown inland from the coastal beaches are found along the northern side of the plain.

3.2.2 Soils

The soil types on the Mana Plain are primarily Mollisols and Entisols. Mollisols are characteristically well drained, relatively young soils that have developed on coral, lava or alluvium. They may be found in moderately dry areas and are generally rich in nutrients. Entisols are weakly developed soils found on old beach sand and on recent alluvial deposits.

The General Soil Map of Kauai delineates two soil associations on the Mana Plain. The soil along the coast belongs to the Jaucas-Mokuleia association which are "deep, nearly level to moderately sloping, excessively drained and well-drained soils that have coarse-textured underlying material." This coincides with the Entisols.

The soil found at the project site belongs to the Jaucas series of the Jaucas-Mokuleia soil association and is known as Jaucas loamy fine sand, 0 to 8 percent slopes. It is characteristically found on old beaches and on windblown sand deposits. Uses that are associated with this soil type are pasture, recreational areas, wildlife habitat, sugarcane and alfalfa. Because of its low capacity to hold water, it is not suitable for crop farming unless it is well irrigated.

The Department of Agriculture, State of Hawaii, has developed a system of classification based on the quality of soil, the growing season and moisture supply required by crops to produce sustained yields of crops economically. Under this program, Agricultural Lands of Importance to the State of Hawaii (ALISH), there are three categories of agricultural lands. These are listed below:

Prime Agricultural Land	Land which has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods.
-------------------------	--

Unique Agricultural Land	Land that has the special combination of soil quality, location, growing season, moisture supply, and is used to produce sustained high quality and or high yields of a specific crop when treated and managed according to modern farming methods.
--------------------------	---

Other Important Agricultural Land	Land other than Prime or Unique Agricultural Land that is also of State-wide or local importance for agricultural use.
-----------------------------------	--

Approximately 63 acres of the landfill expansion project adjacent to the highway and mauka of the existing landfill falls under the category of "Other Important Agricultural Land."

3.2.3 Climate

The Hawaiian Islands are particularly favored with a mild and uniform climate. This circumstance results from a combination of various geographical and meteorological factors. These factors include latitudinal location, the surrounding ocean, Hawaii's location in relation to storm tracks and the Pacific anticyclone, and terrain. Outstanding features of Hawaii's climate include mild and equable temperatures year round, moderate humidities, the persistence of northeasterly trade winds, remarkable differences in rainfall within short distances and the infrequency of severe storms.

There are essentially two seasons in Hawaii, summer and winter. The summer months are from May to October when temperatures range from 70°F to 88°F and the weather is warm and dry. Northeasterly trade winds are also present most of the time. Winter in Hawaii is from November to April. The weather is cooler and temperatures range from 60°F to 83°F. Elevation also affects the temperature. An increase of every 1,000 feet realizes a decrease in temperature of 4°F. The maximum temperature rarely exceeds 90°F and the minimum hovers around 50°F.

Kauai's climate is characteristic of that of the rest of the Hawaiian Islands. It is mild and varies according to elevation and location with respect of the mountainous terrain rather than diurnally or seasonally. The average annual temperature ranges from 70°F to 78°F along the coast. The temperatures on the Mana Coastal Plain are generally mild throughout the year. The average temperature during the winter months is 70°F. During the summer months the average is 78°F.

Rainfall is greatest in the mountainous interior and Mt. Waialeale, which receives an average annual rainfall of 486 inches per year, is known as one of the wettest spots in the world. Hawaii is known for its disparity of rainfall in relatively short distances. Kauai is an excellent example of this phenomenon. As mentioned, Mt. Waialeale has an annual rainfall average of 486 inches per year. However, the town of Mana which is only 21 miles west of Mt. Waialeale receives an average annual rainfall of 21 inches per year. Figure 3-1 illustrates the median annual rainfall for the island.

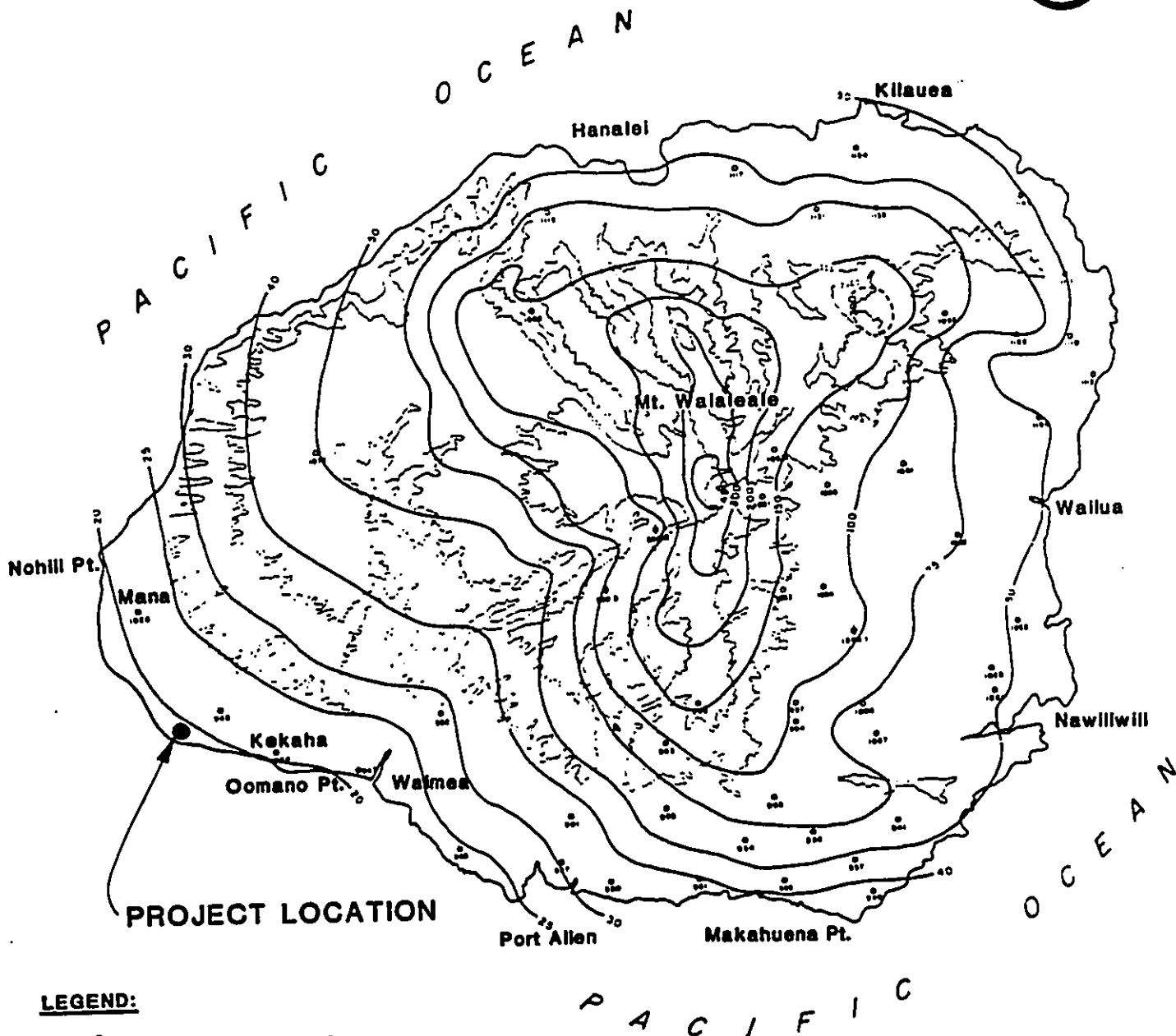
The prevailing winds on Kauai, as with the rest of the Hawaiian Islands, are the northeasterly trades which are present for much of the year. During the summer the trades are persistent for approximately 90 percent of the time. When winter comes, Kona conditions or southerly winds become more frequent and interrupt the trades which are present for only 50 percent of the time. Figure 3-2 illustrates the wind rose for the Barking Sands area, approximately 5 miles northwest of the project site and with similar wind conditions.

Trade winds in the Waimea-Kekaha area follow several paths. These paths flow from the mountains, or come around Mt. Waialeale through Hanapepe, or from around the Na Pali Coast which then turns inland as the coastal plain is reached. During trade wind weather, diurnal wind patterns occur. These patterns bring cooling breezes from the sea to replace the warmer air generated during the day over the coastal area. Kona or cyclonic storms generate strong southerly winds during the winter months. These conditions are often responsible for severe storms which occasionally visit the islands.






3.2.4 Air Quality

Hawaii's trade winds are responsible for the generally good air quality that the islands experience. For the greater part of the year, Hawaii's

NOTES: Isohyets based on values from 80 gages for period 1933-1957.



LEGEND:

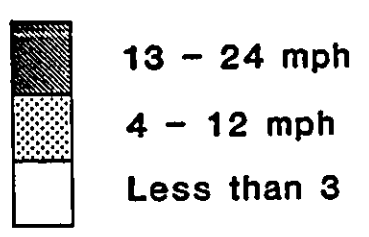
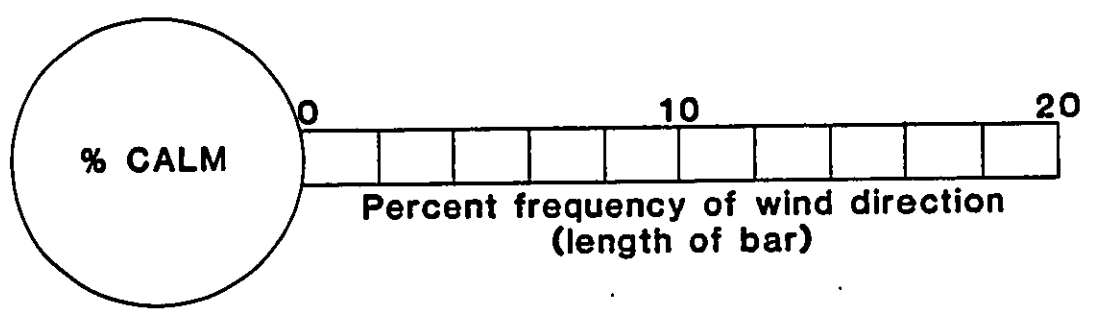
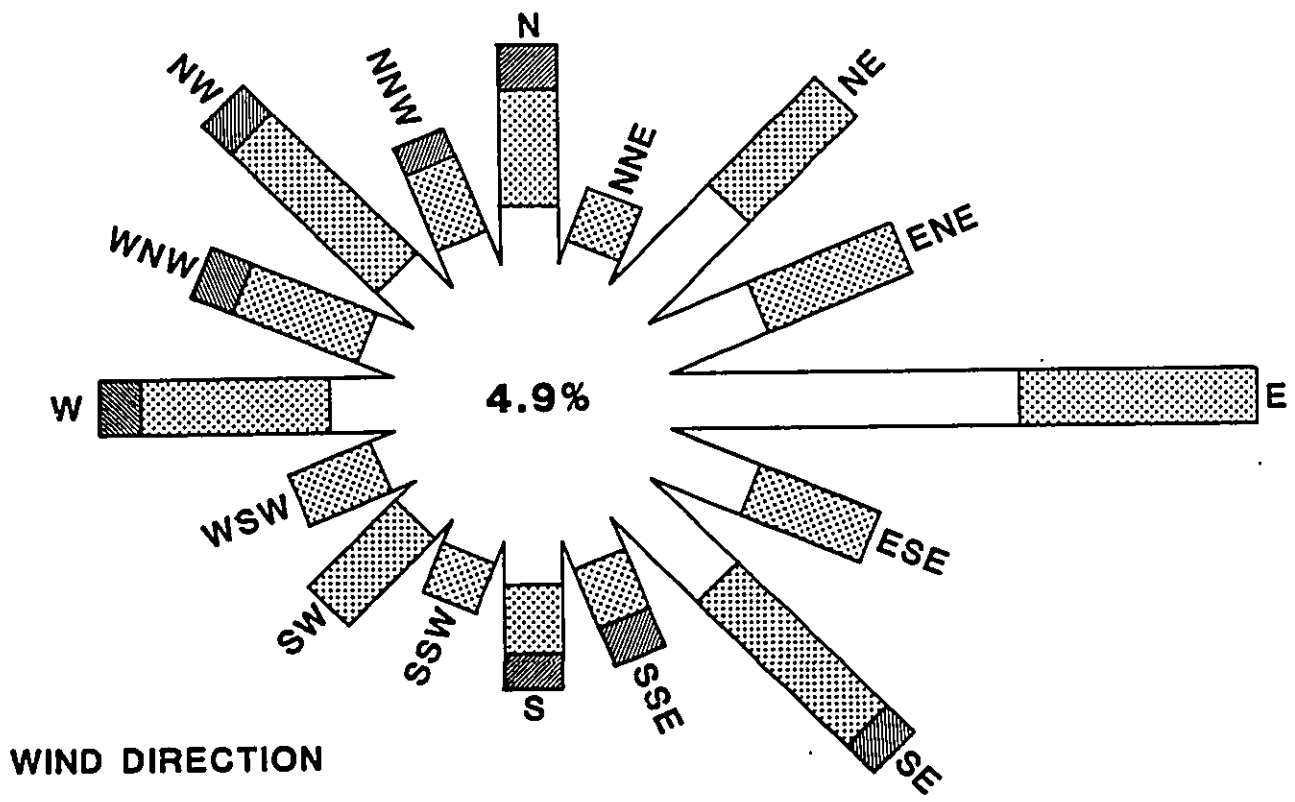
-  Active Rain Gage
-  Discontinued Rain Gage
-  Contour Line
-  Isohyetal Line
-  Estimated Isohyetal Line

SOURCE: Solid Waste Management Plan, County of Kauai



FIGURE 3-1

**MEDIAN ANNUAL RAINFALL
Island of Kauai**



SOURCE: National Weather Service, Pacific Region

FIGURE 3-2
WIND ROSE
Barking Sands, Kauai

trades blow pollutants generated on land out to sea. Localized problems may occur during periods of Kona weather or in areas of intense industry or vehicular traffic.

The air quality of Kauai is considered excellent and is a reflection of the agricultural and tourist orientation of the island. There is little heavy industry on Kauai and it is related to the major agricultural crop, sugarcane, in the form of sugarcane milling. Kauai has four operating sugar mills, which, with the Kauai Electric Company's generating plant at Eleele, are the only major sources of stack emissions.

Lihue is the site of a State DOH air quality monitoring station which measures for particulates and sulfur dioxide. It is located in the commercial area and monitoring results for the years 1973 to 1981 show Kauai to have a high ambient air quality well within State and Federal air quality standards.

Significant sources of pollution other than the sugarcane mills and Kauai Electric include motor vehicle emissions, agricultural burning and fugitive dust from construction and sugarcane cultivation. The most noticeable impact results from motor vehicle emissions.

The Mana Plain experiences the same high ambient air quality as the rest of Kauai. The Pacific Missile Range at Barking Sands and the Kekaha sugar mill are the major sources of air pollutants for this area. However, the excellent circulation caused by the trade wind patterns in the area aid in the dispersal of these pollutants out to sea.

3.2.5 Water Quality

The Department of Health of the State of Hawaii has imposed stringent standards on all inland and coastal waters for the islands. These standards were established to protect their use and value for public water

supplies, propagation of fish and wildlife, and recreational purposes. In addition to a "Basic Water Quality Criteria Applicable to All Waters" each class of water is given a specific criteria to be observed. Kauai is surrounded by water and has many perennial streams. According to the Water Quality Standards Chapter 37A of the Public Health Regulations, Department of Health, State of Hawaii, all inland and coastal waters are classified under given sections. There are no streams within or near the project area. Coastal waters around Kauai are classified as "open coastal waters," Class A or Class AA. The waters around the Mana Plain have been classified as Class A. The specific criteria for this classification are given on Table 3-1.

There are no drinking water wells in the area that would be affected by proximity to the landfill.

3.2.6 Hydrology

The Mana Plain is a flat geomorphological feature on the southwestern corner of Kauai. It has been formed by the accumulation of sedimentary deposits on the remnants of early Na Pali lava flows. The cliffs which rise behind the plain are ancient sea cliffs which were cut by marine erosion when the sea level was at a higher stand than it is now. After the sea level dropped, the plain gradually grew as alluvium washed down from the uplands and combined with calcareous and earthy lagoon deposits and calcareous beach and dune sand. This has resulted in a relatively thick sedimentary layer.

The sedimentary deposits have been found to consist of clays, sand, gravel, boulders and corals as revealed through well records. The sediments are generally less permeable than the underlying Na Pali lava formation and form a caprock that causes relatively high heads on basal water. There are areas in the caprock of sand, gravel or coral which have relatively higher permeability and this results in leakage from the basal aquifer. This

TABLE 3-1

SPECIFIC CRITERIA FOR OPEN COASTAL WATERS
(Note that criteria for open coastal waters differ based
on fresh water discharge.)

Parameter	Geometric Mean Not to Exceed the Given Value	Not to Exceed the Given Value More Than 10% of the Time	Not to Exceed the Given Value
Total Kjeldahl Nitrogen (ug N/l)	150.00* 110.00**	250.00* 180.00**	350.00* 250.00**
Ammonia Nitrogen (ug NH ₄ - N/l)	3.50* 2.00**	8.50* 5.00**	15.00* 9.00**
Nitrate + Nitrite Nitrogen (ug [NO ₃ + NO ₂] - N/l)	5.00* 3.50**	14.00* 10.00**	25.00* 20.00**
Orthophosphate Phos- phorus (ug PO ₄ - P/l)	7.00* 5.00**	12.00* 9.00**	17.00* 13.00**
Total Phosphorus (ug P/l)	20.00* 16.00**	40.00* 30.00**	60.00* 45.00**
Light Extinction Coefficient (k units)	0.20* 0.10**	0.50* 0.30**	0.85* 0.55**
Chlorophyll a (ug/l)	0.30* 0.15**	0.90* 0.50**	1.75* 1.00**
Turbidity (Nephelometric Turbidity Units)	0.50* 0.20**	1.25* 0.50**	2.00* 1.00**
Non-Filtrable Residue (ug/l)	20,000.00* 10,000.00**	30,000.00* 15,000.00**	40,000.00* 20,000.00**

*"Wet" criteria apply when the open coastal waters receive more than three million gallons per day of fresh water discharge per shoreline mile.

**"Dry" criteria apply when the open coastal waters receive less than three million gallons per day of fresh water discharge per shoreline mile.

Applicable to both "wet" and "dry" conditions:

pH Units shall not deviate more than 0.5 units from a value of 8.1.

Dissolved Oxygen - Not less than 75% saturation.

Temperature - shall not vary more than 1°C from ambient conditions.

Salinity (ppm) - Shall not vary more than 10% from natural or seasonal changes considering hydrologic input and oceanographic factors.

leakage was probably responsible for the marshy areas that originally existed before the draining and conversion of the plain into sugarcane fields.

There are a number of wells and shafts that have been sunk to utilize the basal groundwater of the Mana Plain. Wells were probably first drilled in the early 1880's. Between then and about 1906, approximately 50 or more wells were drilled throughout the plain for the irrigation of rice and sugarcane. There are now 52 numbered wells on the plain. A few of the first wells were abandoned and are now lost. Even the locations of some of the numbered wells are uncertain. Shaft 11 was the first shaft and basal tunnel constructed. This shaft was drilled in 1931 at the base of the ancient sea cliff near Kekaha. After 1931, six more shafts were installed along the inland edge of the plain until 1957. Water from these shafts are used for domestic and agricultural use. Shaft type wells are advantageous in that they can tap basal water as high as possible above the transition zone. These wells normally produce water of a better and more uniform quality than deep drilled wells.

Mana Plain has no deep well defined streams. The discharges from streams of the numerous valleys on the inland edge of the plain feed into the irrigation system for the sugar plantation.

In September of 1982, the Department of Public Works of the County of Kauai monitored the water level at the proposed landfill site at Kekaha. At all three test pits the surface layer was composed of approximately 2-1/2 feet of loose sand. Below the surface layer is a layer of hard, compacted sand extending down to the water table. Readings were taken at various times of the day with respect to tidal conditions. The results from the three days of monitoring indicate that the groundwater below the proposed landfill site is not affected by tidal conditions.

3.2.7 Flooding and Tsunami

The Flood Boundary and Floodway Map (Figure 3-3) of the County of Kauai published by the Federal Emergency Management Agency of the Federal Insurance Administration shows the relationship of the project site to the 100-year Flood Boundary and the Coastal High Hazard Area (tsunami hazard). The coastline is considered a "Coastal High Hazard Area" for approximately 200 feet inland. The project site itself although bounded by flood zones on the coastal and inland sides is not itself an area of flooding. Any flooding immediately adjacent to the project site would not include any wave action.

3.3 BIOLOGICAL ENVIRONMENT

Prior to its present use as sugarcane fields, missile range, etc., Mana Plain was once a swamp. Subsequent to its conversion to cane land much of it has been altered beyond the original landscape. The result has been the elimination of native species on the plain. A survey of the flora and fauna of the proposed Kekaha Landfill site was performed on August 6, 1982 by the Kauai Office of the Division of Forestry and Wildlife, Department of Land and Natural Resources, State of Hawaii. The results of that survey are discussed below.

3.3.1 Flora

The survey of the proposed site reflects the highly altered state of the land. The existing vegetation is comprised of exotic species introduced by man and his activities. The DLNR survey (Appendix A) identified the prominent plant species at the proposed landfill site (Table 3-2). It does not constitute a botanically complete list but the survey report states that "it is highly unlikely that any uncommon or rare native plants exist within the landfill sites." As the list of common plants indicates, the flora at the proposed landfill site consist of mostly weeds and shrubs. Some shade is provided by kiawe trees.

Seed crops are in cultivation on the proposed southeastern extension of the existing landfill (in areas "E" and "A" on Figure 2-2). The Pride Division

TABLE 3-2

LIST OF COMMON PLANTS AT THE PROPOSED
KEKAHA SANITARY LANDFILL SITE

Scientific Name	Common Name	Type
<i>Acacia farnesiana</i>	Klu (Kolu, Aroma, Popinac)	Shrub
<i>Amaranthus</i> spp.	Amaranth	Weed
<i>Cenchrus echinatus</i>	Sandbur (Burgrass, 'Ume 'Alu, Mau'u-kuku)	Weed
<i>Cynodon dactylon</i>	Bermuda Grass (Manienie)	Grass
<i>Dactyloctenium aegyptium</i>	Beach Wiregrass (Egyptian Grass)	Grass
<i>Lantana camara</i>	Lantana (Lakana, Mikinolia-Hihi)	Shrub
<i>Leucaena glauca</i>	Haole Koa (Koa-Haole, Ekoa, False Koa, Lead Tree, Wild Tamarind, Aroma Blanca)	Shrub, Small Tree
<i>Pluchea indica</i>	Indian fleabane (Indian pluchea)	Shrub
<i>Prosopis pallida</i>	Kiawe (Algaroba, Mesquite)	Tree
<i>Verbesina encelioides</i>	Verbesina (Golden Crown-Beard)	Weed
<i>Xanthium strumarium</i>	Cocklebur (Kikania)	Weed

of the Northrup King Company grows several crops of seed corn per year in area "E." The Kekaha Sugar Company grows seed sugarcane in area "A₂." (See Figure 2-2.)

3.3.2 Fauna

Both the avifauna and the ground fauna at the project site are results of the intervention of man in the natural ecosystem. Among the many birds that were sighted or are likely to exist at the proposed landfill site only three are indigenous species. The remainder are various exotic species, intentionally or accidentally released by man. No known endangered avifauna are known to use the proposed landfill site as a habitat.

Land mammals likely to exist at the site are the common species of cats, mice and rats. The majority of known mammals likely to inhabit the proposed site are rodents. The survey report states that use of the proposed site "would not cause significant wildlife habitat degradation." Table 3-3 lists the wildlife known to or thought to commonly inhabit the area.

3.4 HUMAN ENVIRONMENT

The Waimea-Kekaha region is divided into five major subareas and encompasses almost one-fourth of the total island area. The subareas include the mountain lands, Waimea and Kekaha towns, and the coastal plain. The proposed expansion of the Kekaha sanitary landfill site is located on the coastal plain which includes the town of Kekaha, the plantation village of Mana, the Naval Housing Complex and the Pacific Missile Range Facility. Geographically the region is divided into two physically distinct areas. Encompassing most of the region are the mauka lands where elevations range from 200 feet to 4,000 feet, with terrain composed of sloping mountain plateaus, steep valleys and deep canyons. The second area is comprised of the lower elevations and the Mana Coastal Plain. The current socio-economic profile for the area indicates a relatively stable, agricultural region with small population centers in Kekaha, Mana Village and the Naval Housing Complex.

TABLE 3-3

WILDLIFE KNOWN TO EXIST OR LIKELY TO EXIST AT THE
KEKAHA SANITARY LANDFILL SITE

Scientific Name	Common Name	
<u>Avifauna</u>		
Acridotheres tristis	Common Mynah	EX*
Asio flammeus sandwichensis	Hawaiian Owl (Pueo)	I
Bubulcus ibis	Cattle Egret	EX*
Cardinalis cardinalis	Northern Cardinal	EX*
Carpodacus mexicanus	House Finch	EX*
Copsychus malabaricus	Shama	
Francolinus francolinus	Black Francolin	EX
Garrulax canorus	Hwa-Mei (Chinese Thrush)	
Geopelia striata	Barred Dove	EX*
Lonchura punctulata	Spotted Munia	EX
Mimus polyglottos	Mockingbird	EX
Nycticorax nycticorax hoactli	Black-Crowned Night Heron ('Auku'u)	I
Passer domesticus	House Sparrow	EX
Phasianus colchicus	Ring-Necked Pheasant	EX
Pluvialis dominica	Golden Plover (Kolea)	I
Streptopelia chinensis	Spotted Dove	EX*
Sturnella neglecta	Western Meadowlark	EX
Tyto alba	Barn Owl	EX
Zosterops japonicus	Japanese White-Eye (Mejiro)	
<u>Fauna</u>		
Felis catus	House cat (feral)	EX
Mus musculus	House Mouse	EX
Rattus exulans	Polynesian Rat	EX
Rattus norvegicus	Norway Rat	EX
Rattus rattus	Roof Rat	EX

I = Indigenous
 EX = Exotic
 * = Actually observed during survey. All other species listed are likely to exist, but were not seen.

3.4.1 Population

The 1980 census conducted by the U. S. Bureau of the Census reported the State's resident population to be 965,000. This includes approximately 125,000 military personnel and their dependents. Also included were about 10,000 residents that were temporarily out of the State. The census data showed that four-fifths of the de facto population claimed Oahu as their island of residence.

Hawaii's population is characterized as being racially diverse and young. The median age in the State at the time of the census was 28.4 years making Hawaii the eleventh youngest State in the Union. The racial mixture of the State is composed of Caucasians, Asians, Hawaiians, various other Pacific Islanders and others. There is no single major ethnic group in the State.

Table 3-4 shows the resident population for the State and the breakdown by Counties. The County of Kauai shows a 31.3 percent increase in its total resident population from 1970 to 1980 with a 1980 census population of 39,082. During the 1970's the growth rate of the neighbor islands exceeded that of Oahu as they emerged from a 30-year decline in population. Of all the neighbor islands, Kauai was the third fastest growing followed by Oahu. Population projections (Table 3-5) estimate a large increase of the total population of residents plus visitors over the next several decades.

The proposed sanitary landfill project is located in census tract 409 also known as the Kekaha-Waimea census tract. The population for this area at the time of the 1980 census showed a population figure of 5,256. This figure is a 26.4 percent increase over the 1970 census figure of 4,159. Most of the population of the census tract is divided between the two towns of Waimea and Kekaha. The rest of the population is scattered throughout the census tract. The project site is relatively remote from the populated areas and there are no residences nearby.

TABLE 3-4

RESIDENT POPULATION, TOTAL AND CIVILIAN,
OF COUNTIES AND ISLANDS: 1970 AND 1980

(Excludes visitors present and includes residents temporarily absent.)

County and island	Total resident population <u>1/</u>			Civilian resident population <u>2/</u>	
	April 1, 1970	April 1, 1980 <u>3/</u>	Percent change	April 1, 1970	April 1, 1980 <u>3/</u>
State total	769,913	964,691	25.3	714,771	903,672
City and County of Honolulu	630,528	762,565	20.9	575,719	701,899
Oahu	630,497	762,534	20.9	575,719	701,893
Outlying islands <u>4/</u>	31	31	0	-	6
Other counties	139,385	202,126	45.0	139,052	201,773
Hawaii	63,468	92,053	45.0	63,328	91,891
Kauai	29,761	39,082	31.3	29,627	38,918
Kauai	29,524	38,856	31.6	29,390	38,692
Kaula and Lehua	-	-	...	-	-
Niihau	237	226	-4.6	237	226
Maui and Kalawao	46,156	70,991	53.8	46,097	70,964
Kahoolawe	-	-	...	-	-
Lanai	2,204	2,119	-3.9	2,204	2,119
Maui	38,691	62,823	62.4	38,632	62,796
Molokai	5,261	6,049	15.0	5,261	6,049
Kalawao	172	144	-16.3	172	144
Rest of Molokai	5,089	5,905	16.0	5,089	5,905

1/ Including military personnel and their dependents.2/ Excluding military personnel but including their dependents.3/ Revised.4/ The Northwestern Hawaiian Islands, from Nihoa to Kure Atoll but excluding Midway.Source: U.S. Bureau of the Census, 1980 Census of Population and Housing, PHC80-V-13 (March 1981) and correction note sent August 20, 1981; Hawaii State Department of Planning and Economic Development, Military Personnel and Dependents in Hawaii, April 1980 (Statistical Report 139, May 15, 1980), and records.

TABLE 3-5

POPULATION PROJECTION OF RESIDENTS PLUS VISITORS*
ISLAND OF KAUAI

District	Projected Population (Residents Plus Vistors)					
	1980	1985	1990	1995	2000	2005
Hanalei	3,271	4,812	6,292	7,802	10,445	12,676
Kawaihau	12,717	14,522	15,586	16,603	18,389	19,894
Lihue	9,585	10,921	12,218	13,609	16,043	18,098
Koloa	5,759	7,095	8,575	10,085	12,728	14,959
Waimea	13,296	13,884	14,384	14,884	15,824	16,584
TOTAL	44,628	51,234	57,055	62,983	73,429	82,211

*Based on initial 1980 U. S. Census results with growth factors for each District as developed by the Planning Department, County of Kauai.

3.4.2 Economy

3.4.2.1 The State

The mainstays for Hawaii's economy are tourism, Federal expenditures and agriculture. During past decades, agriculture was the primary contributor to the State's economy and the major economic crops were sugar and pineapple. They are still major sources of income but have dropped to third place. A combination of low sugar prices and increased production costs made 1981 a year of heavy losses for the sugar industry. The sugar industry in 1980 was exceptionally profitable realizing \$385 million. Estimated losses for 1981 totalled \$83 million which hastened the closing of sugar mills on the Island of Hawaii and added to the unemployment figure. Despite the decline of sugar's prominence, Hawaii's sugar still figures as a major contributor to the world's supply despite increased competition from foreign countries. The pineapple industry also experienced a decline in the sales for fresh and processed pineapple.

Today, tourism holds the lead in economic contributions to the State. However, current problems with inflation and higher air fares both in Hawaii and abroad affect the tourist industry in the State. In 1980, Hawaii experienced its first decline in yearly visitors since 1949. This represented a 1.0 percent drop over the previous year. The number of visitors arriving in 1980 remained essentially the same for 1981. Visitor expenditures, on the other hand, increased approximately 10 percent above 1980 figures.

The decline in State income from agriculture was offset by defense spending, as well as by tourist expenditures. Over the past decade military expenditures have unvaryingly increased. In 1971, defense expenditures amounted to \$708.8 million. In 1981 it totalled to some \$1,449.3 million. This represents an increase of over 50 percent in 10 years.

3.4.2.2 Kauai

Tourism on Kauai, like the rest of the State, has become the major source of income for the County. Agriculture, the second largest industry on the island, is dominated by the sugar industry. Both industries have followed

the recent State trend in decreased income. The tourism industry experienced a drop of about 6 percent from 1980 to 1981. This trend has been continuing since 1978 when tourism on Kauai reached a peak of 837,712. As for Kauai's sugar industry, in 1980 the value of the sugar crop amounted to \$83,600,000. One year later, the crop value was \$46,600,000. This represents a drop of 44 percent in revenues.

Defense and other Federal agencies are represented by a small population on the island. Major agencies of this nature are the Kokee Park Station of the National Aeronautics and Space Administration (NASA); BARSTUR, a Naval Tactical Underwater Range at Barking Sands; the Pacific Missile Range Facility serving the Navy, Air Force, Department of Defense, NASA and the Department of Energy; and an aircraft control and warning radar station at Kokee.

The Waimea-Kekaha region does not follow the general trend of the rest of the County, or for that matter, the State. The Federal government is the major employer for this area, with defense/scientific facilities in Mana and Kokee. Sugar is second and tourism is last. The major employers, defense and sugar, generate direct and indirect employment in the supporting services, construction, retail trade and local government.

According to the 1981 annual average job count for Kauai (Table 3-6), as published in the 1982 State of Hawaii Data Book, employment was highest in the non-agricultural industries. The government was the third largest employer on Kauai. This included all levels of Federal, State and County government. The Federal sector count includes branches of the military.

The major agricultural employment generated for the County was sugar, accounting for 1,400 jobs or 90 percent of the total 1,550 jobs for the agricultural industry. The remainder was involved in other agriculture related jobs, i.e., truck farming, etc. An additional 200 jobs are accounted for by the self-employed.

TABLE 3-6

JOB COUNT BY INDUSTRIES
ANNUAL AVERAGE, 1981
COUNTY OF KAUAI

Industry	Job Count
Non-Agriculture, Wage & Salary	15,520
Contract Construction	900
Manufacturing	1,300
Transportation, Communications, Utilities	1,600
Trade	3,800
Finance, Insurance, Real Estate	950
Services and Miscellaneous	3,900
Government	2,750
Agriculture, Wage & Salary	1,550
Sugar	1,400
Other	150
Non-Agriculture, Self-Employed	1,200
Agriculture, Self-Employed	200

Source: 1982 State of Hawaii Data Book

In 1981, land for various agricultural crops accounted for 275,000 acres of the 351,168 acres of land area of Kauai. Sugarcane had 45,800 acres under cultivation which is a reduction in acreage from 46,000 acres of sugarcane in 1980. Less than 1,000 acres each were dedicated to vegetables and melons, fruits, and miscellaneous crops. Less than 500 acres were under pineapple cultivation. No coffee is commercially grown in Kauai and there is no data available for the production of macadamia nuts.

There are five major growers (Table 3-7) of sugarcane on Kauai of which four maintain sugar mills. The Lihue Plantation Company leads in production and total amount of cane land acreage. The McBryde Sugar Co., Ltd., is second followed by Kekaha Sugar Co., Ltd., Olokele Sugar Co., Ltd., and Gay & Robinson, Inc. Gay & Robinson, Inc., is a grower only. The Kekaha Sugar Company has produced the highest yield of tons of sugar per harvested acre.

Livestock operations in 1981 remained fairly stable. The County had 140 farms raising cattle, 115 raising hogs and a number of dairy, poultry and honey operations.

Presently, agricultural uses of the project site and the adjacent areas include pasture, seed crops and sugarcane. The land mauka of the highway is for sugarcane. On the makai side of the highway, west of the existing sanitary landfill access road, the land is used for pasture and east of the same road, the land is under cultivation for seed crops. The Kekaha Sugar Company has obtained a CDUA permit to expand their seed cane operations into Conservation zoned land. Northrup King Company (Pride Seed Division) has leased a portion of this land for the growth of seed corn. Both companies plan to commence the new operations in the near future.

3.4.3 Historic and Archaeological Sites

There are two categories of sites which are based on their period of construction. The first category of sites is archaeological and belongs to the prewestern contact period. Sites of this nature include heiaus,

TABLE 3-7

1981 ACREAGE AND PRODUCTION OF KAUAI SUGAR COMPANIES
(RAW VALUE)

	Total Caneland Acreage	Acreage Harvested	Production (Short Tons)	Tons Sugar Per Harvested Acre
Gay & Robinson, Inc. (Grower Only)	2,650	1,257	17,425 ^a	13.87
Kekaha Sugar Co., Ltd.	8,264	3,949	55,410	14.03
Lihue Plantation Co.	17,135	8,006	74,733	9.33
McBryde Sugar Co., Ltd.	12,906	6,242	56,553	9.06
Olokele Sugar Co., Ltd.	4,846	2,320	31,997	13.79
TOTAL	45,801	21,774	236,118	10.84

^aGay & Robinson sugarcane milled by Olokele Sugar Co., Ltd.

burials and house sites. The second category is historic and includes those sites associated with the arrival of western man. Historic sites are usually structures of a commercial, religious or residential nature.

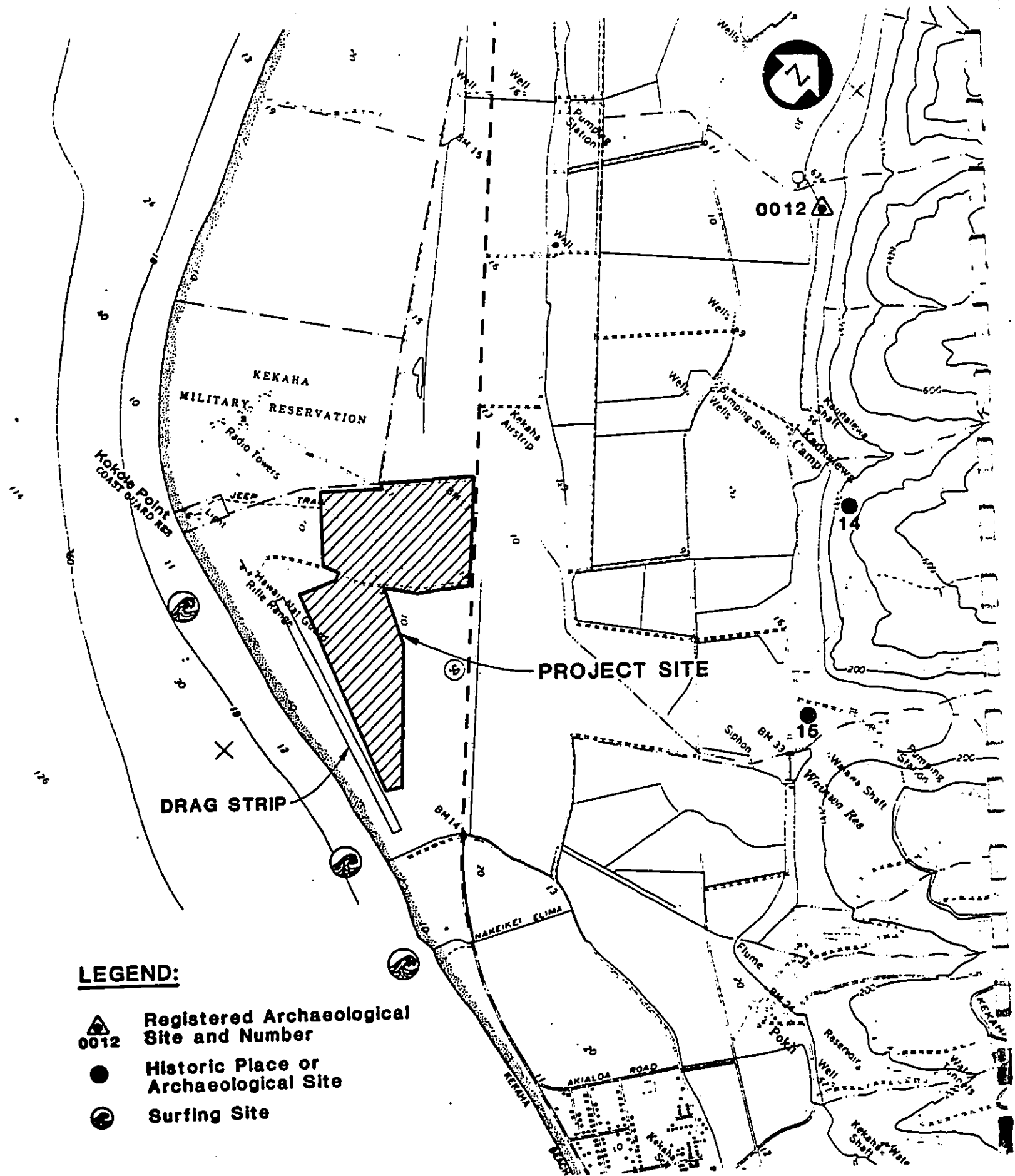
There are a number of archaeological sites scattered throughout the Waimea-Kekaha region. These include sites which are registered with the State DLNR Historic Sites Office and sites which have been identified but were not located during a State survey in 1973-74. There are no surface sites identified in the vicinity of the proposed sanitary landfill (Appendix B). The closest are located by the ancient sea cliff (Figure 3-4). However, the sandy conditions at the project site may harbor as yet undiscovered archaeological sites. These may include burials, sites or artifacts. There are no historic sites in the project vicinity. The closest are those in historic Waimea Town.

3.4.4 Recreation

There are three State Parks in the Waimea-Kekaha region. There are Waimea Canyon State Park, Kokee State Park and Na Pali Coast State Park. None are near the proposed project location.

The coastal plain is a swamp area that has been drained and converted primarily for the use of sugarcane. Due to the primarily military and agricultural uses of the Mana Plain, there are few opportunities for recreational facilities. The military has jurisdiction of the coastal zone northward from Kokole Point. There are several identified surfing sites (Figure 3-4) in this coastal sector. Kikiaola Small Boat Harbor is several miles east of Kekaha. There is also a small park in Kekaha Town itself. Further north by Mana is a wildlife refuge.

The Department of Land and Natural Resources recognizes the potential recreational value of the project vicinity which has an excellent resort climate. A recommendation in the State's Recreation Plan (formerly SCORP) states that "The long beaches west of Kekaha should be reserved wherever



LEGEND:

- ▲ 0012 Registered Archaeological Site and Number
- Historic Place or Archaeological Site
- ☉ Surfing Site



FIGURE 3-4

HISTORIC AND RECREATIONAL RESOURCES

feasible for public shoreline recreation on a regional basis. Where there is enough space behind these beaches, camping should be considered." Several years ago this site was designated as "The Governor Burns Recreation Area" and legislatively funded for a multi-use recreation development. A public drag strip was constructed, but the rest of the park was not developed because no specific agency was designated to be responsible for the planning and follow-up. A request to use the strip for occasional airplane landings was denied by the Board of Land and Natural Resources in September 1981.

3.4.5 Infrastructure

3.4.5.1 Transportation

Kuhio Highway and Kaumualii Highway are under the State's jurisdiction and circle the island from Haena on the North Shore of Kauai to Mana in the Waimea-Kekaha region. These two highways are the island's major traffic arteries and pass through most of the important communities. A third State Highway, Waimea Canyon Drive, begins at the town of Waimea and goes inland to the Kalalau Valley Lookout at Kokee. Another major road in the region, Kokee Road, is under the jurisdiction of the County. This traffic artery diverges from Kaumualii Highway in Kekaha and meets the Waimea Canyon Drive approximately 7 miles mauka of the town. Tour buses presently go through Kekaha and utilize the County Kokee Road to Waimea Canyon because it is more easily negotiable than the State highway.

Kaumualii Highway continues from Kekaha, passes the existing landfill and goes on to the plantation village of Mana. It is an excellent, two-lane highway that provides good access from all sectors of the island to the landfill site. Beyond Mana the road degenerates to an unpaved road until Polihale.

3.4.5.2 Facilities

Waimea is essentially the center of the Waimea-Kekaha region in terms of community services. Many of the public facilities located in Waimea serve all of West Kauai. These include Waimea High School, a police substation at the Waimea Library and the Kauai Veterans Memorial Hospital. There are

also a number of other facilities which help to complete a rounded profile for the community. Kekaha is smaller and more residential in nature. The number of facilities which serve the Kekaha Community are not as numerous as those located in Waimea.

3.4.5.3 Public Services and Utilities

On the coastal plain, water is supplied by the County to Kekaha and Waimea by means of wells and storage tanks that are situated mauka of the towns. Additional water is supplied by the Kekaha Sugar Co. to employee homes in Kekaha and Mana. Both the County and Kekaha Sugar Co. supply water to the Pacific Missile Range Facility at Mana.

3.4.5.4 Wastewater

A sewage treatment plant is located near the town of Waimea and handles a portion of the wastewater of the residents. In Kekaha, sewage is taken care of by means of individual cesspools. The sugar plantation maintains a wastewater system for its own use and for employee housing. Sewage at the Barking Sands facility is handled by a system which serves only the facility.

SECTION 4

THE RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA

4.1 INTRODUCTION

This section discusses the relationship of the proposed sanitary landfill expansion project to various plans and policies guiding State and County actions. Other plans which pertain to or have some bearing in relation to the project are also discussed.

4.2 POLICY PLANS

Both the State of Hawaii and the County of Kauai have adopted general plans to guide the physical, social and economic development of the islands in general and specifically for Kauai. These general plans give in broad outline the objectives and policies that encourage the controlled development of Kauai's resources (energy, water, economics, etc.). Although general in nature, these policies provide the framework for the proposed expansion of the existing sanitary landfill.

4.2.1 Hawaii State Plan

The Hawaii State Plan was signed into law on May 22, 1978. It is a long-range guide which "establishes for Hawaii an overall theme, goals, objectives, policies, priority directions and a system for plan formulation and program coordination to provide for the integration of all major State and County activities." It provides a basis for determining priorities and allocating limited resources such as public funds, services, manpower, land, energy and water. It also seeks to assure the coordination of State and County plans, policies, programs, projects and regulatory activities. The proposed expansion of the sanitary landfill in Kekaha is discussed in Table 4-1 with regards to its conformance or non-conformance to relevant State Plan objectives and policies.

TABLE 4-1

PROJECT RELATIONSHIP TO THE STATE PLAN

STATE PLAN OBJECTIVE	STATE PLAN POLICY	PROJECT RELATIONSHIP
<p><u>POPULATION</u></p> <p><u>Section 5(a)</u> It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives.</p>	<p><u>Section 5(b)(3)</u> Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.</p>	<p>As on all the islands, land is a valuable resource on Kauai. With a projected large increase in the de facto population by the year 2003 the impact on existing County facilities will be major. There are three existing sanitary landfills located at Hanalei, Halehaka and Kekaha. The first two have existing lifespans of less than one year. Kekaha has a remaining lifespan of 7 to 10 years. Expansion of the existing sanitary landfill at Kekaha will add another 20 to 30 years of service to accommodate the projected population growth of the County.</p>
<p><u>AGRICULTURE</u></p> <p><u>Section 7(a)</u> Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives: (1) Increased viability in sugar and pineapple industries. (2) Continued growth and development of diversified agriculture throughout the State.</p>	<p><u>Section 7(b)(6)</u> Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.</p>	<p>Kekaha Sugar Co. has recently obtained a CDU Permit from the DLNR to lease 62 acres of the proposed Kekaha landfill expansion site for commercial agricultural use. The Pride Division of the Northrup King Co. has also indicated an interest in leasing 43 of the 62 acres for seed research purposes on a long term basis. Phasing of the landfill increments will permit existing leaseholders to maintain their operations as long as possible until the County's landfill needs require use of the land. The proposed project will temporarily reduce the amount of viable agricultural lands from production until the completed landfill acreage is available for crops.</p>
<p><u>PHYSICAL ENVIRONMENT - LAND-BASED, SHORELINE AND MARINE RESOURCES</u></p> <p><u>Section 11(a)</u> Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives: (1) Prudent use of Hawaii's land-based, shoreline, and marine resources.</p>	<p><u>Section 11(b)</u> To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to: (1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.</p>	<p>The project will be in conformance with these objectives and policies. The expansion and use of the Kekaha Sanitary Landfill is expected to promote the least amount of degradation to the physical environment during its lifespan as a landfill and after when the land is converted back to other uses. Due to the existing and extensive alteration of the site, no endangered flora or fauna is expected to be impacted. After its</p>

TABLE 4-1 - CONTINUED

PROJECT RELATIONSHIP TO THE STATE PLAN

STATE PLAN OBJECTIVE	STATE PLAN POLICY	PROJECT RELATIONSHIP
(2) Effective protection of Hawaii's unique and fragile environmental resources.	<p>(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.</p> <p>(3) Take into account the physical attributes of areas when planning and designing activities and facilities.</p> <p>(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.</p> <p>(8) Pursue compatible relationships among activities, facilities, and natural resources, especially within shoreline areas.</p> <p>(9) Promote greater accessibility and prudent use of the shoreline for public recreational, educational, and scientific purposes.</p>	<p>lifespans as a landfill is complete, the land will be available for other uses, among which are recreation and agriculture. There will be no significant adverse impact upon the shoreline area or upon other activities in the area.</p>

PHYSICAL ENVIRONMENT - SCENIC, NATURAL BEAUTY AND HISTORIC RESOURCES

Section 12(a)
 Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.

Section 12(b)

(3) Promote the visual and aesthetic enjoyment of mountains, ocean vistas, scenic landscapes, and other natural features.

(5) Encourage the design of developments and activities that complement the natural beauty of the islands.

Section 13(a)

Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:

Section 13(b)

(2) Promote the proper management of Hawaii's land and water resources.

(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.

During the life of the landfill, those portions under operation will necessarily create an adverse visual and aural impact. Visual impact upon users of Kaunualii Highway will be lessened by a 500-foot buffer zone. Landscaping will be initiated as each landfill area is completed.

Because care must be taken with regard to the natural resources of Hawaii, effective measures are necessary to ensure the quality of the land, air and water resources. Available data of the landfill site indicates that the water table below is composed of brackish water and is not affected

TABLE 4-1 - CONTINUED

PROJECT RELATIONSHIP TO THE STATE PLAN

STATE PLAN OBJECTIVE	STATE PLAN POLICY	PROJECT RELATIONSHIP
<p>(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.</p> <p>(2) Greater public awareness and appreciation of Hawaii's environmental resources.</p>	<p>(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.</p> <p>(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.</p>	<p>by diurnal tide fluctuations. The leachate generated is not expected to be of a significant impact due to the low rainfall in the area and the brackish groundwater. Sanitary landfill practices will be strictly adhered to, to insure safety and health and so that adverse impacts are minimized with regard to the physical environment. The project is on land currently used as a landfill and for agricultural purposes.</p>
<p><u>FACILITY SYSTEMS - GENERAL</u></p> <p><u>Section 14(a)</u> Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and utility systems that support statewide social, economic, and physical objectives.</p>	<p><u>Section 14(b)</u> (1) Accommodate the needs of Hawaii's people through improvement priorities established through the planning process.</p> <p>(2) Encourage flexible service delivery systems that can adapt to changing public demands and priorities.</p> <p>(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.</p>	<p>In April of 1974 the County of Kauai published the Solid Waste Management Plan to provide guidelines for the management of solid waste through the year 1990. The expansion of the Kekaha Landfill is an outgrowth of this plan and of the County's objectives to accommodate the growing needs of the people for a sanitary landfill that will benefit the people with the best cost benefit ratio.</p>
<p><u>FACILITY SYSTEMS - SOLID AND LIQUID WASTES</u></p> <p><u>Section 15(a)</u> Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:</p> <p>(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.</p>	<p><u>Section 15(b)</u> (2) Encourage reuse and recycling to reduce solid and liquid wastes and develop a conservation ethic.</p> <p>(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.</p>	<p>Although the County is presently undertaking a study of the effectiveness of a resource recovery system, any system adopted will require the need of a landfill for the disposal of residue. The implementation of a resource recovery system will reduce the amount of solid waste generated but, until a resource recovery system is underway, the landfill will still have to dispose the existing and projected solid waste tonnages generated.</p>

TABLE 4-1 - CONTINUED
PROJECT RELATIONSHIP TO THE STATE PLAN

STATE PLAN OBJECTIVE	STATE PLAN POLICY	PROJECT RELATIONSHIP
<u>HEALTH</u>	<p>Section 20(a) Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:</p> <p>(1) Fulfillment of basic individual health needs of the general public.</p> <p>(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.</p>	<p>Proper use of daily cover material and other sanitary landfill practices will ensure control of litter and vectors which may be generators of disease or unsanitary conditions.</p>
<u>LEISURE</u>	<p>Section 23(a) Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.</p>	<p>A long-range beneficial impact of the project is that after its completed lifespan, the landfill site may be used for recreational purposes with its large open space area in close proximity to the shoreline, a dragstrip and a rifle range. It is not anticipated that the project will hinder its long term recreational potential.</p>
	<p>Section 23(b) (4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values.</p> <p>(5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.</p> <p>(6) Assure the availability of sufficient resources to provide for future recreational needs.</p>	

4.2.2 Kauai General Plan - 1982 Update

In 1971 the County of Kauai, in conformance with the Kauai County Charter, adopted a General Plan to guide the planned growth of the County. Ten years later in 1982 a General Plan Update was completed which reviewed and evaluated the 1971 plan and made necessary changes to update the goals and objectives. The goals were rephrased and modified to more accurately express the needs and desires of Kauai's population. The recommended goals that are relevant to the proposed sanitary landfill are discussed in Table 4-2, together with their relationship to the project.

Figure 4-1, which is from the Kauai General Plan, illustrates the land uses designated by the County for the Waimea-Kekaha Region. The project site is placed on land classified as Public Facilities (PF) and Agricultural (A). The PF classification also encompasses the PMR facility, the Kekaha Military Reservation, the Hawaii National Guard Rifle Range and the Coast Guard Reservation at Kolekole Point. The existing Kekaha Sanitary Landfill is also under this designation. The proposed expansion will extend into the agriculture designation.

4.2.3 Waimea-Kekaha Regional Development Plan

The Waimea-Kekaha Regional Development Plan is one of five regional development plans supplementing the Kauai General Plan. The objective of these plans is to implement, by establishment of development plans, general land use maps, zoning maps, and design criteria, the intent and purpose of the adopted Kauai General Plan and to amend certain portions of that plan to recognize more detailed information and more precise community goals and objectives. Table 4-3 presents the relationship of relevant objectives and policies of this regional plan to the proposed project.

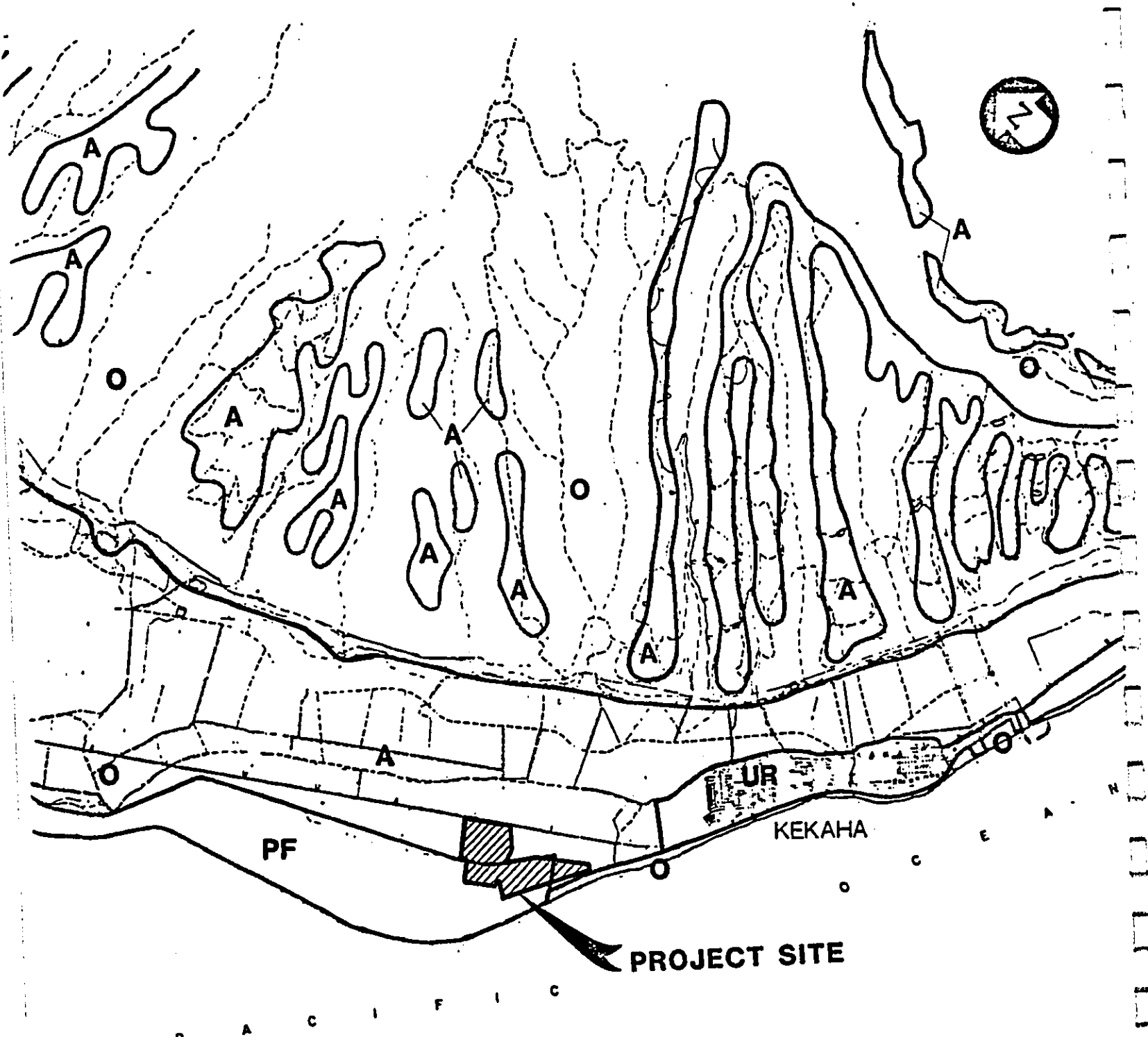
4.3 LAND USE PLANS

Land use plans are more detailed planning tools providing specific boundaries for land use classifications. These boundaries determine whether or not given projects are within the permitted uses of that land

TABLE 4-2

PROJECT RELATIONSHIP TO THE KAUAI GENERAL PLAN

KAUAI GENERAL PLAN GOALS	PROJECT RELATIONSHIP
<p>To maintain the concept of Kauai as "The Garden Isle"; thus, insuring any growth be in consonance with the unique landscape and environmental character of the island.</p>	<p>The proposed expansion of the existing sanitary landfill will serve to maintain the quality of Kauai's environment. The decision to expand present facilities and operations at Kekaha followed a long process of eliminating a number of other sites whose adverse environmental impacts were greater than those at Kekaha.</p>
<p>To insure that all physical growth is consistent with the overall ecology of the island.</p>	<p>The project will serve to accommodate the projected amounts of solid waste generated by a growing population. The expansion of the Kekaha Landfill represents a choice of the least amount of adverse environmental impacts with the maximum amount of landfill capabilities to handle future waste disposal.</p>
<p>To manage growth according to established population growth targets.</p>	<p>By 1983, the two existing landfills at Halehaka and Hanalei will cease operations. With the expansion at Kekaha, beyond its present 7-year operational life, it will be able to accommodate Kauai's refuse for a minimum of 20 to 30 years, thus keeping pace with the island's projected population growth.</p>
<p>To promote the improvement and expansion of the island's economy, by recognizing and carefully utilizing land and water resources.</p>	<p>Although the project will reduce limited portions of land available for agriculture, this will be temporary. Present environmental conditions at Kekaha make it a desirable site for landfill operations. There are no water resources that will be adversely impacted and the land can be reverted to limited agricultural or recreational uses.</p>
<p>To manage implementation through development of social and physical infrastructure based on growth targets, priorities and efficient utilization of facilities and services.</p>	<p>At the completion of the lifespan of the project site as a landfill, it can be used for recreational or agricultural purposes. Should the proposed resource recovery project be initiated, the lifespan of the landfill would be extended beyond its estimated years of use due to reduced amounts of solid waste being handled. The landfill project complies with the County's General Plan.</p>



LEGEND:

- A** AGRICULTURAL
- O** OPEN
- PF** PUBLIC FACILITIES
- UR** URBAN RESIDENTIAL



FIGURE 4-1
GENERAL PLAN MAP
County of Kauai

TABLE 4-3

PROJECT RELATIONSHIP TO THE WAIHEA-KEKAHA REGIONAL PLAN

PLAN OBJECTIVE	PLAN POLICY	PROJECT RELATIONSHIP
<p>"To insure that all physical growth is consistent with the overall ecology" of the area.</p>	<p>Assure the conservation and protection of natural, scenic, and historic resources in the region.</p> <p>Insure the preservation of flora and fauna, especially endangered species.</p>	<p>The existing landfill site and the proposed expansion will physically alter the land by creating a long, low mound on what is now relatively flat land.</p> <p>It is believed that there are no endangered species of flora or fauna in the project area or its vicinity due to the highly altered nature of the Mana Plain itself. Moreover, the majority of known plants and animals on this coastal plain are exotic species.</p>
<p>"To promote and protect the health, safety, and welfare of all residents."</p>	<p>Ensure development of compatible land uses.</p> <p>Control air and water pollution.</p>	<p>The expansion of the existing landfill at Kekaha will fill a much needed requirement essential to the health, safety and welfare of all the residents of Kauai. According to the County's General Plan, a portion of the project will be on land designated as Public Facility. The remainder will expand into land designated as Agriculture. During landfill operations which will utilize the "A" lands they will necessarily be out of production for their designated use. However, after completion of landfill operations, the land may be used for limited agricultural purposes. The choice of Kekaha as the landfill site is attractive due to its capacity for expansion, available cover material and brackish water which eliminates the need for a leachate control system. Other considerations for choosing the site are low rainfall, no relationship between groundwater levels and diurnal tide fluctuations, presence of sand that will act as a filter for leachate from the landfill and dilution of leachate due to nearshore circulation of ocean waters. All these factors are aids in the control of pollution.</p>
<p>To sustain a healthy economy and "to create opportunities for a greater diversity of employment..."</p>	<p>Maintain and, if possible, expand agriculture lands.</p> <p>Provide opportunities for economic development adjacent to PMR.</p>	<p>Expansion of operations on the Kekaha Sanitary Landfill will temporarily reduce the number of acres available for present or planned uses. Both Kekaha Sugar Co. and the Northrup King Co. (Pride Seed Division) have existing leases for the areas of land planned for the ultimate expansion of the landfill. Although on conservation land, the Kekaha Sugar Co. has obtained a Conservation District Use Permit for commercial agricultural use. Use of these lands as a landfill will deny its use for agricultural purposes. This however will be temporary and the land may be returned for agricultural use.</p>

classification. Land use plans and controls which pertain to the development of the proposed landfill expansion are the State Land Use District Regulations, and the Comprehensive Zoning Ordinance for the County of Kauai.

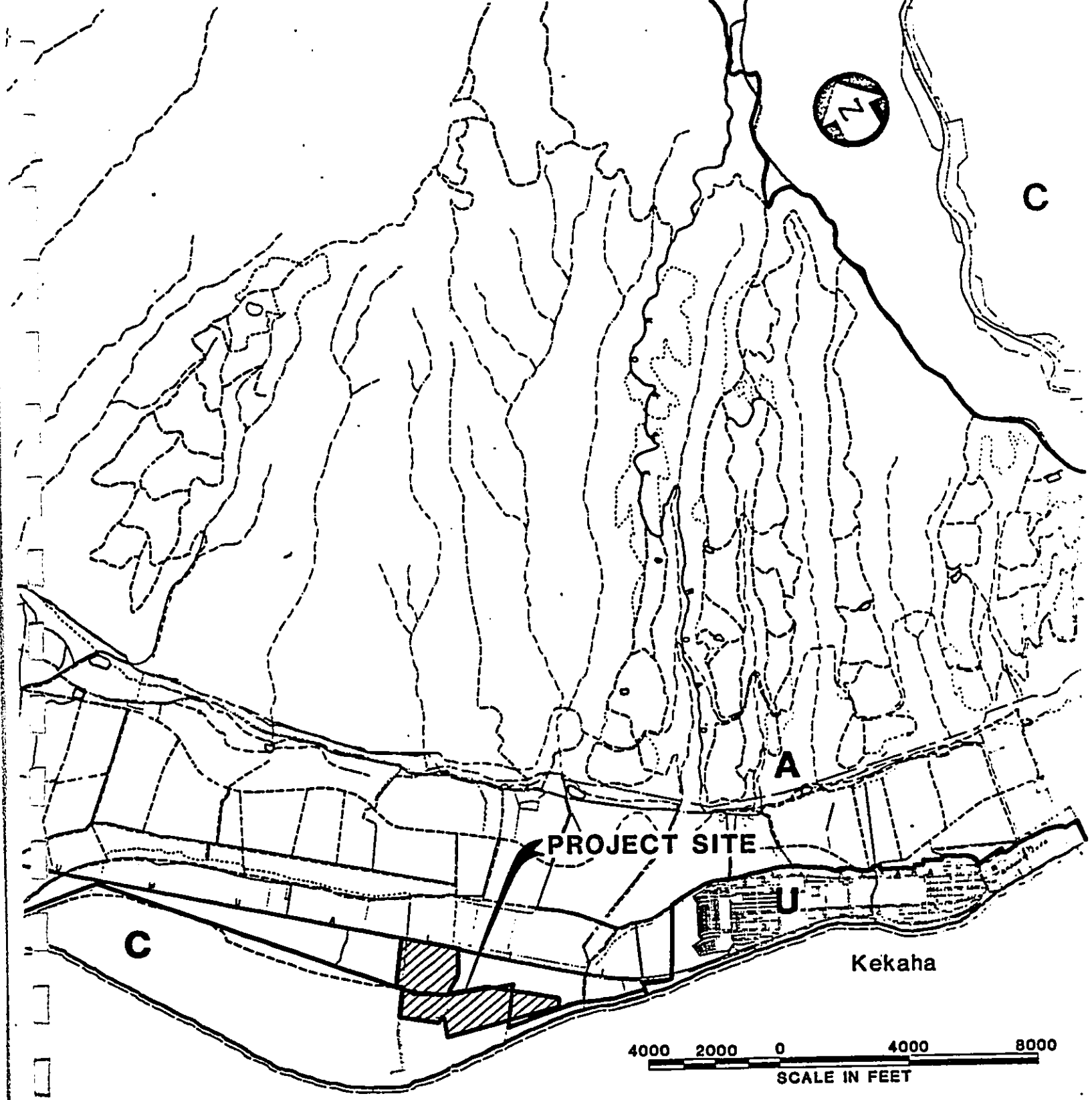
4.3.1 State Land Use Districts

The Land Use Commission of the State of Hawaii has assigned four major land use district classifications to all lands in the State. These districts are urban, rural, agricultural and conservation. The Island of Kauai as of January 1982 has the following estimated acreages in each district:

Urban	10,820.1
Conservation	198,731.8
Agricultural	143,114.8
Rural	1,233.3

As shown, the Conservation District has the greatest amount of estimated acreage. Following closely is the Agricultural District and the Urban and Rural Districts having relatively small amounts of acreage. The great majority of conservation land on Kauai is found in the mountainous central to northwest coast of the island. The intermingled agricultural, rural and urban districts are concentrated around the perimeter of the island.

Figure 4-2 illustrates the State Land Use District Classifications of the sanitary landfill and the surrounding area. The proposed expansion of the Kekaha sanitary landfill will be on lands designated as an Agricultural District or as a Limited (L) Subzone of a Conservation District. The first expansion of the proposed landfill is on agriculturally designated land and the second increment is on both Conservation (L Subzone) land as well as agriculture land. Use of a Conservation District for the sanitary landfill expansion will require the approval of a Conservation District Use Application (CDUA) by the State Board of Land and Natural Resources.



LEGEND:

- A** Agriculture
- C** Conservation
- U** Urban

SOURCE: Supplement Waimea-Kekaha Regional Development Plan for County of Kauai by Belt Collins, Assoc., Ltd., Sept. 1977

FIGURE 4-2
STATE LAND USE DISTRICTS
County of Kauai

4.3.2 Comprehensive Zoning Code

In 1972 the County of Kauai adopted a Comprehensive Zoning Ordinance "to provide an implementing tool for the General Plan's long-range policy on growth and development." The ordinance regulates the use of land under the County's control by means of 23 sub-district designations. Major zoning districts are residential, resort, commercial, industrial, open, agriculture, SMA, and special treatment (public facilities). Figure 4-3 indicates the existing land use in the project area.

4.4 OTHER PROGRAMS AND CONTROLS

4.4.1 State Environmental Policy

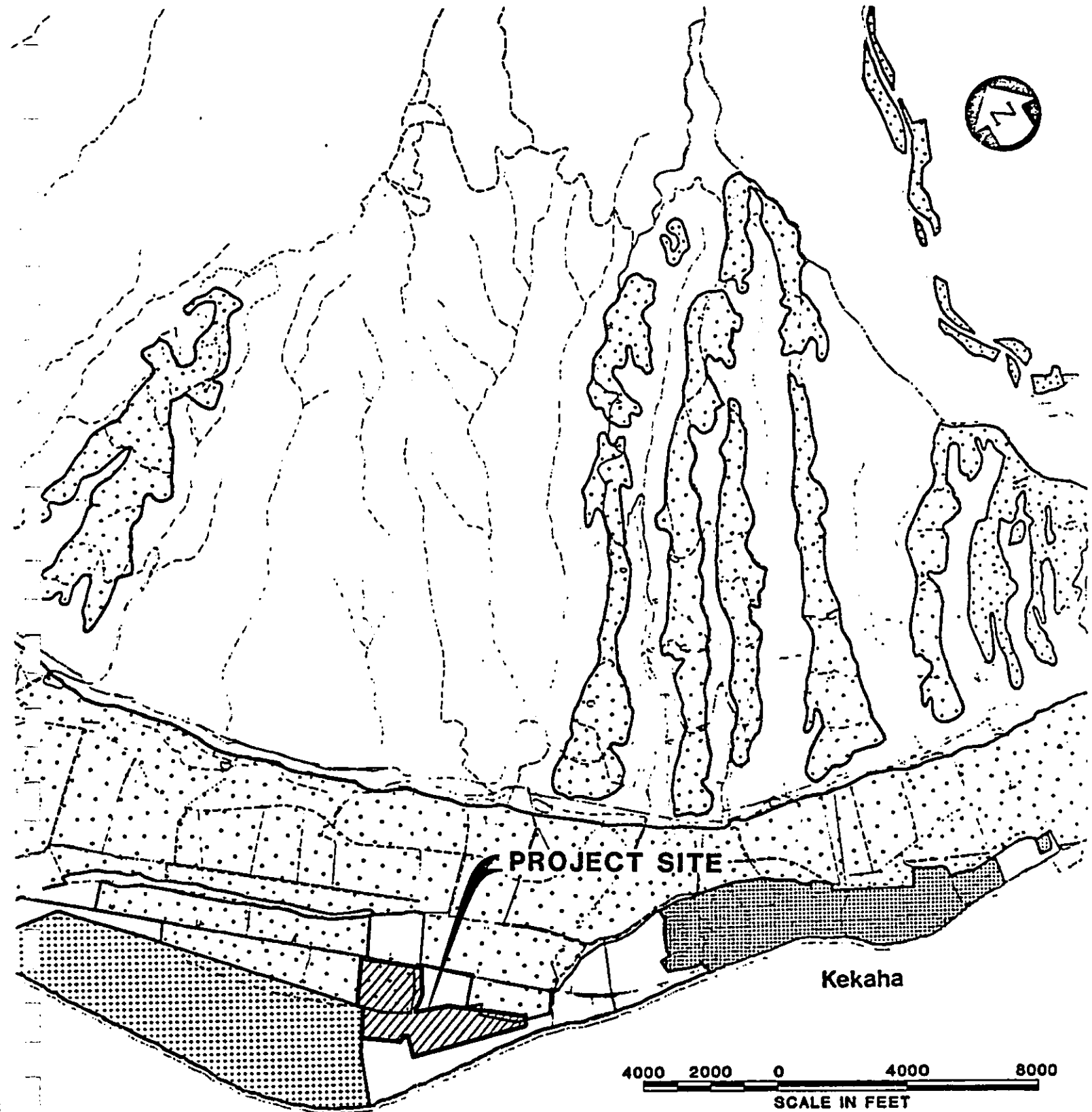
The State recognizes the need for information on the environmental consequences of a proposed action in making decisions. Therefore, an Environmental Impact Statement (EIS) is required for any project that significantly impacts the environment, is not specifically exempted, uses either State or County funds or lands, is in a Conservation District, a shoreline setback area, or in certain parts of Waikiki, a listed historic site, and/or requires a County General Plan amendment. The proposed expansion of the Kekaha sanitary landfill will subject the existing environment to significant impacts. An EIS for the project is therefore required to comply with the State's environmental policy and to insure that environmental concerns are given appropriate consideration along with economic and technical considerations.

4.4.2 National Flood Insurance Program





The Federal Emergency Management Agency of the Federal Insurance Administration has published a series of Floodway Maps indicating flood boundaries and floodways for the State of Hawaii. These maps indicate coastal high hazard areas and areas prone to flooding. According to the floodway map specific to the project site (Figure 3-3), the project is not included in any coastal high hazard area or floodway.

4.4.3 Hawaii Coastal Zone Management Program

The Hawaii Coastal Zone Management (CZM) Program is a guide for the management of Hawaii's valuable coastal resources. Its goals, as stated in



LEGEND:

-  Urban
-  Agriculture
-  Military
-  Open, Pasture and Other Uses

SOURCE: Supplement Waimea-Kekaha Regional Development Plan for County of Kauai by Belt Collins & Assoc., Ltd., Sept. 1977

FIGURE 4-3
EXISTING LAND USE
 County of Kauai

the objectives and policies of Chapter 205A, HRS, are the beneficial use, development and protection of Hawaii's coastal resources. Emphasis is placed on the following areas:

- Scenic and Open Spaces
- Historical Resources
- Recreational Resources
- Development
- Coastal Ecosystems
- Economic Uses
- Coastal Hazards

To implement the CZM program, all State and County agencies are to insure that coastal development is located, designed, and constructed to minimize social, visual and environmental impacts in the coastal zone management area. This includes the Special Management Areas and the waters from the shoreline to the seaward limit of the State's jurisdiction.

Table 4-4 lists the relevant CZM objectives and policies and discusses the relationship of the proposed action.

Portions of the project's required expansion area are located within the County's Special Management Area (SMA) (Figure 2-2). As such, a SMA permit will be required for the proposed expansion.

4.4.4 Kauai Solid Waste Management Plan

In 1974 the Kauai Solid Waste Management Program recommended the establishment of a primary central sanitary landfill at Kipu to meet the projected needs of Kauai for refuse disposal. Although a change in the site has been required, after an intensive search of candidate sites, the objective of the plan is met by expanding the existing Kekaha sanitary landfill and designating it as Kauai's island-wide landfill.

TABLE 4-4

PROJECT RELATIONSHIP TO THE
HAWAII COASTAL ZONE MANAGEMENT PROGRAM

CZM OBJECTIVES	CZM POLICIES	PROJECT RELATIONSHIP
<p><u>RECREATIONAL RESOURCES</u></p> <p>Provide coastal recreational opportunities accessible to the public.</p>	<p>Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:</p> <ul style="list-style-type: none"> - Providing and managing adequate public access, consistency with conservation of natural resources, to and along shorelines with recreational value. - Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters. 	<p>Access to the dragstrip, adjacent beach area and surfing sites will not be impeded during landfill operations. A portion of the existing road will be improved and maintained as it will also serve the landfill.</p> <p>There will be several groundwater monitoring wells installed adjacent to the landfill site for periodic monitoring. This is to insure that any unforeseen degradation in water quality will be detected.</p>
<p><u>HISTORIC RESOURCES</u></p> <p>Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.</p>	<p>Identify and analyze significant archaeological resources;</p> <p>Support State goals for protection, restoration, interpretation, and display of historic resources.</p>	<p>An archaeological survey performed in the project area found no traces of archaeological sites. If a buried site is uncovered during landfill operations, the DLNR Historic Sites Office will be notified for investigation purposes. Corings in advance of construction will be routinely made in the sand to identify any archaeological finds.</p>
<p><u>SCENIC AND OPEN SPACE RESOURCES</u></p> <p>Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.</p>	<p>Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural land forms and existing public views to and along the shoreline;</p> <p>Preserve, maintain and, where desirable, improve and restore shoreline, open space and scenic resources; and</p> <p>Encourage those developments which are not coastal dependent to locate in inland areas.</p>	<p>Because of the open space surrounding the proposed landfill expansion, a definite adverse visual impact will be felt. To mitigate this effect, a buffer zone separates the landfill from users of Kaunualii Highway. As each increment is completed landscaping will be initiated to integrate the landfill with the surrounding area.</p> <p>Once the effective life of the landfill is complete, the entire area may be used as an open space recreational area to supplement the nearby dragstrip and beach. The choice of Kekaha for an island-wide landfill was based on an evaluation of several sites and selecting the one with the least adverse environmental impact.</p>

TABLE 4-4 - CONTINUED
 PROJECT RELATIONSHIP TO THE
 HAWAII COASTAL ZONE MANAGEMENT PROGRAM

CZM OBJECTIVES	CZM POLICIES	PROJECT RELATIONSHIP
<u>COASTAL ECOSYSTEMS</u>	Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.	The water table beneath the landfill expansion has been determined to be of a brackish nature. This factor was an important consideration in choosing Kekaha as a landfill site. Additionally, water-table investigations relative to tidal conditions indicate that the groundwater in the area is independent of tidal influences. Groundwater monitoring wells will be located adjacent to the landfill for periodic monitoring to insure that any unforeseen degradation of water quality is detected.
Promote water quantity and quality planning and management practices which reflect the tolerance of freshwater and marine ecosystems and prohibit land and water uses which violate State Water Quality standards.	Due to the low rainfall experienced on the plain, only a small amount of leachate is expected to filter down to the water table. Should the area be used for light agricultural activities, careful irrigation practices should keep the water from percolating into the refuse areas thereby maintaining low leachate generation. This leachate will eventually enter the ocean but only after being filtered through the large body of sand lying between the landfill and the ocean. Further dilution will take place due to the nearshore circulation of the ocean waters. The diluted leachate reaching the ocean would be non-toxic because hazardous wastes are prohibited in the landfill.	Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard; Ensure that developments comply with requirements of the Federal Flood Insurance Program.
<u>COASTAL HAZARDS</u>	Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.	The proposed action is not included in the coastal high hazard or flooding areas as determined by the Federal Insurance Administration.

SECTION 5
PROBABLE IMPACTS OF THE PROPOSED ACTION

This section discusses the probable impacts of the proposed project to expand the existing Kekaha Landfill. The impacts on the environment of the proposed action may be classified as (1) primary or direct impacts and (2) secondary or indirect impacts. Primary impacts are usually associated directly with the on-site construction and operation and are generally of a short term nature. These impacts include dust, noise and traffic disruption. Secondary or indirect impacts may be induced by off-site conditions resulting from the project and are generally long-term in nature.

The primary and secondary impacts are further subdivided into beneficial and adverse impacts. Beneficial impacts are those which will enhance the quality of the physical or human environment or enable a more effective use of natural and/or economic resources. Adverse impacts, on the other hand, are those which decrease the quality of the environment.

5.1 PRIMARY IMPACTS

5.1.1 Beneficial Impacts

5.1.1.1 Physical Environment

The proposed landfill site has adequate room for expansion for up to 10 years beyond the minimum 20-year life, and much longer if resource recovery is initiated. Because of the low rainfall in the area, it is anticipated that only a small quantity of leachate will be generated. This factor plus the low water table of brackish water decreases the need for expensive leachate control. The site is unaffected by any nearby stream or shoreline. The site is already impacted by the existing sanitary landfill. The access roads to the site are excellent and will require a minimum of improvement. Water and electric power utilities can be readily brought to the site.

5.1.1.2 Biological Environment

The completed landfill will provide extensive acreage on its top for landscaping and possible growth of agricultural crops such as seed corn and seed cane.

5.1.1.3 Human Environment

There will be no human residents displaced or significantly impacted by the project. The remote site is now characterized by landfill and agricultural activities which will essentially remain unchanged. Development of the Kekaha site proved to be the least expensive for the County and State taxpayers in the comparative analysis (Section 7) conducted for the five candidate landfill systems. The proposed expansion site is now heavily littered with solid waste debris including junk cars. This unsafe condition will be eliminated as the landfill development progresses.

The short-term economic impact resulting from the limited landfill site construction tasks will be beneficial in that they will provide some jobs to local construction personnel. Local material suppliers and retail businesses may also benefit from the increased activities.

5.1.2 Adverse Impacts

5.1.2.1 Physical Environment

During the construction phase of the landfill, it will be necessary to improve the existing access road to the landfill, construct a maintenance area with an operations building, install the necessary utilities, clear, grub and excavate the first two increments, and install a security fence around the maintenance area. The use of conventional construction equipment will create short-term impacts to the local environment. Noise, air, and visual impacts, although limited to daylight hours, are often termed nuisance problems and are unavoidable.

The air quality in the project area will be adversely impacted by dust generated during excavation, filling, grading and general construction activities. Hydrocarbon emissions from construction equipment will also

add to the general air pollution. Generally, the fumes and dust will be dispersed out to sea by the prevailing trade winds. Should "Kona" conditions prevail, the ambient air quality of the project site and surrounding areas would decrease.

The expansion of the existing site will require landfill development to the higher elevation of approximately 37 feet msl which is approximately 13 feet higher than the present landfill height of 24 feet. This will result in a long, low mound in this low coastal area. The on-site excavation of sand for cover material will produce sufficient quantities of material so that the importing of off-site material will not be required. However, sand may be regarded as a valued mineral resource which should be conserved.

5.1.2.2 Biological Environment

To develop the site, it will be necessary to remove vegetation by clearing and grubbing the site. Wildlife inhabiting the project area is expected to relocate to the open space areas that surround the site. Growth of corn and sugarcane seed crops will be interrupted when the landfill is expanded to the southeast. The resumption of agricultural activities in this area may possibly increase leachate generation unless strict irrigation controls are practiced.

There are a number of water ditches in the vicinity of the proposed expansion which are extensively used by the Hawaiian Coot, Gallinule, Stilt and the Koloa. These birds are listed as endangered species. Any leachate generated in the nearby landfill would not be significant to these birds in terms of toxicity or quantity. Also, it is not anticipated that the movement of leachate will be toward these ditches, therefore, leachate should not pose a threat to these endangered species. A recent survey of water levels in the mauka ditch was performed by the County of Kauai and confirmed that leachate movement would not be toward the ditches.

5.1.2.3 Human Environment

Noise generated by construction activities will primarily affect the equipment operators on the site as there are no residential or commercial establishments in the immediate vicinity of the project. Traffic will probably increase due to the presence of construction vehicles and will probably create some inconvenience to users of the landfill access road since it also serves as access to the dragstrip and nearby beach.

It is possible that archaeological sites, including human remains, exist in the soft sand and will require special considerations. These conditions would involve halting activities in the area surrounding any archaeological sites uncovered, notification to the DLNR Historic Sites Office by the County and undertaking salvage archaeology as required. A fund will be established for a contract archaeologist to perform hand auger corings in the sand at 50-foot intervals on straight lines approximately 100 feet apart prior to excavation. The planned expenditure of County funds for on-site development of roads, scales, maintenance building and utilities will be significant. The visual intrusion of the long, low landfill into the scenery along the Kaumualii Highway will be noticeable even though it will not interrupt any panoramic view of the ocean from the relatively low highway grade.

5.2 SECONDARY IMPACTS

5.2.1 Beneficial Impacts

5.2.1.1 Physical Environment

Expansion of the Kekaha site will permit the closure of the main County landfill at Halehaka, near Lihue, which has a much less favorable physical environment.

5.2.1.2 Biological Environment

There are no beneficial secondary impacts identified with the project.

5.2.1.3 Human Environment

Development of the proposed island-wide sanitary landfill will ensure that the County will have a safe, healthy and clean environment for residents

and visitors for the foreseeable future. Establishment of the landfill will ensure the proper disposal of solid wastes in a safe, confined area. This not only protects the visual and physical beauty of Kauai but controls the possible spread of disease by vectors. In this manner, the health and well being of Kauai's people are protected and enhanced. On a long term basis, further development of an island-wide landfill system will allow continuing island growth, consequently creating new businesses and jobs.

Development of the extensive off-site system of solid waste transfer stations and truck-tractors and trailers for off-site transport from the transfer stations to the landfill will create a limited number of job opportunities with the County government.

5.2.2 Adverse Impacts

5.2.2.1 Physical Environment

The long time period involved and the large scale of the project will create adverse secondary impacts to the physical environment as long as the landfill remains in operation. A new solid waste transfer station will be required in the Lihue area at a site yet to be determined. It will require a design phase and possible completion of the EIS. The daily operation of the off-site transportation system of truck-tractors and trailers will adversely impact the air quality and noise level along the main coastal highways.

5.2.2.2 Biological Environment

There are no significant adverse secondary impacts on the biological environment identified with this project.

5.2.2.3 Human Environment

Because Kekaha is located at one end of Kauai, refuse from all other parts of the island must be moved from the transfer stations to the landfill, using the State highway system. As these highways are the major traffic arteries for Kauai, it can be expected that the refuse transfer trucks will have some impact on existing traffic density. This would probably increase

as more refuse is generated by a growing population which would require more trips to move refuse from the rest of the island to Kekaha.

A potential adverse economic impact can develop as the County's capacity for municipal refuse disposal increase. The continuing urban expansion which it will facilitate will inevitably elevate Kauai's economic level, resulting in increased costs for goods and services. The landfill off-site development and operation and maintenance costs for transporting the island's solid waste to the remote location of the landfill will be significant. This will impact adversely upon the County's limited economy.

The project could adversely affect the long range development of the shoreline's recreational potential. The State Recreation Plan (formerly SCORP) recommended . . . "the long beaches west of Kekaha should be reserved wherever feasible for shoreline recreation on a regional basis. Where there is enough space behind these beaches, camping should be considered."

SECTION 6

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED AND MITIGATION MEASURES PROPOSED TO MINIMIZE ADVERSE IMPACTS

6.1 PRIMARY ADVERSE IMPACTS AND MITIGATION MEASURES

6.1.1 Physical Environment

The operation of the landfill and construction equipment during the development and operation of the landfill will produce the normal noise, dust and air pollution associated with such equipment. The landfill site is relatively remote so that these impacts will be limited in their significance. Comparable heavy agricultural equipment and trucks are in operation on the adjacent agricultural lands. All construction and landfill equipment will comply with Chapter 43, the Air Pollution Control Regulations of the State Department of Health, which prescribe required equipment air pollution control systems and control procedures. Daily cover of the completed cells of solid waste will control disease vectors, such as rats and flies, odors and litter at the working face of the landfill.

6.1.2 Biological Environment

The removal of vegetation from the site will be required as the landfill is developed. The clearing and grubbing will be performed incrementally as necessary by the progression of the landfill operation. After closure of the individual landfill increments with the final cover, landscaping will be accomplished through use of a ground cover of morning glory vines. The natural revegetation of the completed landfill will also be permitted to occur. The use of the landfill top for light agricultural purposes such as seed crops will also aid in the restoration of the landfill site to a more natural aspect. These agricultural activities will require careful irrigation practices to prevent excessive percolation below the root zone of the intended crop. Monitoring wells will be utilized for surveillance of the groundwater quality to determine if leachate is generated by these activities. If leachate is detected in the wells, it should not be toxic

since toxic materials are prohibited in the landfill. Wildlife that vacated the site during construction are expected to return as the site is closed and revegetated.

6.1.3 Human Environment

Noise generated during construction will primarily impact the landfill operators. Mitigative measures to cushion the impact include limiting the hours of operation, use of mufflers on the construction equipment and insure that they are properly maintained and operated.

Particular attention will be paid to the landfill access roads during the development and operation of the landfill to ensure that there is unrestricted access to the National Guard Rifle Range, the dragstrip and to the shoreline for fishing and water sports.

The State Historic Preservation Office emphasizes the need for archaeological testing prior to the development of the Kekaha landfill site. Although there were no surface features, there is a high probability of subsurface cultural deposits and burials whose presence or absence may be determined by subsurface corings. The County or its archaeological subconsultant will undertake this operation prior to the construction phase of the increments. The coring reports will be forwarded to the State Historic Sites Office to keep them apprised of any findings. In the event that subsurface cultural deposits are located, the County or its archaeological consultant will notify the State Historic Preservation Office who will determine the need for excavation and/or salvage of the remains prior to bulldozing. If conditions indicate the possibility of unlocated burials, this office may recommend archaeological monitoring. This will be done progressively as required by the incremental progression of the landfill. It is also recommended that an initial coring report in the makai portion of the proposed landfill be forwarded to the historic sites office for review and for their possible recommendations.

The required expenditure of County funds for development and operation of the landfill will be significant. The on-site costs will be mitigated by adherence to the landfill operation plan for the orderly, cost-effective operation of the landfill. The costs for the purchase and operation of the landfill equipment will be mitigated through careful supervision and control of the equipment and operators.

The visual intrusion of the long, low mound of the completed landfill on the coastal plain will be mitigated by the relatively low elevations planned for the landfill. The height of the landfill has purposefully been limited to two lifts when three lifts were feasible and would have been included if the landfill was in an area less sensitive than this coastal sector. The visual aspect of the completed landfill will be improved by landscaping and possible agricultural use.

6.2 SECONDARY IMPACTS AND MITIGATION MEASURES

6.2.1 Physical Environment

The new solid waste transfer station required in the Lihue area will be located only after extensive interaction with the local community. Alternative sites will be considered, together with possible environmental impacts, to ensure the optimum location and design of the new facility. The operations of the off-site vehicles required for movement of solid waste from the transfer stations to the landfill will be carefully controlled for cost-effective transportation. Proper vehicle maintenance will decrease air pollution and noise impacts along the highways.

6.2.2 Human Environment

Movement of the solid waste vehicles on the main highways will be controlled to avoid the traffic congestion during commuting hours. The proposed project will improve the public works infrastructure and facilitate the planned growth of the County's resident and visitor population. The adverse environmental impacts inherent in this increased population will be mitigated through orderly implementation of the State and County General Plans.

The high off-site costs of the landfill will be mitigated by the County's close supervision and control of the off-site system of hauling, transfer stations and landfills.

The potential for degradation of the recreation potential of the shoreline area is recognized. It will be mitigated by careful control of the adjacent landfill activities which are limited to areas mauka of the rifle range and drag strip. When the need arises in the distant future for expansion of recreation space, the low landfill mound could provide an excellent elevated site adjacent to the shoreline and suitable with proper landscaping, for passive recreation purposes. This could include camping after suitable site checks have been made to ensure that methane gas generation has essentially ceased and is no longer a hazard.

SECTION 7
ALTERNATIVES TO THE PROPOSED ACTION

There are a number of alternative actions which have been considered with the proposed project. These include "no action," other sites, and alternative disposal or processing methods. These alternatives are discussed in this section.

7.1 NO ACTION

The consequences that face the island should a "no action" course be undertaken would be very detrimental to the health and safety of the population. The existing landfills on Kauai all have extremely limited lifespans. Both the Hanalei and Halehaka Landfills are expected to close operations in 1983 while the existing landfill at Kekaha has a remaining lifespan of approximately 7 years at the present low rate of use. Once closure of the first two landfills is completed, most of the refuse generated on Kauai will be routed to Kekaha. The present landfill site will quickly fill up and if expansion acreage is not available to accept the projected refuse generated, a serious island-wide solid waste disposal problem will arise. The problem will increase with time as the population increases. The "no action" alternative is not believed to be viable for Kauai.

7.2 ALTERNATIVE SITES

Section 2.2, Project Background, describes the extensive County search for an island-wide sanitary landfill site. The island-wide search initially identified fifteen candidate sites which were subsequently narrowed to five for further study. The five sites were then narrowed down to three (Kumukumu, Kipu and Kekaha) for a detailed analysis. Figure 2-1 locates these three sites in their widely separate locations. Figures 7-1 and 7-2, respectively, provide additional detail on the sites at Kumukumu and Kipu. A preliminary development plan and cost estimates for off-site and on-site costs were prepared for the three landfill systems (off-site plus on-site facilities) and two combination (Kumukumu-Kekaha and Kipu-Kekaha) systems.

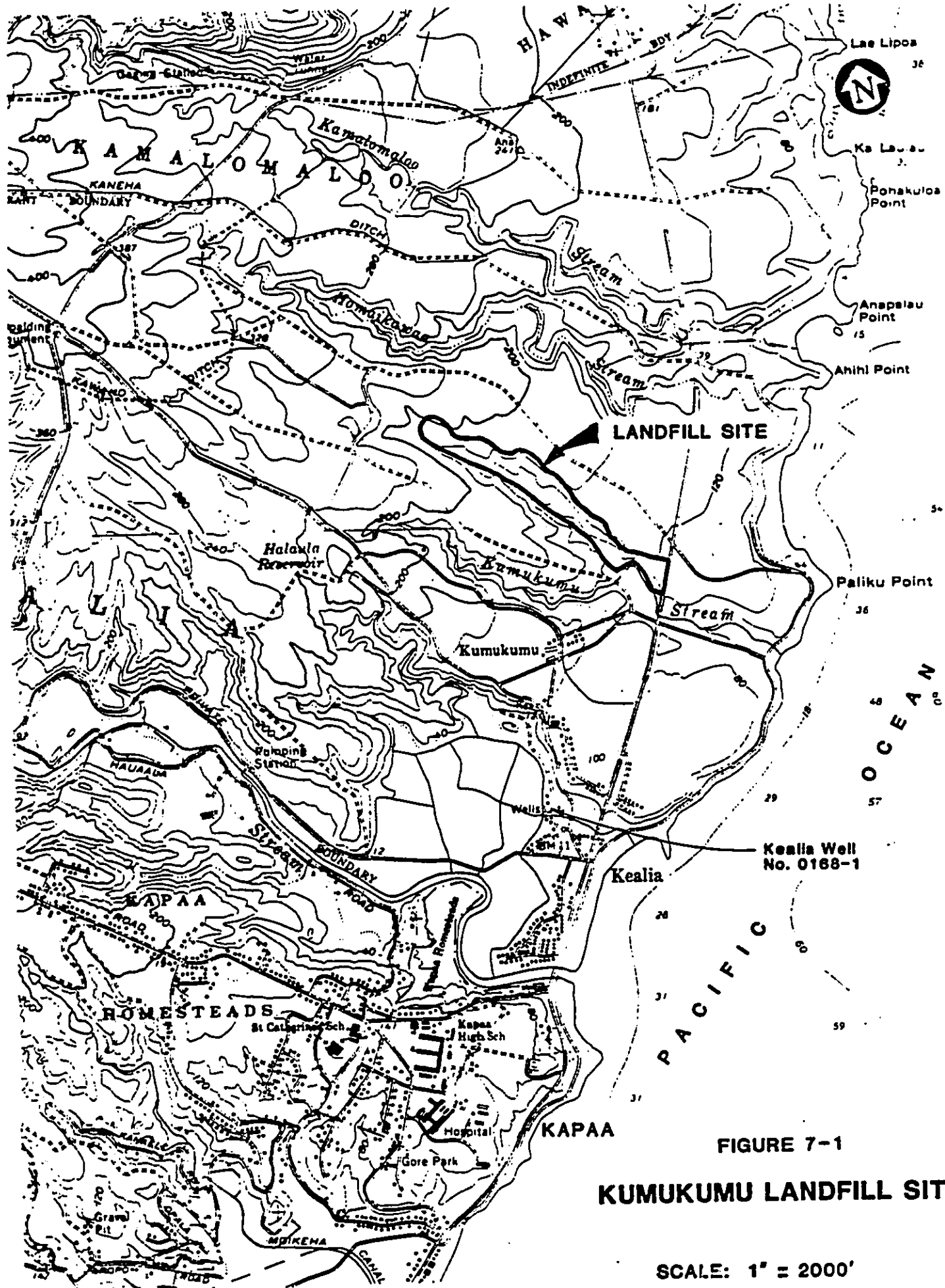


FIGURE 7-1
KUMUKUMU LANDFILL SITE

SCALE: 1" = 2000'

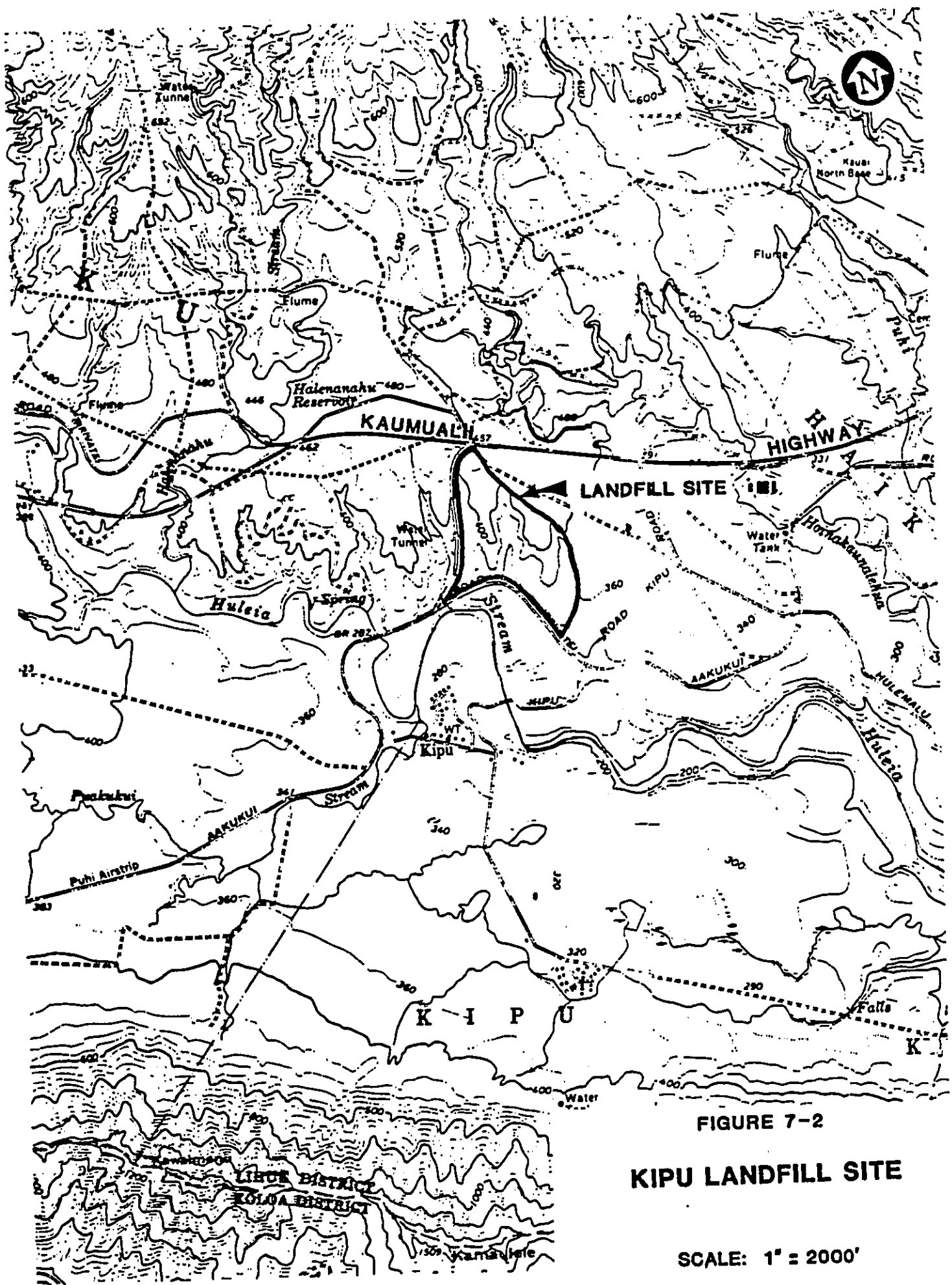


FIGURE 7-2

KIPU LANDFILL SITE

SCALE: 1" = 2000'

Given the five candidate landfill systems, a comparative analysis of the systems was required to determine the relative value of each to the County. A specific objective was to determine the landfill system best qualified for the more detailed preliminary design effort to follow. The analysis to determine the relative ranking among the five landfill systems required the application of a set of evaluation criteria. It was designed to develop a single numerical measure for each criteria which would be suitable for aggregation and overall ranking of the sites relative to each other.

7.2.1 Evaluation Criteria

The five criteria selected for use in the evaluation were on-site and off-site development and O&M costs, landfill life extension, leachate control, environmental impacts and closure concept (ultimate use). The development plan prepared for each of the three sites was for a fully acceptable landfill for the 20-year period. The non-cost evaluation criteria were selected to evaluate those key parameters which are essentially subjective and which cannot be expressed simply in terms of costs. Each of the criteria was developed to permit use of the following numerical scale in the rating of a specific landfill system.

<u>Rating Description</u>	<u>Numerical Rating Value</u>
Excellent	10
Good	8
Average	6
Fair	4
Poor (but acceptable)	2

Three of the five criteria were assigned a Rating Factor in excess of 1.0 to give proper weight to the specific criterion in the evaluation process. The Rating Factor for each criterion is included in the individual descriptions that follow:

On-Site and Off-Site Costs

After preparation of the optimum development plan for each site, the landfill development and operation and maintenance costs were determined. The preliminary development plans for Kumukumu and Kipu are shown in Figures 7-3 and 7-4, respectively. The preliminary development plan for Kekaha was similar to the revised plan shown in Figure 2-3. Costs determined included on-site costs for land, access roads, excavation, cover, utilities and facilities at the site for the 20-year period plus the off-site costs for facilities and transportation. The total of the present worth costs for the 20-year landfill at each site is very significant to the County as a measure of the financial burden anticipated for the total 20-year period. The actual cost of the initial increment of use will vary with the size of the initial increment which the County will elect to construct. Table 7-1 indicates that the total system costs for each of the five systems is close to the average total cost. The present worth costs are therefore evaluated simply by assigning each system a higher or lower rating relative to the average cost. Rating Factor: 3.0.

Landfill Life Extension

With a twenty-year landfill life as a "poor" minimum, sites with apparent higher capacities for extended landfill life beyond 20 years are of obvious additional value to the County and were rated on a subjective scale upward from fair to excellent as appropriate. Rating Factor: 1.0.

Leachate Control

Leachate control is a more meaningful evaluation factor than rainfall because leachate control requirements vary greatly among the sites. Each site will experience some leachate generation due to the incidence of heavy rainfall during periodic very wet weather. The evaluation factor here is the relative significance of the leachate generation at each site, i.e., how sensitive is the area to the impact

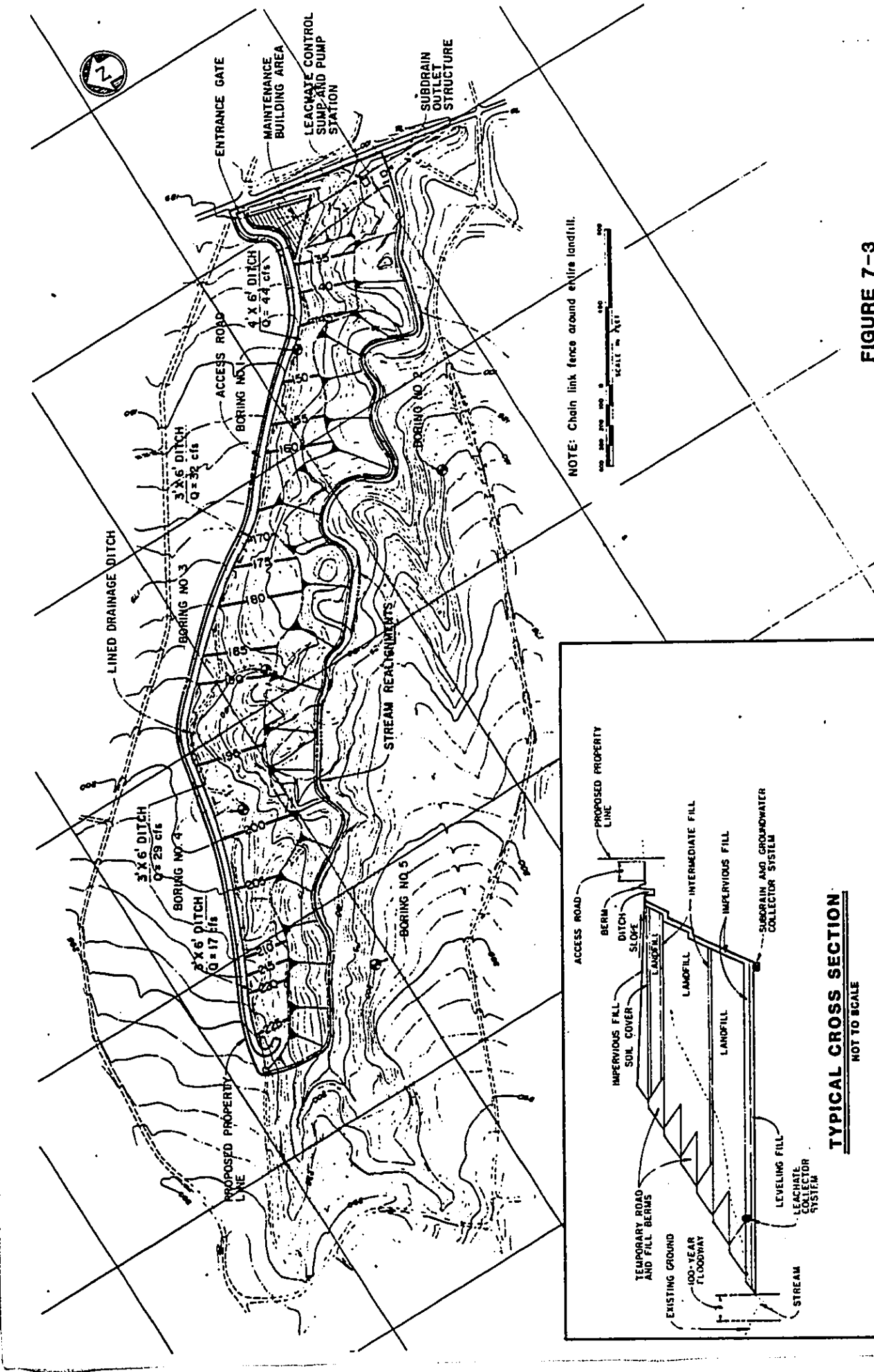


FIGURE 7-3

**DEVELOPMENT PLAN
KUMUKUMU LANDFILL SITE**

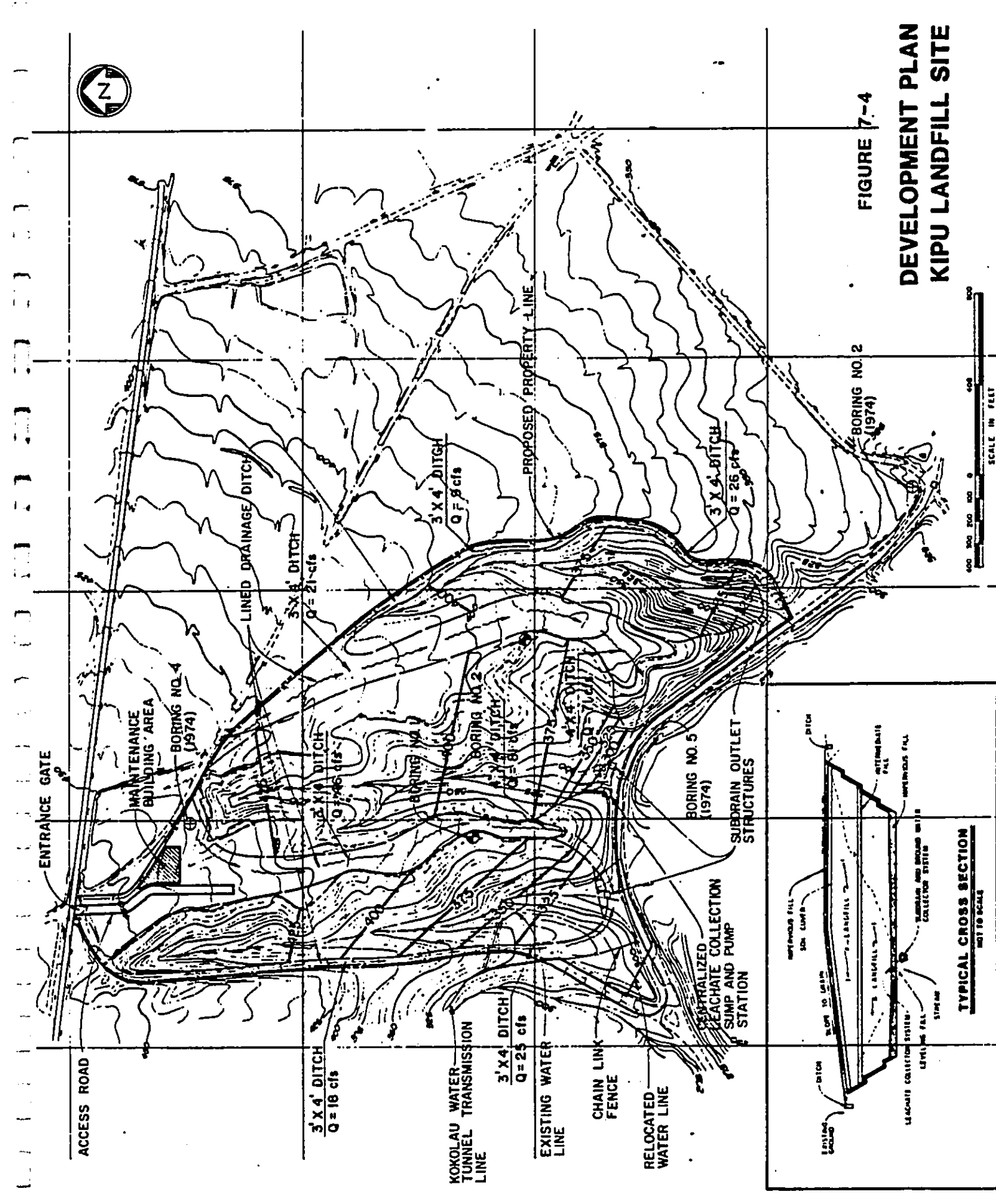
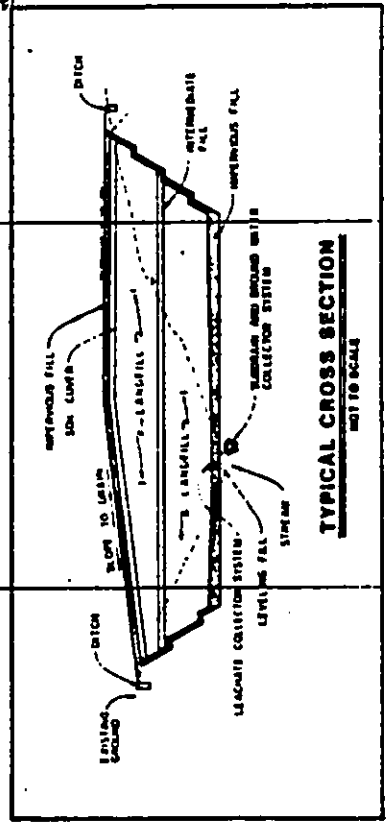


FIGURE 7-4
**DEVELOPMENT PLAN
 KIPU LANDFILL SITE**



of leachate and especially to the possible malfunction of the leachate control system. A site which would realize significant environmental impact from a malfunction of the leachate control system is rated as poor while a site which would not realize any significant environmental impact from a malfunction is rated as excellent. Rating Factor: 2.0

Environmental Impacts

This criteria evaluates the potential adverse environmental impacts caused by the development of a large sanitary landfill at the site. A low range of adverse impacts earned the site a rating of excellent and a high range of adverse impacts earned a poor rating. The adverse impacts of concern here are the impacts of the general landfill nuisances (noise, dust, odors, traffic, litter and visual intrusion) upon the physical, biota and human environments. Rating Factor: 3.0

Closure Concept

The closure concept is a concept for the ultimate use of the landfill site. This is an important consideration since the "active" period of the landfill is 20 years plus while the "closed" period is essentially forever. A very limited use would earn a "poor" rating while some beneficial use would earn a higher rating as appropriate. Rating Factor: 1.0

7.2.2 Land Systems Evaluation

7.2.2.1 Kumukumu

On-Site and Off-Site Costs (Table 7-1)

The 20-year present worth on-site and off-site costs are above the average of the five systems so the rating is Average to Fair (5).

Landfill Life Extension

The Kumukumu landfill has a limited capability for expansion by raising the landfill level considerably above the level of the

TABLE 7-1

COSTS OF ALTERNATIVE LANDFILL SYSTEMS
FOR 20-YEAR LIFE*

Landfill System	On-Site Development Costs (\$)	On-Site Operation and Maintenance Costs (\$)	Off-Site Costs (\$)	Total Costs (\$)
1. Kumukumu	10,100,000	7,029,000	7,320,000	24,449,000
2. Kipu	14,181,000	4,693,000	6,045,000	24,919,000
3. Kekaha	6,472,000	5,628,000	11,138,000	23,238,000
4. Kumukumu-Kekaha	8,956,000	7,787,000	6,894,000	23,637,000
5. Kipu-Kekaha	12,532,000	6,077,000	6,170,000	24,779,000
			AVERAGE TOTAL COST	\$24,204,000

*All costs are based on Present worth. Present worth is the amount of money which would have to be set aside at the present time to meet the anticipated escalated costs of each system over the 20-year period, using an assumed interest return on the set-aside monies of 7-5/8 percent, as prescribed by the EPA. Present worth calculations are essential for system cost comparisons over a period of time.

surrounding cane land. This expansion capability beyond the minimal 20-year life is believed to be less than could be realized at Kekaha so the landfill life rating is Poor (2).

Leachate Control

Leachate control at Kumukumu is relatively complex in that a new expansion of the leachate control system must be developed for each increment of landfill development. Disposal of leachate will be by irrigation of the landfill by pumping up from the collection sump. The relatively moderate level of rainfall will minimize the collection and disposal problems. Malfunctioning of the leachate control system would not be a severe problem because escaping leachate would move directly downstream for a distance of approximately one-half mile through cane land to the ocean shoreline which is uninhabited and characterized by surf action and good circulation. The high dilution quickly achieved in the nearshore area is evidenced by the rapid disappearance of the turbid stream water presently entering the ocean. Any uncontrolled leachate entering the stream would be a violation of State Water Quality Standards. The leachate control criteria at Kumukumu is therefore rated as Fair (4).

Environmental Impacts

Environmental impacts at the Kumukumu site will not be significant. The site is essentially out of visual range and well screened from the highway by trees. There are no endangered plants or animals in the area. The little village of Kumukumu is located approximately 1,200 feet south of the site. However, the access road is located on the opposite side of the site from the village. There should be no adverse visual, noise or air quality impacts upon the village residents. There will be a significant loss of approximately 24 acres of productive cane land for access road, drainage and cover material requirements. There would be no adverse impact upon the existing Kealia water well located

approximately 1.5 miles south of the site. The Underground Injection Control line around the island perimeter includes the landfill site as an exempted aquifer, thereby enabling use of the site for landfill purposes. The environmental impact criterion at Kumukumu is rated as Average (6).

Closure Concept

The existing gulch land is essentially unused except for the cane land in the makai bottom land. The closure concept here would be to build the landfill up to the level of the surrounding cane or higher and to provide a well drained, vegetated and impermeable cover which would be suitable for open space, pasture, or light agricultural use. Preparation of the closed landfill for growing sugarcane is not planned. It could be done but would be relatively expensive since an additional cover of at least four feet of soil would be required. Also, the use of furrow or drip irrigation would be counter-productive to the objective of minimal leachate production. The closure concept rating is Average (6).

7.2.2.2 Kipu

On-Site and Off-Site Costs (Table 7-1)

The 20-year present worth on-site and off-site costs for Kipu are the most expensive of the five systems sites costs so the rating is Average to Fair (5).

Landfill Life Extension

The Kipu site has a limited capability for expansion by raising the landfill above the level of the surrounding land. This expansion capability is believed to be significantly less than the expansion capability of the Kekaha site so the rating is Poor (2).

Leachate Control

Leachate control at the Kipu site will be relatively complex in that each of the three gulches must have its own collection and disposal system. Collection of leachate will be relatively higher at Kipu because of the higher rainfall. Malfunctioning of the leachate control system could be a serious problem because gulch drainage of the escaping leachate would be downstream and into the adjacent (250' distance) Huleia Stream which flows into the protected waters of the wildlife refuge near the Menehune Fishpond. The leachate control criterion at Kipu is therefore rated Poor (2).

Environmental Impacts

The adverse environmental impacts at the Kipu site would be significant. The existing potable water system draws water from a nearby tunnel and transports it by pipeline through the landfill site, requiring expensive rerouting around the site and special precautions to ensure no contamination of the water supply by landfill leachate. The small village of Kipu is located approximately 2,000 feet south of the site but should not be significantly affected by noise, visual or air quality impacts. Clearing of the landfill site will mean the destruction of approximately 30 acres of a forest of large trees (pine and eucalyptus). The Underground Injection Control lines does not yet exempt the Kipu landfill site so that the site would probably not be acceptable to the State Department of Health. The environmental impact rating of the Kipu site is believed to be Poor (2).

Closure Concept

The existing gulch land is unused. The closure concept is to build up the landfill to the level of the surrounding cane land or higher. It will also provide for a well drained, vegetated and impermeable cover which would be suitable for open space,

pasture or orchard use. Preparation of the closed landfill for growing sugarcane is not planned. It could be done but would be relatively expensive since an additional cover of at least 4 feet of soil would be required. Also, the use of furrow or drip irrigation would be counter-productive to the objective of minimal leachate production. The closure concept rating is believed to be Average (6).

7.2.2.3 Kekaha

On-Site and Off-Site Costs (Table 7-1)

The 20-year present worth on-site and off-site costs are the lowest of the five systems so the rating is believed to be Good to Average (7).

Landfill Life Extension

The Kekaha landfill has an excellent capability for expansion by raising the landfill height. This is limited only by the need to maintain a relatively low landfill profile in this coastal sector for aesthetic reasons. Additional cover material is available on-site. The landfill life extension capability is therefore believed to be Excellent (10).

Leachate Control

Leachate control at Kekaha has been and can continue to be ignored because the underlying water table is brackish and has no potential for drinking water. Very little leachate will be generated in this region of very low rainfall but some will occur during the periodic heavy storm events. Any leachate generated will move with the groundwater and be filtered through the sand as it moves toward the ocean approximately 500 to 2,000 feet west from the site. The leachate should be well diluted before entering the ocean where it would be diluted further by the open ocean coastal waters. To ensure the water quality of coastal waters, monitoring wells will be installed to provide a means to

determine if leachate from the landfill is in excess of that anticipated. The leachate control at Kekaha is therefore believed to be Excellent (10).

Environmental Impacts

The Kekaha site is approximately 1.3 miles west of the town of Kekaha and therefore will have no significant impact on area residents. Nearby is a National Guard Rifle Range that is used only infrequently. A drag strip is used for recreational use primarily on weekends. There should be no use conflict with these activities in the expansion of the existing landfill into the adjacent areas. The existing roads to these activities will be maintained. Much of the proposed expansion area is under a month to month lease to the Kekaha Sugar Company by the State Department of Land and Natural Resources for agricultural use but is not now in productive use. The expansion area is generally littered with trash, especially junk cars. The existing vegetation is some scrub growth with grasses. An adverse environmental impact will be the continued use of the sand resource as a cover material. The site is one mile west of the Kekaha Garden development and one mile east of the Navy housing area. The environmental impact rating of the site is believed to be Excellent (10).

Closure Concept

The closure concept at Kekaha is to develop a relatively low landfill mound with a vegetated cover that will be stable against erosion and with a visual aspect that is not unattractive. The cover material will be essentially sand so the landfill side slopes must be relatively flat for stability. The ultimate use will be open space or crop land. Seed corn and/or sugarcane could be grown on top of the landfill as it is now on the adjacent lands. The closure concept at Kekaha is rated as Good (8).

7.2.2.4 Kumukumu-Kekaha

On-Site and off-Site Costs (Table 7-1)

The on-site and off-site costs are relatively low and near the average of the cost range of the five systems so the rating is Good to Average (7).

Landfill Life Extension

The solid waste volume generated in Koloa and Hanapepe will be transported to Kekaha, with the remainder of the island's solid waste being transported to Kumukumu. This will extend the landfill life at Kipu and at Kumukumu. Each will also have the additional expansion capabilities as described above. The landfill life extension rating is therefore Excellent (10).

Leachate Control

The leachate control rating of the two sites can be described simply as the average of the two individual sites. The leachate control rating of this system is therefore Good to Average (7).

Environmental Impacts

The environmental impact of the two sites can be described as the average of the two individual sites. The environmental impacts rating is therefore Good (8).

Closure Concept

The closure concept of the two sites can be described as the average of the two individual sites. The closure concept rating is therefore Fair (4).

7.2.2.5 Kipu-Kekaha

On-Site and Off-Site Costs (Table 7-1)

The on-site and off-site costs of the two sites are in the above average range of costs for the five systems and the rating is therefore Good to Average (7).

Landfill Life Extension

Under this combination of landfills the landfill life at each of the two sites will be extended due to the reduced landfill at each site. In addition, each of the landfills has its own landfill life extension capability. The overall landfill life extension capability is therefore Excellent (10).

Leachate Control

The leachate control rating of the two sites can be evaluated as the average of the two individual sites. The leachate control rating is therefore Average (6).

Environmental Impacts

The environmental impacts rating of the two sites can be evaluated as the average of the two individual sites. The environmental impacts rating is therefore in the range between Poor and Excellent for a rating of (6).

Closure Concept

The closure concept rating of the two sites can be evaluated as the average of the two individual sites. The closure concept rating is therefore Good to Average (7).

7.2.3 Comparative Analysis of Landfill Systems

An evaluation matrix, Table 7-2, presents the numerical ratings and factored ratings for each criteria as applied to each of the five candidate systems. The table sums the factored rating evaluations for each system, permitting the relative ranking as indicated in the table.

The evaluation matrix does accomplish the desired sorting and permits the identification of the system best suited for preliminary design. The evaluation matrix indicates Kekaha as the optimum site and was the basis for its selection as the island-wide sanitary landfill.

TABLE 7-2

SYSTEM EVALUATION MATRIX

LANDFILL SYSTEM	EVALUATION CRITERIA: RATING/FACTORED RATING					(6) Factored Rating Total	(7) Relative Ranking
	(1) On-Site & Off-Site Costs 3.0	(2) Landfill Life Extension 1.0	(3) Leachate Control 2.0	(4) Environ. Impacts 3.0	(5) Closure Concept 1.0		
(A) Kumukumu	5/15	2/2	4/8	6/18	6/6	49	4
(B) Kipu	5/15	2/2	2/4	2/6	6/6	33	5
(C) Kekaha	7/21	10/10	10/20	10/30	8/8	89	1
(D) Kumukumu-Kekaha	7/21	10/10	7/14	8/24	7/7	76	2
(E) Kipu-Kekaha	5/15	10/10	6/12	6/24	7/7	68	3

LEGEND: Rating Description Numerical Rating Value

Excellent	10
Good	8
Average	6
Fair	4
Poor	2

7.3 ALTERNATIVE DISPOSAL OR PROCESSING METHODS

There are four alternative disposal or processing methods available for landfilling operations. These include shredding, incineration, baling and resource recovery. Resource recovery methods include composting, pyrolysis, recycling, steam and energy generation. These alternative methods do not eliminate the need for a landfill because the residue they produce must still be disposed of. However, they can extend the lifespan of the landfill by greatly reducing the volume of solid wastes.

Resource recovery is a process by which energy and/or materials are recovered from refuse and is another means of reducing the amount of solid waste to be landfilled. It is of increasing importance in Hawaii. All four Counties in the State are in some stage of developing a resource recovery plan. The County of Kauai is presently analyzing the resource recovery alternatives of a refuse-derived fuel (RDF) facility at the Lihue Plantation Company sugar mill in Lihue and a mass-burning modular incinerator at the McBryde sugar mill in Koloa. Although environmentally attractive, the economic success of this venture depends on a number of factors. These factors include alternative disposal costs, the market demand for resource recovery products generated (recovered materials, soil conditioners and energy), financing, climate, availability and control of wastes and citizen acceptance.

7.3.1 Shredding

A major advantage of the shredding process is that it reduces the volume of solid waste and converts it into a relatively homogeneous material. The machinery required for this process is commercially available in various types. The most commonly used is the hammermill. An important consideration in choosing the equipment is the size of the particles produced. This size consideration is important with regard to the process following shredding, i.e., energy recovery, disposal or a combination of both. The various advantages and disadvantages of shredding are enumerated in Table 7-3.

TABLE 7-3*

ADVANTAGES AND DISADVANTAGES OF ALTERNATE
DISPOSAL OR PROCESSING METHODS

METHOD	ADVANTAGES	DISADVANTAGES
Shredding	<p>Significantly reduces solid waste volume.</p> <p>A large portion of solid waste can be shredded.</p> <p>Reduced volume provides an advantage in hauling, handling and landfilling.</p> <p>Shredded waste is easily compacted and can extend the life of the landfill.</p> <p>When compacted, a landfill has fewer voids than unprocessed waste density and is 25 to 60 percent greater depending if daily coverages is required.</p> <p>Does not attract vectors, support combustion, have an objectionable odor or lead to littering.</p> <p>Produces a more uniform fuel for incineration. The problem of agitating the fuel to prevent uneven fire beds is minimized.</p> <p>Produces a uniform material so it is a common prerequisite for composting.</p> <p>Public acceptance to shredding facilities have been relatively good in comparison to acceptance of more conventional solid waste processing or disposal facilities.</p> <p>Compared to other reduction processes, the initial investment and operation cost is relatively low.</p>	<p>Some waste cannot be introduced into a shredder system due to size, density, high moisture content, hazardous qualities or any other qualities requiring specialized handling in any system.</p> <p>Municipal solid waste is known to have a high percentage of flammable materials which have started fires in the shredder.</p> <p>There is a potential for explosions within the shredder due to explosive materials which may enter the facility.</p> <p>Shredders are noisy and are dust producers so the entire operation must be enclosed with dust collectors installed.</p> <p>Uneven feeding or jamming of the shredder can significantly reduce the output of the mill.</p>
Incineration	<p>Solid waste is reduced in both weight and volume.</p> <p>Reduces refuse quickly and efficiently.</p> <p>Reduced volume is advantageous in terms of hauling, handling and landfilling.</p> <p>Can extend landfill life significantly.</p> <p>It is adaptable to energy recovery processes such as steam generation and recovery of minerals from the residue.</p>	<p>Requires large capital expenditures and has high operating costs.</p> <p>Skilled labor is required for the operation and maintenance of the facility.</p> <p>Improper operations can result in air, water and land pollution.</p> <p>Residents may object to having an incinerator in their neighborhood.</p>
Baling	<p>Can almost double the lifespan of a landfill.</p> <p>Can handle most types of solid wastes.</p> <p>Bales are easier to transport and to handle.</p> <p>Cost is comparable to cost of other forms of solid wastes.</p> <p>Allows more immediate use of the disposal site since only a minimal amount of settling is anticipated.</p>	<p>A greater initial investment is required than with a conventional transfer station handling the same amount of solid waste.</p> <p>A resource recovery system cannot be used in conjunction with this process once a bale has been formed.</p> <p>Presently, data on the economics and effects of baling on decomposition, gas and leachate formation and settling are incomplete.</p>

*From EIS for the Proposed Leeward Sanitary Landfill.

TABLE 7-3 - CONTINUED

ADVANTAGES AND DISADVANTAGES OF ALTERNATE DISPOSAL OR PROCESSING METHODS

METHOD	ADVANTAGES	DISADVANTAGES
Composting	<p>Reduces the volume and weight of refuse.</p> <p>Extends the lifespan of a landfill.</p> <p>The end product can be used as a soil conditioner to improve soil characteristics.</p>	<p>Municipal refuse does not contain the necessary amount of nitrogen to ensure proper digestion. This means a supplemental source of nitrogen must be introduced.</p> <p>A composting facility requires a large amount of land for the process.</p> <p>The organic matter undergoing decomposition is an attractant to vectors and generates odor.</p> <p>The total amount of solid waste is not accounted for in the process because of the required separation of organic refuse from inorganic.</p> <p>It becomes uneconomical when applied on a large scale due to the high cost of application to land.</p> <p>Sale of the end product is dependent on the market.</p>
Pyrolysis	<p>It reduces the weight and volume of solid wastes which facilitates its handling.</p> <p>Landfill life is extended.</p> <p>The process is not influenced by weather conditions.</p> <p>A liquid or gas fuel can be produced by this process from solid waste.</p>	<p>The system requires skilled operators.</p> <p>If an efficient production of fuel is required, shredding and separating is required prior to pyrolysis.</p> <p>Impacts which may occur during operation of the facility include noise, dust, thermal atmospheric discharge and contaminated wastewater.</p> <p>The cost for this process is high.</p>
Recycling	<p>Conserves irreplaceable resources.</p> <p>Reduces the quantity of refuse to be disposed thereby increasing the landfill life.</p> <p>Recovered material can lower disposal costs.</p> <p>Siting of a resource recovery facility would possibly generate less opposition than a landfill due to public concern with conservation.</p>	<p>Aside from aluminum, Hawaii has little demand for secondary materials since the Islands are not a major manufacturing center.</p> <p>The degree of risk varies with the complexity of the system.</p> <p>The economies of any system are based on projected maintenance costs, separation systems, an assumed value for the product and a market for the secondary materials.</p>

TABLE 7-3 - CONTINUED

ADVANTAGES AND DISADVANTAGES OF ALTERNATE
DISPOSAL OR PROCESSING METHODS

METHOD	ADVANTAGES	DISADVANTAGES
Steam and Power Generation	<p>It reduces the volume and weight of solid waste to be disposed of.</p> <p>Landfill life is extended.</p> <p>Produces an alternate energy source which reduces dependency on conventional fuels while disposing of solid wastes.</p>	<p>Skilled operators are required.</p> <p>A large amount of land and water is required for the facility and for processing.</p> <p>This system requires prior processing before refuse can be used as fuel.</p> <p>Conventional fire support systems are required as a backup system in case refuse quantities are insufficient.</p> <p>Adverse impacts are operationally related and include possible air pollution by thermal, gas and particulate discharges, water pollution from contaminated wastewater discharges, noise, dust and traffic operation.</p>

7.3.2 Incineration

The process of incineration involves a controlled combustion that reduces solid, liquid or gaseous solid wastes into carbon dioxide, other gases and a relatively noncombustible residue. It can reduce the volume of solid wastes introduced into the system by as much as 80 to 90 percent thereby considerably extending the life of a landfill.

This system is, however, one of the most costly alternatives. This is due to the increasing strict air pollution control requirements set forth by the Federal government and higher construction costs. Additionally, it would exceed the cost of a resource recovery facility because energy and metal would not be recoverable and sold to offset the cost of the facility. The advantages and disadvantages of incineration are listed in Table 7-3.

7.3.3 Baling

Baling is another means of reducing the volume of solid waste that must be landfilled. When transfers and long hauls are necessary to dispose of solid waste it can save on costs. It not only can extend the life of the landfill but the handling and transport of wastes becomes easier. The advantages and disadvantages of this process are listed on Table 7-3.

7.3.4 Composting

Composting is another means of reducing the volume of solid wastes. The first step involves the separation of organic solid wastes from the inorganic fraction. The organic wastes are then decomposed at a rapid rate in open windrows or in a confined stand. The final product is a humus-like substance that is used primarily as a soil conditioner. However, in the United States, this has proven to be an extremely costly process and is being phased out. The failure of composting as a viable alternate disposal method rests on four factors; (1) there has been no steady market found for the end product; (2) the initial investment and the operating costs have been found to be generally high when compared to other disposal systems; (3) a high quality product cannot be derived from refuse without excessive

expense; and (4) the separation of organic from inorganic wastes requires a secondary disposal method, i.e., landfilling. The pros and cons of this process are discussed in Table 7-3.

7.3.5 Pyrolysis

Pyrolysis involves the thermal decomposition of refuse in an anaerobic or near anaerobic condition. The high temperatures generated and the lack of oxygen breaks the materials down into three parts. The first is a gas which is primarily hydrogen, methane and carbon monoxide. The second product is a liquid fuel which includes organic chemicals (acetic acid, acetone and methanol) and lastly a char is produced which is composed of almost pure carbon and includes any glass, metal or rocks that may have been included in the initial material. The end result desired is the conversion of solid wastes into a storable, transportable liquid or gas fuel. Table 7-3 outlines the advantages or disadvantages of this process.

7.3.6 Recycling

Recycling involves the recovery of materials from municipal refuse that can be marketed for reuse. There are basically two methods of recovery that are available. The first is recovery before refuse is placed within a collection vehicle as is often done in Hawaii with aluminum cans. The second method is recovery from the mixed municipal refuse after its collection.

Types of materials that are recoverable include paper, glass and metal containers. These are generally separated at the source of generation and directly transported to a dealer in recycled material or to a manufacturer. In Hawaii, the largest market is in aluminum cans which has been steadily increasing. Landscape trimmings for composting, steel and paper are not viable markets here. Table 7-3 discusses the advantages and disadvantages of a resource recovery program.

7.3.7 Steam and Power Generation

The generation of energy from municipal refuse can be achieved with a system utilizing a waterwall incinerator. "Waste" heat generated by the

burning of solid wastes is transferred to a boiler system. This mechanism is composed of water-filled tubes placed within the furnace lining. The steam which is generated is piped to users or can be sold or converted to electrical energy by means of steam turbines.

Solid waste which fuels the furnaces can either be burned in bulk or go through processing to remove combustible materials. The process would involve shredding, drying and air separation and metals may also be recovered. The combustible materials separated is then incinerated and the thermal energy produced generates steam.

The cost involved with this system is high. A refuse processing plant may be required to prepare refuse as an acceptable fuel. Table 7-3 enumerates the pros and cons of this system.

SECTION 8

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES AND THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENCHANCEMENT OF LONG-TERM PRODUCTIVITY

8.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The project will require the irreversible and irretrievable commitment of a number of resources. These include the materials and capital to be invested in the proposed expansion of the landfill and the manpower and energy to be used to operate and maintain the facility.

The site development will utilize resources and materials essential for the completion of the project. Financial, manpower and material resources will be irretrievably committed for planning, engineering, construction, operation and maintenance of the landfill. Energy will be irreversibly committed not only for the landfill site development but for its continued operation and maintenance. These commitments also apply to the operation and maintenance of the off-site solid waste system composed of truck-tractors and trailers and transfer stations.

The major commitment of land for expansion at the site will be irreversible and irretrievable. The use of the site for a landfill eliminates it from other uses during filling operations. However, the site is not a significant wildlife habitat nor are there any endangered species known to the area.

Once closure of the landfill is completed, it can only be utilized for a limited number of uses. The uneven, long-term settlement of the landfill and the generation of potentially hazardous landfill gas (methane) will deny the future development of the site for residential or urban construction. However, it can be returned to use as a wildlife habitat, open space or for limited recreational, agricultural or grazing purposes. The ability to reclaim energy and materials through resource recovery techniques from the buried solid waste will be lost.

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

Solid wastes will be continuously and increasingly produced in the foreseeable future. A safe and efficient means of disposal must be available to the people of Kauai. A sanitary landfill, properly operated, is safe and can be relatively odorless, free of vector problems and with a minimum generation of litter and dust. The landfill is presently the most efficient and economical means for the disposal of solid wastes on Kauai. Even with the implementation of a resource recovery system, a landfill must still be available for the disposal of residue. However, resource recovery can significantly increase the effective life of a landfill. Resource recovery on Kauai is still several years away from realization so a full-scale landfill operation is required now and for the foreseeable future.

The maintenance and enhancement of long-term productivity on the Island of Kauai is essential for the desired social and economic growth of the island's population. The proposed landfill project will require intensive use of the landfill's local environment over the next 20 to 30 years of landfilling to ensure the desired long-term, island-wide productivity. There does not appear to be any acceptable alternative to this use.

SECTION 9

OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES
BELIEVED TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE
PROPOSED ACTION

Compliance with environmental regulations helps to offset the adverse effects of the proposed action. The project complies with the policies set by the Hawaii Statute on Environmental Quality (Chapter 342, Hawaii Revised Statutes).

The Coastal Zone Management Program has developed objectives and policies for all significant actions affecting the State's coastal zone. The proposed project complies with these objectives and policies in that it will provide an essential public facility with a minimal adverse impact upon the coastal environment.

The State Environmental Policy Act, Chapter 344, Hawaii Revised Statutes, has developed policies and guidelines "which will encourage productive and enjoyable harmony between man and his environment, promote efforts which will prevent or eliminate damage to the environment and biosphere, and stimulate the health and welfare of man, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii." In accordance with this policy, the County of Kauai is proposing to expand the existing sanitary landfill at Kekaha because it represents the optimum choice of many alternatives analyzed in detail.

To efficiently utilize the landfill to its maximum capacity, the County is also undertaking a study for a possible resource recovery program for Kauai. This program, if successfully established, can significantly extend Kekaha Landfill's effective life beyond its projected 30-year lifespan.

SECTION 10
SUMMARY OF UNRESOLVED ISSUES

A possible unresolved issue is the potential effect of leachate on endangered waterbirds utilizing drainage ditches in the project vicinity. The unresolved issue of the direction of leachate migration should be resolved by further studies now being performed by the County of Kauai.

At the present time it is unresolved what means of disposal is to be used for construction/demolition, earthfill materials, abandoned cars and large trees.

Further issues may develop as a result of the planned public meeting on the selection of the existing Kekaha Landfill site for further expansion.

SECTION 11
LIST OF NECESSARY APPROVALS

The expansion of the Kekaha sanitary landfill will require a number of State and County government permits. These are listed below:

11.1 STATE OF HAWAII

Department of Land and Natural Resources:

Conservation District Use Application (CDUA)

Department of Health:

Solid Waste Management Permit
Conditional Use Permit for Construction Activities

State Land Use Commission:

Special Use Permit

11.2 COUNTY OF KAUAI

Department of Public Works:

Zoning
Use
Special Management Area
Grading
Grubbing
Stockpiling

SECTION 12
ORGANIZATIONS AND PERSONS CONSULTED

U. S. Geological Survey²
U. S. Army Corps of Engineers
State Department of Health²
State Department of Land and Natural Resources^{1,2}
 Division of Land Management²
 Division of Forestry and Wildlife
 Division of Parks, Outdoor Recreation and Historic Sites²
 Division of Aquatic Resources
State Department of Land Utilization
State Department of Planning and Economic Development
State Department of Transportation
Water Resources Research Center, University of Hawaii^{2,3}
Hawaii National Guard
County Department of Water^{2,3}
County Planning Department
County Department of Public Works
Lihue Plantation Company
Northrup King Co. (Pride Seed Division)
McBryde Sugar Company
AMFAC Sugar Company
Kekaha Sugar Company, Ltd.
Fewell Geotechnical Engineering, Ltd.
W. A. Hirai and Associates, Inc.
Kauai Electric Company
Archaeological Research Center Hawaii, Inc.
Ms. JoAnn Yukimura¹
Mr. John Mink

Footnotes:

¹Requested to be a Consulted Party

²Comments Received

³No Response Required

BIBLIOGRAPHY

1. Belt, Collins & Associates, Ltd., "Waimea Kekaha Regional Development Plan" prepared for the County of Kauai, September 9, 1977.
2. Belt, Collins & Associates, Ltd., "Supplement Waimea Kekaha Regional Development Plan" prepared for the County of Kauai, September 9, 1977.
3. Environment Impact Study Corporation, "Environmental Impact Statement for the Proposed Kapaa Sanitary Landfill Expansion (Windward District Sanitary Landfill Project)," prepared for Stanley S. Shimabukuro and Associates, Inc., September 1977.
4. Environment Impact Study Corporation, "Environmental Impact Statement for the Proposed Leeward Sanitary Landfill (Leeward District Sanitary Landfill Project)," prepared for Stanley S. Shimabukuro and Associates, Inc., October 1977.
5. Hawaii Audubon Society, "Hawaii's Birds," Honolulu, 1981.
6. Hawaiian Sugar Planters' Association, "1982 Hawaiian Sugar Manual," Honolulu, 1982.
7. Kennedy Engineers, "Sanitary Landfill Study, Solid and Hazardous Waste Disposal Plan," prepared for the Department of the Army, Pacific Ocean Division, Corps of Engineers, November 1980.
8. MacDonald, Gordon A. and A. T. Abbot, "Volcanoes in the Sea," The Geology of Hawaii," The University Press of Hawaii, 1977.
9. MacDonald, Gordon A., Dan A. Davis and Doak C. Cox, "Geology and Ground-Water Resources of the Island of Kauai, Hawaii," Hawaii Division of Hydrography, Bulletin 13, 1960.
10. Planner's Collaborative, "1982 Kauai General Plan Update, Summary of Findings and Recommendations," prepared for the County of Kauai, June 1982.
11. R. M. Towill Corporation, "Feasibility Report, Kipu Sanitary Landfill," prepared for the County of Kauai, Department of Public Works, 1977.
12. R. M. Towill Corporation, "Identification of Potential Landfill Sites - Phase I of Island-Wide Site Survey and Feasibility Study," prepared for the County of Kauai, Department of Public Works, December 1979.
13. R. M. Towill Corporation, "Site Feasibility Report - Phase II of Island-Wide Site Survey and Feasibility Study," prepared for the County of Kauai, Department of Public Works, May 1981.

14. R. M. Towill Corporation, "Preliminary Engineering Report, Kauai Island-Wide Landfill," prepared for the County of Kauai, Department of Public Works, March 1983.
15. Spencer, Koebig & Koebig, "Solid Waste Management Program," prepared for the County of Kauai, April 1974.
16. State of Hawaii, "State Functional Plans," May 3, 1982.
17. State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development, "A General Plan for Domestic Water/Island of Kauai," in cooperation with the Department of Water, County of Kauai, Report R40, February 1972.
18. State of Hawaii, Department of Planning and Economic Development, "The State of Hawaii Data Book - 1982, A Statistical Abstract," November 1982.
19. U. S. Department of Agriculture, Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," in cooperation with the University of Hawaii, Agricultural Experiment Station, August 1972.
20. University of Hawaii, Department of Geography, "Atlas of Hawaii," The University Press of Hawaii, 1980.
21. W. A. Hirai & Associates, Inc., "Resource Recovery from Solid Wastes - Phase I" prepared for the County of Kauai, Department of Public Works, July 30, 1982.

APPENDIX A
FLORA AND FAUNA SURVEY



HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
KAUAI DISTRICT
P. O. BOX 1871
LIHUE, KAUAI, HAWAII 96766

August 6, 1982

Mr. Henry Morita
County Engineer
County of Kauai
Dept. of Public Works
4396 Rice Street
Lihue, Kauai, HI. 96766

The following is in response to your 19 July 1982 request for a flora and fauna survey at the Kumukumu and Kekaha candidate sanitary landfill sites:

A survey was conducted at Kekaha on July 30, 1982 and at Kumukumu on 6 August 1982. The attached list indicates those wildlife species actually seen at the respective areas, as well as those that were not seen, but are likely to be found there.

Both the Kekaha and Kumukumu sites are highly altered from once existing native conditions and are vegetated with exotic plants. I have also attached a list of plants known to occur at the candidate landfill sites; however, the list includes only the prominent plant species and does not constitute a botanically complete list. It is highly unlikely that any uncommon or rare native plants exist within the landfill sites.

No endangered wildlife species are known to occupy any of the candidate sites, although the Hawaiian Duck (koloa) and Hawaiian Gallinule may infrequently use portions of Kumukumu Stream. In my opinion, sanitary landfill use of any of the three proposed sites would not cause significant wildlife habitat degradation.

Please contact me should you desire additional assessment of the wildlife values in the project areas.

Sincerely yours,

Thomas C. Telfer
District Wildlife Biologist

cc: L. Landgraf
R. Daehler

WILDLIFE KNOWN TO EXIST OR LIKELY TO EXIST AT THE
CANDIDATE KEKAHA AND KUMUKUMU SANITARY LANDFILL SITES ON KAUAI

Common Name	Scientific Name	7/30/82	8/6/82
		Kekaha	Kumukumu
Black-Crowned Night Heron	<i>Nycticorax nycticorax hoactli</i>	I	I
Cattle Egret	<i>Bubulcus ibis</i>	EX*	EX
Golden Plover	<i>Pluvialis dominica</i>	I	I
Common Mynah	<i>Acridotheres tristis</i>	EX*	EX*
Barred Dove	<i>Geopelia striata</i>	EX*	EX*
Spotted Dove	<i>Streptopelia chinensis</i>	EX*	EX*
House Sparrow	<i>Passer domesticus</i>	EX	EX*
House Finch	<i>Carpodacus mexicanus</i>	EX*	EX
Mockingbird	<i>Mimus polyglottos</i>	EX	
Spotted Munia	<i>Lonchura punctulata</i>	EX	EX*
Northern Cardinal	<i>Cardinalis cardinalis</i>	EX*	EX
Hawaiian Owl	<i>Asio flammeus sandwichensis</i>	I	I
Barn Owl	<i>Tyto alba</i>	EX	EX
Western Meadowlark	<i>Sturnella neglecta</i>	EX	
Ring-Necked Pheasant	<i>Phasianus colchicus</i>	EX	EX
Black Francolin	<i>Francolinus francolinus</i>	EX	
Hwa-Mei (Chinese Thrush)	<i>Garrulax canorus</i>		EX*
Shama	<i>Copsychus malabaricus</i>		EX*
Japanese White-Eye	<i>Zosterops japonicus</i>		EX
Roof Rat	<i>Rattus rattus</i>	EX	EX
Norway Rat	<i>Rattus norvegicus</i>	EX	EX
Polynesian Rat	<i>Rattus exulans</i>	EX	EX
House Mouse	<i>Mus musculus</i>	EX	EX
House cat (feral)	<i>Felis catus</i>	EX	EX

I = Indigenous, EX = Exotic, * = Actually observed during survey
All other species listed are likely to exist, but were not seen.

List of Common Plants at Kumukumu Sanitary Landfill Site

Java Plum	Eugenia cuminii
Haole Koa	Leucaena glauca
Lantana	Lantana Camara
Ironwood	Casuarina equisetifolia
Christmasberry	Schinus terebinthifolius
Banana	Musa spp.
Passionflower	Passiflora spp.
Mauna Loa Vine	Canavalia cathartica
California grass	Brachiaria mutica

List of Common Plants at Kekaha Sanitary Landfill Site

Kiawe (Mesquite)	Prosopis pallida
Klu	Acacia farnesiana
Lantana	Lantana camara
Indian fleabane	Pluchea indica
Verbesina	Verbesina encelioides
Beach Wiregrass	Dactyloctenium aegyptium
Bermudagrass	Cynodon dactylon
Sandburr	Cenchrus echinatus
Amaranth	Amaranthus spp.
Haole Koa	Leucaena glauca
Cocklebur	Xanthium strumarium

APPENDIX B
ARCHAEOLOGICAL RECONNAISSANCE

ARCHAEOLOGICAL RESEARCH CENTER HAWAII, INC.
P. O. BOX 285
LAWA'I, KAUA'I, HAWAII 96765

4
August
1982

Mr. William E. Spencer, Jr.
Manager, Engineering Department
R.M. Towill Corporation
677 Ala Moana Blvd., Suite 1016
Honolulu, Hawaii 96813

SUBJECT: Archaeological Reconnaissance of
Three (3) Sites, for Proposed
Kaua'i Central Sanitary Landfill
Project, Kekaha and Kipu, Kona,
Kaua'i Island, and Kumukumu,
Puna, Kaua'i Island. ARCH Project
14-125 I.

Dear Mr. Spencer:

On August 4, 1982 Archaeological Research Center
Hawaii, Inc. conducted an archaeological reconnaissance
at the above subject areas. The purpose of an
reconnaissance is to determine the presence or absence
of archaeological sites. No archaeological sites or
any evidence of archaeological activity were discovered
at either the Kekaha or Kipu project locations. No
archaeological remains were discovered at the Kumukumu,
however, there is reason to believe that lo'i and other
archaeological sites once existed

within this study area. The study area has since been bulldozed and the land planted in sugar cane or turned into pasture land for cattle.

Based on our observations (which are described below), no further archaeological work is recommended.

KEKAHA - Part of this proposed sanitary land fill site is presently being used by the County of Kaua'i as a sanitary land fill; another part (to the north of the present sanitary land fill) is presently being used by Kekaha plantation to dump bagasse, before being used for this purpose this area was used as pasture lands and holding pens for cattle and horses owned by Kekaha Plantation; the entire project area has been bulldozed countless times. In general, before the land was modified by the plantation and others in the 1930's the area back of the sand dunes was a large natural fishpond (this drained and filled and sugar cane planted in its place). The major archaeological sites in the area are located along the base of the ridges and in the valleys north of the study area. The only things that one might expect to find in the study area would be the usual fishing shelters, fishing shrines and burials; no trace of any of these can be seen today. Burials, however, can be expected in those areas of the dune which have not been modified too badly but these areas are all outside of the project boundaries. The vegetation here consists mainly of kiawe and koa haole. No further archaeological work is recommended within the project area.

KIPU - The tops of the bluffs in this project area are presently planted in sugar cane and, therefore, it was not walked. All of the gulches were walked and no archaeological remains were discovered. The vegetation consists of groves of large kukui, two large koa trees, ti, a great deal of none, Java plum, ironwood pine, mango, grasses, lantana, a beautiful stand of large Norfolk island pine, guava, strawberry guava, woodrose, sword tail fern, castor bean and assorted grasses. No archaeological remains were discovered here and no further archaeological work is recommended for the Kipu sanitary landfill project area.

KUMUKUMU - Of the three study areas, we expected to find archaeological remains at this one. The reason being that according to the project maps the study area is located fairly close to the sea, it has a running stream and there are flat areas adjacent to the stream which appeared suitable for lo'i cultivation. Our field inspection showed us, however, that the low lands on the makai side of the project area are presently under cane cultivation, while the mauka portion of the

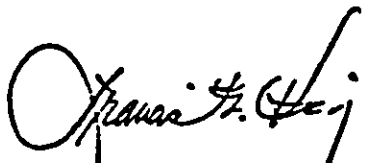
Letter Report ARCH 14-125 I
Aug. 4, 1962
Page 3

project area has been bulldozed and the land turned into pasture. The low lands adjacent to the stream are indeed suitable for lo'i and kula agriculture but all traces of lo'i and other planting terraces have been bulldozed away. No archaeological sites were discovered; however, we did find wild taro near the stream. In addition to the taro, there is also, banana, koa haole, java plum, lili wai, monkey pod, guava, lawa'i, swordtail fern, african tulip, "octopus tree", and maninia and other assorted grasses and bushes. No further archaeological work is recommended.

If you have any questions concerning the above or if I can be of further assistance to you please do not hesitate to contact me.

Na Kau a Kau,

ARCHAEOLOGICAL RESEARCH CENTER HAWAII, INC.



Francis K.W. Ching
President

Enclosure: Statement

APPENDIX C

COMMENTS AND RESPONSES DURING THE
CONSULTATION AND EISPN REVIEW PROCESS

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 243-3318

CLAY KAGAWA
DEP. COUNTY ENGINEER
TELEPHONE 243-3302



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
4396 RICE STREET
LIHUE, KAUAI, HAWAII 96746

August 2, 1983

TONY T. KUNIMURA
MAYOR

ENGINEER
PUBLIC WORKS
4396 RICE STREET
LIHUE, HAWAII 96746



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF LAND MANAGEMENT
P. O. BOX 200
LIHUE, HAWAII 96746

June 15, 1982

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

Subject: Comments concerning Island-wide Sanitary
Landfill - Preliminary Engineering Report
and Draft EIS Preparation Notice - Kauai

Dear Sir:

If State land at Kekaha were to be selected as the site for the central landfill, we would suggest that before the conveyance be made, the County be asked to develop clear-cut procedures to minimize the extensive dumping which occurs on State lands around the dump site.

This might have to include off-hour and weekend enforcement by County personnel.

Thank you for the opportunity to comment.

Very truly yours,

Sam Lee
SAM LEE
Land Agent

cc: Mr. James J. Dator
Mr. Takeo Yamamoto

Mr. Sam Lee, Land Agent
Division of Land Management
Department of Land and Natural Resources
State of Hawaii
P. O. Box 3390
Lihue, HI 96766

Dear Mr. Lee:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE KAUAI
ISLAND-WIDE LANDFILL PROJECT

We are responding to your letter dated June 15, 1982 on the draft Environmental Impact Statement Preparation Notice as recently requested by the Office of Environmental Quality Control.

It was suggested by your agency that:

"...the County be asked to develop procedures to minimize the extensive dumping which occurs on State lands around the dump site.

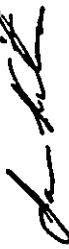
This might have to include off-hour and weekend enforcement by County personnel."

It is felt that due to the relative remoteness of the landfill site security fencing will not be required to enclose the entire site. Only the maintenance area will have such fencing surrounding it. This will enable public access to the working face of the landfill during off-hours. The

Mr. Sam Lee, Land Agent
August 2, 1983
Page -2-

landfill will be operated on an eight-hour day, seven days a week schedule which will allow the general public to bring in their refuse any day of the week. This should encourage the dumping of refuse at the landfill site rather than in the surrounding off-site areas. County personnel at the landfill during working hours can discourage such off-site dumping.

Very truly yours,



LAWRENCE KITAMURA
County Engineer

/sb



GEORGE S. ANTONOFF
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 507
LIHUE, KAUAI, HAWAII 96766

GEORGE S. ANTONOFF
DIRECTOR OF HEALTH
JOHN F. COULSON, M.D., M.P.H.
CHIEF SANITARIAN
WALTER H. THOMPSON, M.D.
DEPUTY CHIEF SANITARIAN
MELVIN A. ELLIOTT
DEPUTY CHIEF OF HEALTH
WALTER LINDSEY, M.D., M.A., M.S.
DEPUTY CHIEF OF HEALTH

June 23, 1982

Mr. Henry Morita
County Engineer
County of Kauai
4396 Rice Street
Lihue, Hawaii 96766

Dear Mr. Morita:

SUBJECT: ISLAND-WIDE LANDFILL REPORT AND EIS/PM

We have reviewed the Preliminary Engineering Report and draft Environmental Impact Statement Preparation Notice and wish to offer our comments.

The consultants did not contact our office during their study but we hope that they had access to our comments which have been submitted during earlier phases of this project.

The Department of Health's position agrees with the consultant's conclusions which ranks the Kekaha site highest in the order of suitability to the County considering all on-site and off-site factors. The Department of Health continues to support the Kekaha site because we feel it has the least negative environmental effect of the considered sites, requires least pollution control measures, and fewest operational constraints for successful landfill operation.

Thank you for the opportunity to review the report.

Sincerely,

Theodore Inouye
Theodore Inouye
Chief Sanitarian, Kauai

TJ:HZE/plo

cc: Environmental Permits Branch

TONY T. KUNIMURA
MAYOR



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
408 RICE STREET
LIHUE, KAUAI, HAWAII 96766

August 2, 1983

Mr. Theodore Inouye
Chief Sanitarian, Kauai
Department of Health
State of Hawaii
P. O. Box 671
Lihue, HI 96766-0201

Dear Mr. Inouye:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE KAUAI
ISLAND-WIDE LANDFILL PROJECT

We are responding to your letter dated June 25, 1982 on the draft Environmental Impact Statement Preparation Notice as recently requested by the Office of Environmental Quality Control.

The comments which were submitted by your agency during the early phases of this project were made available to our consultant. These comments were taken into consideration during preparation of the Environmental Impact Statement Preparation Notice (EIS/PM). We concur in your support of the Kekaha landfill site. The comparative analysis of the three candidate sites has clearly indicated the advantages of the Kekaha site.

Thank you for your comments.

Very truly yours,

Lawrence Kitamura
LAWRENCE KITAMURA
County Engineer

/sb

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 244-3518

CLAY KADAWA
DEP. COUNTY ENGINEER
TELEPHONE 244-3802



United States Department of the Interior

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
P.O. Box 50166
Honolulu, Hawaii 96850

June 25, 1982

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

Dear Mr. Morita:

SUBJECT: Environmental Impact Statement (EIS) preparation notice for
the Kauai Control Sanitary Landfill.

Attached are comments by my staff on the subject EIS preparation notice for the Kauai Control Sanitary Landfill. Principal reviewers were Kiyoshi Takasaki and Paul Eyré.

Thank you for giving us an opportunity to comment on this document.

Aloha,

John A. Jones
John A. Jones
District Chief

Attachment

Comments on Preliminary Engineering Report:

Kauai Control Sanitary Landfill

Page Paragraph Comments

We recognize the difficulty of locating a landfill site. The following comments simply emphasize that the problems at the proposed sites, as mentioned in this and past engineering reports, are serious and require the use of the best available engineering practice in order to prevent substantial surface and coastal water pollution.

"... a relatively low rainfall of approximately 45 inches/year." should be changed to "... a moderate rainfall of 45 inches/year."

Although the rainfall is not high here (45-50 inches/year), this site is extremely wet. Drainage of perched ground water, augmented by excess irrigation and natural storm runoff create the wet environment. Flash flooding through this small, steep drainage basin may also pose a problem to a landfill built on the side of the gulch.

Change "... moderate annual rainfall of approximately 62 inches/year." to "... moderately high annual rainfall of approximately 62 inches/year." (Kipu site)

The plan "to incrementally develop the landfill in the gulches." will require drainage system to be constructed across the landfill. Much leachate will naturally be created by this system. A well-functioning leachate and erosion control system will be required to prevent degradation of the aesthetic and environmental qualities of Huleia and nearby streams.

Although "the site is well drained" the landfill itself will not be drained at all, it will be steeping in warm brackish groundwater. Leachate production will be accelerated by the diurnal fluctuations of the tide which will periodically saturate and then drain the base of the landfill. The leachate will eventually show up in the ocean near the shore. Very little leachate will be produced in this dry, hot area if the landfill is built above the water table. (Kekaha site)

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 242-3218

CLAY KAGAWA
DEPT. COUNTY ENGINEER
TELEPHONE 242-3222



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
408 FIVE STREET
LIMUKE, KAUAI, HAWAII 96794

August 2, 1983

TONY T. KUNIMURA
MAYOR

Mr. Benjamin L. Jones
District Chief
Geological Survey
Water Resources Division
U.S. Department of the Interior
P. O. Box 50166
Honolulu, HI 96850

Dear Mr. Jones:

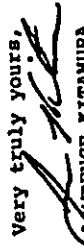
SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE KAUAI
ISLAND-WIDE LANDFILL PROJECT

We are responding to your letter dated June 25, 1982 on the draft Environmental Impact Statement Preparation Notice as recently requested by the Office of Environmental Quality Control.

We have incorporated the changes your agency suggested into the project as described in the EIS. The choice of an island-wide sanitary landfill site has been narrowed down to the expansion of the existing landfill at Kakaha. We are aware of the possible leachate problems that may be generated and as such have limited excavation to a depth of 0.5 feet above the water table (typically at 3.0' msl). It has been established through field tests that the level of the groundwater below the landfill site is not affected by tidal conditions.

Thank you for your comments.

Very truly yours,


LAWRENCE KITAMURA
County Engineer

/sb

DEPARTMENT OF WATER

COUNTY OF KAUAI
P. O. BOX 1704
LIHUE, HAWAII 96766

June 28, 1982

Mr. Henry Morita
County Engineer
Dept. of Public Works
County of Kauai
Lihue, HI 96766

Re: Island-Wide Sanitary Landfill for the County of
Kauai

The sanitary landfill sites will not adversely affect
the Department of Water; and we, therefore, have no
comments to offer on the Preliminary Engineering
Report and draft Environmental Impact Statement Pre-
paration Notice.

Raymond H. Sato
Raymond H. Sato
Manager and Chief Engineer

RHS:rs

NO RESPONSE NECESSARY
TO MR. SATO'S LETTER





University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 210 • 2540 Dole Street
Honolulu, Hawaii 96822

8 July 1982

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

Dear Mr. Morita:

Subject: Draft Environmental Impact Statement Preparation Notice
and Preliminary Engineering Report, Maui Central Sanitary
Landfill, June 1982

We have reviewed the subject DEIS Preparation Notice and have no
comment to offer at this time. Thank you for the opportunity to com-
ment. This material was reviewed by WRC personnel.

Sincerely,

Edwin T. Murabayashi
Edwin T. Murabayashi
EIS Coordinator

ETH:ja

cc: Y.S. Fok
H. Cee
M.H.P. Young

NO RESPONSE NECESSARY
TO MR. MURABAYASHI'S LETTER

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 263-3114



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
4200 RICE STREET
LIHUE, KAUAI, HAWAII 96746

August 2, 1983

TONY T. KUNIMURA
MAYOR

Mr. Charles G. Clark
Director of Health
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, HI 96801

Dear Mr. Clark:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE KAUAI
ISLAND-SIDE LANDFILL PROJECT

We are responding to your letter dated July 9, 1982 on the draft Environmental Impact Statement Preparation Notice as recently requested by the Office of Environmental Quality Control.

The Department of Public Works of the County of Kauai monitored the water table level at the Kekaha landfill site in September of 1982. The findings indicated that the water table is typically at approximately 3.0 feet msl and not affected by tidal conditions. Operations at the landfill will now limit excavation to 0.5 feet above the water table to minimize leachate generation.

Thank you for your comments.

Very truly yours,
Lawrence Kitamura
LAWRENCE KITAMURA
County Engineer

/sb

CHARLES G. CLARK
DIRECTOR OF HEALTH
STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801



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

July 9, 1982

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

Dear Mr. Morita:

Subject: Request for Comments on Proposed Environmental Impact Statement (EIS) for the Kauai Central Sanitary Landfill Project

Thank you for allowing us to review and comment on the subject proposed EIS. We are not in complete agreement with Section 6.3.3, Leachate Control, page 6-7, Kauai Central Sanitary Landfill, Preliminary Engineering Report, R.H. Towill Corporation.

The water table at Kekaha landfill may be five feet below grade instead of twelve feet as stated in the Towill Engineering Report. At the five feet level, solid waste will be in direct contact with the ground water and leachate will be generated regardless of the very low rainfall. This condition would probably affect the quality and the quantity of leachate generated.

This section also stated, "The leachate should be well diluted before entering the ocean where it would be diluted further by the ocean coastal waters. The leachate control at Kekaha is therefore believed to be excellent." If this statement is made based on the twelve feet depth of the water table and the low rainfall of the area, we suggest that the need of leachate control be re-evaluated.

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

Sincerely,

Charles G. Clark
CHARLES G. CLARK
Director of Health

cc: Office of Environmental Quality Control
District Health Office, Kauai



2749 Kapena
Lihue, HI 96766
December 17, 1982

January 4, 1983

Mr. Thomas Ibara
Department of Public Works
County of Kauai
4396 Rice Street
Lihue, HI 96766

Dear Mr. Ibara:

I would like to be a consulted party on the
"Kauai Island-Wide Sanitary Landfill Project".

Thank you very much.

Sincerely,

Joann Yukimura
JOANN YUKIMURA

Joann Yukimura
2749 Kapena Street
Lihue, Kauai, HI 96766

SUBJECT: ISLAND-WIDE SANITARY LANDFILL

Thank you for showing an interest in our development of
the landfill study.

We have attached for your use a copy of the EIS Prepa-
ration Notice. Please submit any comments that you may have
regarding the report, and we will try to have it clarified
and addressed.

/s/ Lawrence Kitamura
LAWRENCE KITAMURA
County Engineer

XIV
/km

attachment

WALDE R. ARTHUR
CHIEF CLERK



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 51
HONOLULU, HAWAII 96809

RECEIVED AND FORWARDED
TO THE CHIEF CLERK
FROM THE DIVISION
OF STATE PARKS
ON JANUARY 6, 1983

January 6, 1983

Mr. Thomas Ibara
Department of Public Works
County of Kauai
4396 Rice Street
Lihue, Hawaii 96766

Dear Mr. Ibara:

SUBJECT: EIS, Island-Wide Sanitary Landfill Project
Kauai County

A review of our records indicates that this project does not occur on historic properties that are listed on the Hawaii Register or the National Register of Historic Places, or that have been determined eligible for inclusion on the National Register of Historic Places. However, survey(s) conducted in the vicinity reveals the existence of resources that may meet the criteria for listing on either register. Thus, it is likely that previously unidentified resources also exists in the proposed project area.

Therefore, we recommend that, prior to any project activity that may have an effect on resources, a reconnaissance survey be conducted by a qualified archaeologist within the proposed area, and that the survey results be forwarded to our office for evaluation. Should the existence of significant resources be substantiated, we may provide additional recommendations to avoid, mitigate, or negate any adverse effects.

If the undertaking has any federal involvement (e.g. funding, loan guarantee, permit or license), the applicant should verify with the federal agency that the provisions of 36 CFR 800 (Advisory Council on Historic Preservation's Procedures for the Protection of Historic and Cultural Properties) are being complied with.

Mr. Thomas Ibara
Page 2
January 6, 1983

Should you have any questions, please contact our office at 548-7460.

Sincerely yours,

Raymond H. Magaña
State Parks Assistant
Administrator

cc: Office of Environmental Quality Control
Planning Office, DLNR
Land Management, DLNR

TONY T. KUNIMURA
MAYOR



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
1000 KAUAI STREET
LONUE, KAUAI, HAWAII 96706

August 2, 1983

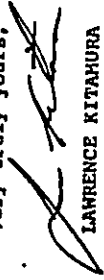
LAWRENCE KITAHURA
COUNTY ENGINEER
TELEPHONE 243-3319

CLAY KAGAWA
DEP. COUNTY ENGINEER
TELEPHONE 243-3322

Mr. Ralston H. Nagata
August 2, 1983
Page -2-

archaeological finds. This will be done progressively as required by the incremental development of the landfill.

Very truly yours,


LAWRENCE KITAHURA
County Engineer

Mr. Ralston H. Nagata
State Parks Assistant Administrator
Division of State Parks
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Nagata:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE KAUAI
ISLAND-WIDE LANDFILL PROJECT

We are responding to your letter dated January 6, 1983 on the draft Environmental Impact Statement Preparation Notice as recently requested by the Office of Environmental Quality Control.

An archaeological reconnaissance survey was performed on August 4, 1982 on the three candidate sites (Kipu, Kumu-kumu, and Kekaha) by the Archaeological Research Center Hawaii, Inc. The survey report has since been forwarded to your office. It indicated no archaeological sites or any evidence of archaeological activity at the candidate sites.

The project development will conform to the requirements of the State Historic Preservation Office for a systematic survey of the sand areas by hand augers for possible

/sb

JOHN S. ANTONIO
Governor of Hawaii



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P O BOX 681
HONOLULU, HAWAII 96806

EDWARD DING, Chairman
State of Land and Natural Resources
EDWARD A. HANAUAN
Secretary to the Commission
DEVELOPMENT:
PLANNING
ARCHAEOLOGICAL INVESTIGATION
PROGRAM
ADMINISTRATIVE SERVICES
CEREMONIAL PROGRAMS
RESEARCH PROGRAMS
COMMITTEES
LAND USE AND PLANNING
STATE PARKS
WATER AND LAND RELATIONSHIP

Ref. No.: CPO-1139

FEB 24 1983

Mr. Thomas Ibara
Department of Public Works,
County of Kauai
4396 Rice Street
Lihue, Kauai, HI 96766

Dear Mr. Ibara:

This responds to publication, in the December 9, 1982 Environmental Quality Commission Bulletin of the EIS Preparation Notice for a "Kauai Island-Wide Sanitary Landfill Project".

We understand that the project involves a system of refuse transfer stations and landfills, with possible expansion of the existing Kekaha landfill or establishment of a new landfill at Kumukumu or Kipu. Inasmuch as the project may directly affect our resource-management responsibilities and programs on Kauai, we wish to serve as a consulted party and to review the forthcoming EIS.

In order to assist the preparation effort at this early stage, our Division of Aquatic Resources suggests that for each affected site the EIS, 1) identify nearby aquatic environments, their biotas, and level of public use thereof (e.g. fishing); 2) discuss temporary impacts to such resources and uses from construction or other sitework; 3) address long-term impacts to such resources and uses from blowing rubbish, from nutrients or other pollutants leaching into aquatic environments, from discharge into aquatic environments of stormwater runoff and contaminants therein, and from any other long-term impacts related to operation of the proposed landfill system; and 4) provide definitive discussion of measures which would be employed to mitigate any adverse impacts.

We note that the deadline for receipt of this request is January 7, 1983; we apologize for the lateness of this response.

Very truly yours,

SUSUMU ONO, Chairman
Board of Land and Natural Resources

February 2, 1983

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

SUBJECT: ISLAND-WIDE SANITARY LANDFILL FOR
KAUAI COUNTY - EIS PREPARATION

Thank you for showing an interest in the development of our study.

We have attached for your use a copy of the EIS Preparation Notice and a copy of the archaeological findings done by Mr. Francis Ching of Archaeological Research Center Hawaii, Inc. Please submit any comments that you may have, and we will try to have it clarified and addressed.

Very truly yours,

LAWRENCE KITAMURA
County Engineer

TI
/km
attachment



APPROVE & SIGNATURE
DATE



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 547
HONOLULU, HAWAII 96808

DEVELOPER: [REDACTED]
PROJECT: [REDACTED]
ADDRESS: [REDACTED]
CITY: [REDACTED]
STATE: [REDACTED]

March 11, 1983

Mr. Lawrence Kitamura
County Engineer
County Of Kauai
Department of Public Works
4396 Rice Street
Lihue, Hawaii 96786

Dear Mr. Kitamura:

SUBJECT: Review and Comment on the EIS Preparation Notice
for the Kauai Island-Wide Sanitary Landfill Project
TKN 1-2-02: 1, 9, 21, 40; 3-4-06: 12; 4-7-04: 1

Thank you for forwarding a copy of the EIS Preparation Notice and the accompanying archaeological survey report to our office. The project is of concern because the scope of a sanitary landfill has the potential of disturbing a large area and affecting unknown historic and archaeological sites. We note that the impact to these archaeological and historical sites was not addressed in the EIS Preparation Notice.

Historic Sites Concerns:

The archaeological reconnaissance survey of the three sites for the landfill suggested historic sites only in the Kekaha project area. Ching notes that the "major archaeological sites in the area are located along the base of the ridges and in the valleys north of the study area." However, Ching does mention that there is a potential for burials being uncovered in the dune which he considered outside the designated landfill area. But sandy deposits are found in the makai section of the project area and these sandy deposits often contain not only burials but also subsurface cultural deposits. We would recommend subsurface archaeological testing by auger coring when sand dunes are to be impacted. We recognize that some of this area has been disturbed historically but remnants of an earlier deposit may remain intact.

Mr. Lawrence Kitamura
Page 2
March 11, 1983

Consequently, the concern of Historic Sites is that the County of Kauai recognizes that cultural resources associated with the dune and sandy deposits may be adversely affected if the landfill boundaries include any such sandy deposits. If any burials should be located during the construction of the landfill, disinterment should be in compliance with Section 338-25.5, Hawaii Revised Statutes (Department of Health) and reported this office.

We foresee no problem with the choice of the Kipu and Kumukumu landfill sites from an archaeological standpoint as the survey uncovered no evidence of historical or archaeological features. However, if any cultural remains such as artifacts, firepits, or walls are uncovered during construction, please notify the Historic Sites Office at 548-7460 immediately.

Recreational Concerns:

There are no recreation interests involved except the recreation values of the sandy beach shoreline makai of the Kekaha site should be recognized as well as the drag strip. The proposed landfill should not be allowed to detract from the adjoining shoreline area.

Sincerely yours,

Kay A. C. Sue
State Parks Administrator

TONY T. KUNIMURA
MAYOR



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
100 S. KALEI STREET
LIMAU, KAUAI, HAWAII 96796

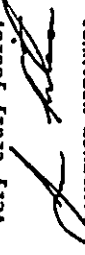
August 2, 1983

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 348-3318
CLAY KAGAWA
DEPT. COUNTY ENGINEER
TELEPHONE 348-3062

Mr. Roy K. C. Sue
August 2, 1983
Page -2-

area for fishing and water sports. The visual intrusion of the long, low mound of the completed landfill on the coastal plain will be mitigated by the relatively low elevations planned for the landfill. The visual aspects of the completed landfill will be improved by planned landscaping and possible agricultural use.

Very truly yours,


LAWRENCE KITAMURA
County Engineer

/sb

Mr. Roy K. C. Sue
State Parks Administrator
Division of State Parks
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Sue:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE FOR THE KAUAI
ISLAND-WIDE LANDFILL PROJECT

We are responding to your letter dated March 11, 1983 on the draft Environmental Impact Statement Preparation Notice as recently requested by the Office of Environmental Quality Control.

Development of the project will conform to the requirements of the State Historic Preservation Office for a systematic survey of the sand areas by hand augers for subsurface archaeological finds. This will be done progressively as required by the incremental progression of the landfill. If any cultural remains are discovered during the testing or operation of the landfill, the Historic Sites Office will be notified immediately.

Particular attention will be paid to the landfill access roads during the development and operation of the landfill to ensure that there is unrestricted access to the dragstrip and adjacent shoreline

APPENDIX D

COMMENTS AND RESPONSES DURING THE
DRAFT EIS REVIEW PROCESS

GEORGE S. ANTON
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH
KAUAI DISTRICT HEALTH OFFICE
P. O. BOX 671
LIHUE, KAUAI, HAWAII 96766

May 17, 1983

CHARLES S. CLARK
DIRECTOR OF HEALTH

TONY T. KUNIMURA
MAYOR



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
400 RICE STREET
LIHUE, KAUAI, HAWAII 96766

November 1, 1983

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 743-3318

CLAY KAGAWA
DEPT. COUNTY ENGINEER
TELEPHONE 1-00-0002

Mr. Lawrence Kitamura
County Engineer
County of Kauai
Lihue, Hawaii 96766

Dear Mr. Kitamura:

SUBJECT: Kauai Island-Wide Sanitary Landfill -- EIS Draft

After reviewing the draft EIS for the Kekaha Sanitary Landfill Expansion Project, we have some comments to offer. In Section 2.2 (pg. 2-2) and 2.3.3 (pg. 2-10), it states that construction/demolition and earth fill materials or large trees will not be disposed of in the planned sanitary landfill but will be diverted to other less expensive sites designated for such use. While the EIS does not specify the method of final disposal for these materials they must be disposed of in an approved manner consistent with the Department of Health's Solid Waste Management Control Regulations, Title 11, Chapter 58. The present non-conforming open dump for these materials at Kekaha cannot be perpetuated or relocated. Whether disposed of at a County or private landfill the operation must conform to the same landfill standards. The EIS should address the method of disposal of those materials in the solid waste stream excluded from the proposed Kekaha site.

Thank you for the opportunity to review and comment on the draft EIS.

Sincerely,

Theodore Inouye
Theodore Inouye
Chief Sanitarian, Kauai

TI:HFZ/plo

cc: Environmental Permits Branch

Mr. Theodore Inouye
Chief Sanitarian, Kauai
Kauai District Health Office
State of Hawaii
P. O. Box 671
Lihue, HI 96766

Dear Mr. Inouye:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KEKAHA SANITARY LANDFILL EXPANSION PROJECT

We are in receipt of your May 17, 1983 letter of comment upon the subject Draft EIS.

The County is also concerned over the proper disposal of construction/demolition and earthfill materials and large trees. They will continue to be accepted within the landfill since they represent a small fraction of the total volume of solid waste generated.

Thank you for your comments.

Very truly yours,

Lawrence Kitamura
LAWRENCE KITAMURA
County Engineer

TI/sb

cc: R. H. Towill Corp.

GEORGE B. ANTONICH
DIRECTOR OF LAND



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 681
HONOLULU, HAWAII 96809

MAY 20 1983

Honorable Lawrence Kitamura
County of Kauai
Department of Public Works
4396 Rice Street
Lihue, Kauai, Hawaii 96766

Dear Mr. Kitamura:

We appreciate the opportunity to review the environmental impact statement (EIS) for expansion of the Kekaha sanitary landfill. We have a number of concerns to express.

Conservation District Concerns:

For Phase 2 of the landfill project, a permit from this agency to use lands in a Conservation District will be required.

Historic Sites Concerns:

We would emphasize the need for archaeological testing prior to development of Kekaha landfill site. Although no surface features were located, there is a high probability of subsurface cultural deposits and burials. To determine the presence/absence of any buried cultural materials, we recommend subsurface corings in these sandy deposits. If subsurface cultural deposits are located, there should be an allowance for excavation and salvage of these remains prior to any bulldozing. If no cultural remains are located during the coring, we may recommend archaeological monitoring if the conditions indicate a possibility of unlocated burials. An initial coring report in the makai portion of the proposed landfill site should be forwarded to our historic sites office for review and any recommendations regarding further archaeological work.

Recreation Concerns:

We note that private dumping is to be allowed and the Kekaha site is apparently an existing, unauthorized dumping ground. Problems of continued unauthorized dumping in or near the landfill site should be addressed as well as the avoidance of loose material blowing and/or falling from vehicles enroute to the landfill. The Kekaha site may also create a conflict between landfill traffic and traffic generated by shoreline recreation activities.

The discussion in the EIS about the recreational setting (pg. 3-14, para. 3.4.4) is inadequate. The emphasis is on the dump's effect on existing recreational facilities. It ought to be on the site's future recreation potential:

DIVISION DIRECTOR, CHIEF OFFICER
OF LAND AND NATURAL RESOURCES
EDGAR A. HAHAKU
DIRECTOR OF THE DIVISION
OFFICE: 1505 KALANANAKU
APARTMENT 1505
HONOLULU, HAWAII 96813
AGENCY: 1505 KALANANAKU
HONOLULU, HAWAII 96813
CONSULTANTS: 1505 KALANANAKU
HONOLULU, HAWAII 96813
CONTACT AND MAILING
STATE OFFICE
1505 KALANANAKU
HONOLULU, HAWAII 96813

Hon. Lawrence Kitamura
Kekaha Sanitary Landfill
PAGE 2 OF 3

1) It does not refer to the potential recreation value of the site and adjoining shoreline - a shoreline with a climate as good or better than Kaanapali on Maui.

2) It does not refer to the State Recreation Plan's (formerly SCORP) recommendation . . . "The long beaches west of Kekaha should be reserved wherever feasible for public shoreline recreation on a regional basis. Where there is enough space behind these beaches, camping should be considered."

3) It does not recognize that several years ago this site was designated as "The Governor Burns Recreation Area" and legislatively funded for a multi-use recreation development. A public drag strip was constructed, but the rest of the park was not developed because no specific agency was designated to be responsible for the planning and follow up. It should be noted that the drag strip was constructed at considerable State expense - it is not . . . "an abandoned landing field used as a drag strip" as identified in the EIS. A request by the Board of Land and Natural Resources on September 11, 1981, when considering Conservation District Use Application KA 4/9/81-1380.

We anticipate that the landfill will over the years have an adverse and detrimental effect on the recreation potential of this site.

Wildlife Concerns:

The brackish water ditches at Kekaha are extensively used by endangered waterbirds: Hawaiian Coots, Stilts, Gallinules, and Koloa. Conceivably, heavy metal residues or persistent pesticides or their byproducts could enter the brackish water in these ditches and cause health or productivity problems for the endangered waterbirds. Accordingly, the subject of leachate control at Kekaha should be assessed more thoroughly particularly since the brackish water table is three feet higher than mean sea level (pg. 7-8, para. 7.2.2.3) and direct contact with landfill material is likely. In particular, back-up data are needed regarding leachate migration rates and directions.

Sincerely,

SUSUMU ONO
Chairman of the Board
and

State Historic Preservation Officer

TONY T. KUNIMURA
MAYOR



LAWRENCE KITAMURA
DEPT. COUNTY ENGINEER
TELEPHONE 348-3314

CLAY KAGAWA
DEPT. COUNTY ENGINEER
TELEPHONE 348-3622

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
ONE RICE STREET
LIPALE, KAUAI, HAWAII 96796

September 23, 1983

Mr. Susumu Ono
Chairman of the Board and
State Historic Preservation Officer
Department of Land and Natural
Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR THE KEKAHA
SANITARY LANDFILL EXPANSION PROJECT

We are in receipt of your May 20, 1983 letter of comment upon the subject Draft EIS. We offer the following responses to your comments, in the sequence.

Conservation District Concerns

A Conservation District Use Application will be prepared and forwarded to DLNR for the construction phase of the project.

Historic Sites Concerns

Development of the project will conform to the requirements of the State Historic Preservation Office for a systematic survey of the sand areas by hand augers for subsurface archaeological finds. This will be done progressively as required for the incremental progression of the landfill. If any cultural remains are discovered during the testing or operation of the landfill, the Historic Sites Office will be notified immediately. An initial coring report will be forwarded to the Historic Sites Office for review.

Mr. Susumu Ono
September 23, 1983
Page -2-

Recreation Concerns

The County plans to clean up the Kekaha Landfill expansion areas as they are acquired from the State for landfill use. Unauthorized dumping and littering from vehicles enroute to the landfill will be minimized by the planned easy access directly into the landfill each day of the week. County personnel working at the landfill will be responsible for the control of unauthorized dumping and littering along the access road enroute to the landfill. The proposed improvements to the access road to the landfill will ensure unimpeded access to the shoreline activities.

The referenced paragraph on Recreation has been revised in the EIS as requested.

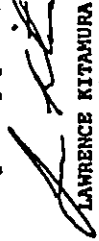
The secondary adverse impact upon the recreation potential of the shoreline area is now recognized in paragraph 5.2.2.3 and mitigation measures are discussed in paragraph 6.2.2.

Wildlife Concerns

The County has surveyed the water level in the irrigation ditches mauka of Kaunualii Highway. It is sufficiently above the water table at the landfill to ensure that any leachate migration in the groundwater flow would be toward the ocean and not toward the ditches.

Thank you for your comments.

Very truly yours,


LAWRENCE KITAMURA
County Engineer

/ab

cc: R. M. Towill Corp.

GEORGE A. JAYSON
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 2370
HONOLULU, HAWAII 96824-0237

May 31, 1983

Mr. Lawrence Kitamura, County Engineer
Department of Public Works
County of Kauai
4398 Rice St.
Lihue, Kauai 96766

Dear Mr. Kitamura:

Subject: Environmental Impact Statement (EIS) for Kauai Island-Wide Sanitary Landfill

CHARLES G. CLARK
DIRECTOR OF HEALTH

JOHN F. CHALKER, M.D.
DEPUTY DIRECTOR OF HEALTH

ROBERT M. THOMPSON, M.D.
DEPUTY DIRECTOR OF HEALTH

MELVIN E. SOLOMON
DEPUTY DIRECTOR OF HEALTH

ARLENE MADRID BRUCE, M.A., J.D.
DEPUTY DIRECTOR OF HEALTH

In reply, please refer to
File: Env-83

Mr. Lawrence Kitamura

-2-

May 31, 1983

disposed of at a County or private landfill, the operation must conform to the same landfill standards. The EIS should address the method of disposal of those materials in the solid waste stream excluded from the proposed Kekaha site.

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

Sincerely,

Melvin E. Solomon
MELVIN E. SOLOMON
Deputy Director for
Environmental Health

cc: OEQC
DHO, Kauai

Thank you for allowing us to review and comment on the subject EIS.

We submit the following comments for your information and consideration:

1. Table 4 - There are no Federal or State ambient standards for hydrocarbons. Moreover, there is no State ambient standard for 24-hour nitrogen oxides and there is a State standard for toxic equivalent to the Federal standard.
2. Major concern from resource recovery facilities has been focused on non-regulated pollutants. Environmental impact from the emissions of non-regulated pollutants should be assessed.
3. Table 10 - Stack gas exit temperature without wet scrubber needs to be reviewed again.
4. Table 11 - The test column concentration and emission rate is difficult to interpret considering the second column noting with and without wet scrubber. Further clarification is needed.
5. Maximum ground level concentration - Any assessment of maximum ground level concentration from emissions from Lihue plant must take into account rather the elevated terrain adjacent to the plant.

In Section 2.2 (pg. 2-2) and 2.3.3 (pg. 2-10), it states that construction/demolition and earth fill materials or large trees will not be disposed of in the planned sanitary landfill but will be diverted to other less expensive sites designated for such use. While the EIS does not specify the method of final disposal for these materials, they must be disposed of in an approved manner consistent with the Department of Health's Solid Waste Management Control Regulations, Title II, Chapter 58. The present non-conforming open dump for these materials at Kekaha cannot be perpetuated or relocated. Whether



GEORGE B. ARYONG
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH

P. O. BOX 209

HONOLULU, HAWAII
July 28, 1983

CHARLES B. CLARK
DIRECTOR OF HEALTH

BY: [Signature]
DATE: 7/28/83

Mr. Lawrence Kitamura, County Engineer
Department of Public Works
County of Kauai
4396 Rice St.
Lihue, Kauai 96766

Dear Mr. Kitamura:

Subject: Environmental Impact Statement (EIS) for Kekaha Sanitary Landfill
Expansion Project

Thank you for allowing us to review and comment on the subject EIS.

We reiterate the following comments for your information and consideration:

1. Table 1: There are no Federal or State ambient standards for hydrocarbon. Moreover, there is no State ambient standard for 24-hour nitrogen oxides and there is a State standard for lead equivalent to the Federal standard.
2. Major concern from resource recovery facilities has been focused on non-regulated pollutants. Environmental impact from the emission of non-regulated pollutants should be assessed.
3. Table 10: Stack gas exit temperature without wet scrubber needs to be reviewed again.
4. Table 11: The last column on concentration and emission rate is difficult to interpret considering the second column noting with and without wet scrubber. Further clarification is needed.
5. Maximum ground level concentration: Any assessment of maximum ground level concentration from emissions from Lihue plant must take into consideration the elevated terrain adjacent to the plant.

Section 2.2 continues to state that construction/demolition and earth fill materials will be excluded from the Kekaha site and will be diverted to other sites. The other sites are not identified though they will require permits and would have to meet the same standards as the Kekaha Landfill. The Kekaha facility plan is essentially the island-wide solid waste plan and by excluding this category of wastes it leaves the plan incomplete. If other sites are to be developed, it would defeat the concept and efficiency of the island-wide facility planned for Kekaha. If other sites are developed, it will be difficult to exclude domestic/commercial refuse from them.

Mr. Lawrence Kitamura

-2-

July 28, 1983

Section 2.3.2 continues to state that in developing the Kekaha site that the grub material removed from the site can be burned in the bottom of the areas excavated for the landfill. This would be a violation of the Air Pollution Control Regulations.

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

Sincerely,

[Signature]
HELVIN K. KOIZUMI
Deputy Director for
Environmental Health

cc: OEQC
DHO, Kauai
R. M. Towill Corp.



TONY T. KUNIMURA
MAYOR

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
1840 E. KAUAI, HAWAII 96798

November 1, 1983

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 346-3514
CLAY KADAWA
DEP. COUNTY ENGINEER
TELEPHONE 49-0882

Mr. Melvin K. Koizumi
November 1, 1983
Page -2-

landfill. We are now removing some of these materials and are looking at various means to prevent their accumulation near the project site. The County will be able to assume more positive control over these fields when they pass from State to County control.

In addition to burial within the landfill, some controlled burning of the cleared and grubbed material may be authorized if a variance from the Air Pollution Control Regulations can be obtained.

Thank you for your comments.

Very truly yours,

LAWRENCE KITAMURA
County Engineer

Mr. Melvin K. Koizumi
Deputy Director for Environmental
Health
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, HI 96801

Dear Mr. Koizumi:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
FOR THE KEKAHA SANITARY
LANDFILL EXPANSION PROJECT

We are in receipt of your letters of May 31, 1983 and July 28, 1983 which offered comments upon the subject EIS. We offer herewith our response to those comments.

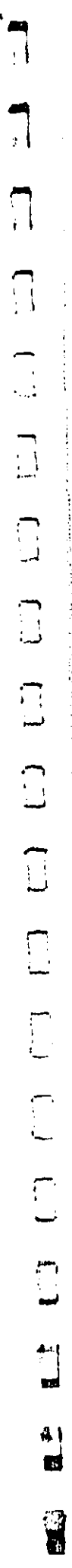
The County is also concerned over the proper disposal of construction/ demolition and earthfill materials and large trees. They will continue to be accepted within the landfill since they represent a small fraction of the total volume of solid waste generated.

The focus of the current effort was upon the identification and preliminary design of an island-wide sanitary landfill. It complements the existing Kauai Solid Waste Master Plan.

We share your concern with the unauthorized disposal of old vehicles and other waste in the fields near the present

TI/sb

cc: R.M. Towill Corp.



U.S. Department
of Transportation
United States
Coast Guard



Commander (dpl)
Fourteenth Coast Guard District

Prince Kahanui
Federal Building
300 Ala Moana Blvd.
Honolulu, Hawaii 96802
Phone: 546-2861

11000
Serial 561

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

Dear Sir:

The Fourteenth Coast Guard District has reviewed the Environmental Impact Statement for Kekaha Sanitary Land-fill Expansion Project and has no objection or constructive comments to offer at the present time.

Sincerely,

J. E. SCHWARTZ
Commander, U. S. Coast Guard
District Planning Officer

By direction of
Commander, Fourteenth Coast Guard District

Copy: Department of Public Works
County of Kauai

R. M. Towill Corporation

NO RESPONSE NECESSARY TO

J. E. SCHWARTZ LTR



United States Department of the Interior

FISH AND WILDLIFE SERVICES
300 ALA MOANA BLVD./Apt.
P. O. BOX 5012
HONOLULU, HAWAII

NO BULKY OBJECTS PERMITTED
ES
Room 6307

JUL 14 1983

Mr. Melvin K. Koizumi
Acting Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Re: EIS, Kekaha Sanitary Landfill
Expansion Project, Kekaha, Kauai

Dear Mr. Koizumi:

Due to current manpower and budget restrictions, the Office of Environmental Services cannot devote the time necessary to conduct a thorough review of fish and wildlife concerns associated with the referenced action at this time. We strongly recommend that you consult directly with the State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources and Division of Forestry and Wildlife and consider their recommendations in your project planning.

Please be advised that this notification does not abrogate your responsibilities to comply with the requirements of the Fish and Wildlife Coordination Act, nor does it represent Service approval of, or support for, the proposed activity. The Service may review future actions related to this proposal should administrative constraints be alleviated or if adverse impacts to significant fish and wildlife resources are identified. Please continue to keep this office apprised of the project's status.

Sincerely yours,

William R. Kramer
Project Leader
Office of Environmental Services

cc: MIFS-MPPO
EDFAM
EDAR
EPA, San Francisco
Department of Public Works, Kauai
R.M. Tovill Corporation



Save Energy and You Serve America!



TONY T. KUNIMURA
MAYOR

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 243-3319
CLAY MAGAWA
DEP. COUNTY ENGINEER
TELEPHONE 243-3827

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
4308 KICE STREET
LIMUKE, KAUAI, HAWAII 96796

September 22, 1983

Mr. William R. Kramer
Project Leader
Office of Environmental Services
U. S. Department of the Interior
Fish and Wildlife Service
300 Ala Moana Blvd., Room 6307
Honolulu, HI 96850

Dear Mr. Kramer:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR THE KEKAHA
SANITARY LANDFILL EXPANSION PROJECT

Thank you for your letter dated July 14, 1983 commenting on the subject project.

As listed in Section 12 of the EIS, the Division of Aquatic Resources and the Division of Forestry and Wildlife of the State DLNR were consulted during the preparation of the report. We have included a copy of the results of the flora and fauna survey as an appendix in the Revised EIS. The survey report states that "no endangered wildlife species are known to occupy the proposed Kekaha Landfill expansion site. The report further states that "sanitary landfill use of any of the three proposed sites would not cause significant wildlife degradation."

The Division of Aquatic Resources expressed concerns relating primarily to the discharge of leachate into streams. At Kekaha there are no streams and the existing landfill has had no demonstrated adverse impact upon the marine life at the adjacent shoreline. The proposed expansion project will



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 203 • 2540 Dole Street
Honolulu, Hawaii 96822

14 July 1983

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

Gentlemen:

SUBJECT: Environmental Impact Statement for the Kauai Sanitary
Landfill Expansion Project, Kauai, Hawaii, June 1983

We have reviewed the subject EIS and have no comment to offer.
Thank you for the opportunity to comment. This material was reviewed
by WERC personnel.

NO RESPONSE NECESSARY TO
EDWIN T. MURABAYASHI LTR

Sincerely,

Edwin T. Murabayashi
Edwin T. Murabayashi
EIS Coordinator

ETH:jm

cc: DFW, County of Kauai
R.M. Towill

AN EQUAL OPPORTUNITY EMPLOYER

State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu, Hawaii 96814

HLHRC

16 JUL 1983

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

Gentlemen:

Kohala Sanitary Landfill Expansion Project

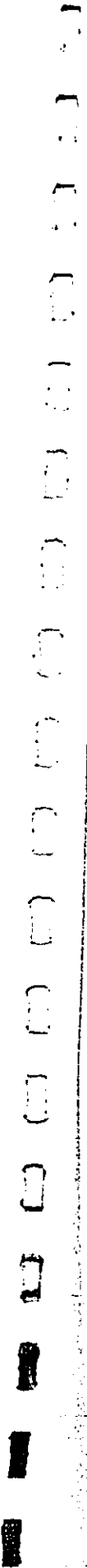
Thank you for providing us the opportunity to review the proposed project, "Kohala Sanitary Landfill Expansion" project Environmental Impact Statement. We have completed our review and have no comments to offer at this time.

Yours truly,

JERRY M. MATSUDA
Major, MAJG
Contr & Engr Officer

cc: Dept of Public Works/Kauai
A.H. Yovill Corp.
Env Quality Comm w/LIS

NO RESPONSE NECESSARY TO
JERRY M. MATSUDA LTR



GEORGE L. ARIYOSHI
GOVERNOR



JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE
SUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii

July 17, 1963

September 23, 1963

MEMORANDUM

To: Office of Environmental Quality Control
Subject: Draft Environmental Impact Statement
Kakaha Sanitary Landfill Expansion Project

The Department of Agriculture has reviewed the subject statement and offers the following comments.

On page 2-13, it is stated that in the year 2000, approximately 72 acres will be required for expansion of the landfill onto land now leased to the Northrup King Company (Pride Seed Division) and the Kakaha Sugar Company for seed crops. It is further stated that "it will be possible at that time for seed crop cultivation to be transferred to the top of the already abandoned landfill." This statement should be expanded to indicate the suitability of such landfill area for crop cultivation of the type envisioned.

On pages 3-2 and 3-3, the soils of the project site are described, but no mention is made of the Land Study Survey and Agricultural Lands of Importance to the State of Hawaii (LSIS) classifications of the area. This information should be included.

Section 5 discusses the primary and secondary impacts of the proposed action, but no mention is made of the scenic impact of relocation or possible displacement of the seed corn and seed sugarcane operations. Estimates of these costs should be included.

Thank you for the opportunity to comment.

Jack K. Suwa
JACK K. SUWA
Chairman, Board of Agriculture

cc: Department of Public Works,
County of Kauai
R.H. Tostill Corporation

Mr. Jack K. Suwa
Department of Agriculture
1428 South King Street
Honolulu, HI 96814

Dear Mr. Suwa:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR THE KAKAHA
SANITARY LANDFILL EXPANSION PROJECT

Thank you for your letter dated July 16, 1963 commenting on the subject EIS. We offer the following responses to your comments.

The final cover of the landfill will be two feet of cover material placed on top of a daily cover of one foot. This will make a total cover of three feet of cover material. If the land is used for agricultural purposes, additional topsoil will be required. Kakaha Sugar Company and Northrup King Company (Pride Seed Company) have indicated that this would be satisfactory for the growth of either seed cane or seed corn.

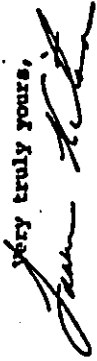
We have now included pertinent information in the Revised EIS on the Agricultural Lands of Importance to the State of Hawaii (LSIS) classification with respect to the proposed project.

The displacement of seed crops would not occur until approximately the year 2000. The Pride Seed Company has

"Support Hawaiian Agricultural Products"

Mr. Jack K. Suwa
September 23, 1983
Page -2-

estimated a present development cost for this type of land
to be approximately \$4,000.00 per acre as now indicated in
the report.

Very truly yours,


LAWRENCE KITAMURA
County Engineer

TI
/ab



HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860

IN REPLY REFER TO:

00ZA:QUR:jm
Scr 1624

19 JUL 1983

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

Gentlemen:

Environmental Impact Statement
Kohala Sanitary Landfill Expansion Project

The EIS for the Kohala Sanitary Landfill Expansion Project has been reviewed and the Navy has no comments to offer. As this comment has no further use for the EIS, the EIS is being returned to the Environmental Quality Commission, by copy of this letter.

Thank you for the opportunity to review the EIS.

Sincerely,

M. M. DALLAH
Commanding Officer, U. S. NAVY
NAVAL BASE PEARL HARBOR
OFFICE OF THE COMMANDER

NO RESPONSE NECESSARY TO

M. M. DALLAH LTR

Enclosure

Copy to:
Environmental Quality Commission
Department of Public Works,
County of Kauai
R. N. Towill Corporation ←

(P)1616.3

JUL 20 1983

Mr. Melvin Koizumi
Acting Director
Office of Environmental
Quality Control
550 Hahaione Street, Room 301
Honolulu, Hawaii

Dear Mr. Koizumi:

Subject: Kekaha Sanitary Landfill Expansion Project
Kekaha, Kauai
Environmental Impact Statement (EIS)

We have reviewed the subject EIS and have no comments

to offer. Thank you for the opportunity to review the EIS.

Very truly yours,

HIDEO MURAKAMI
State Comptroller

Hijji
cc: Department of Public Works
R. H. Towill Corporation

NO RESPONSE NECESSARY TO
HIDEO MURAKAMI LTR

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

DEPARTMENT OF WA

COUNTY OF KAUAI
P.O. BOX 1708
LIMU, HAWAII 96768

July 20, 1983

Office of Environmental Quality Control
550 Hickamulla Street, Room 301
FORDY, HI 96813

Re: Kekaha Sanitary Landfill Expansion Project

We have reviewed the Environmental Impact Statement
for the Kekaha Sanitary Landfill Expansion Project
and have no comments to offer at this time.

Thank you for the opportunity to comment.

Raymond H. Sato

Raymond H. Sato
Manager and Chief Engineer

WRH:rs

cc: Department of Public Works, County of Kauai
✓ R.M. Towill Corporation

NO RESPONSE NECESSARY TO
RAYMOND H. SATO LTR



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96989

July 26, 1993

Mr. Lawrence Kitamura, Director
Department of Public Works
County of Kauai
4396 Rice Street
Lihue, Hawaii 96766

Dear Mr. Kitamura:

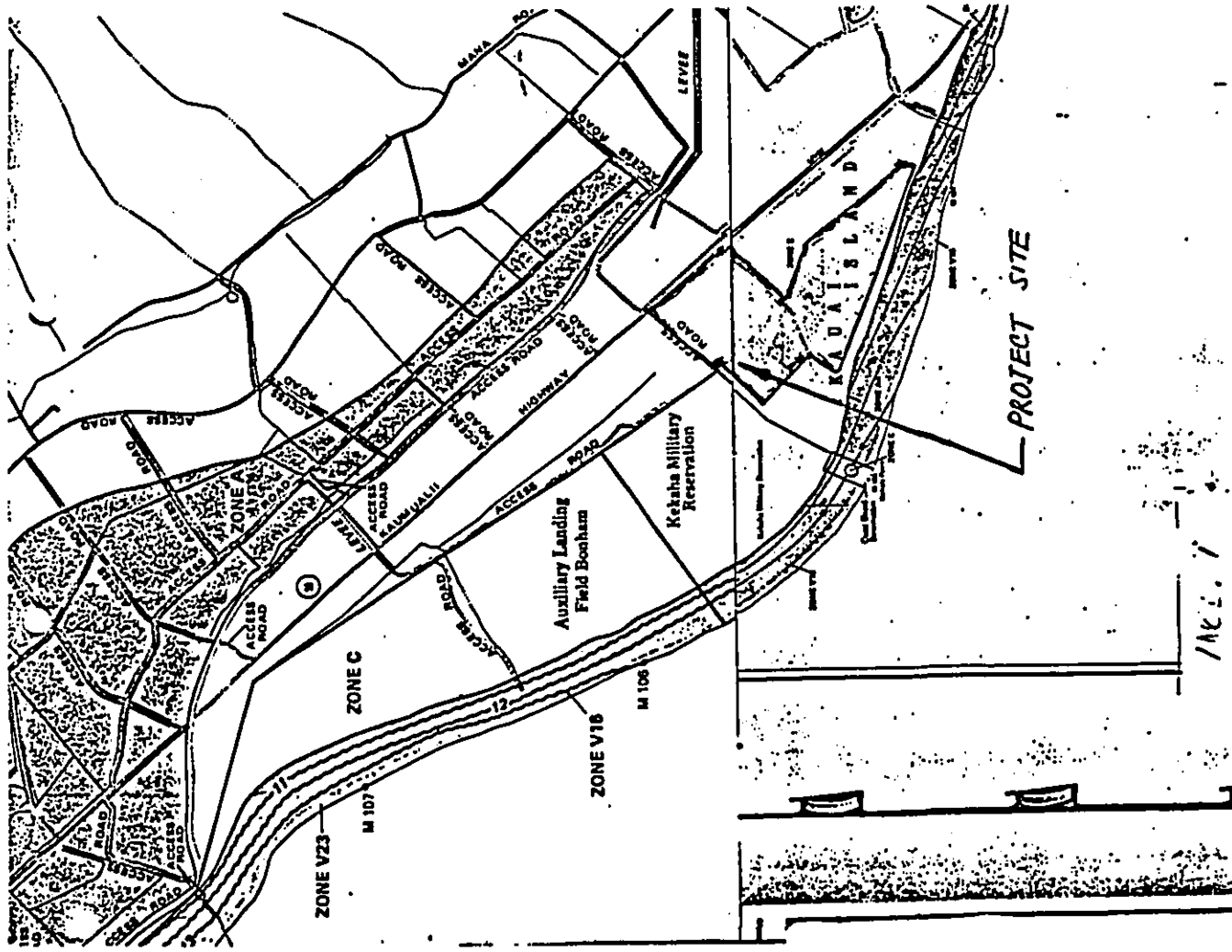
Thank you for the opportunity to review the environmental impact statement for Kekaha Sanitary Landfill Expansion Project. We offer the following comments:

- a. A Department of the Army permit is not required.
- b. According to the Flood Insurance Rate Map prepared by the Federal Insurance Administration, the project is located in Zone C, an area of minimal flooding (see enclosure 1).

Sincerely,

Kiosk Chung
Chief, Engineering Division

Enclosure



TONY T. KUNIMURA
MAYOR



LAWRENCE KITAHARA
COUNTY ENGINEER
TELEPHONE 248-3318

CLAY KAGAWA
DEPARTMENT ENGINEER
TELEPHONE 248-3322

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
478 KICE STREET
LIPAAE, KAUAI, HAWAII 96798

October 5, 1983

Mr. Kinuk Cheung
Chief, Engineering Division
Pacific Ocean Division
Corps of Engineers
Department of the Army
Fort Shafter, HI 96858

Dear Mr. Cheung:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
KEKAHA SANITARY LANDFILL
EXPANSION PROJECT

Thank you for your letter of July 26, 1983 commenting
on the subject EIS.

We have included the flooding information in Figure
3-3, Flooding Boundary and Floodway Map.

Very truly yours,

LAWRENCE KITAHARA
County Engineer

/sb

cc: R. H. Towill Corp.



United States
Department of
Agriculture

Soil
Conservation
Service

P.O. Box 50004
Honolulu, Hawaii
96850

July 26, 1983

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

Gentlemen:

Subject: EIS for the Kekaha Sanitary Landfill Expansion Project
Department of Public Works, County of Kauai

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

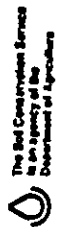
Thank you for the opportunity to review this document.

Sincerely,

Francis C. H. Lum
FRANCIS C. H. LUM
State Conservationist

cc: Department of Public Works, County of Kauai
R.M. Towill Corporation

NO RESPONSE NECESSARY TO
FRANCIS C. H. LUM LTR



The Soil Conservation Service
is an agency of the
Department of Agriculture





University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 944-1449

July 29, 1983
RE:0381

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

Dear Sir/Madam:

Draft Environmental Impact Statement
Kekaha Sanitary Landfill Expansion Project
Kekaha, Kauai

This Environmental Center review has been prepared with the assistance of Bertell Davis, Archaeology; Marshall Mock, Kauai Community College; Jacquelin Miller and Mark Ingolia, Environmental Center.

In our review of the DEIS there appear to be two primary areas of concern: 1) The possible effects of the land fill expansion on archaeological or historical sites; and 2) The possible effects of the leachate on the avifauna. Our reviewers have also provided comments regarding the commitment of resources, economics, and the general content of the DEIS.

Archaeology/Historic Sites

On pages 3-13 and 3-14 it is stated that "there are no historic sites in the project vicinity." The basis for this statement should be indicated in the revised EIS. If surveys or reconnaissance studies have been made, the supporting documents including methods, results and recommendations should be presented in the REIS to allow a review evaluation of potential archaeological resources. Page 3-4 states that special considerations may be required concerning possible archaeological sites. What "special considerations" are proposed and how will they be implemented? The Historic Preservation Office has emphasized the need for archaeological testing prior to development of the Kekaha Landfill site (page 6-2). The DEIS however does not indicate whether such testing will be performed. It would seem appropriate to discuss in the REIS how the testing will take place, if coring is involved as mentioned, and who will be responsible for these tests. Will the construction contractors make the actual determination to notify the State Historic Preservation Office in the event of archaeological materials being unearthed? Archaeological expertise at these critical determination and sampling stages is of utmost importance and provision for on site archaeologists during grading operations should be required. Careful testing before major work begins is recommended by many who have experienced costly delays due to last minute "after the fact" discoveries of archaeological remains.

In general, the discussion of the potential archaeological resources, testing and mitigation measures in this DEIS is deficient. While it is possible that no significant archaeological

AN EQUAL OPPORTUNITY EMPLOYER

OEQC

July 29, 1983

- 2 -

sites will be impacted, the information presented in the DEIS does not permit a reviewer to draw that conclusion. It would be of great help if these areas were more clearly defined in the final document on the basis of supported documentation.

Leachate Pollutants

Our reviewers have concurred with the discussion presented in the DEIS that it is unlikely that leachate movement will be toward the water ditches in the vicinity of the proposed expansion. However, the additional studies to be performed by the County of Kauai (page 5-3) are appropriate to confirm that the avifauna will not be endangered.

Irreversible and Intractable Commitments of Resources

Although a minor point, it may be appropriate to recognize that any potential for reuse of the solid waste will be close to impossible after the material is buried in the sanitary landfill site.

Advantages and Disadvantages of Alternative Disposal or Processing Methods

Inclusion of Table 7-3 (adapted from the EIS for the Proposed Leeward Sanitary Landfill) in the Kekaha Sanitary Landfill Expansion Project DEIS is helpful in evaluating the advantages and disadvantages of the various alternatives. The table would be greatly improved by providing an economic evaluation of the alternatives. Since economics is often the limiting factor particularly when balancing the social, biological, historical or physical impacts of a project, adequate economic data in the DEIS is of major importance.

General comments

A few general comments from our reviewers seem appropriate to pass on for consideration in the development of future documents or the preparation of the revised EIS. The DEIS for this project seems to include many pages of unnecessarily detailed text and tables which have little or no significance to the expansion of an existing sanitary landfill. Section 1 and 2 are excellent and adequately described the proposed action. Sections 3 and 4 contain far too detailed a description of Kauai County with much superfluous information only vaguely pertinent, if at all, to the expansion of a land fill at Kekaha. Inasmuch as excess text and tables add to the cost of preparation as well as review time of the DEIS, we would urge that future such DEIS's or the REIS for this project have a more carefully and concisely defined content.

We appreciate the opportunity to comment on this DEIS and hope you will find our comments useful in your preparation of the revised document.

Yours truly,

Don C. Cox
Director

cc: R.M. Towill Corporation
Bertell Davis
Marshall Mock
Jacquelin Miller
Mark Ingolia

TONY T. KUNIMURA
MAYOR



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
408 RICE STREET
LĪHĀE, KAUAI, HAWAII 96741

September 23, 1983

LAWRENCE KITAHURA
COUNTY ENGINEER
TELEPHONE 748-3318

CLAY KAGAWA
DEP. COUNTY ENGINEER
TELEPHONE 748-3082

Mr. Doak C. Cox
September 23, 1983
Page -2-

clearly in the Revised EIS. Testing and monitoring required will be the responsibility of the County or its designated consultant. Coring reports will be sent to the Historic Sites Office to apprise that office of the archaeological findings, if any. It will also be notified of any sites actually uncovered by the County as reported by the archaeological consultant or by the County's on-site supervisor, if no archaeological representative is present.

Leachate Pollutants

The survey by the County have since been performed. It was found that the water table mauka of the landfill site was at a significantly higher elevation than that at the existing landfill. It can be concluded that any leachate generated by the landfill will move toward the ocean and not toward the ditches.

Irreversible and Irrecoverable Commitment of Resources

Your suggestion has been incorporated into the Revised EIS.

Advantages and Disadvantages of Alternate Disposal or Processing Methods

The desirability of including an economic evaluation of the alternative methods of refuse disposal is recognized. However, such a comparative evaluation would require cost analyses based on the specifics of the Kekaha site. The landfill was selected as the preferred disposal alternative in the earlier Kauai Solid Waste Master Plan.

General Comments

Because the project will, in its entirety, involve all points of the island now served by the County of Kauai's refuse service, a limited description of the island-wide environment was included.

Very truly yours,

LAWRENCE KITAHURA
County Engineer

/ab
cc: R. H. Towill Corp.

Mr. Doak C. Cox
Director
Environmental Center
University of Hawaii at Manoa
Crawford 317
2550 Campus Road
Honolulu, HI 96822

Dear Mr. Cox:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
FOR THE KEKAHA SANITARY
LANDFILL EXPANSION PROJECT

Thank you for your letter dated July 29, 1983 commenting on the subject EIS. We offer herewith the following responses to your comments.

Archaeology/Historic Sites

On August 4, 1982, our subconsultant, Archaeological Research Center Hawaii, Inc., conducted an archaeological reconnaissance survey of the project area and reported "No archaeological sites or any evidence of archaeological activity were discovered at either the Kekaha or Kipu project locations." We have included a copy of its report as an appendix to the Revised EIS.

The "special considerations" mentioned on page 5-4 involve halting activities in the area surrounding any archaeological sites uncovered, notifying the DLNR Historic Sites Office and undertaking salvage archaeology, as required. The need for archaeological testing prior to the landfill development has been stated more

NO RESPONSE NECESSARY TO
RYOKICHI HIGASHIONNA LTR

STP 8.9256

August 2, 1983

Mr. Melvin Koizumi,
Acting Director
Office of Environmental
Quality Control
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

Environmental Impact Statement
Kekaha Sanitary Landfill Expansion Project
Kekaha, Kauai

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

The proposed action is not anticipated to adversely impact our existing and proposed programs for the subject area. In this regard, we have no comments to offer which could improve the document.

Very truly yours,

Ryokichi Higashionna

Ryokichi Higashionna
Director of Transportation

ABK:ko

cc: Kauai Dept. of Public Works
R.M. Towill Corp.

August 2, 1983

Directorate of Facilities Engineering

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

Gentlemen:

The Environmental Impact Statement (EIS) for the Keolu Sanitary Landfill Expansion Project, Ketchikan, Kaula has been reviewed and we have no comments to offer. There are no Army installations or activities in the vicinity of the proposed project.

Thank you for the opportunity to comment on the EIS.

Sincerely,

Original signed by

R. C. Brennan
R. C. Brennan
Acting Director of Facilities
Engineering

Copies furnished:
Department of Public Works
County of Kauai
4306 Rice Street
Lihue, Hawaii 96746

✓ S. N. Tovill Corporation
477 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

NO RESPONSE NECESSARY TO

R. C. BRENNAN LTR

LAWRENCE KITAHURA
COUNTY ENGINEER
TELEPHONE 243-3318
CLAY KAGAWA
DEP. COUNTY ENGINEER
TELEPHONE 243-3622



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
4300 KINE STREET
LIHUE, KAUAI, HAWAII 96746

September 22, 1983

TONY T. KUNIMURA
MAYOR

GEORGE E. JAROSSE
PLANNING DIRECTOR
PLANNING DIVISION
PLANNING DEPARTMENT

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT
HAWAIIAN BUILDING, 270 SOUTH KING STREET, HONOLULU, HAWAII 96813



August 4, 1983

Ref. No. 7810

COPY

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

Dear Sir:

SUBJECT: Draft Environmental Impact Statement on the
Sanitary Landfill Expansion Project, Kauai

We have reviewed the subject draft statement and offer the following with respect to the Kauai Coastal Zone Management Program policies on recreational resources.

Lands adjacent to the proposed site are presently used for a variety of recreational purposes. An assessment of the project's impact should include a more complete description of these activities and how they might be affected over the long term by the changed landfill.

Beyond this, so find the EIS has satisfactorily addressed the associated coastal and environmental impacts. Thank you for this opportunity to comment.

Very truly yours,

Kent M. Keith
Kent M. Keith

cc: Department of Public Works, County of Kauai
R.H. Towill Corporation

Mr. Kent Keith, Director
Department of Planning and
Economic Development
P. O. Box 2359
Honolulu, HI 96804

Dear Mr. Keith:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR THE KEKAHA
SANITARY LANDFILL EXPANSION PROJECT

Thank you for your letter dated August 4, 1983 comment-
ing on the subject EIS.

We have included a more comprehensive description of
the recreational resources in the Revised EIS. We have
also expanded on the probable impacts that may be generated
by the long term use of the landfill.

Very truly yours,

Lawrence Kitamura
LAWRENCE KITAHURA
County Engineer

/sb

cc: R. M. Towill Corp.



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
STATE ENERGY OFFICE
 335 Merchant Street, Room 110
 Honolulu, Hawaii 96813

GEORGE R. ARNONE
 HONOLULU
 FRANK SPANGLER
 HONOLULU

Ref No 83:1609A

August 5, 1983

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

Dear Sirs or Madames:

We have reviewed the Environmental Impact Statement sent to us on June 30, 1983, on the "Kekaha Sanitary Landfill Expansion Project." It appears this is a practical undertaking for the County of Kauai in dealing with solid waste disposal. We have no objections.

Thank you for this opportunity to review this EIS.

Very truly yours,

Takeshi Yoshihara
 Takeshi Yoshihara
 Energy Program Administrator

TY/BS:cq

cc: Dept. of Public Works
 County of Kauai
 R.M. Towill Corporation

NO RESPONSE NECESSARY TO
 TAKESHI YOSHIHARA LTR



TONY T. KUNIMURA
MAYOR

LAWRENCE KITAHURA
COUNTY ENGINEER
TELEPHONE 243-3319
CLAY KAGAWA
DISTRICT COUNTY ENGINEER
TELEPHONE 243-3622

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
ONE RACE STREET
LIPAALE, KAUAI, HAWAII 96798

September 23, 1983

Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850
August 6, 1983

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

Dear Sir:

The Hawaii District Office of the U.S. Geological Survey, Water Resources Division has reviewed the Environmental Impact Statement regarding the Kekaha Sanitary Landfill Expansion Project and we have the following comment:

We recommend the importance of continued efforts to monitor the ground-water and coastal receiving bodies to detect long-term changes in water quality relating to the proposed expanded landfill. The lack of a leachate monitoring control system makes it more important to evaluate the long-term effects of the landfill in the environment.

Sincerely,

Stan F. Kapustka
District Chief

cc: Department of Public Works
P.W. Towill Corporation

Mr. Stan F. Kapustka
District Chief
U. S. Geological Survey
Water Resources Division
P. O. Box 50166
Honolulu, HI 96850

Dear Mr. Kapustka:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR THE KEKAHA
SANITARY LANDFILL EXPANSION PROJECT

Thank you for your letter dated August 8, 1983 commenting on the subject EIS.

The County also shares your concern over the water quality in the project vicinity. In Section 6.1.2 of the EIS the discussion on the monitoring of the groundwater has been expanded. Monitoring will allow us to monitor changes in the groundwater that may be generated by the project.

Very truly yours,

LAWRENCE KITAHURA
County Engineer

/ab

cc: R. M. Towill Corp.

TONY T. KUHIMURA
MAYOR



LAWRENCE KITAHURA
COUNTY ENGINEER
TELEPHONE 243-3319
CLAY KAGAWA
DEPT. COUNTY ENGINEER
TELEPHONE 243-3322

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
400 WILSON STREET
LIMU, KAUAI, HAWAII 96746

September 23, 1983

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

Gentlemen:

Thank you for the opportunity to review the environmental impact statement (EIS) for an expanded sanitary landfill at Kekaha.

We would emphasize the need for archaeological testing prior to any development of the Kekaha site. Although no surface features were located, there is a high probability of subsurface cultural deposits and burials. To determine the presence/absence of any buried cultural materials, we recommend subsurface corings by an archaeologist in these sandy deposits in a systematic manner as mentioned in Section 6 (page G-2) of this EIS. If subsurface cultural deposits are located, there should be an allowance for excavation and salvage of these remains prior to any bulldozing. If no cultural remains are located during the coring, we may recommend archaeological monitoring if the testings indicate a possibility of unlocated archaeological remains. Two copies of the initial coring report for the first increment of the testing in the Kekaha portion of the proposed landfill site should be forwarded to our historic sites office for review with any recommendations regarding further archaeological work.

Under 2.3.1 Landfill Site Characteristics (pages 2-4 to 2-6), the EIS assumed that the State's Board of Land and Natural Resources will withdraw the land from existing leases or uses to allow the landfill. This assumption should be revised to indicate that the Board will be requested to withdraw the land. The Board has not committed the land for landfill; therefore, any assumption to that effect should be deleted.

Sincerely,

Susumu Ono
SUSUMU ONO
Chairperson
and

State Historic Preservation Officer

cc: Dept. of Public Works (Kauai)
R. H. Towill Corp.

Mr. Susumu Ono
Chairperson and State Historic
Preservation Officer
Department of Land and Natural
Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
KEKAHA SANITARY LANDFILL
EXPANSION PROJECT

Thank you for your letter dated August 16, 1983 commenting on the subject EIS.

In reference to your comment regarding archaeological testing, Sections 3.4.3 and 6.1.3, which deals with archaeology and historic sites has been expanded to include additional information. The County will transmit two copies of the coring report for the first increment as requested.

The paragraph referring to the Board's power to withdraw the land for the project site has been revised as requested.

Very truly yours,

L. Kitahura
LAWRENCE KITAHURA
County Engineer

/sb

cc: R. H. Towill Corp.



HEADQUARTERS
NAVAL BASE, PEARL HARBOR
PEARL HARBOR, HAWAII 96313

IN REPLY REFER TO:
002B:MKL:jmm
Set 1806
19 AUG 1983

Office of Environmental Quality Control
550 Halekua Drive, Room 301
Honolulu, Hawaii 96813

Gentlemen:

Addendum to Environmental Impact Statement (EIS)
Kekaha Sanitary Landfill Project

We have reviewed the addendum to the subject EIS, forwarded by your letter of August 5, 1983, and have no comments to offer.

Thank you for the opportunity to review the EIS.

Sincerely,

J.A. ...
CAPTAIN, U.S. NAVY
FACILITIES ENGINEER
BY DIRECTION OF THE COMMANDER

Copy to:
Department of Public Works
County of Kauai
R. M. Towill Corporation



NO RESPONSE NECESSARY TO
H. M. DALLAM LTR

DEPARTMENT OF WATER

COUNTY OF MAUI
P. O. BOX 1706
LIHUE, HAWAII 96766

August 22, 1982

Environmental Quality Commission
550 Halekaunila Street
Room 301
Honolulu, HI 96813

Re: Addendum to EIS - Kekaha Sanitary Landfill

We have reviewed the Addendum to EIS - Kekaha Sanitary Landfill and have no comments to offer.

Thank you for the opportunity to comment.

Raymond H. Sato

Raymond H. Sato
Manager and Chief Engineer

WH:rat

cc: Dept. of Public Works
R.M. Towill Corporation

NO RESPONSE NECESSARY TO
RAYMOND H. SATO LTR



State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu, Hawaii 96818

MEMO

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

Contentment:

Addendum to EIS --- Kahala Sanitary Landfill Project

We have received your August 5, 1983 letter regarding the above subject project addendum and have no comments to offer.

Yours truly,

JERRY M. MATSUDA
Major, MANG
Contr & Engr Officer

cc: Dept of Public Works/Kauai County
K. H. Towill Corp
O&Q Control w/Addendum

NO RESPONSE NECESSARY TO
JERRY M. MATSUDA LTR



DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
1555 KALANOAHI AVENUE, SUITE 200, HONOLULU, HAWAII 96813

GEORGE B. ARYOON
KENT H. KEITH
FRANK J. JOHNSON

COPY

August 29, 1983

8024

Ms. Letitia Uyehara
Interim Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: Addendum to EIS--Kohala Sanitary Landfill Project, Kauai

We have reviewed the addendum to the draft EIS for the Kohala Landfill Project and find that we have no additional comments.

Thank you for the opportunity to review the addendum.

Very truly yours,

Kent M. Keith

cc: Department of Public Works, County of Kauai
R. H. Towill Corporation

NO RESPONSE NECESSARY TO
KENT H. KEITH LTR

GEORGE B. ANIYOSHI
GOVERNOR



JACK K. SUMA
CHAIRMAN, BOARD OF AGRICULTURE
EUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822

August 31, 1983

MEMORANDUM

To: Office of Environmental Quality Control
Subject: Addendum to Draft Environmental Impact Statement
(EIS) for Kekaha Sanitary Landfill Expansion Project

NO RESPONSE NECESSARY TO
JACK K. SUMA LTR

The Department of Agriculture has reviewed the addendum to the subject draft EIS and has no additional comments to offer other than those we submitted to your office on July 18, 1983.

Thank you for the opportunity to comment.

JACK K. SUMA
Chairman, Board of Agriculture

cc: Department of Public Works,
County of Kauai
R. M. Towill Corp.

"Support Hawaiian Agricultural Products"



GEORGE A. KITAMURA
COUNTY ENGINEER

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
100 MALDENBLUM ST.
ROOM 201
HONOLULU, HAWAII 96813

September 6, 1983

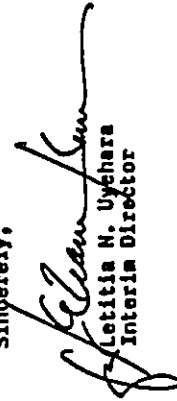
Mr. Lawrence Kitamura
County Engineer
Department of Public Works
County of Kauai
3021 Umi Street
Lihue, Hawaii 96766

Dear Mr. Kitamura:

Subject: Kekaha Sanitary Landfill Expansion Project Draft
Environmental Impact Statement

We are cognizant of the fact that this proposed landfill project is in the exempted area under the Underground Injection Control Program; however we are concerned that contamination of coastal waters may result from landfill leachates.

Sincerely,


Letitia N. Uyehara
Interim Director

cc. R.M. Towill Corporation



TONY T. KUNIMURA
MAYOR

Letitia N. Uyehara
Interim Director
TELEPHONE NO.
88-8783

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
OFFICE OF THE MAYOR
LILUO, KAUAI, HAWAII 96798

September 23, 1983

Ms. Letitia N. Uyehara
Interim Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Ms. Uyehara:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT
STATEMENT FOR THE KEKAHA
SANITARY LANDFILL EXPANSION PROJECT

Thank you for your letter dated September 6, 1983 commenting on the subject EIS.

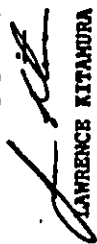
The County also shares your concern regarding the degradation of the coastal waters off the Kekaha shore. In response to this concern, the proposed landfill is designed not only to maximize its lifespan but to avoid contact between the solid refuse and groundwater thereby minimizing leachate production. The water table beneath the landfill expansion has been determined to be of a brackish nature. This factor was an important consideration in choosing Kekaha as a landfill site. Additionally, water table investigations relative to tidal conditions indicate that the groundwater in the area is independent of tidal influences. Groundwater monitoring wells will be located adjacent to the landfill for periodic monitoring to insure that any unforeseen degradation of water quality is detected. Also, due to the low rainfall experienced on the plain, only a small amount of leachate is expected to filter down to the water table. Should the area be used for light agricultural

LAWRENCE KITAMURA
COUNTY ENGINEER
TELEPHONE 848-3318
CLAY KAGAWA
DEP. COUNTY ENGINEER
TELEPHONE 83-3002

Ms. Letitia N. Uyehara
September 23, 1983
Page -2-

activities, careful irrigation practices should keep the water from percolating into the refuse areas thereby maintaining low leachate generation. This leachate may eventually enter the ocean but only after being filtered through the large body of sand lying between the landfill and the ocean. Further dilution will take place due to the near-shore circulation of the ocean waters. The diluted leachate reaching the ocean would be non-toxic because hazardous wastes are prohibited in the landfill. Therefore, we do not anticipate that the contamination of coastal waters will be a problem.

Very truly yours,


LAWRENCE KITAMURA
County Engineer

/sb

cc: R. M. Towill Corp.

