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SANITARY LANDFILL**

**Revised Environmental
Impact Statement**

Final Addendum

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CITY AND COUNTY OF HONOLULU DEPARTMENT OF PUBLIC WORKS

FINAL ADDENDUM

TO

REVISED ENVIRONMENTAL IMPACT STATEMENT

for

LEEWARD DISTRICT SANITARY LANDFILL

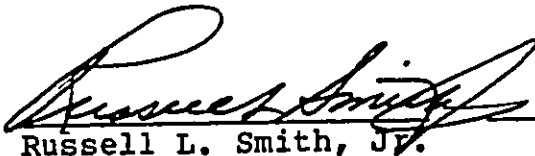
at

WAIMANALO GULCH SITE
(TMK: 9-2-03 Por 13, 2, 40)

This environmental document is submitted
pursuant to Chapter 343, HRS

Accepting Authority: Department of Land Utilization
City and County of Honolulu

Responsible Official:


Russell L. Smith, Jr.
Director and Chief
Engineer

8/30/85
Date

Prepared For: Shimabukuro, Endo & Yoshizaki, Inc.
Honolulu, Hawaii

By : Diane S. Hirsch

PROPOSED PROJECT: LEEWARD DISTRICT SANITARY LANDFILL

APPLICANT: CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PUBLIC WORKS

DETERMINATION: ADDENDUM TO REVISED EIS

ACCEPTING AUTHORITY: CITY AND COUNTY OF HONOLULU
DEPARTMENT OF LAND UTILIZATION

CONTACT: FRANK J. DOYLE, CHIEF
DIVISION OF REFUSE COLLECTION AND
DISPOSAL
DEPARTMENT OF PUBLIC WORKS
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

PHONE: (808) 527-5358

ATTENTION: John Lee
(808) 527-5832

ENGINEERING CONSULTANT: SHIMABUKURO, ENDO & YOSHIZAKI, INC.
1126 12th Avenue
Honolulu, Hawaii 96816

PHONE: (808) 737-1875
CONTACT: Stanley S. Shimabukuro
President

**ENVIRONMENTAL
SUBCONSULTANT:** DIANE S. HIRSCH
c/o Engineering Consultant

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Summary

SUMMARY

This Addendum has been prepared to expand and clarify specific sections of the "Revised Environmental Impact Statement for the Proposed Leeward Sanitary Landfill at Waimanalo Gulch and Ohikilolo Site, 5-7-84" (REIS). These sections of the REIS concern Alternative Waste Processing Methods, Alternative Sites, and the anticipated visual impact of the proposed project. Although the REIS included Ohikilolo as part of the proposed project, Ohikilolo was subsequently deleted from current consideration, and this Addendum addresses only the Waimanalo Gulch site. If the Ohikilolo site is to be reconsidered at some future time, a separate addendum will be submitted for review and acceptance.

The Addendum section, "ALTERNATIVE DISPOSAL/PROCESSING METHODS", includes most of the discussion already presented in the REIS, primarily for ease in review and input of additional information. The additional information only clarifies or provides additional support to the REIS information and does not alter the concept nor the priorities of the proposed project. The City is actively pursuing development of a resource recovery program for Oahu. However, resource recovery alone does not address all solid waste disposal and will not replace the need for a sanitary landfill. Various waste processing methods are

presented, and each method's compatibility with the City waste management program is discussed.

The "ALTERNATIVE SITES" section begins with a historical perspective of the site selection process for the Leeward District Sanitary Landfill project since 1977. Various criteria and rationale for establishing priorities in selecting and eliminating sites are presented. Protection of potable groundwater sources is presented as a priority criterion in evaluating suitability of a potential site. In addition, other important selection factors are presented, particularly existing Federal or State land use and close proximity to communities.

The 1977 "Inventory Study of Potential Sanitary Landfill and Demolition Landfill Sites" [11] and the 1979 study (unpublished) identified twenty-six (26) potential Leeward landfill sites. Two of the original twenty-six (26) sites, Waimanalo Gulch and Ohikilolo, were proposed as the first and second sites for the landfill project, respectively. Waimanalo Gulch is now proposed as the sole site for development, with Ohikilolo considered an "Alternative Site". Details for Waimanalo Gulch and Ohikilolo are presented in the Revised EIS. This section presents summaries on 25 individual alternative sites and their advantages and disadvantages for potential sanitary landfill development.

"ADDITIONAL STATEMENTS OF ANTICIPATED VISUAL IMPACTS" presents graphic renderings of existing land contours of

Waimanalo Gulch and anticipated contours of the completed sanitary landfill project, based on preliminary engineering plans.

The final section, "AGENCIES, ORGANIZATIONS, AND PERSONS CONSULTED DURING REVIEW OF ADDENDUM," presents a list of all who will receive a copy of the Addendum during the review process. Once the review has ended, this section will include comments received and responses to those comments.

Introduction

INTRODUCTION

This document has been prepared to fulfill the City and County of Honolulu Department of Land Utilization's (DLU) request to expand particular sections presented in the "Revised Environmental Impact Statement for the Proposed Leeward Sanitary Landfill at Waimanalo Gulch and Ohikilolo Site, 5-7-84" (REIS) [1], which was determined not acceptable by DLU on July 13, 1984 [2]. After communication between DLU and the City's proposing agency, Department of Public Works (DPW) [3;4], specific areas for expansion were identified as: (1) statements on Alternative Waste Processing Methods and conclusions on how they fit into the City's plans; (2) descriptions of Alternative Sites; and (3) presentation of anticipated visual impact of the proposed sanitary landfill. Each of these specific areas is presented in a separate section of this document.

The following statement appears in the Forward of the REIS:

"During the completion of this Revised Environmental Impact Statement, the City and County of Honolulu accepted the Pricing Proposal submitted for the Honolulu Resource Recovery Project which will burn refuse, recover recyclable materials and generate electrical energy. With the implementation of this project, a major portion of Oahu's solid waste, which is presently landfilled as raw refuse, will be incinerated to ash and the volume to be disposed of will be reduced by ninety percent (90%). Existing and planned landfill life or capacity will therefore be increased threefold, and the required area for landfill operations will be decreased. With the large waste volume reduction associated with resource recovery, it is anticipated that the proposed Waimanalo Gulch

(Leeward) and Kalaheo and Bellows (Windward) Sanitary Landfills will satisfy Oahu's disposal needs for 15 to 20 years.

As a result of this lessened demand for sanitary landfill sites, the City has decided not to pursue Ohikilolo as a site for the Leeward District Sanitary Landfill and to delete the site from the Public Facilities Map of the Oahu Development Plan. This decision is based on operational, and not environmental, considerations. Therefore, the City intends to include Ohikilolo as part of the Leeward District Sanitary Landfill EIS in order that the information and data gathered to date can be made available to all concerned parties."

Subsequent to the publication of the Revised EIS, the City Council removed Ohikilolo from the Public Facilities Map of the Oahu Development Plan, with the understanding that implementation of the resource recovery project would eliminate the need to develop a landfill at Ohikilolo in the near future.

Ohikilolo has, therefore, been deleted from this proposal, leaving Waimanalo Gulch as the proposed site for the Leeward District Sanitary Landfill. With the City actively pursuing development of a resource recovery program, the need for Ohikilolo presently is not critical. Should development of this site become necessary, a separate Addendum will be prepared at that time.

**Alternative
Methods**

ALTERNATIVE DISPOSAL/PROCESSING METHODS

Most of the discussion from the Revised EIS is present in this discussion, primarily for ease in review and to provide additional information. The additional information only clarifies or provides additional support to the information presented in the Revised EIS and does not alter the concept nor the priorities of the proposed project.

Solid waste management is more an issue of processing and transforming solid waste to best serve a given community, before final disposal. Final disposal must comply with Federal Regulations, which means land disposal in a sanitary landfill. Ocean disposal is prohibitive (refer to Appendix I). Currently there is no feasible alternative to land disposal. There are a number of waste processing methods, however, which can be utilized to maximize the efficient use of a sanitary landfill. Some are essentially volume reduction processes which would increase the life of the landfill. Others use solid waste as a resource, which also tends to reduce the volume of the solid waste, thus lengthening landfill life.

A concept of waste processing is resource recovery. The City and County of Honolulu is pursuing development of resource recovery. A concept being considered is a facility to use municipal refuse as fuel to generate steam for turbines which

could be used to generate electricity. Although this would be a positive step in the solid waste management plan for Oahu, such a facility would not replace the need for a sanitary landfill, since residue and ash from operations, refuse bypassed during shutdowns, and non-combustibles still would require land disposal.

A concept of waste processing compatible with a resource recovery facility is recycling. Basically, the idea behind recycling is to remove reuseable materials from the waste stream before or after the solid waste undergoes processing. Locally, these items can be categorized as paper, glass, and ferrous and non-ferrous metals. This is discussed further in a later section.

Solid waste can be processed as follows:

1. Incineration
2. Shredding
3. Baling
4. Waste Utilization (besides recycling):
 - a. composting
 - b. pyrolysis

Each of these methods is described in this section, along with a discussion of its compatibility with the City and County's plans for solid waste management.

I. INCINERATION

Waipahu Incinerator already is part of the City and County's waste management operations. The primary advantage for incineration is volume reduction, which can be around 90%. [5] Incineration cannot process all types of solid waste, e.g., demolition materials, but remains the most efficient method of volume reduction. This process has lengthened the existing landfill lives and has reduced the need to search for additional landfill sites through the years. Incineration alone, however, cannot replace a sanitary landfill, since disposal of ash and non-combustible materials is still required.

Construction of additional incinerators has been considered. High capital cost, expensive air pollution controls, and wasted heat energy make incinerators unattractive as a long-term solution. The primary drawback of straight incineration without energy recovery is the operations and maintenance cost, which is more than double the cost of landfilling. This high cost, with no revenue stream to offset it, makes incineration alone impractical. It is estimated that the per ton cost of incineration is \$69.00, versus \$25.00 for landfilling, excluding transportation costs. [7]

II. SHREDDING [5;6]

Shredding reduces the volume of solid waste and turns it into a relatively homogeneous material which is easier to dispose. "Not only is the volume reduced by up to 50%, but it

is converted into a humuslike substance which is relatively odorless, unattractive to flies and vermin and which is relatively incombustible" (i.e., less subject to spontaneous combustion). [5]

There are a number of size reduction equipment commercially available. The most common is the hammermill type, which combines impaction and shredding functions. [5] The size of the particles produced is quite important to the effectiveness of the step or steps following shredding (energy recovery, landfill disposal, or a combination of both). The shredding system must be capable of meeting the particular size requirements. Until recently, shredding was used to reduce solid waste volume for immediate landfill disposal, but it is now considered a beneficial first step to other processing methods, such as composting and resource recovery.

An important aspect of a successful shredding operation is presortment of nonmillable materials from refuse. Even with effective presortment, shredders do jam and require considerable maintenance costs. The decision to introduce shredding into a waste management plan would be based on its overall advantages and compatibility with the plan.

Advantages of Shredding:

- Reduces the volume of solid wastes significantly; is easily compacted and can extend the life of the landfill.
- Shredded waste does not attract nor support vectors, support spontaneous combustion, have an objectionable odor, nor lead to littering.

- When compacted in a landfill, shredded waste has fewer voids than unprocessed waste; the density is 25% to 60% greater depending on whether daily coverage is required.
- Shredding produces a more uniform fuel for incineration; the problem of agitation of the fuel to prevent uneven firebeds is minimized.
- Shredding is essential to process solid wastes for efficient mechanical separation.
- Shredding produces uniform material, so it is a common prerequisite for composting.
- Because shredding reduces the volume of bulky waste, it provides ease and cost-effectiveness in hauling.
- Public acceptance to shredding facilities has been relatively good compared to acceptance of more conventional solid waste processing or disposal facilities.
- A large portion of the total solid waste load can be shredded.
- A higher rate of decomposition occurs, compared to raw refuse, which results in quicker stabilization of the landfill.

Disadvantages of Shredding:

- Some waste cannot be put through a shredder because of size or density or because it is hazardous, has a high moisture content, or has other qualities that normally call for specialized handling in any system.
- Jamming of the shredder and uneven feeding can significantly reduce the output of the mill.

- Municipal solid waste has a high percentage of flammable materials which have caused, on occasion, fires in the shredder.
- There is a potential for explosion within a shredder due to explosive materials that may enter the facility.
- Shredders are noisy and produce dust, so the entire operation must be enclosed and dust collectors must be installed.

Compatibility of Shredding with the City's Waste Management Program:

During the design phase of the City and County of Honolulu's Keehi Transfer Station, the possibility of including a shredding operation was considered. A feasibility analysis, however, indicated that the operation's capital and operating costs would be only partially offset by lower transportation costs and extended landfill life.

Since resource recovery was also being considered at that time, it was felt that shredding equipment should not be installed at a location separate from a resource recovery facility. Greater handling and cost efficiency could be achieved by presorting, with magnetic separators, and shredding at a resource recovery facility.

III. BALING [5;6]

Baling is a method used to reduce the volume of refuse, by compacting raw, loose, solid waste into dense blocks of material

before disposal in a sanitary landfill. Densities of uncompacted household refuse range from 3.8 to 15.9 pounds/cubic foot (102.6 to 429.3 pounds/cubic yard), with the higher densities indicating samples with less void space than low density samples.

Whether a compacted bale will hold its initial volume reduction depends on the characteristics of the compacted material. Paper, rubber, plastic, and plant matter contribute at least 65% (by weight) to refuse and have semi-elastic characteristics; bales tend to springback and increase in volume after compaction. After such springback, it is estimated that bales are compacted to densities around 50-60 pounds/cubic foot (1350-1620 pounds/cubic yard), depending on the amount of pressure that was applied.

Baling can achieve cost savings if transfer and long hauls are necessary prior to disposal and if land disposal space is at a premium. It also can make waste easier to handle and transport. The decision to implement baling would be based, in part, upon the economic and environmental features of a given community.

The capital cost for establishing baling operations can range anywhere from about two-million dollars to four-million dollars. The cost of refuse disposal by baling is estimated to be \$42.00 per ton, excluding transportation costs. [7]

Advantages of Baling:

- Baling increases the life of the land disposal site up to 60% and reduces the number of times a city government must go through the difficult process of acquiring a new disposal site. Densities vary from 1,000 to more than 1,600 pounds per cubic yard, depending on the type of baler used.
- Balers can handle most types of wastes.
- While the cost is comparable to that of other forms of solid waste processing, bulk reduction makes long hauls more economical.
- Bales are easier to handle and transport than unprocessed waste; they are, therefore, more convenient for operations such as rail hauling.
- Baling should permit more immediate use of the disposal site upon completion, since minimal settling is anticipated.
- In shredding/baling operations, ferrous metal can be recovered from recycling via magnetic separation during shredding. Also, corrugated containers and white goods can be hand-picked, baled separately and sold; however, this increases costs.
- The rise in temperatures within tested bales seems quite rapid and sufficiently high to effectively destroy most microorganisms in household wastes.
- Bales require little or no daily cover.
- Bales resist the burrowing of animal and insect pests.
- Bales are not subject to wind blowing material around.

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- The rise in temperatures within tested bales seems quite rapid and sufficiently high to effectively destroy most microorganisms in household wastes.
- Bales require little or no daily cover.
- Bales resist the burrowing of animal and insect pests.
- Bales are not subject to wind blowing material around.

- Bales do not burn as easily as uncompacted material; they also resist water percolation, thereby reducing the generation of leachate.

Disadvantages of Baling:

- Facilities which include baling involve a greater initial investment than conventional transfer stations handling the same tonnage.
- Baling precludes resource recovery once the bale is formed.
- There is incomplete knowledge about the economics of baling and effects of baling on decomposition in landfills, gas and leachate formation, and settling.
- Baling is not a final disposal process; bales must be disposed in a sanitary landfill.

Compatibility of Baling with the City's Waste Management Program:

In terms of the City and County's waste management plans, baling would be an uneconomical procedure to introduce for two basic reasons. First, bales would be incompatible with resource recovery. Second, existing waste processing procedures achieve compaction of about 1000-1200 pounds/cubic yard [7], compared to baled densities estimated at 1000-1600 pounds/cubic yard [5]. The significantly higher cost of constructing and maintaining a baling operation, compared to its contribution in lengthening landfill life, is not cost-effective, especially considering the City's long-term plans toward initiating a resource recovery program.

IV. WASTE UTILIZATION

A. Composting [5;6]

Composting is a biological process in which organic solid wastes, after separation from the inorganic fraction, are decomposed at a rapid rate (15-21 days) in open windrows or within confined tanks. The end product is a humus-like substance that primarily is used to condition soil. Because it is a biological process, it is subject to well-defined biological limitations: "(1) a suitable microbial population must be present; (2) the rate and efficiency of the process are functions of the rate and efficiency of microbial activity; (3) the capacity of a given operation is limited by the size and nature of the microbial population; (4) the substrate subject to composting generally must be organic; and (5) environmental factors are of key importance." [5]

Sorting and grinding (or shredding) are important steps which precede composting. Besides construction and demolition wastes, items which must be removed from the waste stream include metal cans, miscellaneous metals, glass and ceramic ware because of the potential damage and high wear-and-tear these items would cause to grinders and shredders. Synthetic rags and plastics also should be removed because of their unesthetic effect on the resultant compost. Ferrous metals are commonly magnetically separated. Rags and nonferrous objects can be removed by hand or mechanically sorted when the technology is

developed. Excess paper can be removed by a blower and suction mechanism; this may be necessary to maintain optimum moisture content. Glass and ceramic ware present more problems. Hand picking is unprofitable; however, pulverizing glass mixed with garbage requires special equipment design and excessive energy requirements. [5]

In the United States, composting has not proven to be economically viable; its extremely high cost limits the number of markets for the compost materials. Consequently, composting, as a processing method for municipal solid waste, is slowly being phased out. [6] The per ton cost of composting is estimated at \$68.00, excluding transportation costs. [7]

Advantages of Composting:

- Reduces volume and weight of the organic portion of refuse by about 30-40% (overall volume would be less because of the nonbiodegradable portion) and can prolong use of sanitary landfill.
- Can be used as soil conditioner to improve soil characteristics, thereby recycling solid wastes back to the soil.

Disadvantages of Composting:

- Municipal refuse does not contain sufficient nitrogen to ensure proper digestion, so most compost media must be supplemented with additional nitrogen.
- Requires large land areas for processing, which is limited on Oahu.

- Attracts flies and rodents.
- Generates odor.
- Requires separation of non-compostable (i.e., inorganic) material so does not account for total waste disposal.
- High cost of application to land has made it uneconomical for large-scale use.
- Dependent on market conditions, i.e., large-scale agriculture is not interested in distributing bulky materials over cropland when inorganic fertilizers are more cost-effective.
- Beneficial effects of composting can be realized only by careful control of all phases of the process. All particles must be adequately exposed to the high temperatures of composting to kill pathogens.

The following is an excerpt from Handbook of Solid Waste Disposal [8]:

"Despite considerable investment and technical knowhow, not one large-scale composting plant has operated economically long enough in the United States to indicate that the process is feasible. As of 1972, there had been 18 attempts at composting in the United States and of those 18 only one or two were operating, and they existed under special circumstances. Composting has failed in the United States for four main reasons: (1) no steady market for the end product has been found; (2) initial investment and

operating costs are generally high compared to other disposal methods; (3) a high quality end product usually cannot be derived from refuse in the United States without excessive expense; and (4) the separation of noncompostables requires a secondary method of disposal."

Compatibility of Composting with the City's Waste Management Program:

Currently, composting would not be the most efficient processing method to introduce. Land already is at a premium on Oahu and the land requirements, along with impacts due to vectors and odor, make this option unattractive. It only addresses organic material which accounts for about 59% of the total Oahu refuse tonnage. It would be advisable to study the survival of pathogens, especially parasite eggs from sewage sludge, through the composting process. Another factor which should be studied is the possible adverse effect of pesticides present on in-coming organic matter which is transformed into compost and subsequently applied to crops. Application of composted municipal refuse characteristically could introduce metals to crops, and potential effects should be addressed. Before a large-scale composting operation can be entertained by the City, a safe product would have to be guaranteed from a facility which can handle 1,000 or more tons per day.

Compared to incineration, volume reduction by composting is quite inefficient. This, combined with a questionable market for compost, renders this processing

method unadvisable. Should market and economic conditions change, however, resource recovery would not preclude the possibility of supplementing the program with a composting operation.

B. Pyrolysis [5;6]

Pyrolysis is the physical and chemical decomposition of organic materials in the absence and near-absence of oxygen at high temperatures. "The high temperature and the 'starved-air' situation causes a breakdown of the materials into three parts: (1) a gas consisting primarily of hydrogen, methane, and carbon monoxide; (2) a liquid fuel that includes organic chemicals such as acetic acid, acetone and methanol; (3) a char consisting of almost pure carbon, plus any glass, metal, or rock that may have been processed." [5] Pyrolysis processing is under development by many private and public organizations. The ultimate goal of this system is to convert solid waste into a storable, transportable fuel, either liquid or gas.

There are basically two types of pyrolysis processes: a gas pyrolysis process, and oil pyrolysis. There are different types of gas pyrolysis, but the principle is essentially the same: as refuse moves through the pyrolysis reactor, it is exposed to successively higher temperatures and is destructively distilled. In some processes, there is sufficient recovered fuel to be used as auxiliary fuel in fossil fuel boilers (medium Btu gas systems). In other

systems, the gas is of low Btu value and cannot be transported off-site; thus, it must be used as a fuel in a waste heat boiler to produce steam or electric power. Oil pyrolysis differs from gas pyrolysis in the temperatures to which the refuse is exposed.

According to a study by MITRE [9], cost estimates for a gas pyrolysis system range from \$33.90 (\$54.00 in 1985 dollars) per ton for a thousand TPD facility to \$25.44 (\$41.00 in 1985 dollars) per ton for a 2,000 TPD facility. MITRE's cost estimates for an oil pyrolysis system range from \$30.64 (\$49.00 in 1985 dollars) per ton for a 500 TPD facility to \$23.16 (\$37.00 in 1985 dollars) per ton for a 2,000 TPD facility. [9]

Advantages of Pyrolysis:

- Reduces refuse volume and weight to facilitate solid waste handling; prolongs life of landfill site.
- Processing can produce fuel in the form of gas and oil.

Disadvantages of Pyrolysis:

- Requires skilled operators.
- Requires prior shredding and separating if fuels are to be produced efficiently.
- Can produce operational impacts of noise, dust, thermal discharge into the atmosphere, and contaminated wastewater.
- Cost for the process is high.

Compatibility of Pyrolysis with the City's Waste Management Program:

During the bidding for the HPOWER contract, no bidder proposing a pyrolytic system could demonstrate reliability in handling the daily volume requirements, as stipulated by the request for proposals (RFP).

Recently, an RFP was released for the Honolulu Resource Recovery Project. This RFP states: "The minimum requirement to satisfy this item is that the proposed process (or components) not be a prototype or demonstration plant and that there exists an operational facility in which the offeror's technical members have been substantially involved. Also that the system has been successfully operated for the past two years with front end refuse derived fuel (RDF) systems processing a minimum of 30 tons per hour (TPH) and combustion systems firing a minimum of 300 tons per day (TPD) of raw refuse input in a single operating line; has accepted at least 50,000 tons of solid waste in the past 12 months; which without major modification or equipment changes would substantially represent the system proposed for Honolulu, and that the processing and firing of refuse has in the past 12 months resulted in the generation of marketable steam or electricity." Based on current plans, therefore, a pyrolytic system would be incompatible with the City's resource recovery plans.

C. Recycling [6]

Certain types of marketable materials can be recovered from solid waste, either before materials are placed in a collection vehicle, or later, from mixed municipal refuse.

Examples of materials that can be recovered from refuse through "source separation" are paper, glass and metal containers. These can be separated at their point of generation, be it at the home, office or other place of business. Once these materials have been separated out, they can be transported to a secondary materials dealer or directly to a manufacturer.

Recovery of materials by source separation has been practiced only in a few instances prior to 1970. Since then this method has grown rapidly as a means of recovering paper, primarily newsprint, and aluminum from municipal refuse. Source separation has been used widely for recovery of waste paper. Recovery of glass and cans by this method has been used only in a few communities; the economic balance of these systems has been poor to date. Table 1 gives a breakdown of the estimated national percentages of paper, glass, ferrous metals, and other materials that compose total municipal solid refuse [6]. Table 2 provides recent information for Oahu.

TABLE 1

COMPOSITION OF MUNICIPAL SOLID WASTE, AS DISCARDED,
UNITED STATES, 1973^{1,2}

Component	Amount (millions of tons)	Percent of Total
Paper	44.2	32.8
Newspaper	8.0	6.0
Corrugated	11.8	9.0
Office paper	5.4	4.0
Other	19.0	14.1
Glass	13.2	9.9
Ferrous Metals	11.0	8.2
Nonferrous Metals	1.4	1.0
Food Waste	22.4	16.6
Yard Waste	25.0	18.5
Other	17.2	12.8
TOTAL:	134.8	100.0

¹Smith, F.A., U.S. Environmental Protection Agency.
Unpublished data.

²Includes wastes generated in households, commercial and business establishments, and institutions (schools, hospitals, etc.); excluded are industrial process wastes, agricultural and animal wastes, construction and demolition wastes, mining wastes, abandoned automobiles, ashes, street sweepings, and sewage sludge. Waste now being recycled are also excluded.

SOURCE: [6]

TABLE 2

COMPONENT FRACTIONS OF WASTE SAMPLES

OAHU - JANUARY/FEBRUARY 1984

(All Values in Percent, by Weight)

COMPONENT	COMBINED MEAN (%)	RESIDENTIAL MEAN (%)	COMMERCIAL MEAN (%)
NEWSPRINT	7.93	7.90	7.98
CORRUGATED CARDBOARD	7.26	2.92	13.78
OTHER PAPER	24.47	24.44	24.51
PLASTICS	5.69	5.16	6.50
YARD WASTES	19.37	28.24	6.08
OTHER COMBUSTIBLES	20.95	19.06	23.79
FERROUS	3.64	3.79	3.41
ALUMINUM	1.59	1.37	1.92
GLASS	6.63	5.19	8.79
OTHER NON-COMBUSTIBLES	2.46	1.95	3.24
<hr/>			
TOTAL COMBUSTIBLES	85.68	87.71	82.64
TOTAL NON-COMBUSTIBLES	14.32	12.29	17.36

Source: Refuse Division, City and County of Honolulu, 1984

There are three basic approaches to implement the recovery of marketable materials from mixed municipal refuse. The first approach is to add shredding and ferrous metal recovery systems to landfill operations. Shredding can improve landfill operations and reduce requirements for landfill volume, and can also be an important first step in separating out various components. The second approach would be to recover non-combustible materials either before or after energy recovery takes place. The third approach is to recover as many of the components of the waste as is economically feasible through source separation.

Materials recovery offers several advantages: (1) conserving resources; (2) reducing the quantity of refuse to be disposed, thus lengthening the life of a landfill; (3) lowering municipal disposal costs by the sale of recovered material; and (4) siting of resource recovery facilities would encounter less community opposition than conventional disposal facilities.

There are still many disadvantages and risks associated with recycling of materials. The degree of risk varies with the complexity of the system, but, in general, the methods used to recover marketable materials are still in the early stage of development. Therefore, cost and performance information on commercially available equipment are not well documented. Economic feasibility of recycling is primarily

based on projected maintenance costs, the separation systems' recovery rate, and an assumed value for the product. There are also marketing considerations, since the feasibility of a recovery system would depend upon the sale, at a reasonable price, of the extracted materials.

Even with full use of mechanical separating equipment and with full reuse of all separated materials, recycling can never utilize 100 percent of the solid waste. There will always be materials which must be disposed of through other means because of contamination of some materials and because of inefficiencies in the separation of others. For example, paper contaminated with grease or oil cannot be reprocessed into a new paper product and must be disposed of by incineration or landfilling.

Market Conditions in Hawaii. Hawaii is not a major manufacturing center, so there is little local demand for secondary materials. Markets exist in the Orient and on the Mainland for recycled materials, but the cost of shipping, added to the cost of separation, has not made recycling from municipal refuse feasible in Hawaii.

A number of recycling companies locally, however, are accepting certain marketable materials. A telephone survey of recycling and scrap metal companies was conducted during March and April of 1985. Information from 13 of 15 (87%) companies was obtained. Some companies collect certain marketable recyclable materials and have other companies ship the materials. Other companies collect from other

recycling companies and from customers and bale the items before shipment. The predominant items being recycled are paper and aluminum, some copper/brass, and negligible amounts of stainless steel, glass, and lead and batteries. The major market for these items is the Orient.

Based on information obtained from the 13 respondents, conservative estimates of materials being recycled by these companies are 45 tons per day (TPD) for paper, 20 TPD for aluminum, and 5 TPD for copper/brass. Stainless steel and glass each account for about 1 TPD, and lead and batteries are negligible. This accounts for less than 75 TPD out of the total 2200 TPD (March 1985) municipal refuse being generated on Oahu.

Ferrous Metals. The recovery of metal cans from solid waste appears to be promising, as there is a Mainland market for steel. Before metal cans can be used for their steel content, however, the tin in the metal must be removed. Detinning of cans from Hawaii is presently done in Seattle. No detinning operations are planned for Oahu, and it is uncertain whether such an operation would be economically feasible here. The two major operators of detinning plants for the recovery of tin and ferrous metals in the United States are M & T Chemicals and the Vulcan Materials Company. Both firms have expressed an interest in securing ferrous materials recovered in Hawaii from solid waste. There are, however, a number of restrictions imposed by both

Vulcan Materials Company and M & T Chemicals which must be considered prior to entering an agreement with either of these firms. Each of the firms requires the following:

- Metal shall be relatively free of trash, paper, plastics and other foreign contaminants.
- Iron content of the material is to be approximately 95 percent.
- Cans cannot be balled or nuggetized but must be shredded in a manner to provide maximum surface area.
- A price penalty will apply to scrap that has not been subject to air cleanup operation for removal of loose materials.

Locally, recycling of ferrous metals is accomplished by Flynn-Learner and by Hawaiian Western Steel. Neither of these firms accepts metals cans, because of their tin content.

The Dole Company bales old defective cans and sells them to mainland concerns as scrap.

A valuable source of recyclable ferrous metals is junk cars. Considerable energy can be conserved by producing steel from scrap compared to production from virgin ore. The City and County organized a Junk Car Task Force in April 1983 to study the junk car problem, both from the perspective of the accumulation of junk cars on Oahu and their potential resource in recycling. [10]

As presented in the report prepared by the Task Force, "the rapid removal of junk cars from public and private properties is to a large extent related to the economic cycle of the automobile." [10] With the ecological movement came "a decline in the use of scrap from automobiles due to inefficiencies in the scrap processing industry and technological changes such as the switching over in the steel industry from open hearth furnaces to basic oxygen furnaces. The oxygen furnace used less scrap as part of the production process." [10]

"As a result, automobile hulks began accumulating in alarming numbers in countless auto graveyards across the nation. Derelict and abandoned vehicles began to be noticed in urban as well as rural areas." [10]

In the City and County of Honolulu, auto registration in January 1983 was 502,987 and is projected to grow approximately by 11,000 vehicles per year. Of the total registered annually, about 7%, or 35,000 vehicles, are retired annually; this is consistent with national figures. [10]

"Past figures indicate that less than 1 percent of the total registered vehicles will wind up on City streets as either derelicts or abandoned vehicles. Since 1974, the number of abandoned and derelict vehicles on City streets has steadily declined from a high of 4,700 in 1974 to a low of 2,500 in 1978." [10]

"For fiscal year 1982, the number of derelicts and abandoned vehicles rose to 3,500. This trend is expected to continue as the ratio of over 10-year-old cars have (sic) grown dramatically during the past 10 years. Excluding trucks and buses, the number of vehicles 10 years of age or older has grown from 8 percent of total cars registered in 1970 to 31 percent in 1982." [10]

"The rate of utilization of junk cars for scrap in Oahu is related to the health of the local construction industry. Many of the junk cars are processed into No. 2 bundles (i.e, the most prevalent form of scrap from auto hulks) for Hawaiian Western Steel which converts the scrap into reinforcing bars, or rebars, for the local construction industry. Demand for rebars has diminished substantially due to the downturn in the local construction industry. This has reduced demand for No. 2 bundle scrap and correspondingly lowered demand and price for auto hulks." [10]

Rags. The demand for cotton rags on Oahu is substantial. The largest Hawaii distributor sells more than 16,000 pounds of rags a week, most of which are used for wiping purposes in various island industries. Cloth rags must be salvaged at the point of refuse generation (home), since there is no economical way of salvaging cloth after it has entered the waste stream.

**Alternative
Sites**

ALTERNATIVE SITES

I. HISTORICAL PERSPECTIVE OF SITE SELECTION PROCESS

In 1977, the Inventory Study of Potential Sanitary and Demolition Landfill Sites was prepared for the Department of Public Works, City and County of Honolulu, by Stanley S. Shimabukuro and Associates, Inc. [11] The purpose of this study was to prepare an inventory of sites on the island of Oahu which could serve as sanitary or demolition landfill sites, based on various criteria (refer to Appendix II).

Existing landfill sites were rapidly reaching capacity, and new sites had to be found to continue sanitary disposal of solid waste, thereby assuring protection of the public's health. The search for potential sites was based on criteria and factors outlined in Federal regulations for sanitary landfills [12]. Besides these regulations, the island of Oahu's characteristics had to be considered:

- limited land space of a small island community;
- restrictions imposed by the Board of Water Supply in groundwater supply areas;
- scarcity of low cost, undeveloped, suitable lands;
- large volumes of solid waste generated by everyone; and
- community objections to landfills

A number of potential sites are located in inland areas which are away from populated areas on the island. These areas,

however, have major disadvantages: (1) some may be areas considered sensitive wildlife habitats, where such a proposed development could affect endemic species of plants and animals, some of which may be considered threatened or endangered; (2) some are areas where annual rainfall is high enough that leachate may be generated, despite mitigative engineering measures to alleviate this potential (i.e., grading the landfill to minimize infiltration of water into the landfill; and providing a peripheral surface drainage system around the landfill to route most of the surface runoff around the landfill); and (3) nearly all inland areas are located over sources of potable groundwater.

Although a leachate collection system could be provided, there are factors which render development of sanitary landfills unadvisable and/or prohibitive. If sites outside potable groundwater zones are found to be just as suitable for sanitary landfill development, then those sites should be considered before the sites which are over a vital, irretrievable resource.

To protect potable water sources on this island, the Board of Water Supply has a set of criteria which must be fulfilled before they will approve development of a sanitary landfill over a potable groundwater zone: [13]

1. a documented study or guarantee indicating that generated leachate will not pollute groundwater resources.
2. monitoring of landfill to assure leachate is confined.
3. monitoring of groundwater quality to assure nondegradation of the underlying groundwater aquifer.

4. landfill developer must accept liability for source replacement in the event of contamination.

Conditions 2 and 3 can be met. Condition 1 will be difficult to meet, since no prudent engineer will become responsible for making an absolute statement such as "generated leachate will not pollute potable groundwater resources." Solid waste technology has not yet advanced to a stage where anyone can assure that leachate will not pollute our groundwater resources. If it can happen, it may happen, and it may happen through no fault of the engineer or the City, but through the negligence of others or "by an act of God."

Condition 4 will be impossible to meet. Oahu's potable groundwater resources are virtually irreplaceable and no prudent person or underwriter will agree to undertake the "liability of source replacement in the event of contamination." The possible liability would be enormous, incalculable, and too great to assume, since our potable groundwater resources are virtually irreplaceable.

If a site, therefore, is unacceptable to the Board of Water Supply, then that should receive the lowest priority and/or be eliminated as a potential site for development.

Based on all these factors influencing site selection, the 1977 Inventory Study identified potential sites for sanitary and demolition landfill development [11]. Table 3 is from Section 6 of the Revised EIS.[1] Entries #1 through #11 pertain to potential Windward sites and should be considered inapplicable

TABLE 3

LANDFILL SITES STATUS (1983)

	Code
1. Kapaa #2 and #3 Landfill Sites	SLF
2. Kapaa #1 Landfill Site	PA
3. Kalaheo Landfill Site	PS
4. Heeia Uka Landfill Site	2
5. Waimanalo North Landfill Site	3
6. Auloa Landfill Site	6
7. Waimanalo South Landfill Site	1
8. Kahaluu, Waihee, Waiahole, Waikane, Kaawa and Punaluu Landfill Sites	1
9. Olomana Landfill Site	6
10. Bellows Field Landfill Site	3&4
11. Heeia Kai Landfill Site	1
12. Makaiwa Landfill Site	2
13. Nanakuli Landfill Site	2
14. Kaloi Landfill Site	1
15. Honouliuli Landfill Site	1
16. Kaukonahua and Waipahu Landfill Sites	1
17. Maili Landfill Site	0
18. Koko Crater Landfill Site	7
19. Waipio Landfill Site	3
20. Mililani Landfill Site	1
21. Poamoho Landfill Site	1
22. Keekee Landfill Site	1
23. Kaena Quarry Landfill Site	1
24. Makua Landfill Site	3
25. Ohikilolo Landfill Site	5
26. Waimanalo Gulch Site	5
27. Barbers Point	1
28. Diamond Head	3
29. Ewa No. 1	1
30. Ewa No. 2	1&3
31. Halawa Sites	1
32. Kahe	1
33. Kunia	1
34. Pearl Harbor	WL
35. Sand Island	3
36. Waianae	2

Source: [1]

Code

1. Site located within ground water supply area
2. Site located within close proximity to communities
3. Land owned by Federal or State government and/or in use, unavailable for use as a sanitary landfill
4. Site considered for Windward landfill
5. Site considered for Leeward landfill
6. Alternative site considered for Windward landfill
7. Alternative site considered for Leeward landfill
- SLF Presently used as a sanitary landfill
- PA Prior agreement not to be used as a landfill in order to obtain the use of Kapaa #2 and #3; and Kalaheo as landfills
- PS The proposed project site
- WL Wetland area, under Federal regulations
- 0 Site is presently being used for quarry operations. It is not contemplated the owners will allow the City to develop a landfill on this site.

as possible alternate sites for the proposed Leeward District Sanitary Landfill.

Entries #12 through #26 of Table 3 are sites identified in the 1977 Inventory Study as potential sanitary and/or demolition sites for the Leeward District Sanitary Landfill. At that time, three potential sites were identified as having the best overall potential for sanitary landfill and one for demolition landfill development:

- Makaiwa Gulch (sanitary landfill)
- Nanakuli A and B (sanitary landfill)
- Kaloi (sanitary landfill)
- Honouliuli (demolition landfill)

In 1978, an environmental impact statement [14] was prepared proposing sanitary landfill development at one of three sites (Makaiwa, Nanakuli A & B, or Kaloi). During the public information process for the project, it became apparent that community opposition to the proposed project was significant. The City and County Administration decided to table plans for the project at the proposed sites of Makaiwa and Nanakuli because of each site's close proximity to communities and start another evaluation process to find new sites and reassess other sites identified in the 1977 Inventory Study. Subsequently, Kaloi was deleted, because it is located over a protected groundwater area.

In 1979, Stanley S. Shimabukuro and Associates, Inc. commenced another study (unpublished) to re-evaluate the Leeward sites presented in the 1977 Inventory Study, conduct an

inventory study to identify additional potential sites, and recommend sites with best potentials for sanitary landfill development. This study attempted to develop a matrix procedure to enable a more quantitative ranking of the sites, but it became an inherently difficult method to use. Some sites would have several characteristics that would give them high rankings for landfill development, but these sites also would have a single disadvantageous characteristic (e.g., over a protected groundwater source) that would either eliminate the site or place it in the lowest priority for consideration, regardless of its overall ranking. Once some of these selection factors eliminated sites from consideration, there were few sites remaining, and a matrix was not needed to compare them.

Ten of the sixteen Leeward sites evaluated in the 1977 study were re-evaluated in the 1979 supplemental study, and ten new sites were identified. The six sites from the 1977 study that were eliminated from further study in 1979 were:

Makaiwa and Nanakuli: City and County Administration decided to remove these two sites from consideration for the proposed Leeward Sanitary Landfill because of each site's close proximity to communities. Also, essentially all of Nanakuli "B" subsequently was classified as a UIC protected area. Refer to site descriptions for details.

Kaukonahua, Mililani and Poamoho: These three sites were considered by the Board of Water Supply to be suitable only as demolition landfills, "provided that disposed materials

be limited to only construction debris free of any toxic substances and that the operating control measures receive our approval." [13] Since these sites are over potable groundwater sources, no further consideration was given them as potential sanitary landfill sites.

Waipahu: This site continues to be used for disposal of ash from the Waipahu Incinerator. At current ash disposal rates, it is estimated that this site will reach capacity in 5-6 years [15]. Its life as a sanitary landfill (i.e., disposal of raw refuse) would be considerably less, since significant volume reduction is achieved by incineration. This has precluded its consideration as a potential site for disposal of raw refuse.

Of the 26 Leeward sites listed in Table 3, six (Makaiwa, Nanakuli, Kaukonahua, Mililani, Poamoho, and Waipahu) were eliminated for reasons already stated. Of the remaining 20 sites (10 re-evaluated sites from the 1977 study plus 10 new sites from the 1979 study), 6 sites were considered unacceptable for sanitary landfill development by the Board of Water Supply [13;17;18;19]:

- Halawa
- Kaloi
- Kunia
- Makua, including Kahanahaiki
- Ohikilolo (above the 200-foot contour)
- Waianae Expansion Site

Of the remaining 14 sites, 2 sites were eliminated from further consideration because of Federal restrictions (refer to the site descriptions for details):

Ewa No. 2

Waipio

[Makua, including Kahanahaiki, also falls under this category]

Pearl Harbor Swamplands essentially were eliminated by virtue of their classification as wetlands. Refer to its site description for details.

This left 11 sites for consideration.

On April 16, 1981, the Mayor formed the Technical Advisory Committee on the Underground Injection Control Program (TAC UIC) for the purpose of delineating the boundaries of exempted aquifers on Oahu, pursuant to 40 CFR 146.04 and 40 CFR 122.35 of the Safe Drinking Water Act. The Safe Drinking Water Act was adopted by Congress in 1974 to establish minimum drinking water standards and to protect aquifers of high quality water. The aquifer protection portion of the Act is called the Underground Injection Control (UIC) program. [20]

Chapter 23 of Title 11, "Underground Injection Control", of the Administrative Rules of the State Department of Health was proposed by TAC UIC, and a series of public hearings was held in November 1983. This Chapter was adopted and became effective as of July 6, 1984: [21]

"The purpose of this chapter is to establish a state underground injection control (UIC) Program in order to protect the quality of the state's underground sources of drinking water (USDW) from pollution by subsurface disposal of fluids. Toward this end, conditions are specified to govern the location, construction and operation of injection wells so that injected fluids do not migrate and pollute USDW. This chapter establishes minimum standards and counties are not precluded from establishing more stringent standards."

Although this Chapter primarily addresses injection wells, sanitary landfills, because of possible leachate generation, are broadly included with the Chapter through the following definitions: [21]

"Inject" means to dispose or emplace fluids, either under pressure or by gravity flow, into a subsurface formation or formations."

"Waste" means any solid, liquid or gaseous matter, whether treated or not, which, when injected, may pollute or tend to pollute the lands or waters, including, but not limited to sewage; effluent; offal; garbage; refuse; and industrial, agricultural or radioactive fluids."

The UIC line separates exempted aquifers from USDW; USDW areas should be protected from pollutants. Of the 11 sites available for consideration, the UIC line designated the following sites to be over USDW protected areas:

Barbers Point

Ewa No. 1

Honouliuli

Kaena

most of Kahe (above about 40-foot contour)

Keekee

[upper portion of Ohikilolo (above about 200-foot contour)]

These sites, therefore, should receive lowest consideration for a proposed sanitary landfill development.

Of the sites not eliminated for reasons already stated, the following are clearly in UIC exempted areas:

Diamond Head

Koko Crater

Maili

Ohikilolo (below the 200-foot contour)

Sand Island

Waimanalo Gulch

Because of Diamond Head's status as a State Monument and because the proposed project would significantly conflict with existing plans, it was eliminated from further consideration (refer to site description). Sand Island's existing park and role in the 1995 Master Plan for Honolulu Harbor eliminated this site from further consideration as a potential landfill site.

Koko Crater contains an existing City and County botanical garden and is part of Koko Head Natural Park. The site was deeded to the City by Bishop Estate for a park. Because of this stipulation and concerns about traffic impacts on Kalaniana'ole Highway, the City decided to eliminate this site from further consideration. The public facilities amendment process also rejected this site, and this site has been removed from public facilities maps.

As stated in the site description for Maili, this site is in close proximity to the community. This, combined with extensive

access construction costs, make this site unattractive for sanitary landfill development.

Waimanalo Gulch, therefore, provided the best potential for sanitary landfill development. Since most of the lower portions of Ohikilolo, which have potential for development, were outside of the UIC protected area, Waimanalo Gulch and Ohikilolo were proposed as the first and second sites, respectively, for the Leeward District Sanitary Landfill.

The City is actively pursuing a resource recovery program for Honolulu and recently succeeded in signing a contract for the design, construction, and operation of a facility at Campbell Industrial Park. This facility will drastically reduce Oahu's need for landfill space and greatly extend the life of a landfill constructed at Waimanalo Gulch. For this reason, the City has decided to delete Ohikilolo as the second site for the Leeward District Sanitary Landfill, although it is still considered a possible alternative site for long-term, future development. Waimanalo Gulch remains as the sole proposed sanitary landfill site on Leeward Oahu.

II. ALTERNATIVE SITE DESCRIPTIONS

Entry #26 of Table 3 (Waimanalo Gulch Site) is the proposed project's site and is not considered an alternate site in this Addendum. The remaining 15 Leeward sites from the 1977 study, plus ten new sites identified in the 1979 study, are presented alphabetically and complete this section of this Addendum.

As described in the previous section, "I. Historical Perspective of Site Selection Process," inland areas generally are over potable groundwater sources. Reasonable alternative sites are available outside these areas along the coast. These coastal areas, however, are usually populated and/or recreational areas. For this reason, most of the potential landfill sites found in these areas can be expected to have significant public objection.

Factors which developed landfill sites would have in common are:

- peripheral surface drainage system to route surface run-off around the landfill to reduce amount of water contacting refuse;
- general landfill nuisances (i.e., vectors, litter, odor, etc.);
- increased traffic in general area of landfill;
- facilities constructed for operations;
- leachate monitoring system; and
- all sites could revert back upon completion of the landfill for purposes of open space, recreation, or light agriculture.

Costs and impacts involved with these factors naturally depend on the individual site.

Figure 1 provides the general island locations of the alternative sites. A summary of each site is provided in this section, in alphabetical order. These summaries are from the

1977 Inventory Study [11] and from information obtained from the 1979 Supplemental Study (unpublished). Site location maps follow each site description. For consistency with the Revised EIS, the original estimates of landfill life, based on a fill rate of 500 tons of refuse per day, have been recalculated using an updated fill rate of 1000 tons per day.

- 1 Barbers Point
- 2 Diamond Head
- 3 Ewa No. 1
- 4 Ewa No. 2
- 5 Halawa
- 6 Honouliuli
- 7 Kaena
- 8 Kahe
- 9 Kaloi
- 10 Kaukonahua
- 11 Keekee
- 12 Koko Crater
- 13 Kunia
- 14 Maili
- 15 Makaiwa
- 16 Makua
- 17 Mililani
- 18 Nanakuli
- 19 Pearl Harbor Swamplands
- 20 Poamoho
- 21 Sand Island
- 22 Waianae Expansion
- 23 Waipahu
- 24 Waipio
- A Keehi Transfer Station (existing)
- B Waipahu Incinerator (existing)

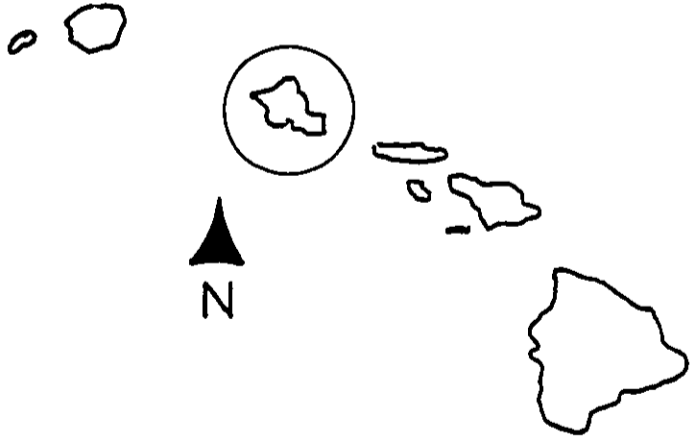
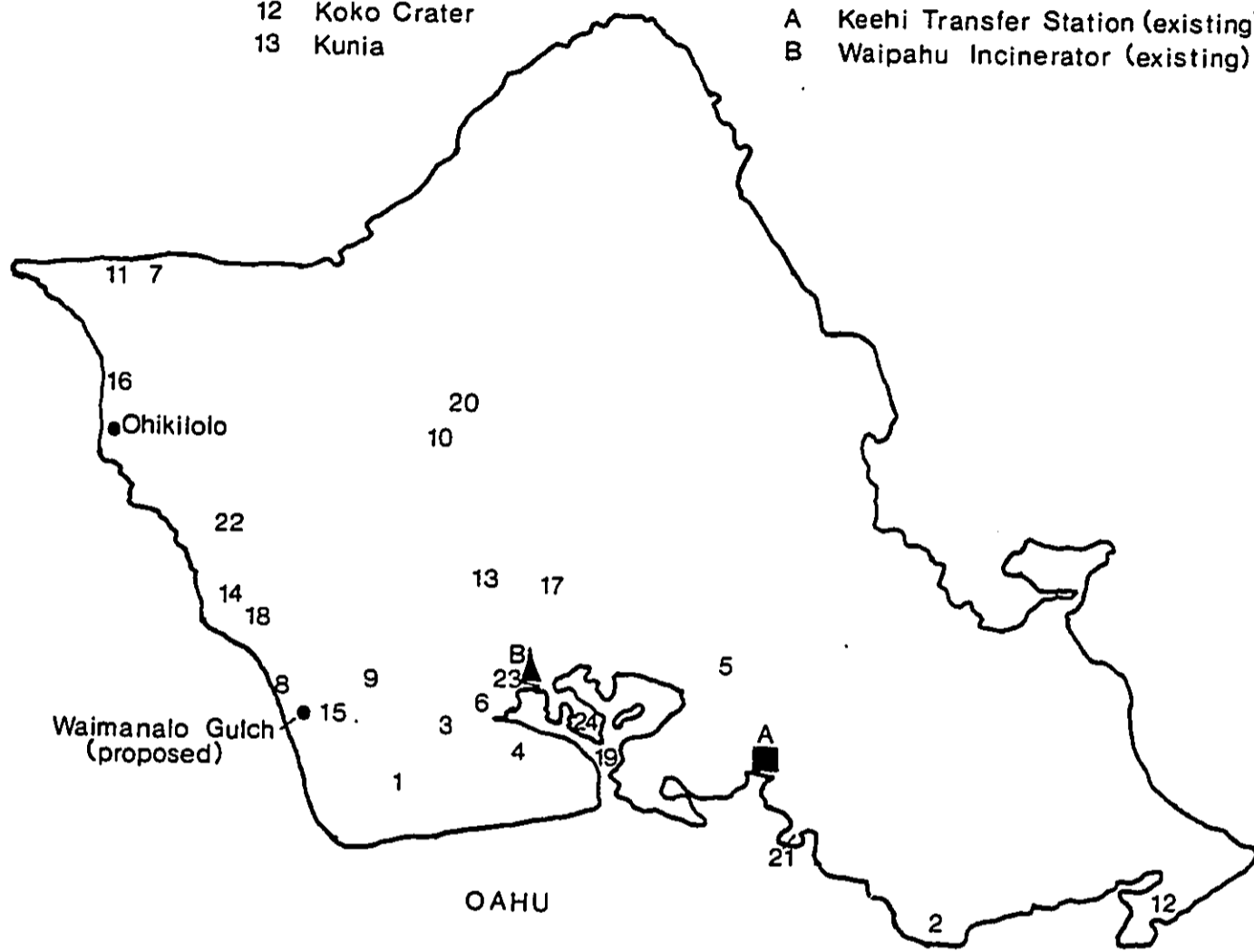


FIGURE 1
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

ALTERNATIVE SITES' LOCATION

BARBERS POINT SITE

(Tax Map Key: 9-1-16: 18 and portion of 1)

This is an abandoned coral quarry site on the Ewa Plains adjacent to Barbers Point Naval Air Station main entrance, about 1.5 miles south of Interstate Route H-1 and about 2 miles southeast of Makakilo. Refer to Figure 2. The site is approximately 8 miles southeast of Nanakuli, 7 miles southwest of Waipahu and 18 miles from Keehi Refuse Transfer Station, on land owned by James Campbell Trust Estate and leased to Oahu Sugar Company, Ltd. and to Benjamin Kekona.

State and City land use designations are Agricultural (zoned AG-1). Present land uses include open space, a junkyard and canefields. There is a pit on the site created by quarry operations, which is about 1,000 feet long, 400 feet wide and 60 feet deep. As a landfill, the 15 acres of this site only would have about 1 year of life and cover material would have to be imported. Prevailing winds are in the direction of a populated area more than 50% of the time.

Advantages

- significant adverse biological or archaeological/historical impacts are not anticipated
- rainfall 20 inches per year; leachate generation not expected

- relatively short (500 feet) new access road must be constructed to site
- nominal surface drainage system required
- electricity and telephone available on site

Disadvantages

- just within the protected area of the Underground Injection Control (UIC) boundary
- short landfill life makes this site impractical for development
- cover material must be imported
- site is upwind of populated areas which are close to the site
- potable water and sanitary sewer would have to be provided to the site
- well and pump system of Oahu Sugar Company and an auto junk dealer will be displaced
- the only way to expand the site would be to remove existing prime agricultural land from production

Restrictions and Setbacks: Special Permit required from State for construction in Agricultural District.

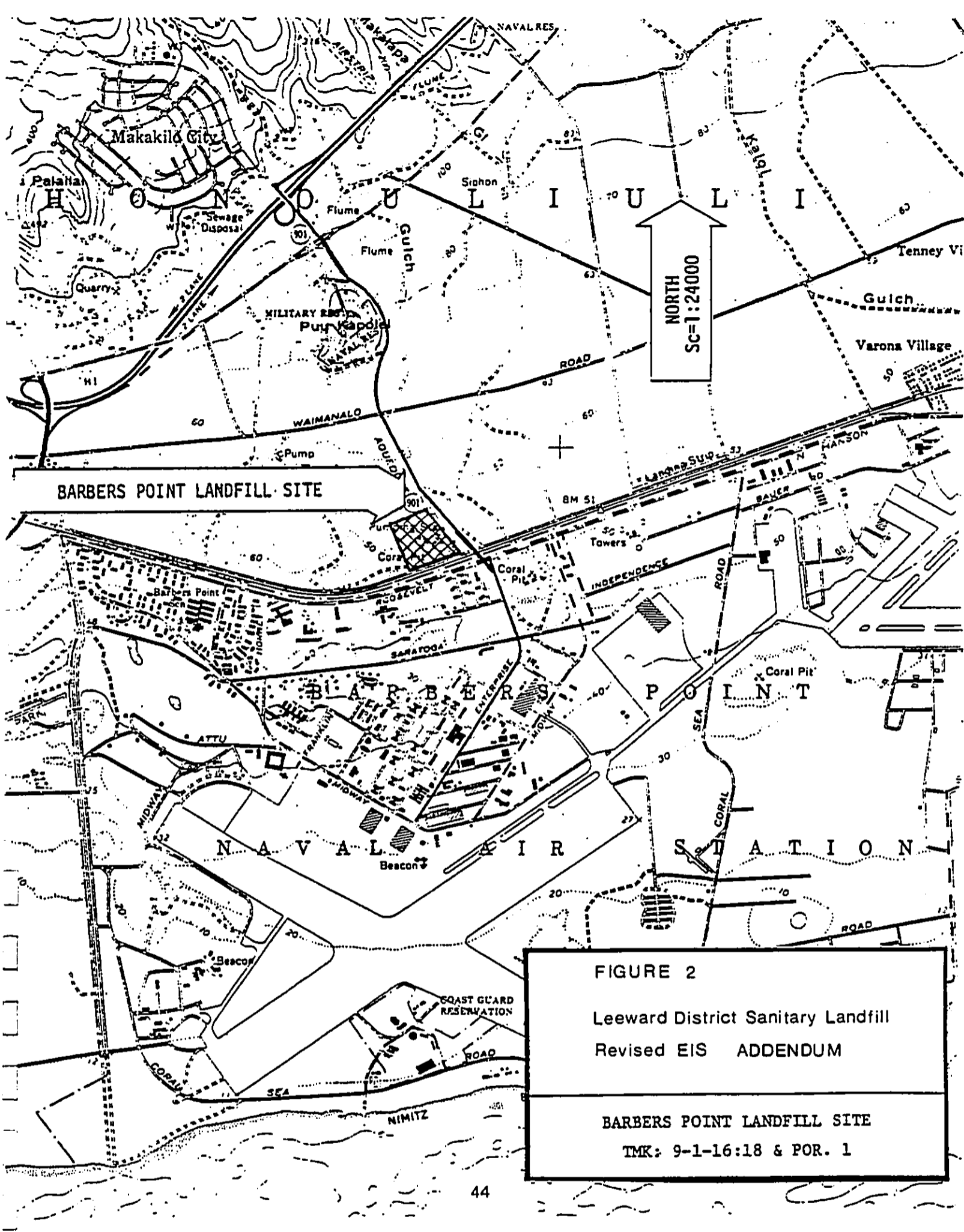


FIGURE 2
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

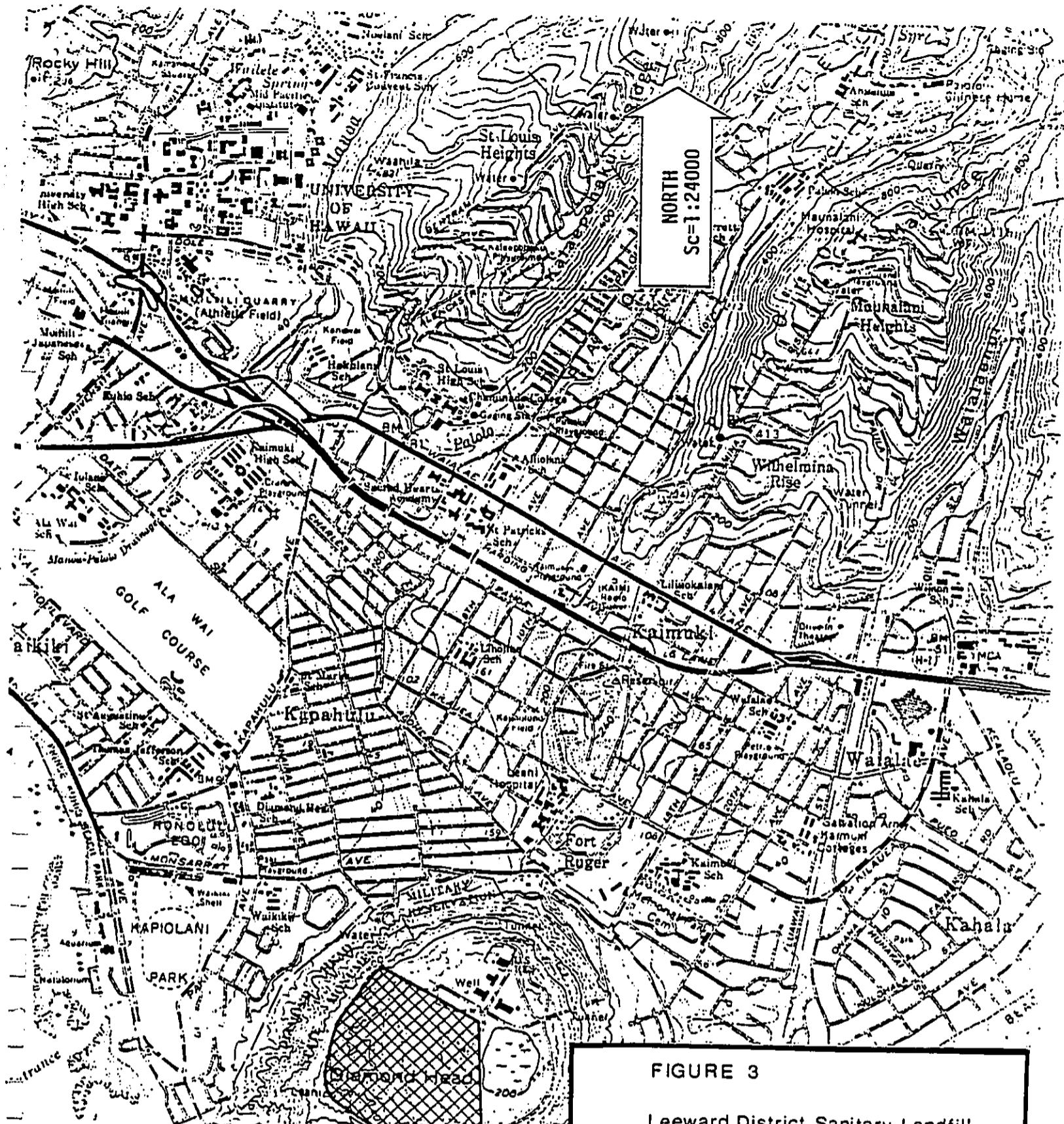
BARBERS POINT LANDFILL SITE
 TMK: 9-1-16:18 & POR. 1

DIAMOND HEAD SITE

(Tax Map Key: 3-1-42: portion of 6)

This site (115 acres) is located in the southwest portion of Diamond Head Crater in the Diamond Head State Monument. The land is owned by the State of Hawaii. State land use designation is Conservation, City General Plan is Military, and City zoning is Preservation (P-1). The site presently is in open space with National Guard and Federal Aviation Administration facilities adjacent and to the northeast of the site. Refer to Figure 3.

This site has been designated a State Monument and a Natural Landmark and will be developed as a Natural Wildlife Reserve recreational area. Because construction of a landfill at the site will conflict with present plans and policies, this Special Consideration will eliminate this site from further evaluation.



NORTH
 SC=1:24000

DIAMOND HEAD LANDFILL SITE

FIGURE 3
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

DIAMOND HEAD LANDFILL SITE
 TMK: 3-1-42:POR. 6

EWA NO. 1 SITE

(Tax Map Key: 9-1-17: portion of 4)

Currently, the site is in canefield and is about 1,200 feet south of Farrington Highway, 0.5 mile west of Honouliuli and 1 mile north of Ewa. Refer to Figure 4. The site is about 3 miles east of Makakilo, 3 miles west of Waipahu and 14 miles from Keehi Refuse Transfer Station. James Campbell Trust Estate is the land owner, with a lease to Oahu Sugar Company, Ltd. State and City land use designations are Agricultural (zoned AG-1).

This site is prime agricultural land and currently is in open space and canefields. Total land area of the site is about 210 acres, of which 150 acres are useable, and has an estimated landfill life of 14 years.

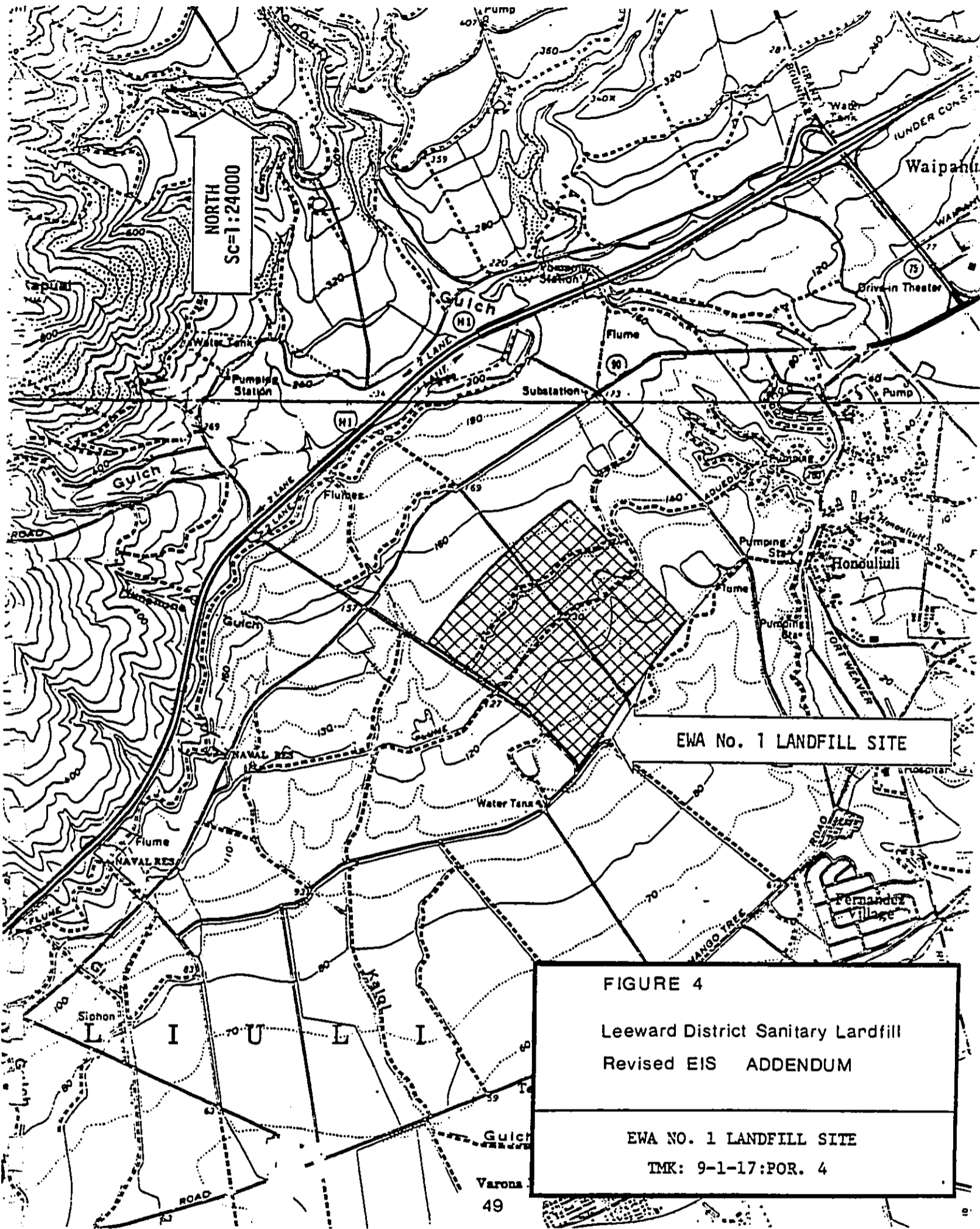
Advantages

- significant adverse biological or archaeological/historical impacts are not anticipated
- cover material available on site
- long landfill life
- not in close proximity to residential areas; wind in direction of populated area less than 10% of the time
- rainfall 25 inches per year; leachate generation not expected
- nominal surface drainage system required

Disadvantages

- major objection from James Campbell Trust Estate
- prime agricultural land will be committed to the landfill; can revert to light agriculture or open space after landfill completed
- site is within UIC protection area
- 1,500 feet of new access road must be constructed to the site from Farrington Highway
- telephone, electricity and water must be extended from Farrington Highway; sanitary sewer must be installed; and portions of an existing Hawaiian Telephone Co. cable easement will require relocation

Restrictions and Setbacks: Special Permit required from State for construction in Agricultural District. A 5-foot wide Hawaiian Telephone Company cable easement crosses the site.



EWA NO. 2 SITE

(Tax Map Key: 9-1-10: portion of 2)

Like the Ewa No. 1 site, this site is in canefield and is about 1.8 miles south of Farrington Highway, 4,000 feet east of Fernandez Village and 1 mile north of Ewa. Refer to Figure 5. It is about 3.5 miles east of Makakilo, 3 miles west of Waipahu and 14 miles from Keehi Refuse Transfer Station. James Cambell Trust Estate is the land owner, with a lease to Oahu Sugar Company, Ltd. State and City land use designations are Agricultural (zoned AG-1).

This site is prime agricultural land and currently is in open space and canefields. This site, however, is within the Navy Blast Zone. Of the total land area of 200 acres, 160 acres are useable with an estimated landfill life of 8 years.

Advantages

- despite a wildlife habitat located about 1000 feet north of the site, at that distance, significant adverse biological impacts are not anticipated; neither are significant adverse archaeological/historical impacts expected
- cover material partially available on site
- relatively long landfill life
- not in close proximity to residential areas; wind in direction of populated area less than 25% of the time

- rainfall 25 inches per year; leachate generation not expected
- nominal surface drainage system required

Disadvantages

- major objection from James Campbell Trust Estate
- prime agricultural land will be committed to the landfill; can revert to light agriculture or open space after landfill is completed
- site is within UIC protected area
- 3,000 feet of new access road must be constructed to the site from Fort Weaver Road
- telephone, electricity and water must be extended from Fort Weaver Road; sanitary sewer must be installed; and portions of an existing Hawaiian Telephone Co. cable easement will require relocation
- site within Navy Blast Zone; Navy will not approve construction and operations of the proposed project within the Blast Zone

Restrictions and Setbacks: Special Permit required from State for construction in Agricultural District. Several easements cross the site. Within the Navy Blast Zone.

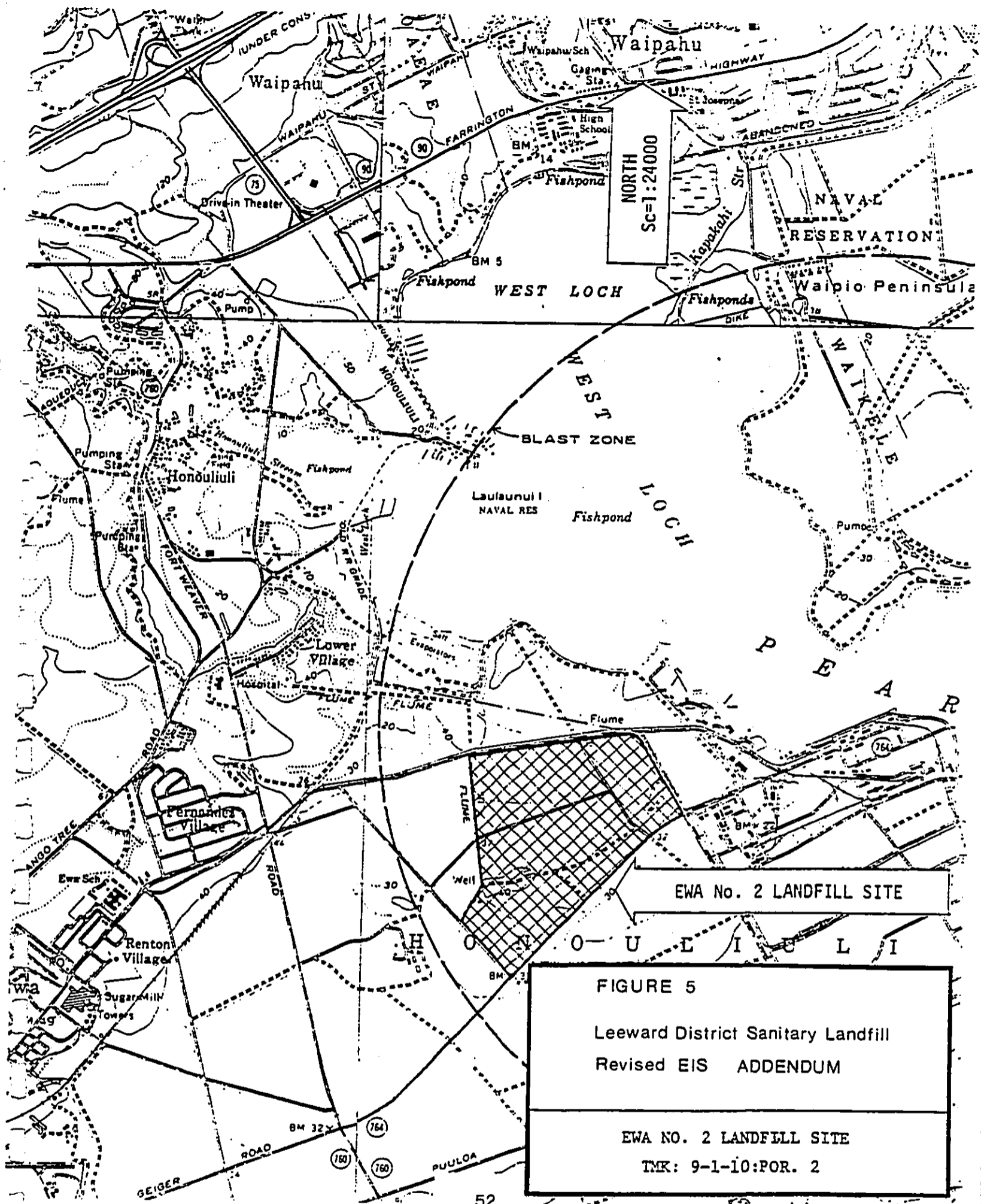


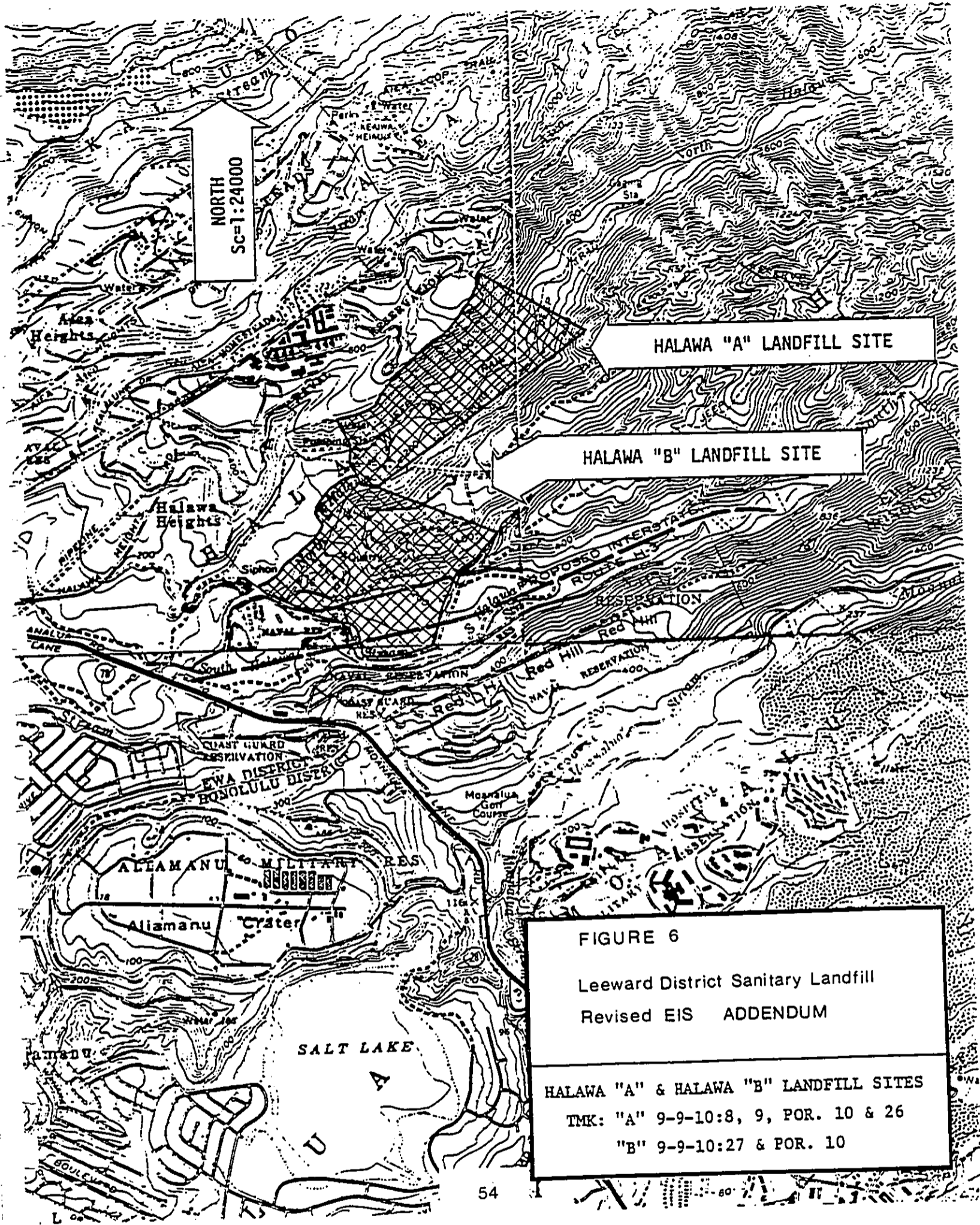
FIGURE 5
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM
 EWA NO. 2 LANDFILL SITE
 TMK: 9-1-10:POR. 2

HALAWA SITES

Two potential sites in Halawa, mauka of Moanalua Freeway, were evaluated for landfill development. Refer to Figure 6. Site "A" (Tax Map Key: 9-9-10: 8, 9, and portions of 10 and 26) is located in North Halawa Valley, mauka of Halawa Industrial Park. The land is owned by the Honolulu Board of Water Supply, the City and County of Honolulu and Queens Medical Center. Total area is about 150 acres.

Site "B" (Tax Map Key: 9-9-10: 27 and portion of 10) is located on the Lone Star Industries, Inc.'s Halawa Quarry site at the nose of the ridge dividing North and South Halawa Valleys. The land is owned by the Queens Medical Center with portions leased to Lone Star Industries, Inc. and subleased to Grace Brothers, Ltd. Total area is about 150 acres.

These sites are located over a Board of Water Supply groundwater zone and in a rainfall zone (averaging 40 inches per year) where leachate may be generated. Because possible risk of contamination to potable water sources exists, these sites are considered unacceptable to the Board of Water Supply. This Special Consideration eliminates these sites from further consideration.



HONOULIULI SITE

(Tax Map Key: 9-1-17)

This site is located 2.6 miles east of Puu Makakilo, 0.5 mile south of Farrington Highway, 2.4 miles east-southeast of Puu Kapuai and 4.5 miles north-northwest of Ewa Beach, on land owned by James Campbell Trust Estate. Refer to Figure 7. The site is a relatively small gully, 1,400 feet long, 35 feet deep, and averaging 400 feet wide. Honouliuli residential and commercial areas are located 1,700 feet to the southeast, Waipahu business district 2.3 miles to the northeast, Fernandez Village 1.4 miles to the south and Makakilo City 2.7 miles to the west-southwest.

State and City land use designations are Agricultural. Approximately 20% of the site is in sugar cane; the remaining 80% is in open space as a gully. Below the site is a plantation-owned domestic water well. Total area of the site is 22 acres with a landfill life capacity of 2 years. Landfill life could be extended to 4 years by expanding into adjacent cane land (prime agricultural land), up to 52 acres.

Advantages

- significant adverse biological or archaeological/historical impacts not anticipated
- cover material available on the site
- rainfall 25 inches per year; leachate generation not expected

- nominal surface drainage system required; underground pipe to and across Fort Weaver Road to Honouliuli Stream must be constructed
- prevailing wind in direction of Honouliuli less than 25% of the time

Disadvantages

- site within UIC protected area
- limited landfill capacity at 2 years; too small for sanitary landfilling, but adequate for demolition disposal
- no utilities available on site; connections must be made at Ft. Weaver Road
- 1,200 feet of access road must be constructed to the site
- visually prominent site
- near residential and commercial area

Restrictions and Setbacks: Special Permit required from State for construction in Agricultural District.

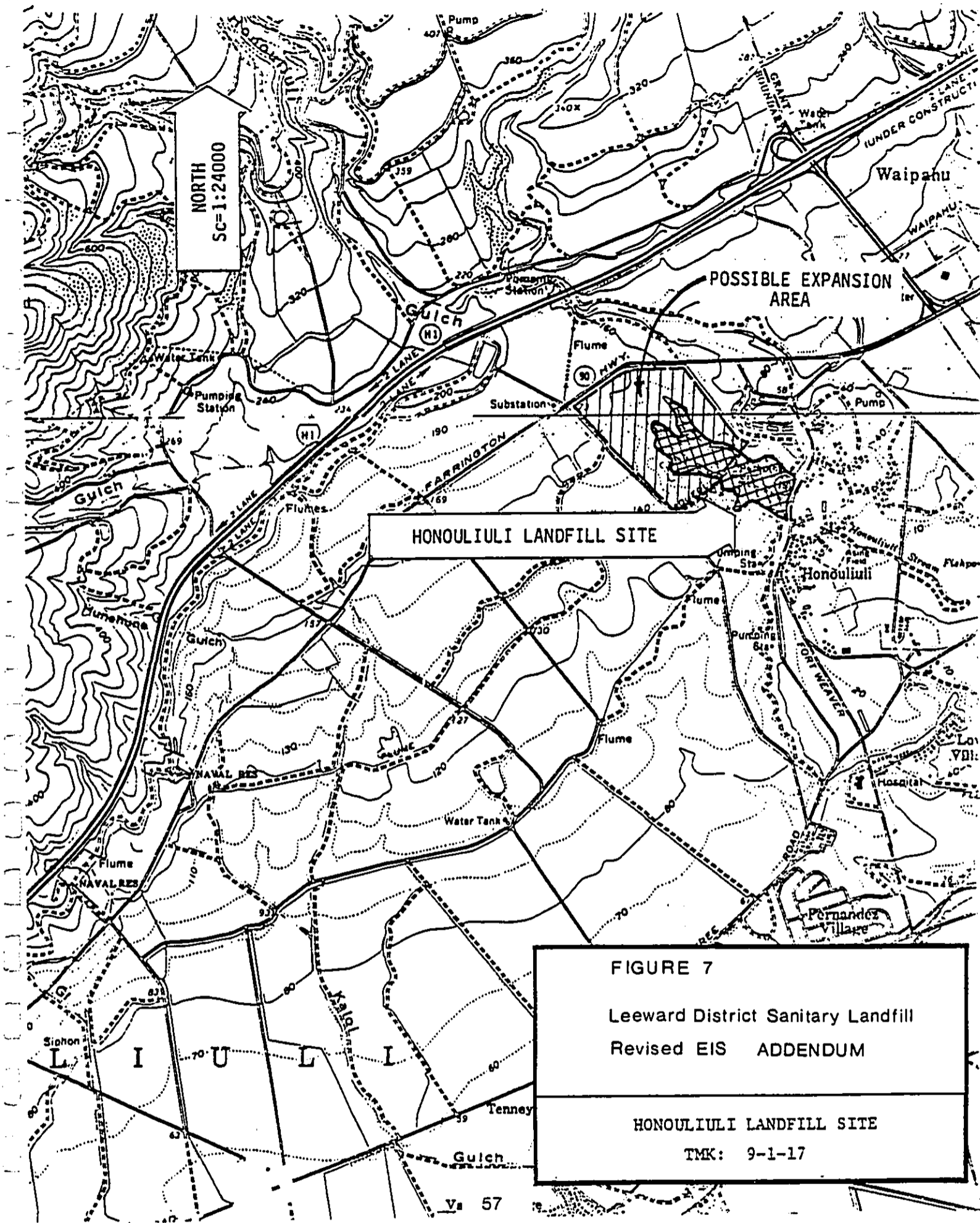


FIGURE 7
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM
 HONOU LI U LI LANDFILL SITE
 TMK: 9-1-17

KAENA SITE

(Tax Map Key: 6-9-01: portion 3, 33 and 34)

This site is at the west mauka end of Dillingham Air Force Base, 1,000 feet mauka of Farrington Highway, 6 miles west of Waialua on the Kaena end of Makua-Kaena State Park. Refer to Figure 8. Waialua is about 6 miles east of the site and Camp Erdman about 4000 feet to the west of the site. The land is owned by the State of Hawaii and Dillingham Corporation. State Land Use designation is Conservation, City General Plan is Preservation, and City zoning is Preservation (P-1).

The site was a quarry operation which created a pit about 1,200 feet long, 700 feet wide and 80 feet deep. It is now abandoned and in open space. The site covers an area of about 40 acres, of which 20 useable acres can be expected to have a landfill life of 2 years.

Advantages

- significant adverse biological or archaeological/historical impacts are not expected
- rainfall 20 inches per year; leachate generation not expected
- landfilling will fill the pit and could provide for more useable open space
- site not in close proximity to populated areas; prevailing wind in direction of populated area less than 25% of the time

- water, electricity and telephone available on site
- nominal surface drainage system required

Disadvantages

- within UIC protected area
- cover material must be imported
- Ulehula Heiau (Site 189) is west of site and potential impacts would have to be investigated
- short landfill life
- far removed from Leeward refuse generation centers (50 miles from Keehi Refuse Transfer Station)
- 1,000 feet of new access road must be constructed to the site
- underground spring discharges into pit and must be diverted or pumped out from pit
- highly visible to public from Farrington Highway and from beaches; possible incompatibility with existing park use
- sanitary sewer system must be installed

Restrictions and Setbacks: Special Permit required from State for construction in Conservation District. Site is located at the Kaena entrance to Makua-Kaena State Park and is under condemnation by the State.

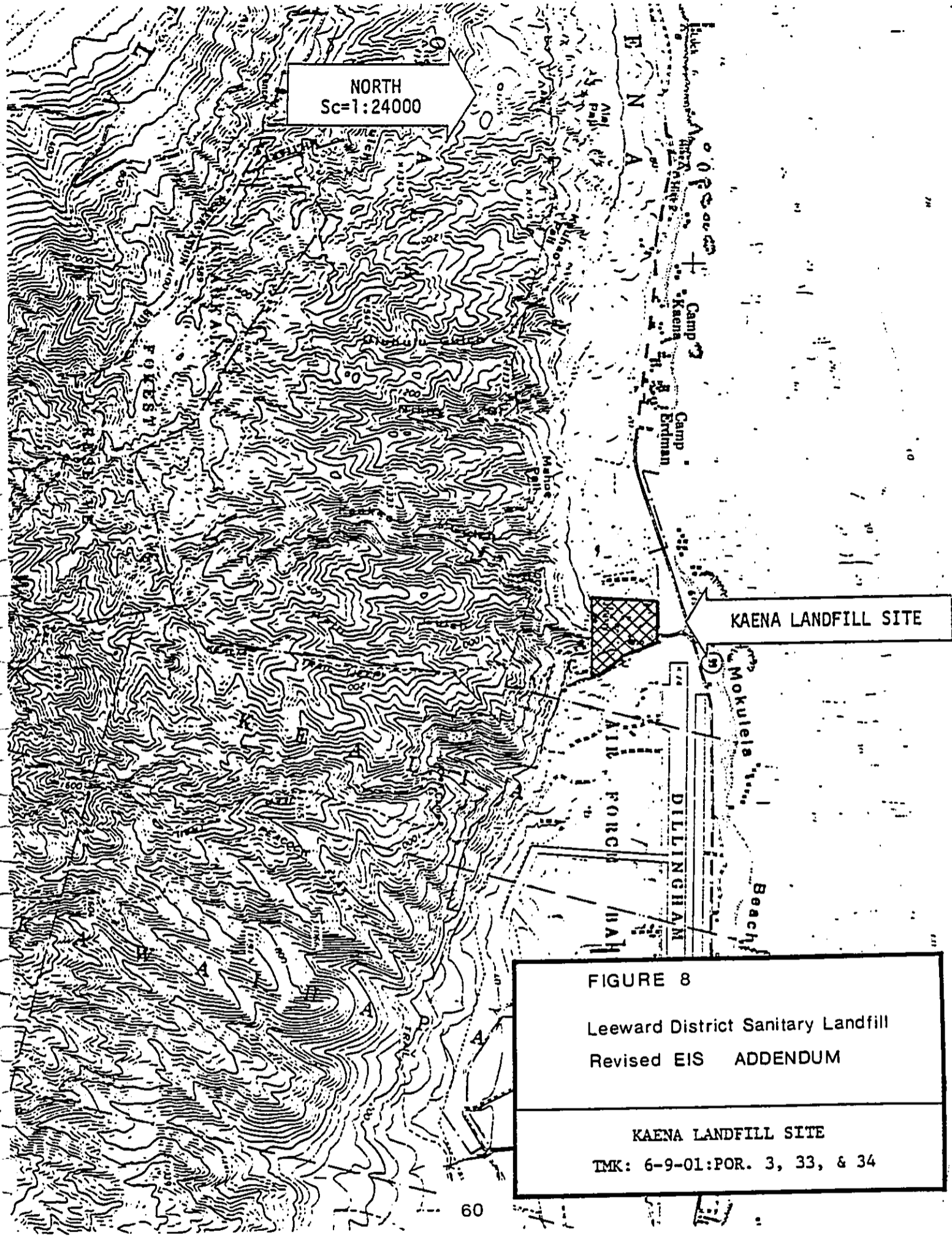


FIGURE 8
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

KAENA LANDFILL SITE
 TMK: 6-9-01:POR. 3, 33, & 34

KAHE SITE, INCLUDING LIMALOA AND KEONEOIO GULCHES

(Tax Map Key: 9-2-03: portion of 27)

This site, which includes Limaloa and Keoneoio Gulches, is located in the northern portion of Kahe Valley, 4.5 miles north of Barbers Point and 1 mile south of Nanakuli. Refer to Figure 9. It is approximately 2 miles northwest of Honokai Hale and 21 miles from Keehi Refuse Transfer Station. Hawaiian Electric Company's (HECo) Kahe Power Plant is located in this valley and the land is owned by HECo. State land use designation is Urban and City land use designation is Industrial (zoned I-1).

The site itself is in open space, but electric power generation facilities are adjacent and to the south of the site. HECo plans to expand its operations in the area of the proposed site. Of the 200 acres total, only about 70 acres are useable, with an estimated landfill life of 9 years.

Advantages

- significant adverse biological or archaeological/historical impacts are not anticipated
- long landfill life
- rainfall 20 inches per year; leachate generation not expected
- electricity and telephone are available at Farrington Highway

- prevailing wind in direction of populated area less than 25% of the time

Disadvantages

- most of the site within the UIC protected area
- landfill would interfere with HECO's long-range expansion plans; strong opposition from HECO can be expected
- 1,000 feet of new access road must be extended into the site from Farrington Highway
- cover material must be imported
- sanitary sewer must be provided to the site
- major drainage system must be constructed to route surface runoff from Limaloa and Keoneoio Gulches around the site
- site highly visible to public from Farrington Highway and Kahe Beach Park; and HECO employees

Restrictions and Setbacks: Permit required by State for access at Farrington Highway. A Waiver must be obtained from the City for landfill construction in Industrial I-1 zone. HECO has master planned the entire Kahe Valley for power generation facilities development, and landfill construction will conflict with their future plans. This is HECO's only available site with areas to accommodate future developments and expansion.

- prevailing wind in direction of populated area less than 25% of the time

Disadvantages

- most of the site within the UIC protected area
- landfill would interfere with HECO's long-range expansion plans; strong opposition from HECO can be expected
- 1,000 feet of new access road must be extended into the site from Farrington Highway
- cover material must be imported
- sanitary sewer must be provided to the site
- major drainage system must be constructed to route surface runoff from Limaloa and Keoneoio Gulches around the site
- site highly visible to public from Farrington Highway and Kahe Beach Park; and HECO employees

Restrictions and Setbacks: Permit required by State for access at Farrington Highway. A Waiver must be obtained from the City for landfill construction in Industrial I-1 zone. HECO has master planned the entire Kahe Valley for power generation facilities development, and landfill construction will conflict with their future plans. This is HECO's only available site with areas to accommodate future developments and expansion.

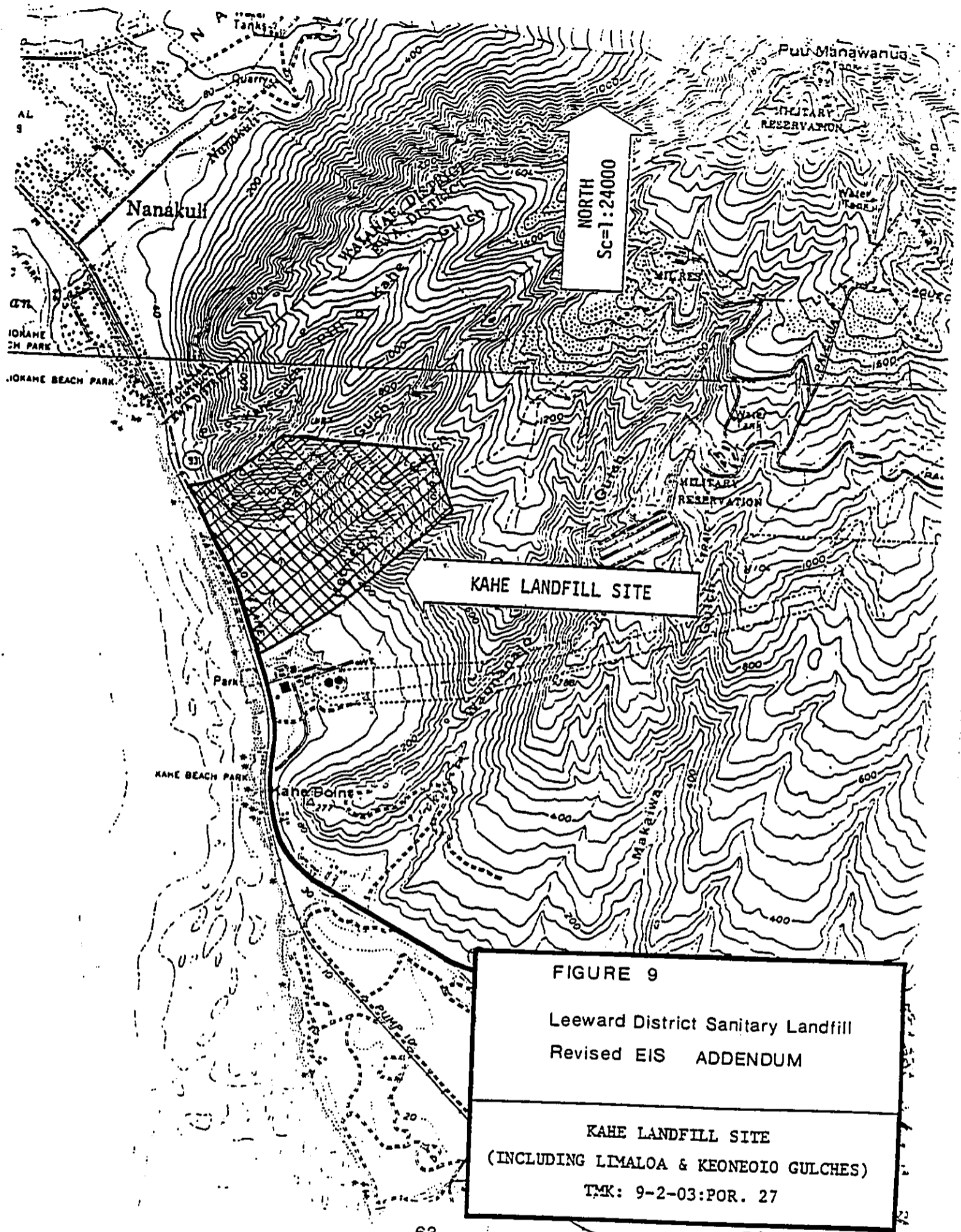


FIGURE 9
Leeward District Sanitary Landfill
Revised EIS ADDENDUM

KAHE LANDFILL SITE
(INCLUDING LIMALOA & KEONEOIO GULCHES)
TMK: 9-2-03:POR. 27

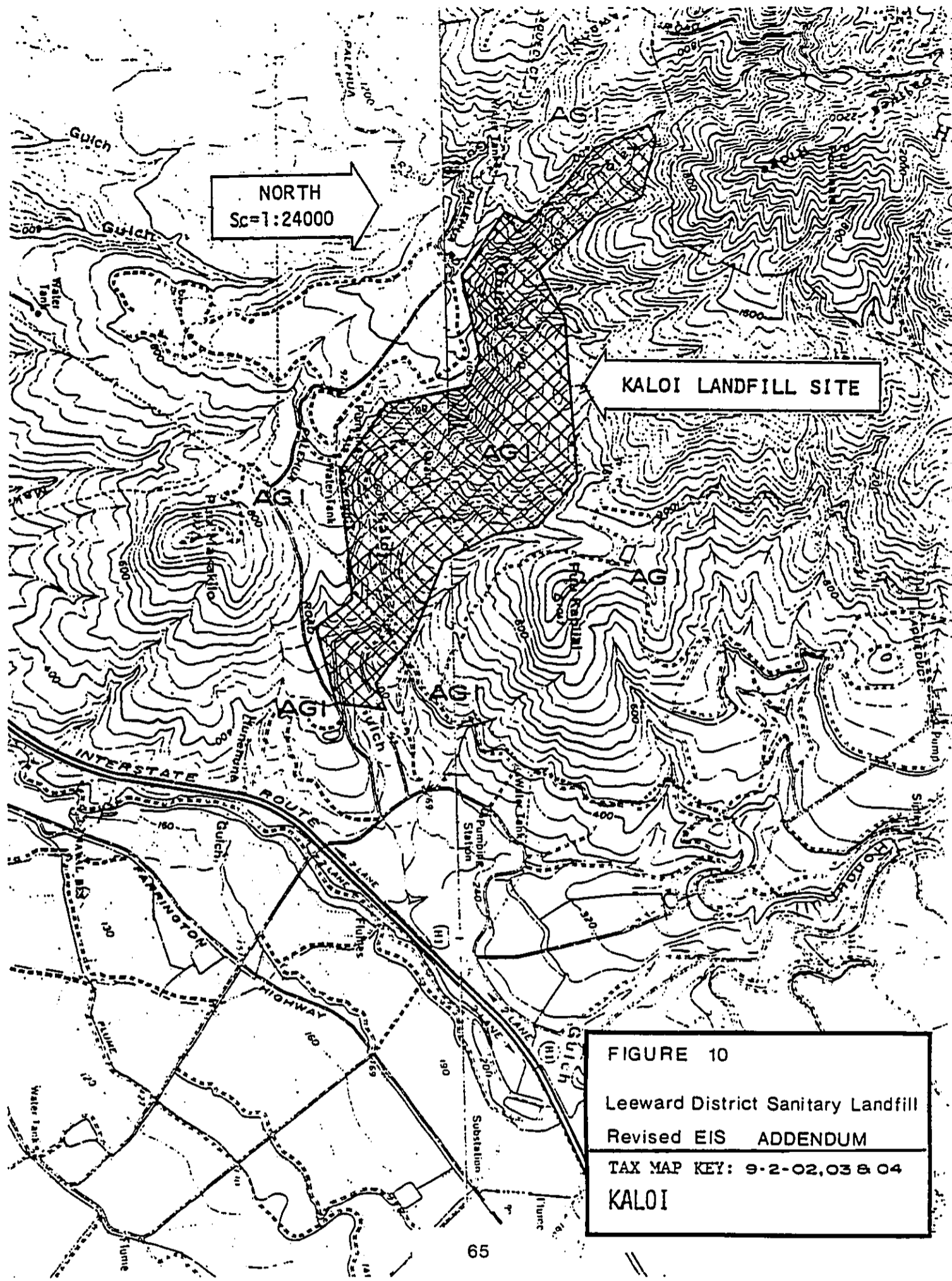
KALOI SITE

(Tax Map Key: 9-2-02: portion of 1;
9-2-03: portion of 2;
9-2-04: portion of 5)

Kaloi Gulch is located south of Puu Kapuai, north of Puu Makakilo, and approximately 2,500 feet northwest of Interstate Route H-1. Refer to Figure 10. This site is located between Nanakuli and Waipahu, 1 mile north of Makakilo City, 18 miles west of downtown Honolulu, 4 miles west of Waipahu, and 5 miles east of Nanakuli.

State Land Use designation is Agriculture, City General Plan is Agriculture and Residential, and City zoning is Agricultural and Residential. The site currently is in sugar cane cultivation, ranching, and open space. James Campbell Trust Estate owns the land, with leases to Oahu Sugar Company and Hawaii Meat Company and a sublease to Tongg Ranch. Approximate area of the site is 400 acres.

Although this site has the advantage of a long landfill life, it is located over a Board of Water Supply groundwater zone and in a location with an average annual rainfall of about 35 inches. Leachate may be generated in areas where annual rainfall exceeds 30 inches. The potential for polluting this potable groundwater source exists. According to the Board of Water Supply, this site is not acceptable and is eliminated from further consideration for development as a sanitary landfill.



NORTH
Sc=1:24000

KALOÏ LANDFILL SITE

FIGURE 10
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM
 TAX MAP KEY: 9-2-02,03 & 04
 KALOÏ

KAUKONAHUA

(TMK: 6-5-01: 1
7-1-01: 1)

As shown in Figure 11 this site is located near Schofield Barracks. It is considered by the Board of Water Supply to be suitable only as a demolition landfill, "provided that disposed materials be limited to only construction debris free of any toxic substances and that the operating control measures receive our approval." [13] This site is located over a UIC protected groundwater area. Although the UIC designation would not preclude its use as a demolition landfill, this particular site has been eliminated from consideration as a potential sanitary landfill.

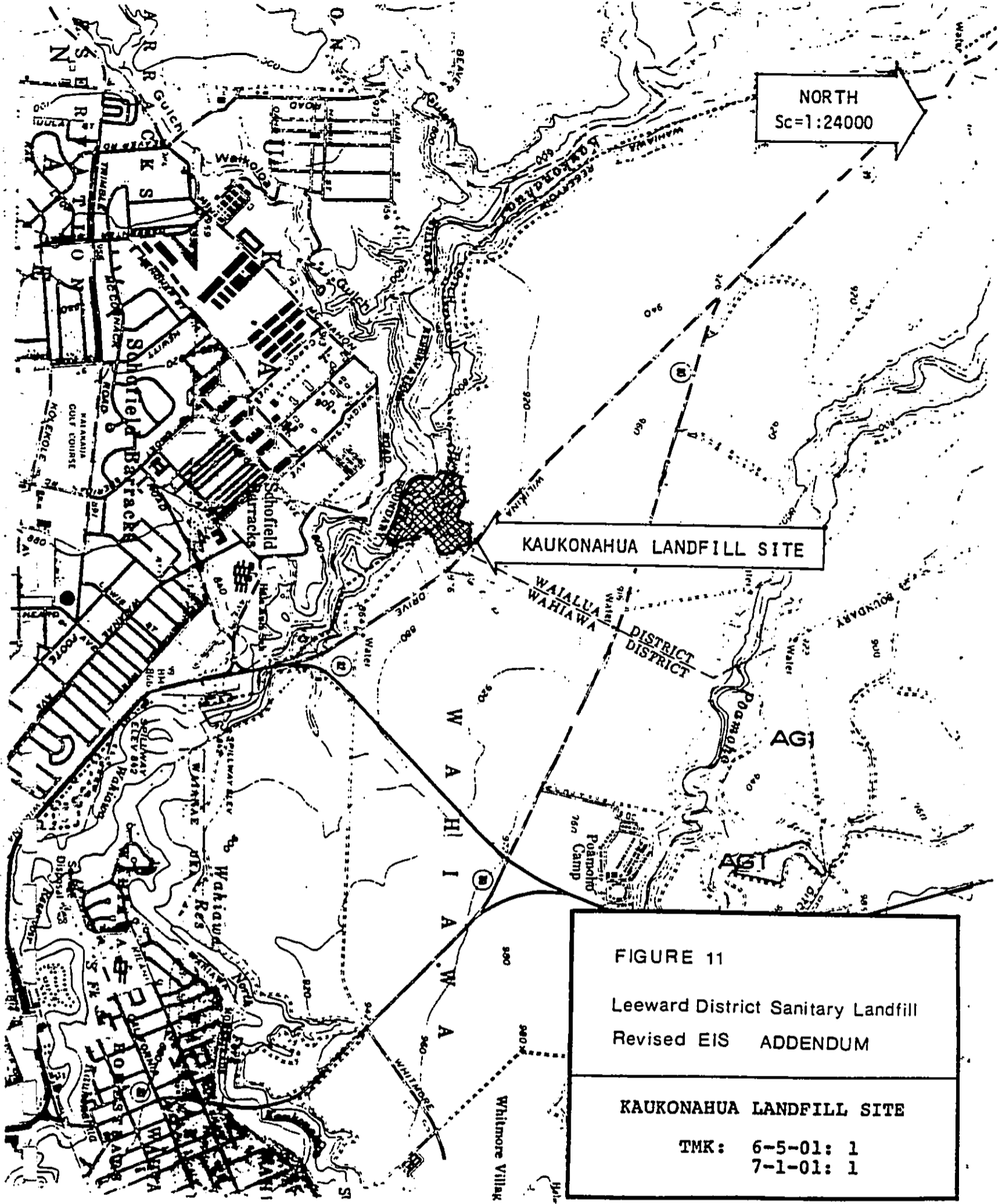


FIGURE 11
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

KAUKONAHUA LANDFILL SITE

TMK: 6-5-01: 1
 7-1-01: 1

KEEKEE SITE

(Tax Map Key: 6-9-01: portions of 3 & 4;
6-9-03: portion of 2)

Keekee is an abandoned quarry site about 0.5 mile west of Dillingham Air Force Base, 1,500 feet mauka of Farrington Highway and 6 miles west of Waiialua, at the Kaena entrance to Makua-Kaena State Park, on land owned by the State of Hawaii. Refer to Figure 12. This site is about 50 miles from Keehi Refuse Transfer Station and considerably removed from Leeward refuse generation centers.

State Land Use designation is Agricultural, City General Plan is Preservation, and City zoning is Preservation (P-1). Currently, the site is in open space at the mouth of Keekee Gulch. It begins at the 160-foot elevation and slopes about 15% at the lower half and in excess of 30% at the upper half to the 400-foot elevation. Although the total area of the site is 40 acres, only 15 of it is useable, with an estimated landfill life of 1 year.

Advantages

- significant adverse biological impacts are not anticipated
- rainfall 20 inches per year; leachate generation not expected
- prevailing wind in direction of populated area less than 25% of the time

Disadvantages

- site within UIC protected area
- major drainage system must be constructed to route surface runoff from Keekee Gulch around the site to minimize infiltration of water into the landfill
- Ulehula Heiau (Site 189) is east of site, and potential impacts would have to be investigated
- site far removed from Leeward refuse generation centers
- short landfill life
- cover material must be imported to the site
- about 1,500 feet of new access road must be constructed to site on a new road right-of-way
- water, electricity and telephone must be extended from Farrington Highway; sanitary sewer must be installed
- site highly visible to public from Farrington Highway and from the beach along the north shore; users of Makua-Kaena State Park will probably find landfilling incompatible with the State Park

Restrictions and Setbacks: Special Permit required from State for construction in Agricultural District. Site is located at Kaena entrance to Makua-Kaena State Park. Access from Farrington Highway must be obtained from Mokuleia Ranch and Land Company or Dillingham Corporation.

NORTH
Sc=1:24000

KEEKEE LANDFILL SITE

FIGURE 12
Leeward District Sanitary Landfill
Revised EIS ADDENDUM

KEEKEE LANDFILL SITE
TMK: 6-9-01:POR. 3 & 4
6-9-03:POR. 2

KOKO CRATER SITE

(Tax Map Key: 3-19-12: portion of 1)

This site is located in Koko Crater in Koko Head Natural Park on the southeastern tip of Leeward Oahu, 2.5 miles west-southwest of Makapuu Point, 1 mile east of Kuapa Pond and 1.3 miles northwest of Hanauma Bay. Refer to Figure 13. The land is owned by the City and County of Honolulu. Although the site is only about 2,000 feet from the urban area of Hawaii Kai, it is buffered from the area by the crater walls. Generally, the site is not visible to the public except from the opening at the crater. Koko Crater Stables is about 1,000 feet outside the northeast opening to the crater. This site would be 16 miles from Keehi Refuse Transfer Station.

State Land Use designation is Conservation, City General Plan is Park, and City zoning is Preservation (P-1). This extinct crater has a moderately deep depression, with an opening on the northeast wall. Currently, the site is in open space with a botanical garden. Of the 140 total acreage available, 75 acres would be useable for landfilling, with an estimated life of 7 years.

Advantages

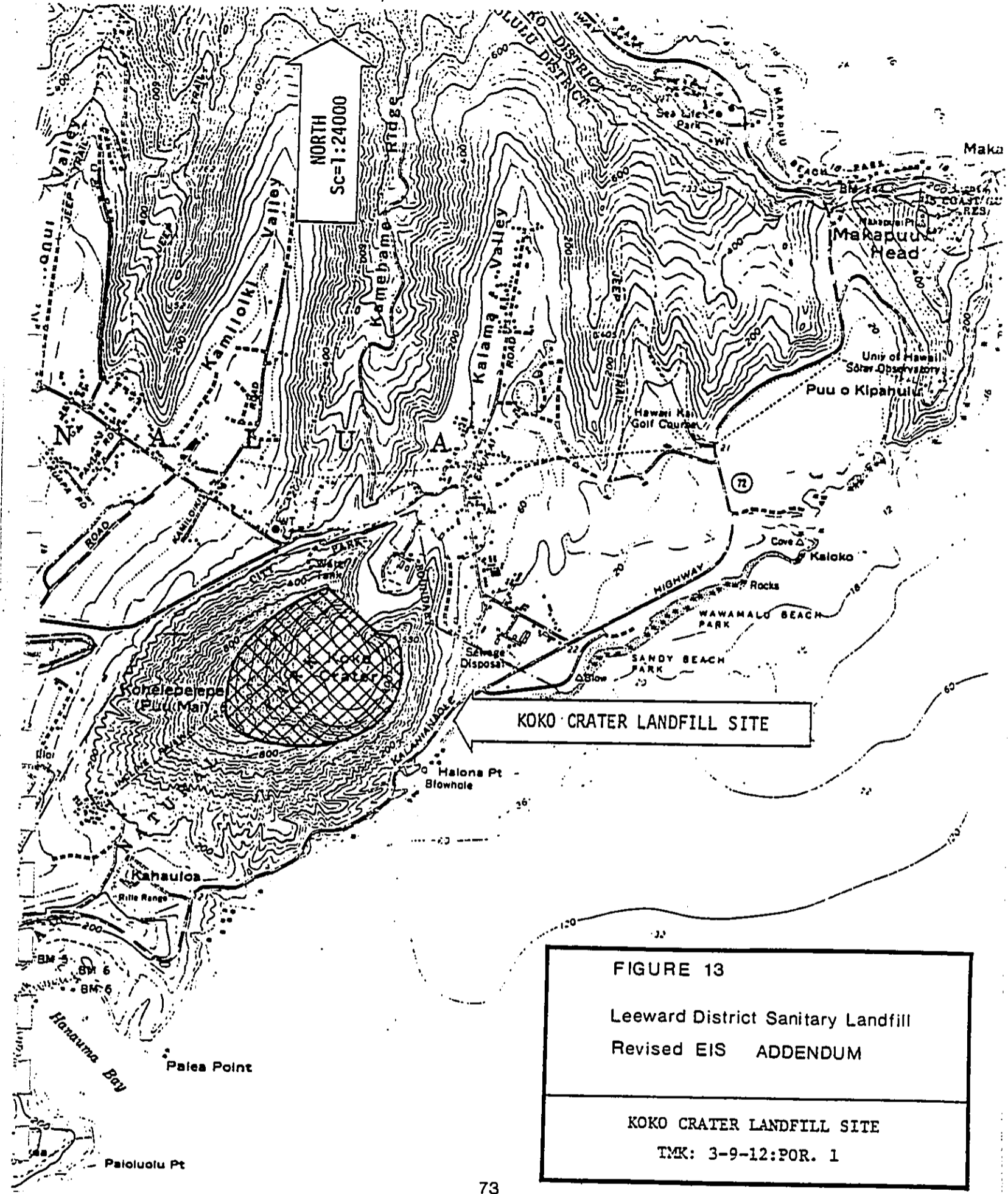
- outside UIC protected area, i.e., in exempt area
- prevailing wind in direction of populated area less than 10% of the time

- relatively long landfill life
- significant adverse archaeological/historical impacts not anticipated
- rainfall 25 inches per year; leachate generation not expected
- visible only from mouth of crater; visual impacts can be mitigated

Disadvantages

- cover material must be imported
- existing botanical garden would either have to be displaced or landfill activities would have to buffer adequately around existing succulent plants; plans of garden could be resumed after completion of landfill
- 4,000 feet of access road must be constructed from Kealahou Street
- Koko Crater Stables would be displaced
- moderate on-site surface drainage system must be constructed to minimize surface runoff into the landfill; off-site drain system required to existing concrete channel
- utilities must be brought on to the site
- traffic will increase from both leeward and windward approach roads via Kalaniananole Highway, Hawaii Kai Drive and Kealahou Street

Restrictions and Setbacks: Special Permit required from State for construction in Conservation District. Site was deeded to the City by Bishop Estate for use as a park, and landfill use will conflict with this stipulation.

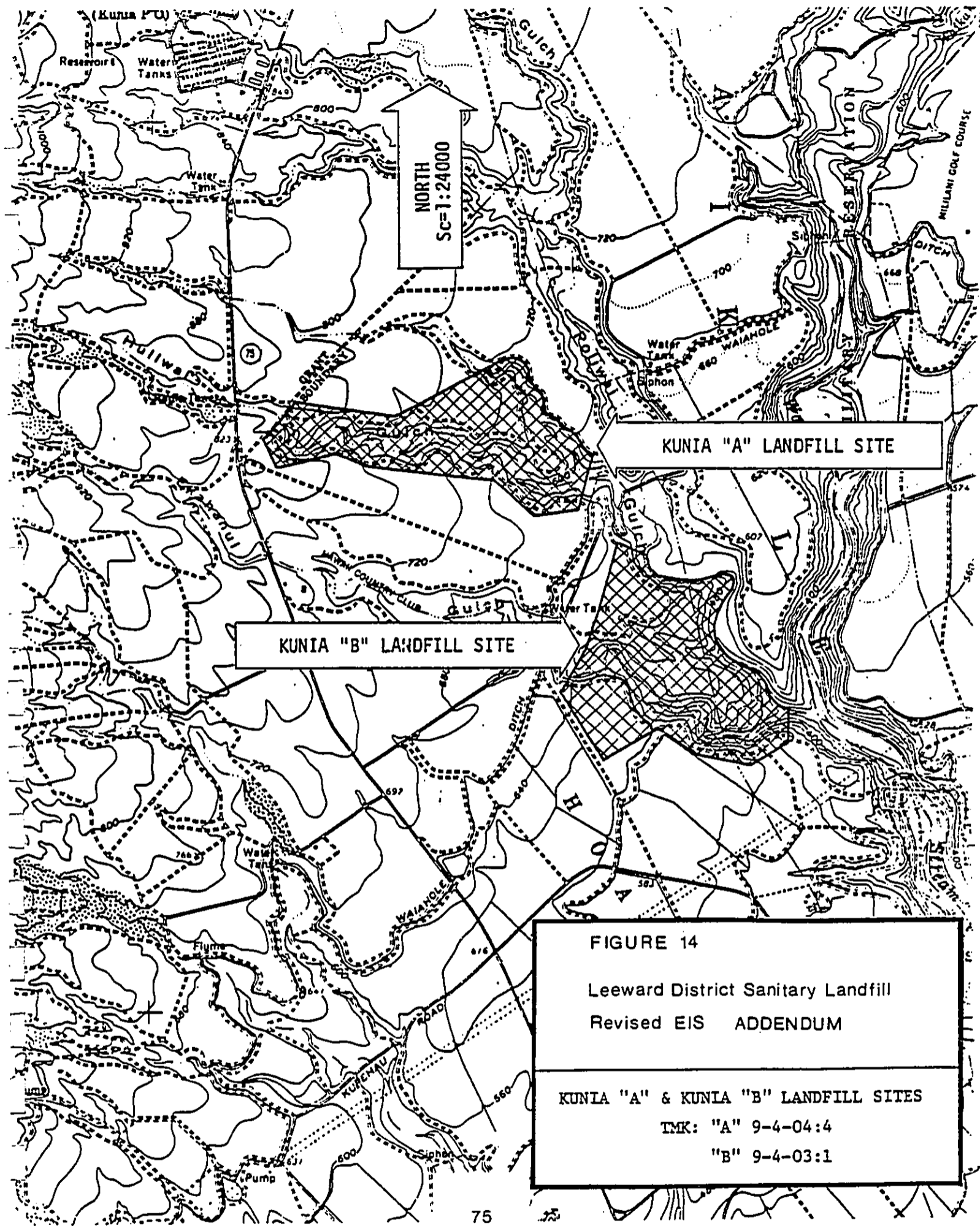


KUNIA SITES

Two potential sites in Hoaeae, north of Interstate Route H-1, east of Kunia Road, west of Waikele Gulch, and south of Kunia camp were evaluated for landfill development. Refer to Figure 14. Site "A" (Tax Map Key: 9-4-04: portion of 4) is located in Huliwai Gulch and an unnamed north branch 0.5 mile north of the Hawaii Country Club. The site is about 150 acres in area and is owned by James Robinson's heirs, et al. and leased to Dole Corporation and Oahu Sugar Company, Ltd.

Site "B" (Tax Map Key: 9-4-03: portion of 19) is located in Ekahanui Gulch and a portion of Poliwai Gulch, adjacent and east of the Hawaii Country Club. The site is about 190 acres in area and is owned by James Robinson's heirs, et al. and is leased to Oahu Sugar Company, Ltd.

Both sites are located over a Board of Water Supply groundwater zone which is an existing potable water source. These sites are located in a rainfall zone (averaging 35 inches per year) where leachate may be generated. Consequently, the potential risk of contamination to potable water sources exists. These sites, therefore, are unacceptable to the Board of Water Supply. This Special Consideration eliminates these sites from further consideration.



MAILI SITE

(Tax Map Key: 8-7-10: 3)

This site is located in Maili, 3,500 feet mauka of Farrington Highway, 4 miles northwest of Nanakuli and 3 miles south of Waianae. Refer to Figure 15. Until recently, land use was as a limestone quarry, with the remaining portion in open space. It is 4 miles northwest of Nanakuli and 27 miles from Keehi Refuse Transfer Station.

State and City land use designations are Agricultural (zoned AG-1). Lone Star recently acquired the site from Kaiser Cement & Gypsum Corporation, former land owners of the parcel. The site had been a limestone quarry with an adjacent cement plant operated by Kaiser Cement.

Although the entire parcel of land is outside the UIC protected area (i.e., in exempt area), there are other factors which make further consideration in developing this site undesirable:

- (1) The site is in close proximity to a community;
- (2) Extensive access road improvements would be required to the site; and
- (3) When the City investigated land acquisition with Kaiser Cement & Gypsum Corporation, the City would have had to purchase the entire parcel and not just the portion required for landfilling operations.

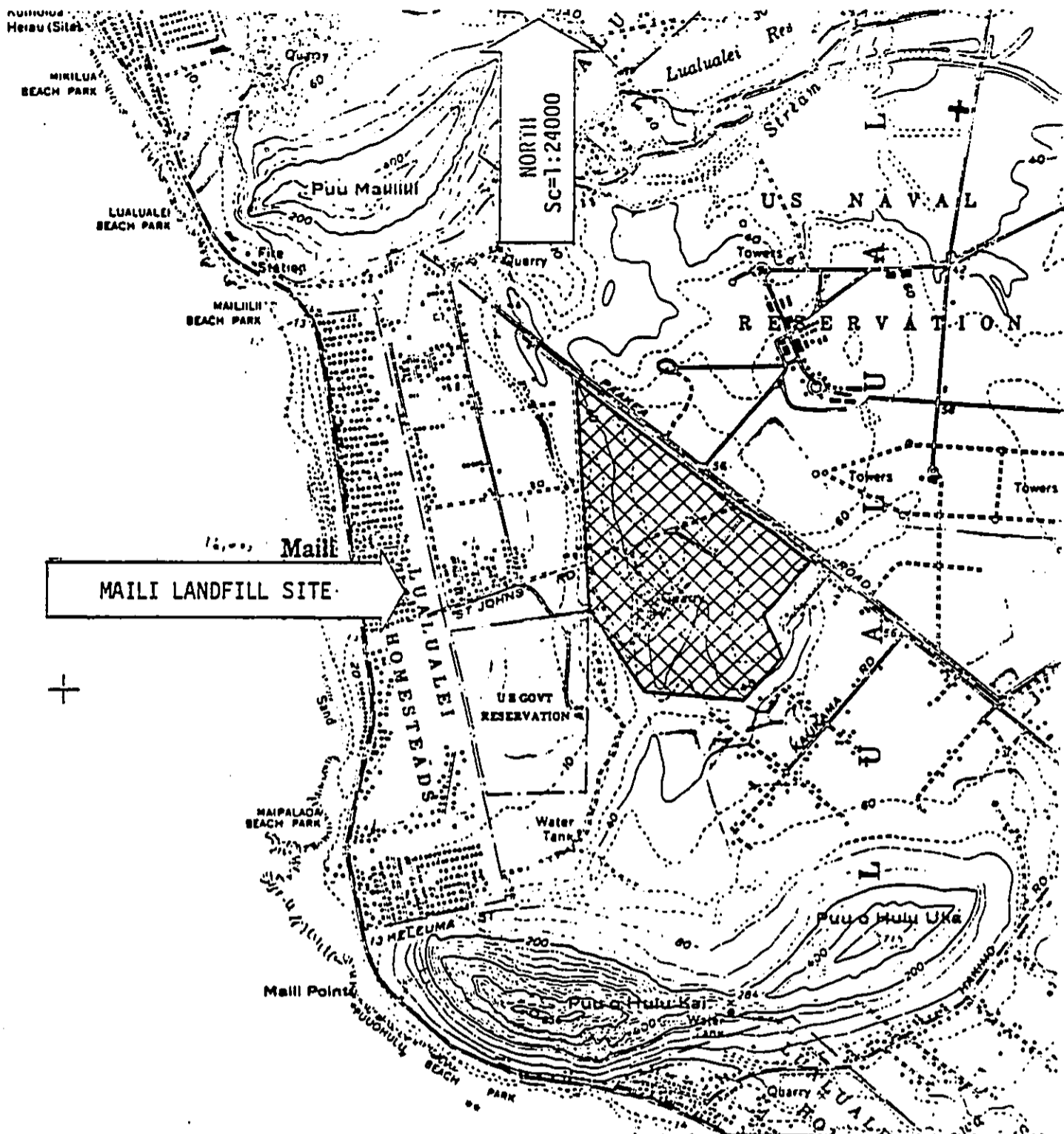


FIGURE 15
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

MAILI LANDFILL SITE
 TMK: 8-7-10:3

MAKAIWA SITE

(TMK: 9-2-03)

As previously stated, Makaiwa Gulch was one of three sites proposed as a potential sanitary landfill site in 1978 [14]. The other two proposed sites were Nanakuli and Kaloi; refer to the individual site descriptions for further information on these sites. During the public information process for the project, it became apparent that community opposition to the proposed project was significant. The City's Administration decided to table plans at Makaiwa because of the site's close proximity to a community.

Recently, however, this site was proposed for development as a sanitary landfill by a private organization, Oahu Reclamation, Inc. (c/o GMP Associates). [22] This proposal is under consideration by the City Council.

This site is located in an adjacent gulch, west of the proposed project at Waimanalo Gulch, 1.5 miles west-northwest of Puu Palailai, north and mauka of Farrington Highway, 1.6 miles south of Puu Manawahua and 1.3 miles east of Kahe Point. Refer to Figure 16. The estimated distance from Keehi Transfer Station is 19 miles. Makakilo City is about 2.8 miles east of the site; Nanakuli urban area 4.2 miles northwest; Maili urban area 7.0 miles northwest; and Waipahu urban area 8.3 miles east. The Honokai Hale and Nanakai Gardens subdivisions are immediately below (makai) and across Farrington Highway. James

Campbell Trust Estate is the land owner, with a lease to Hawaii Meat Co. and a sublease to Tongg Ranch. State and City land use designations are Agricultural (zoned Agricultural and Military).

The site is a gulch about 7,600 feet long and averaging 2,000 feet wide; currently it is in open space. Of the total 338 acres available, 254 acres would be useable for landfilling, providing an estimated landfill life of 18 years.

Advantages

- most of the site (below the 800-foot contour and along the eastern landfill boundary) is outside of UIC protected area, i.e., in exempt area
- long landfill life
- significant adverse biological or archaeological/historical impacts not anticipated
- rainfall 20 inches per year; leachate generation not expected
- electricity, telephone and water connections can be made at Farrington Highway; sanitary sewer connection can be made at a subdivision across Farrington Highway
- some cover material available on site; some cover material still would have to be imported

Disadvantages

- close proximity to Honokai Hale and Nanakai Gardens subdivisions
- prevailing wind is toward a residential area; would require routine odor abatement

- major peripheral drainage system required
- about 1,000 feet of new access road required; improvements to Farrington Highway required to provide safe turning movements
- visual mitigative measures must be maintained since the site is readily visible from Farrington Highway
- power lines cross the upper sections of the site and may require relocation if the full life of the site is utilized

Restrictions and Setbacks: Special permit required from State for construction in Agricultural District. Permit also required from State Highway for access.

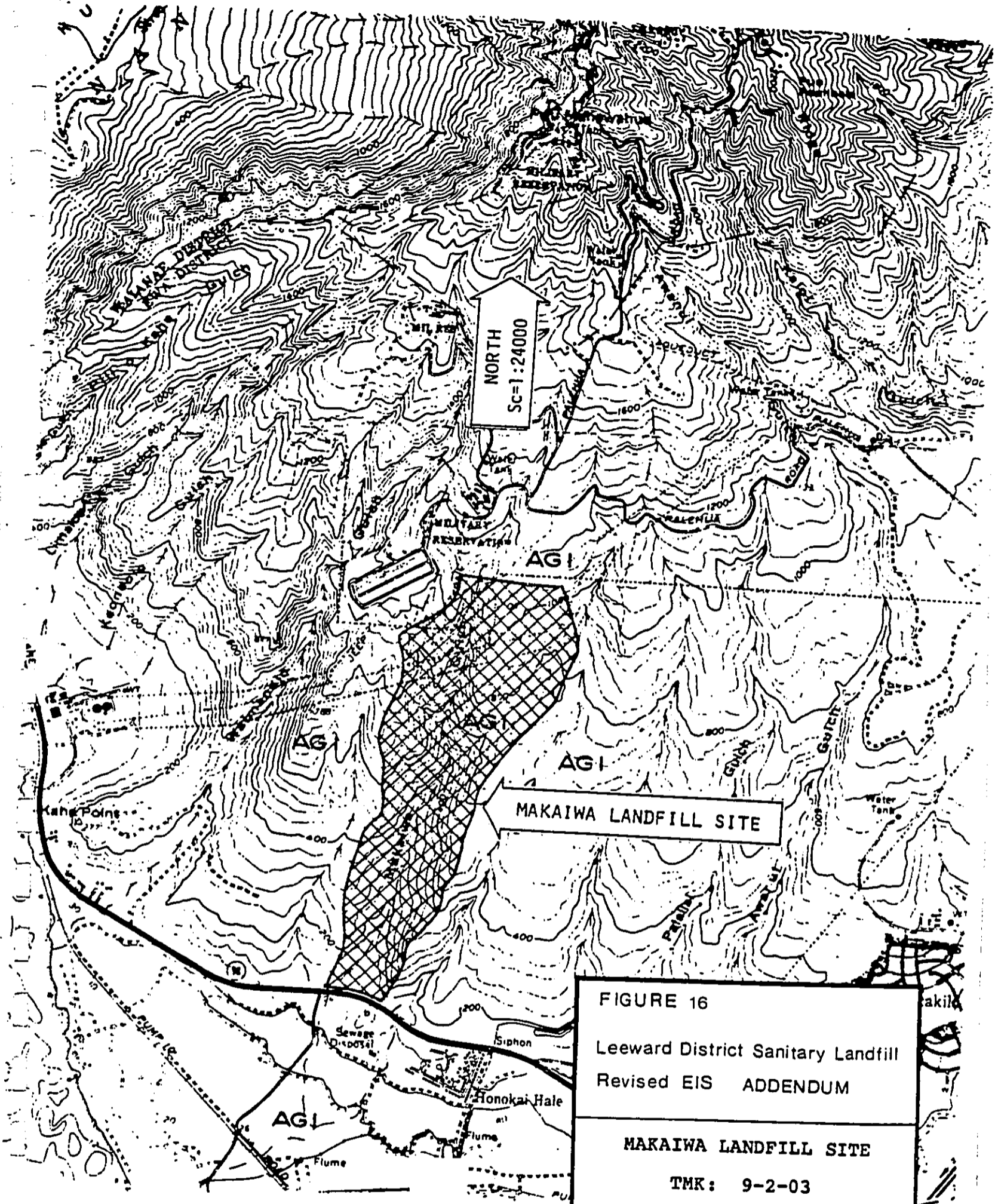


FIGURE 16
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

MAKAIWA LANDFILL SITE
 TMK: 9-2-03

CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

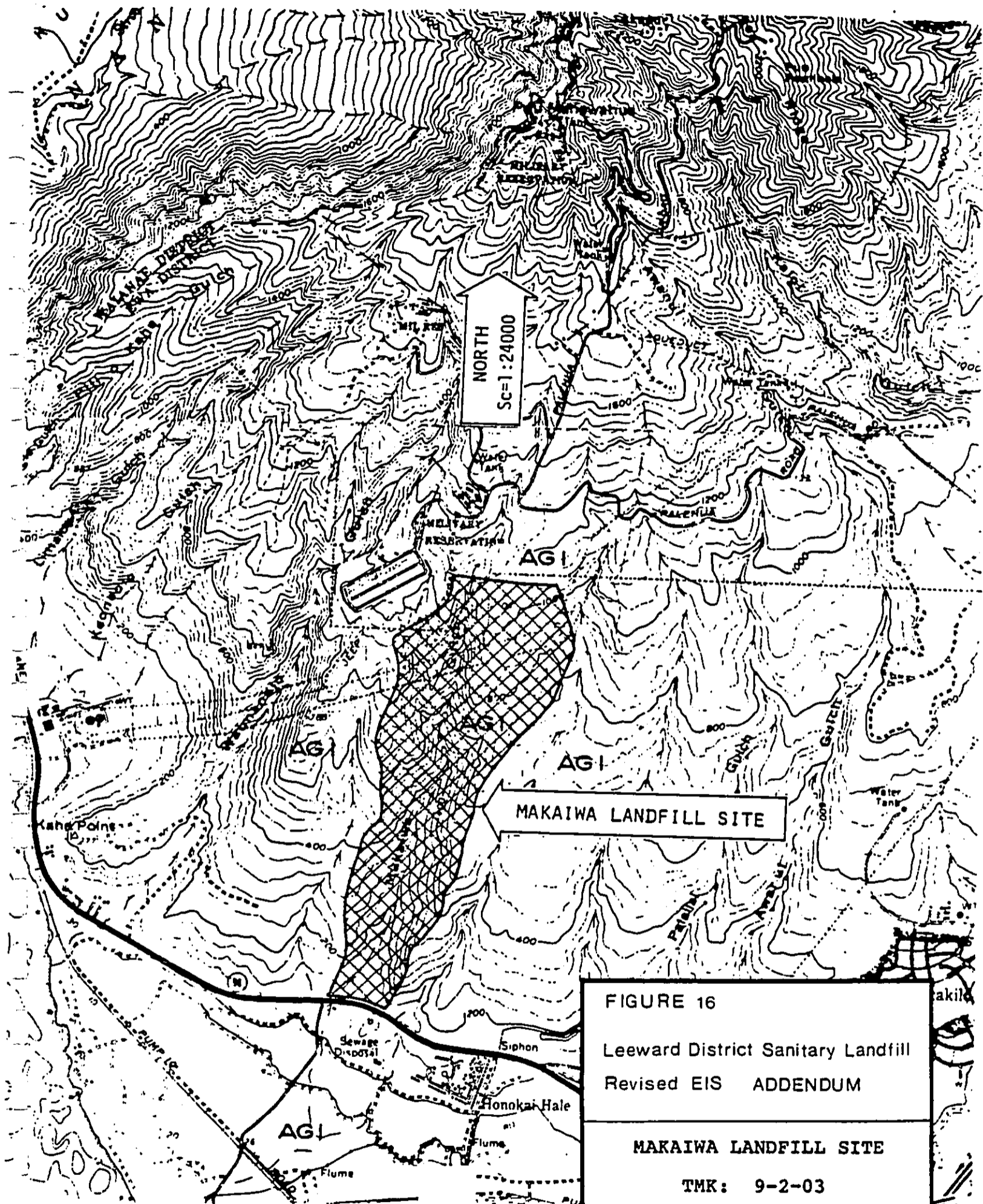


FIGURE 16
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

MAKAIWA LANDFILL SITE
 TMK: 9-2-03

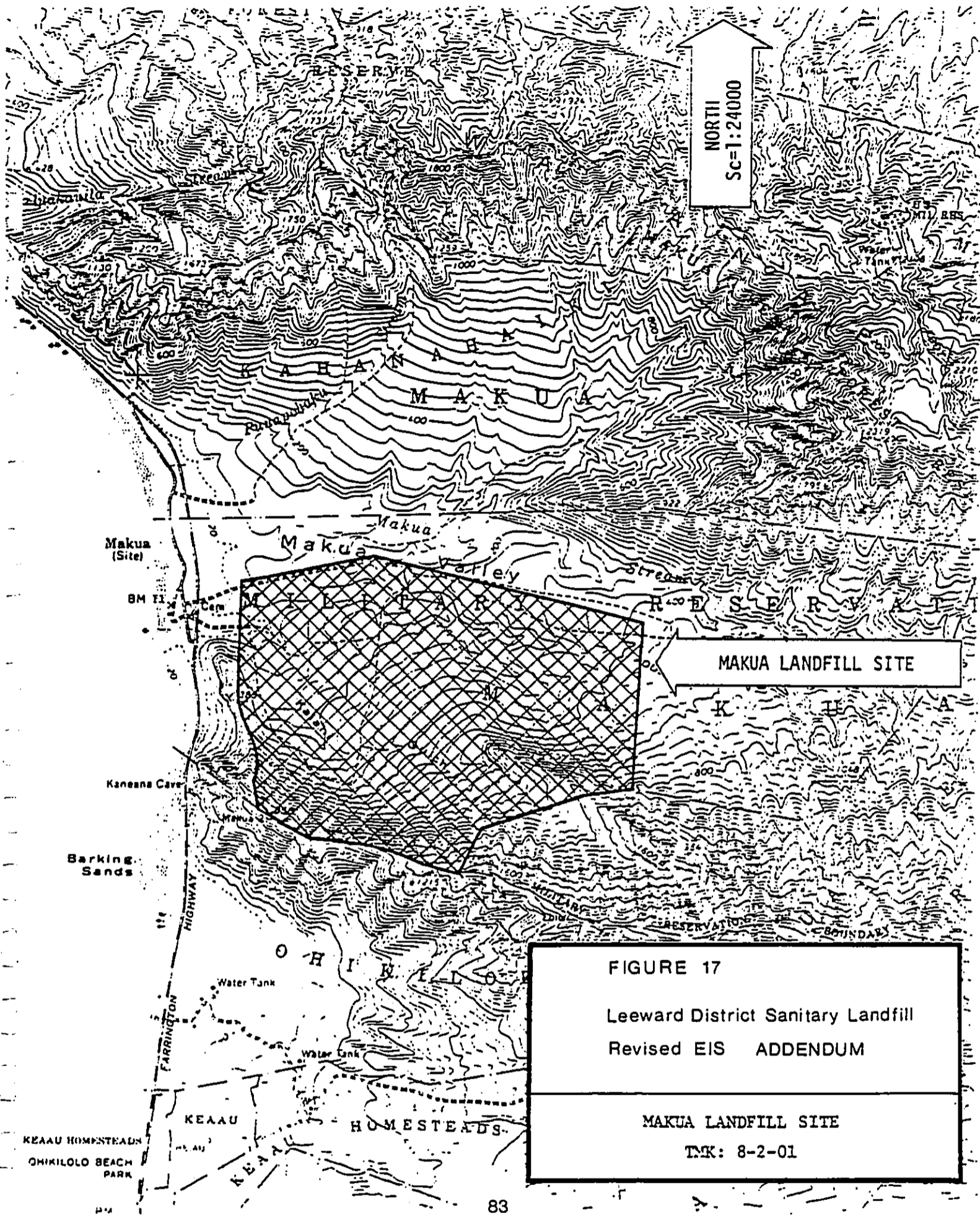
MAKUA SITE, INCLUDING KAHANAHAIKI

(Tax Map Key: portions of 8-1-01 and 8-2-01)

This site is located in Makua Valley, including Kahanahaiki, 5 miles southeast of Kaena Point and 4 miles north of Makaha Valley. Refer to Figure 17. It is approximately 7 miles from the urban area of Waianae, 16 miles from Kahe Point, and 37 miles from Keehi Refuse Transfer Station.

The land is owned by the United States of America and State of Hawaii, leased to the U.S. Army. It currently is used by the United States for military training and live firing exercises. The probability of receiving acceptance and approval for landfill development at the site by the City is minimal. This site is contaminated with unexploded ordnance, the quantity and locations of which are unknown. This would pose a potential hazard for landfilling activities and personnel. Landfill development also conflicts with present plans and policies.

The site is within the UIC protected groundwater area, and a sanitary landfill is not acceptable to the Board of Water supply. This Special Consideration eliminates this site from further consideration.



MILILANI SITE

(TMK: 9-6-04)

The Mililani site is one of the major gullies connected to Panakauahi Gulch. It is located adjacent to Mililani Memorial Park and pineapple fields, 1.5 miles from Kamehameha Highway, 4.6 miles from Waipahu, 3.2 miles from Pearl City and 2 miles from Mililani Town. Approximately 85% of the site is owned by Castle & Cooke and the remaining 15% by B.P. Bishop estate. Refer to Figure 18.

The total usable area is about 34 acres and would provide an estimated 3 years of landfill life, based on existing disposal rates. This site is located in a rainfall area where leachate generation from sanitary landfilling operations can be expected, despite a peripheral drainage system to divert surface runoff around the site.

This site is located over a UIC protected groundwater area. Although the UIC designation would not preclude its use as a demolition landfill, this particular site has been eliminated from consideration as a potential sanitary landfill.

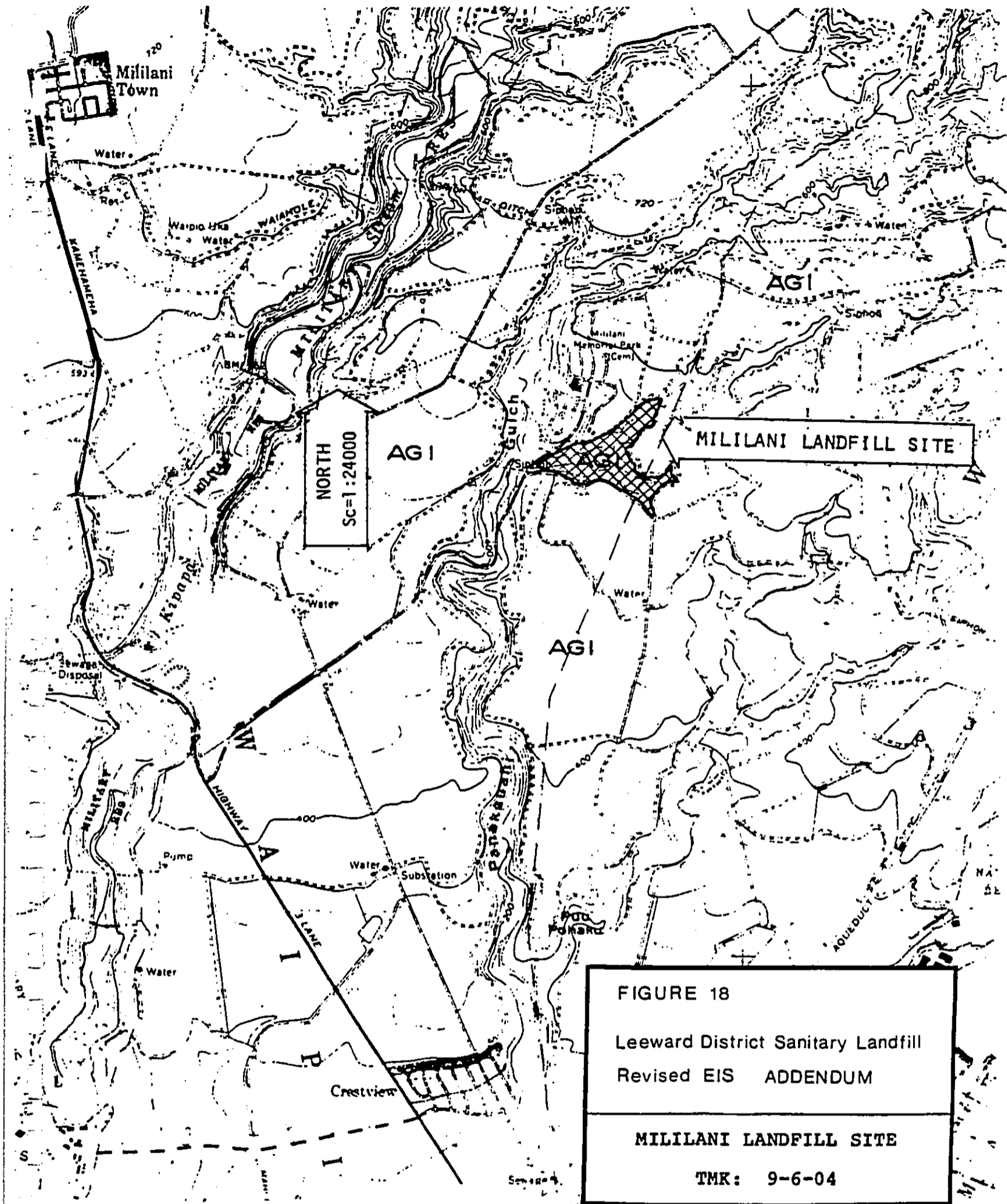


FIGURE 18

Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

MILILANI LANDFILL SITE

TMK: 9-6-04

NANAKULI SITE

(TMK: 8-7-09: 1 & 3;
8-7-21: 26)

As previously stated, Nanakuli was one of three sites proposed as a potential sanitary landfill site in 1978 [14]. The other two proposed sites were Makaiwa and Kaloi; refer to the individual site descriptions for further information on those sites. During the public information process for the project, it became apparent that community opposition to the proposed project was significant. The City's Administration decided to table plans at Nanakuli because of the site's close proximity to residential areas.

This site is located in Nanakuli, about 2,000 feet mauka of Nanaikapono Beach Park, 4,000 feet west of Puu Heleakala, and 4,000 feet east-southeast of Puu o Hulu Uka. Refer to Figure 19. The estimated distance from Keehi Transfer Station is 23 miles. The site is adjacent to the urban area of Nanakuli, with Maili about 3 miles, and Waianae 4.7 miles and Makaha 7 miles to the northwest. Waipahu is 12 miles and Makakilo 5 miles to the southeast.

Land owners are Shigeru Horita, et al., The Hawaii Corp., and U.S. Financial, Inc. State land use designations are Urban and Agricultural, City land use plans are Industrial, Residential, Agricultural, and Preservation (zoned Agriculture and Planned Development Housing).

The site is a large parcel (about 611 acres) which is traversed by Lualualei Naval Road. Site A, west of Lualualei Naval Road, is the site of an abandoned quarry with depressions of 40 feet and mounds of 30 feet on the southern 60% of the site. The northern 40% of the site is in its natural state with two defined shallow gullies meeting Ulehawa Stream.

Site B, east of Lualualei Naval Road, is relatively flat in the lower reaches along the Road and the slope gradually increases toward the ridge line. Of the total 611 available acreage, about 288 acres is usable, providing an estimated 16 years of landfill life.

Advantages

- long landfill life
- significant adverse biological or archaeological/historical impacts not anticipated
- rainfall 20 inches per year; leachate generation not expected
- electricity, telephone and water connections are available at the adjacent Lualualei Homestead Lots
- site preparation costs would be nominal
- cover material available on site

Disadvantages

- nearly all of Site B is in the UIC protected groundwater area (which is a significant portion of the entire parcel)
- adjacent to a community

- prevailing wind toward residential area; would require routine odor abatement
- Lualualei Naval Road would require widening

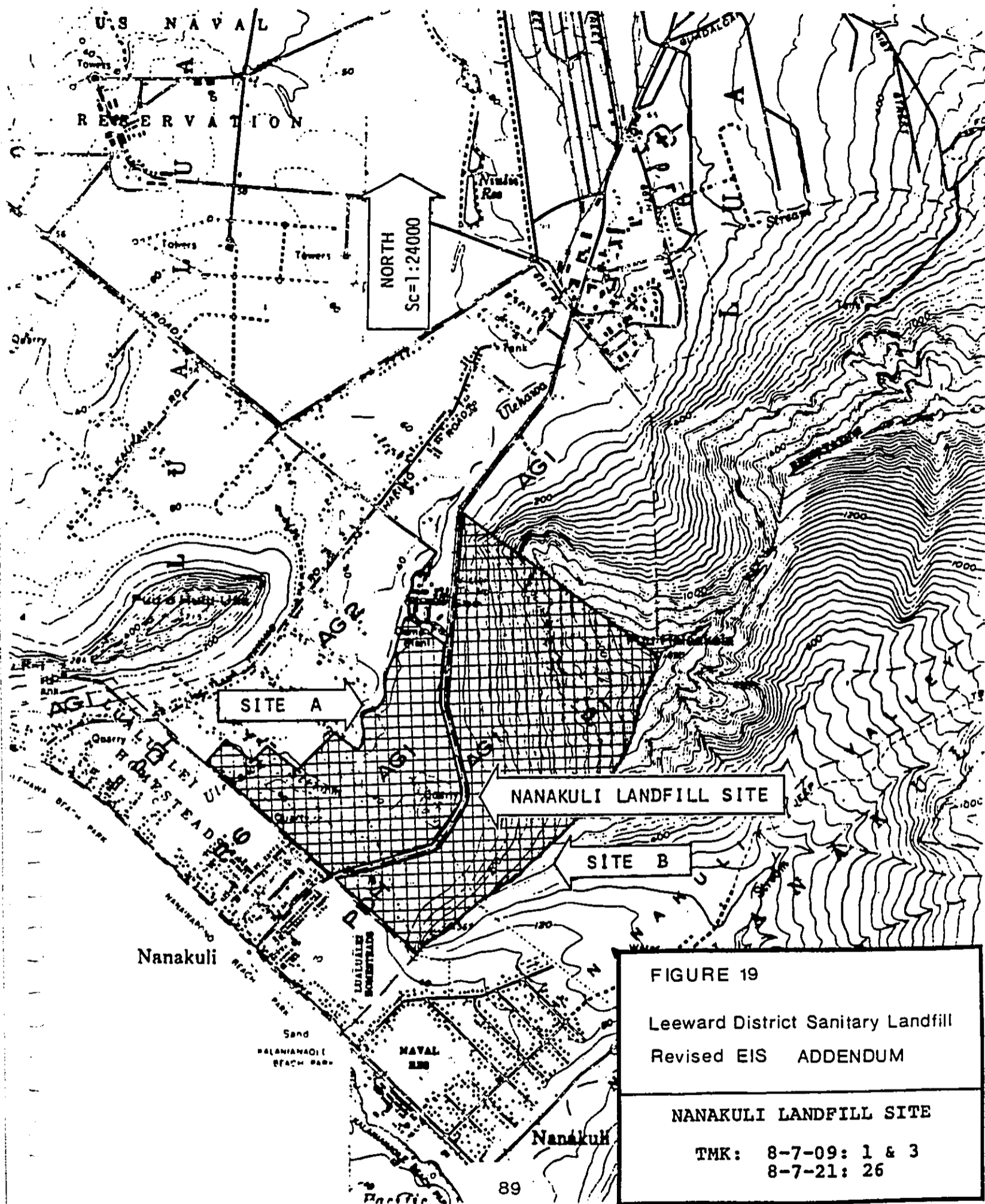


FIGURE 19
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

NANAKULI LANDFILL SITE

TMK: 8-7-09: 1 & 3
 8-7-21: 26

OHIKILOLO SITE

(Tax Map Key: 8-3-01)

The detailed description and discussion of this site are contained in the Revised Environmental Impact Statement for Leeward Sanitary Landfill at Waimanalo Gulch Site and Ohikilolo Site, May 7, 1984. [1]

This site is no longer proposed as the second site for the Leeward District Sanitary Landfill because the City's resource recovery project will extend the life of a landfill at Waimanalo Gulch and reduce the need for additional landfill space at this time. Ohikilolo is still considered a viable alternative site for long-term, future development.

PEARL HARBOR SWAMPLANDS

These sites are the unused swamp areas (considered as wetlands) along the perimeter of Pearl Harbor. Specific sites have not been designated. According to the Federal Register (40 CFR, Part 241), Volume 44, No. 59, Monday, March 26, 1979:

"Environmentally sensitive areas, including wetlands, 100-year floodplains, permafrost areas, critical habitats of endangered species, and recharge zones of sole source aquifers should be avoided or receive lowest priority as potential locations of landfill disposal facilities. If these areas are to be considered, the following subjects need to be addressed:

- (1) Alternatives
- (2) Impact
- (3) Approvals"

Since better alternative sites are available, obtaining approval for a landfill in a wetland would be extremely difficult, if not impossible. This Special Consideration eliminates these sites from further evaluation as potential sanitary landfill sites.

POAMOHO SITE

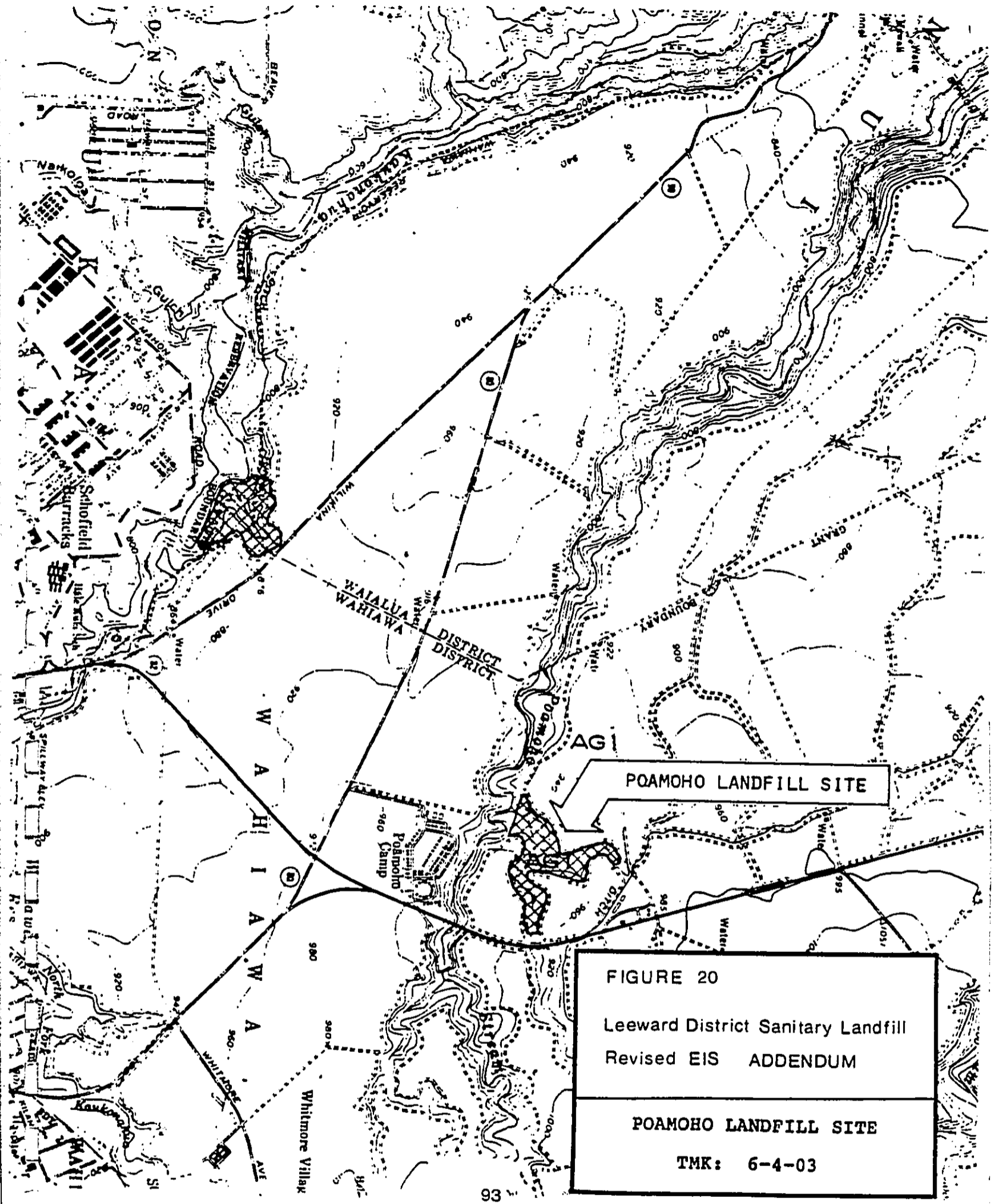
(TMK: 6-4-03)

The Poamoho site is located adjacent to cane and pineapple fields, about 2.6 miles north of Wahiawa urban area, off Kamehameha Highway. Refer to Figure 20.

This site is characterized by a small capacity and short landfill life (less than 1 year) and would require extensive initial construction. About 1,200 feet of the existing cane dirt road would require upgrading; a leachate control system would be required; telephone, water and sanitary services would be have to be provided; and about 1,500 feet of drainage channel must be constructed to accommodate a 5 x 20-foot box culvert crossing Kamehameha Highway.

It is considered by the Board of Water Supply to be suitable only as a demolition landfill, "provided that disposed materials be limited to only construction debris free of any toxic substances and that the operating control measures receive our approval." [13]

This site is located over a UIC protected groundwater area. Although the UIC designation would not preclude its use as a demolition landfill, this particular site has been eliminated from consideration as a potential sanitary landfill.



<p>FIGURE 20</p> <p>Leeward District Sanitary Landfill</p> <p>Revised EIS ADDENDUM</p>
<p>POAMOHO LANDFILL SITE</p> <p>TMK: 6-4-03</p>

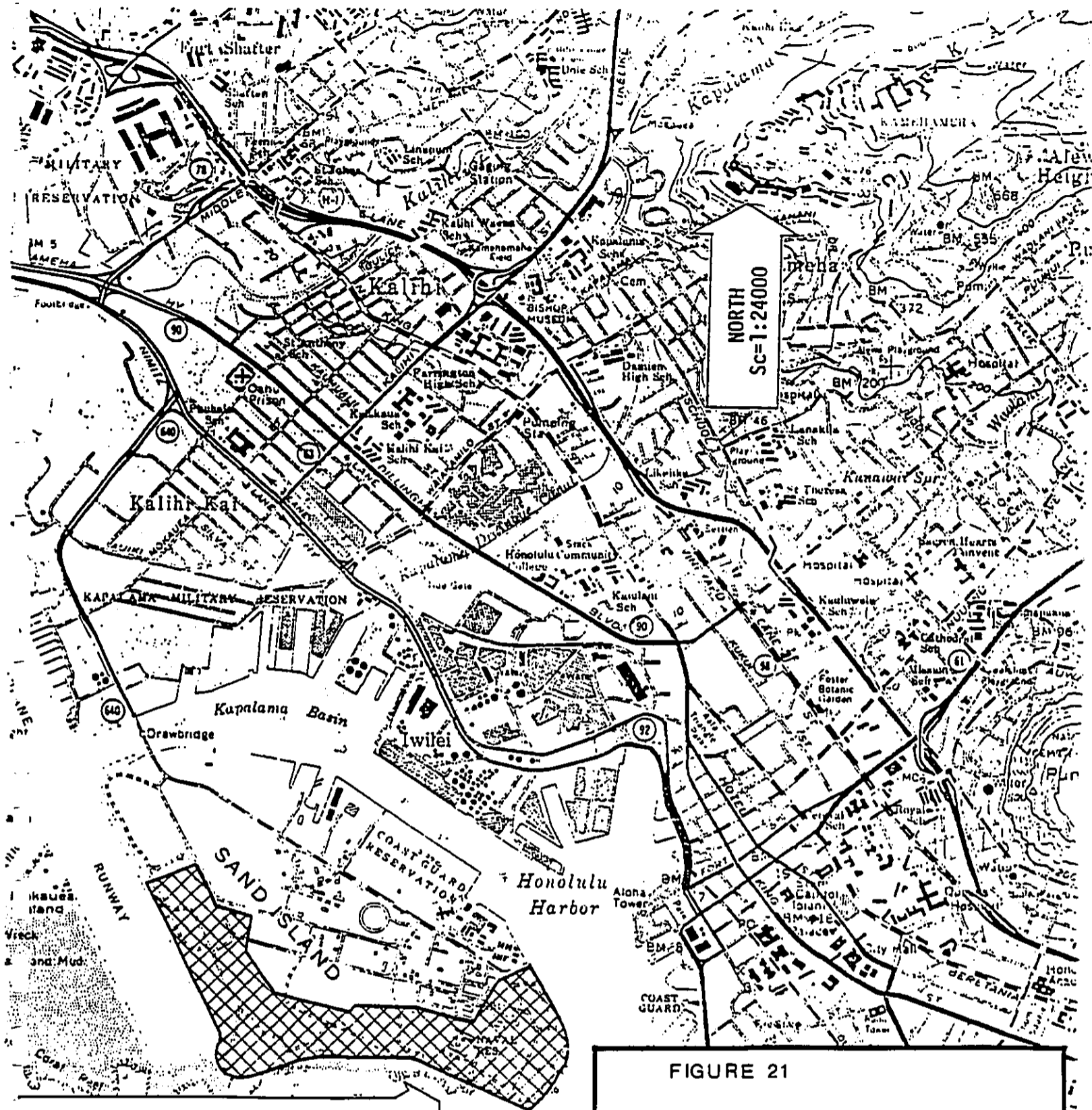
SAND ISLAND SITE

(Tax Map Key: 1-5-41: portion of 6)

The site (150 acres) is located at Sand Island State Park on the south and east sides of Sand Island in Honolulu Harbor, across downtown commercial and Iwilei industrial areas. Refer to Figure 21.

Since World War II, Sand Island has been used primarily as a junkyard and refuse dump. Except for the Coast Guard Station, the U.S. Government released control of the island to the State in 1965. A Task Force was assigned to develop a Master Plan for Honolulu Harbor, including Sand Island. This site has been designated on the 1995 Master Plan for Honolulu Harbor as the Sand Island State Park, and construction of the park has been substantially completed.

Landfill development will conflict with present plans and policies for the site. This Special Consideration eliminates this site from further evaluation as a potential landfill site.



SAND ISLAND LANDFILL SITE

FIGURE 21
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

SAND ISLAND LANDFILL SITE
 TMK: 1-5-41:POR. 6

WAIANAЕ EXPANSION SITE

(Tax Map Key: 8-50-3: 1, 29, 30, 31, 32 and
8-5-06: 10)

This expansion area is adjacent to the existing Waianae Sanitary Landfill, 0.9 mile mauka of Farrington Highway. Refer to Figure 22. The site, which apparently is idle, is about 1 mile mauka of the Waianae Business District and approximately 30 miles from Keehi Refuse Transfer Station. Owners of the land are the City and County of Honolulu; State of Hawaii, leased to Tamotsu Sugiyama; Joseph Moon Wong; Tao Chien Chong; Antone Ruiz, Jr.; Mountain View Dairy; and Timmy Au. State and City land use designations are Agricultural (zoned AG-1).

Of the 140 total acreage of the site, about 130 acres would be useable for landfilling, giving it an estimated landfill life of 8 years.

Advantages

- fairly long landfill life
- significant adverse biological or archaeological/historical impacts are not anticipated
- cover material partially available on the site
- minimal visual impact from residential areas
- minimal surface drainage system required

Disadvantages

- expansion area is within UIC protection area
- rainfall 30 inches per year; this borders on the amount of rainfall which may cause leachate to be generated

- prime agricultural land will be committed to the landfill
- about 4,000 feet of roadway must be improved
- telephone, electricity and water must be extended from Plantation Road; sanitary sewer must be installed
- 30 miles from Keehi Refuse Transfer Station
- some homes close to roadway may require relocation
- prevailing wind in direction of populated area more than 50% of the time

Restrictions and Setbacks: Special Permit required from State for construction in Agricultural District. Several easements cross the site.

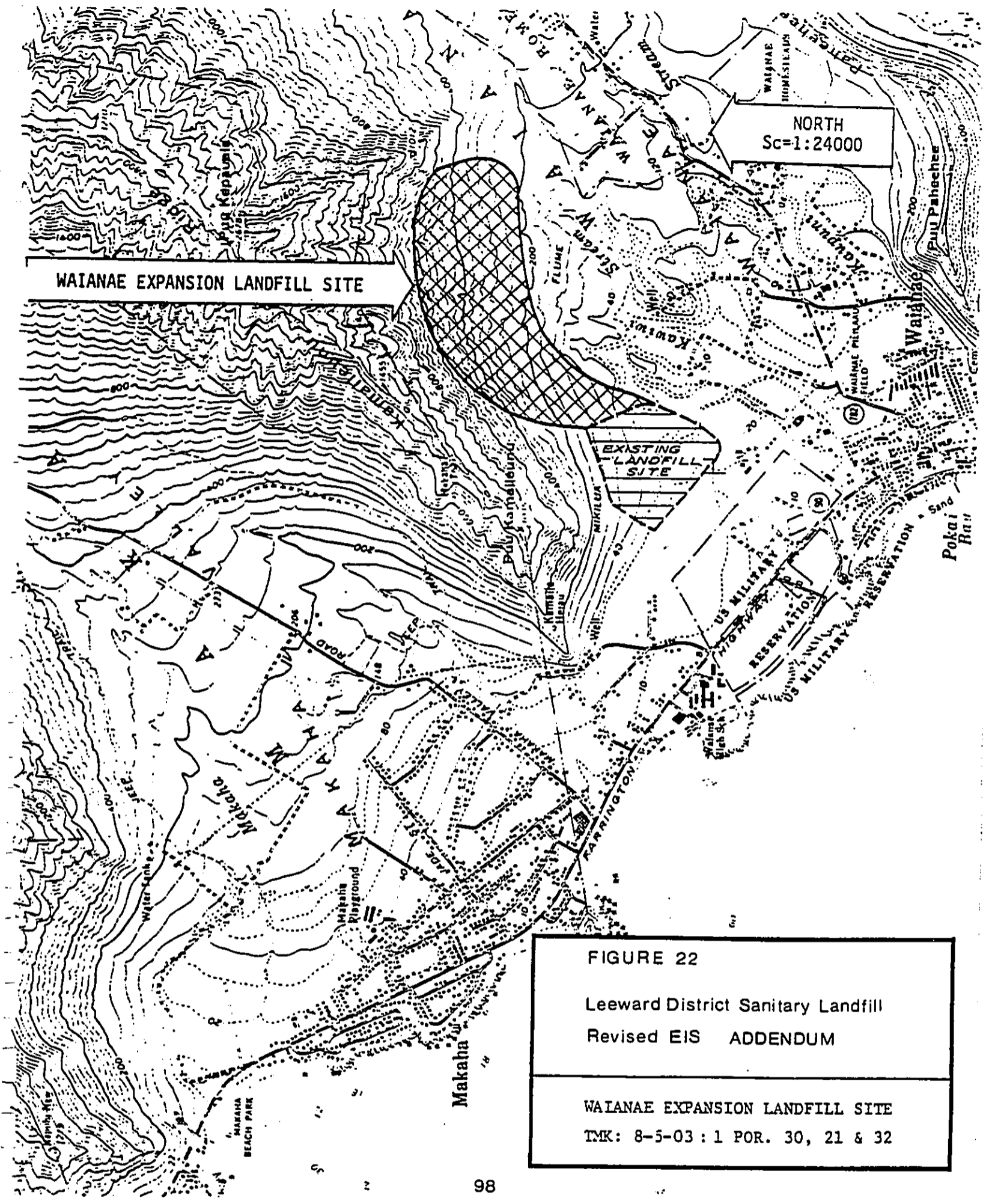


FIGURE 22
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

WAIANAĒ EXPANSION LANDFILL SITE
 TMK: 8-5-03:1 POR. 30, 21 & 32

WAIPAHU SITE

(TMK: 9-3-01)

This site had been used for refuse disposal since the early 1960's until 1972 when refuse disposal at this site ceased. Since then, it has been used to dispose of incinerator ash generated from Waipahu Incinerator. Refer to Figure 23. Existing ash disposal rates leave an estimated 5-6 years of use. [15] Its life as a sanitary landfill (i.e., disposal of raw refuse) would be considerably less, since significant volume reduction is achieved by incineration. Consequently, although it is economical for disposal of ash from Waipahu Incinerator, it would not be economical as a sanitary landfill.

A study conducted in 1973 [16] on this landfill described tidal penetration into the landfill and underground springs throughout the area. Since the landfill seemed to have stabilized and since there was a significant dilutional effect from spring discharges, it was not expected that existing water quality of West Loch would deteriorate. [16]

Currently, a pilot project is underway to evaluate the possibility of using incinerator ash as fill for portions of the Ted Makalena Golf Course which lies just east of Waipahu Incinerator. "The course is quite flat, lies from 7 to 20 feet above sea level atop marine clays, and has a number of problems. The most important of these, and the one most relevant to the incinerator's ash disposal needs is that capillary

rise brings saline water up from the relatively high water table into the root zone of the turf in low-lying areas of the course. This kills the grass and leaves substantial portions of the course devoid of cover. The problem is compounded by the fact that, by virtue of their location and the absence of positive drainage on the flat topography, many of these same areas are frequently flooded during rainy periods. The combination of bare soil and ponded water creates quagmires which prevent proper maintenance and inhibit play." [15]

The goal would be to determine if sufficient space exists on the golf course for incinerator ash disposal (which would also increase the life of the proposed Leeward District Sanitary Landfill) and simultaneously improve the quality of the golf course.

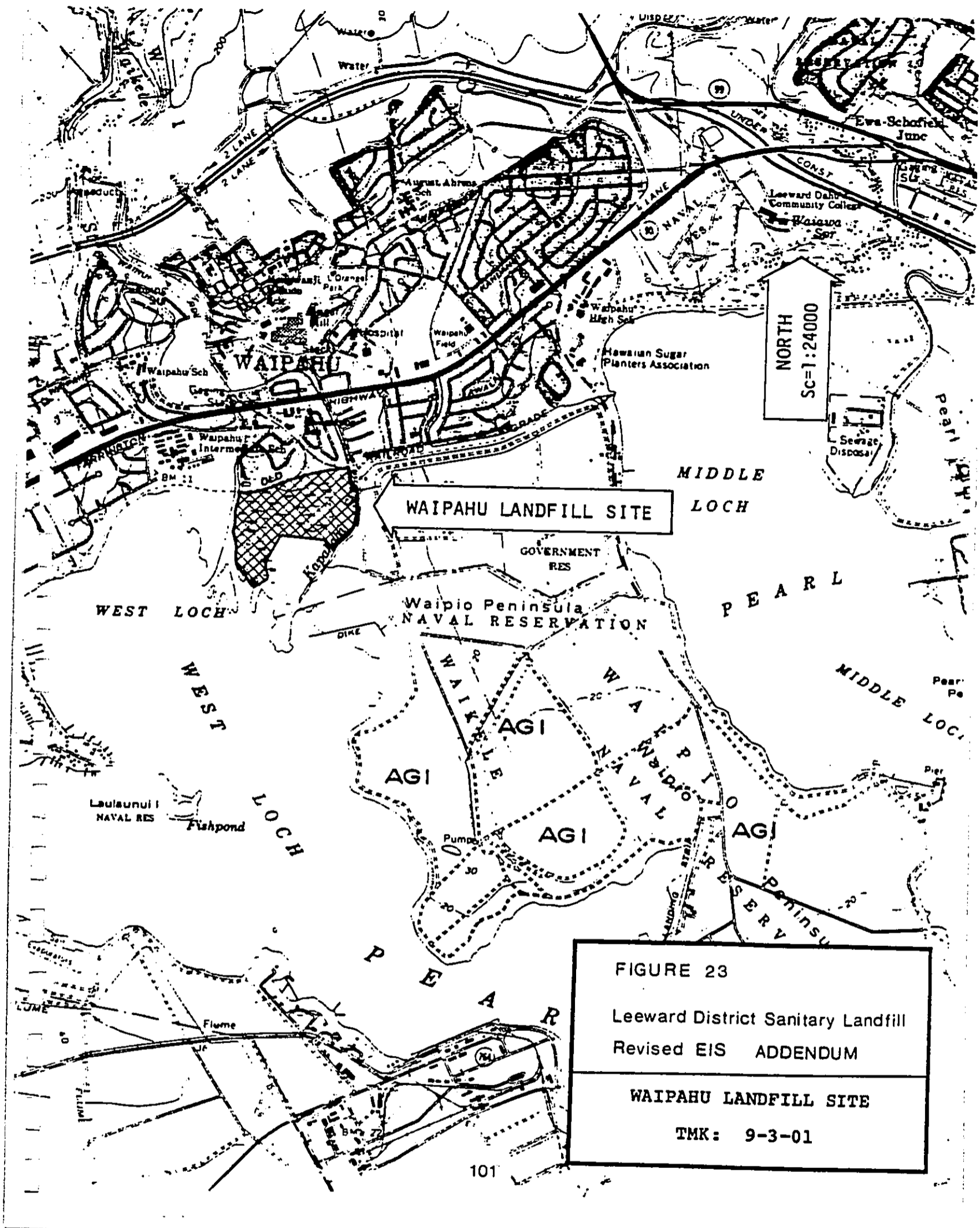


FIGURE 23
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

WAIPAHU LANDFILL SITE
 TMK: 9-3-01

WAIPIO SITE

(Tax Map Key: 9-3-02: portion of 1)

This site is located on the Waipio Peninsula, Pearl Harbor Naval Reservation, 1.4 miles south of Waipahu, and 11 miles from Keehi Refuse Transfer Station. Refer to Figure 24. The site is about 75 acres in area and is owned by the United States of America and leased to Oahu Sugar Company, Ltd. Current land uses include canefield and a disposal site for cane bagasse. It is within the Navy Blast Zone, so construction and operations of the proposed project would not be approved by the Navy.

The Navy estimates that only 60 acres of the parcel is useable for landfilling because the remainder is a bird sanctuary. The site is further limited because it was previously used as a landfill. A Navy soils consultant has recommended that no more than one additional lift (10 to 15 feet) be placed on the site so as to avoid slippage of the unstable subsoil. The Navy, which currently disposes of its solid waste at Palailai and Kapaa, intends to use this site when Palailai closes and if the City disposal system cannot accommodate its refuse. While the site may be adequate for the Navy's needs, it does not provide adequate capacity for an economical municipal landfill.

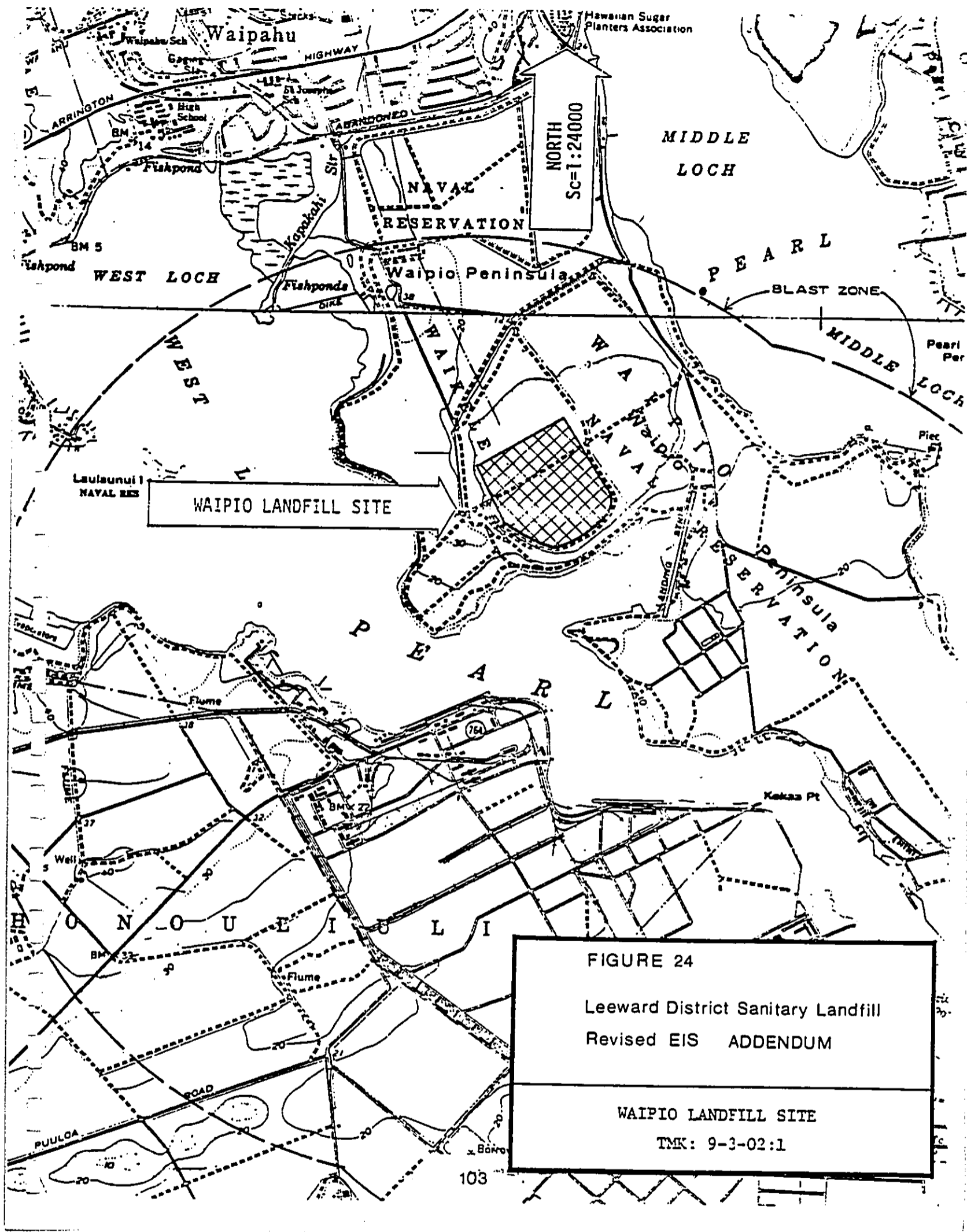


FIGURE 24
 Leeward District Sanitary Landfill
 Revised EIS ADDENDUM

WAIPIO LANDFILL SITE
 TMK: 9-3-02:1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Visuals

ADDITIONAL STATEMENTS OF ANTICIPATED VISUAL IMPACTS

As stated in the Revised EIS [1]:

"All landfills alter the landform by filling in gulches, valleys, and alter the slope of the land. The visual impact of the landfill depends upon the site in relationship to nearby residents. These visual impacts are associated with not only the change in land form, but the existence of denuded areas, and general landfill operations.

Methods to mitigate the visual impact include placement of vegetative buffer zones, vegetative earth berms to screen landfilling activities and an on-going landscaping program. As portions of the sanitary landfill are completed, they can be graded, contoured and revegetated according to the specifications of the final use of the landfill."

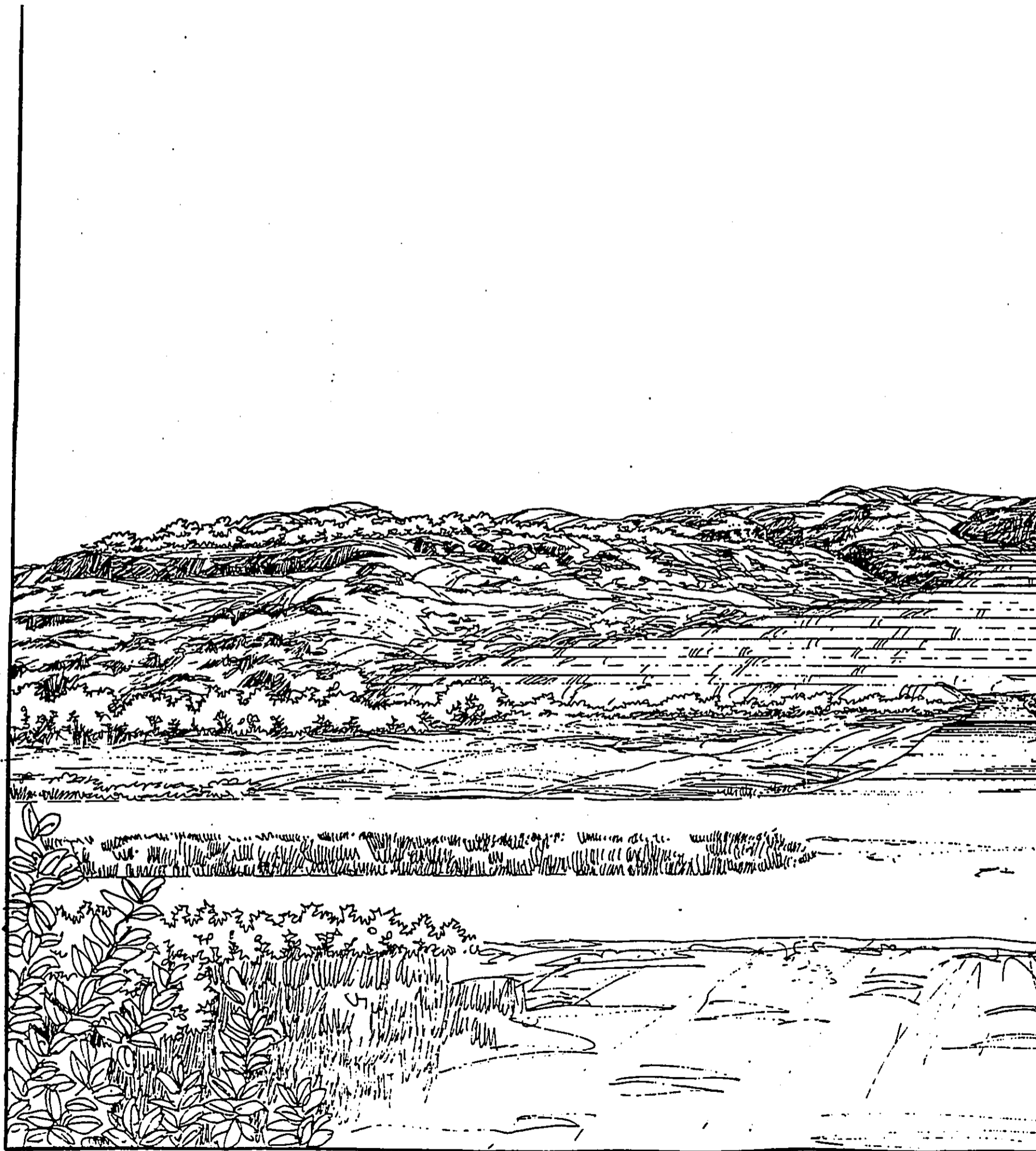
Figure 25 illustrates the existing land formation of Waimanalo Gulch. As part of the initial construction phase, an earth berm will be created fronting the lower portion of the gulch. This berm will be landscaped to prevent erosion and to provide a visual screen from Farrington Highway of the first phases of landfilling operations. In addition, a bend in the access roadway will be designed to block a direct view plane into the landfill's operations from the highway.

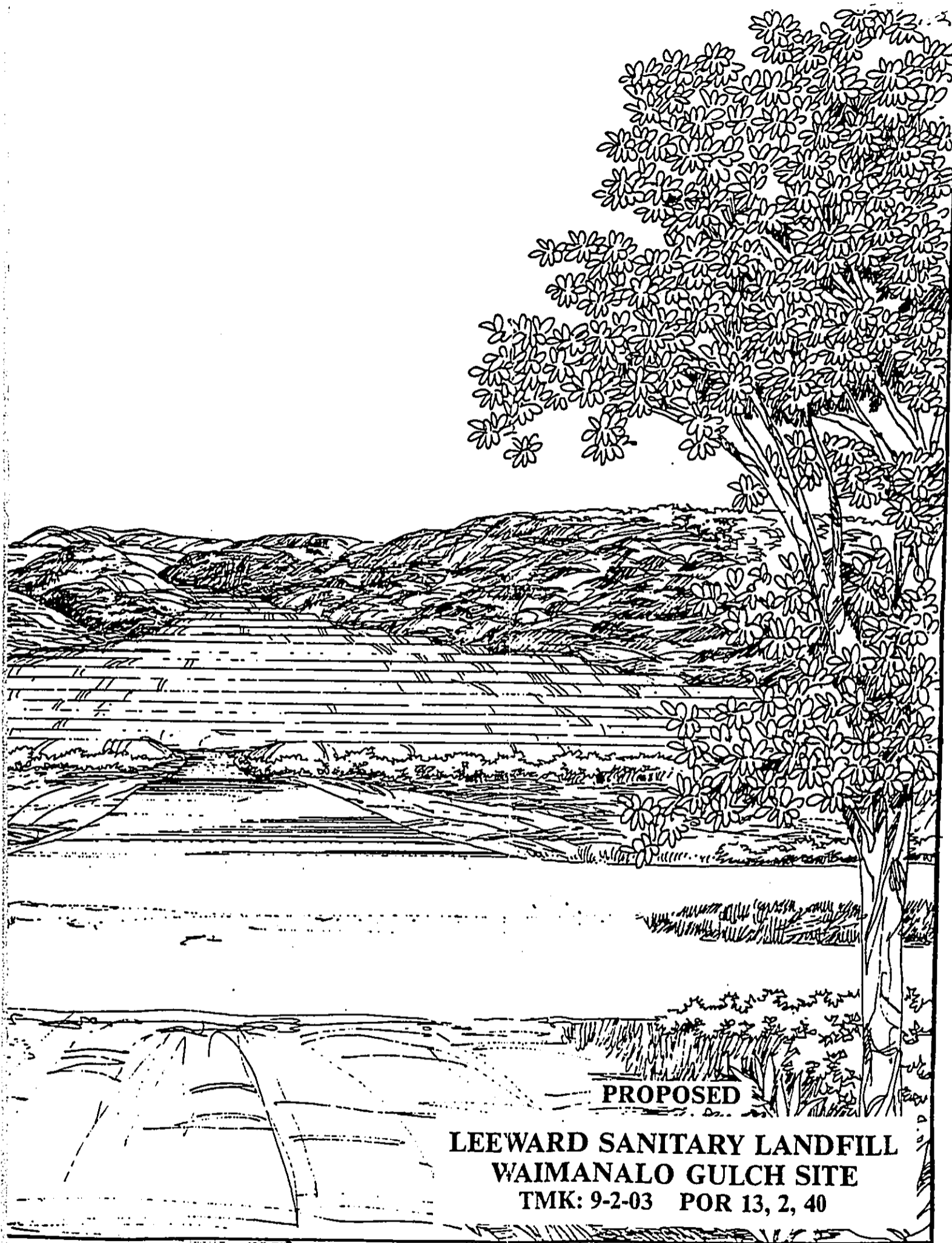
Before cells are constructed on a new lift, a berm will be constructed along the makai perimeter to contain the refuse. Filling will start against the mauka side of the berm, similar to Kapaa Sanitary Landfill. This should continue to screen most of the working area from the highway. On-going grading and landscaping of completed portions of the landfill will mitigate

visual impacts as successive lifts of the landfill are developed. Figure 26 illustrates the expected visual characteristics of the completed landfill.

Figure 25
Page 106

Journal 26
Page 107

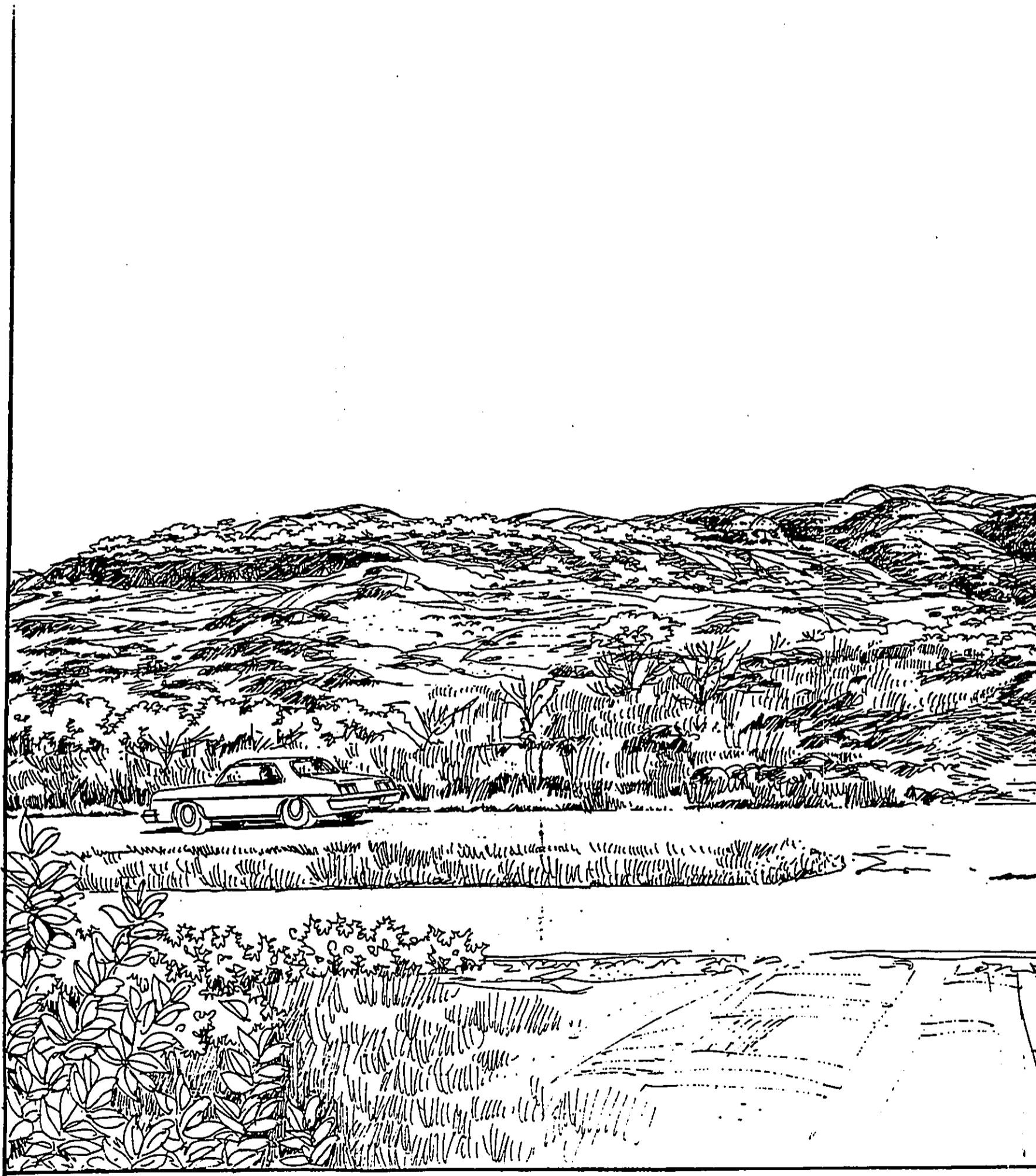




PROPOSED

**LEEWARD SANITARY LANDFILL
WAIMANALO GULCH SITE
TMK: 9-2-03 POR 13, 2, 40**

FIGURE 26





EXISTING

**LEEWARD SANITARY LANDFILL
WAIMANALO GULCH SITE**

TMK: 9-2-03 POR 13, 2, 40

FIGURE 25

Consultation

AGENCIES, ORGANIZATIONS, AND PERSONS
CONSULTED DURING REVIEW OF ADDENDUM

The following list includes those agencies, organizations, and persons to whom the Addendum was submitted for review and comment. Comments were received from those indicated with an asterisk. Those comments and corresponding responses are on the indicated pages.

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Office of Hawaiian Affairs	
Outdoor Circle	
Sierra Club	
Tongg Ranch	
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*Robert Au	145
Mr. and Mrs. Albert Silva	



United States
Department of
Agriculture

Soil
Conservation
Service

P.O. Box 50004
Honolulu, Hawaii
96850



DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

UNITED STATES
POSTAGE

July 26, 1985

RUSSELL E. SMYTH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-834-118AF

Mr. John P. Mhalen, Director
Department of Land Utilization
City & County of Honolulu
650 South King Street
Honolulu, HI 96813

August 12, 1985

Dear Mr. Mhalen:

Subject: Addendum to Revised EIS for Leeward District Sanitary Landfill
Maimanalo Gulch Site, Maimanalo, Oahu

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

Thank you for the opportunity to review the document.

Sincerely,

Francis C. L. Lapi
FRANCIS C. L. LAPI
State Conservationist

Mr. Francis C.H. Lum
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Lum:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

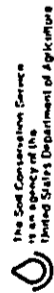
We appreciate your review of the document. Your letter will be
incorporated into the Final Addendum.

cc: Mr. John Lee,
Division of Refuse Collection & Disposal
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, HI 96813

Very truly yours,

Russell E. Smyth, Jr.
RUSSELL E. SMYTH, JR.
Director and Chief Engineer

cc: Department of Land Utilization



The Soil Conservation Service
is a part of the
United States Department of Agriculture





DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT SHAFTER, HAWAII 96858-5160

July 22, 1985


Mr. John Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Thank you for the opportunity to review and comment on the Leeward District Sanitary Landfill Revised EIS Addendum. The following comments are offered:

- a. Any fill in the waters of the U.S., including wetlands and streams, may require a Department of the Army permit.
- b. According to the Flood Insurance Study, prepared by the Federal Insurance Administration for the City and County of Honolulu, the Waimanalo Gulch Landfill site in Waianae, is located within an area of undetermined, but possible flood hazards, with zone D designation.
- c. Since drainage and flooding problems are among the site selection and evaluation criteria, as stated in the EIS addendum, it is suggested that the Flood Insurance Rate Maps (FIRM) prepared by the Federal Insurance Administration be used as a guide to determine flood potentials of the various alternative sites. Flood maps are available at the zone information counter of your department (523-4131) and at our Corps Office. Please contact our Flood Plain Management Section at 438-9865 if you need any assistance on this matter.

Sincerely,


Kasuk Cheung
Chief, Engineering Division

111

Copy Furnished:

• Russell Smith, Director
IN: Mr. John Lee
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



HONOLULU COUNTY, HI
DEPARTMENT OF PUBLIC WORKS

R 85-842

August 15, 1985

Mr. Kisuk Cheung
August 15, 1985
Page 2

Response:

We have consulted the Flood Insurance Study in selecting the proposed site. Final design of the sanitary landfill will consider the zone D designation.

Comment:

"Since drainage and flooding problems are among the site selection and evaluation criteria, as stated in the EIS addendum, it is suggested that the Flood Insurance Rate Maps (FIRM) prepared by the Federal Insurance Administration be used as a guide to determine flood potentials of the various alternative sites."

Response:

The Flood Insurance Rate Maps have been considered for the current site. All alternative leeward sites were eliminated for various reasons stated in the Addendum. Should any of these sites be seriously considered for future landfill development, the Flood Insurance Rate Maps will be consulted to determine flood potentials.

Your letter will be incorporated into the Final Addendum.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

Mr. Kisuk Cheung, Chief
Engineering Division
U.S. Army Engineer District, Honolulu
Department of the Army
Fort Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document and offer the following responses to your comments.

Comment:

"Any fill in the waters of the U.S., including wetlands and streams, may require a Department of the Army permit."

Response:

Your comment has been noted. There are no wetlands, streams, or ocean waters on the proposed Waimanalo Gulch site.

Comment:

"According to the Flood Insurance Study, prepared by the Federal Insurance Administration for the City and County of Honolulu, the Waimanalo Gulch Landfill site in Waiānae, is located within an area of undetermined, but possible flood hazards, with zone D designation."



United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P.O. BOX 50167
HONOLULU, HAWAII 96850

NO STAMP NECESSARY

ES
FORM 5307

AUG 1 1985

FRANK P. PARI

Mr. John P. Whalen
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Re: Revised Environmental Impact Statement Addendum, Leeward District
Sanitary Landfill, Oahu

Dear Mr. Whalen:

The U.S. Fish and Wildlife Service has reviewed the referenced document. The proposed action will have little direct impact on native plants and wildlife in the area. In view of this, we have no objection to this project.

Sincerely,

Original signed by
Ernest Kosaka
Project Leader
Office of Environmental Services

cc: Dept. of Public Works, C & C Unit
ODUC

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
Director and Chief Engineer

R 85-842

August 15, 1985

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
Fish and Wildlife Service
U.S. Department of the Interior
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



UNITED STATES OF AMERICA

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-83A-1184F

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

July 25, 1985

Department of Land Utilization
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Subject: Addendum to the Revised Environmental Impact Statement (EIS)
for the Proposed Leeward District Sanitary Landfill at
Waimanalo Gulch Site (TIR: 9-2-03; 2, 13, 40) and
Ohikilolo Site (TIR: 8-3-01)

Gentlemen:

Thank you for the opportunity to review the subject addendum. The topics discussed in the addendum are somewhat out of our area of expertise, therefore we do not wish to comment at this time. However, we would appreciate keeping the addendum on file in our library as it contains such valuable information on each of the alternative sites.

Thank you for your cooperation.

Sincerely,

Stanley F. Kaputka
District Chief

cc: Mr. Russell L. Smith, Jr.,
Director and Chief Engineer
Department of Public Works

August 12, 1985

Mr. Stanley F. Kaputka, District Chief
Water Resources Division
U.S. Department of the Interior,
Geological Survey
P.O. Box 50166
Honolulu, Hawaii 96850

Dear Mr. Kaputka:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



MET FAX

SEP 002/1233

SEP 006 1233

R 85-834-1184F

HEADQUARTERS
U.S. NAVAL BASE
PO BOX 110
Pearl Harbor, Hawaii 96363-0110

Mr. John P. Mahlen, Director
Department of Land Utilization
City and County of Honolulu
550 South King Street
Honolulu, Hawaii 96813

Dear Mr. Mahlen:

**REVISED ENVIRONMENTAL IMPACT STATEMENT ADDENDUM:
LEEWARD DISTRICT SANITARY LANDFILL**

The Revised EIS Addendum for Leeward District Sanitary Landfill has been reviewed and we have no comments to offer.

Thank you for the opportunity to review the EIS.

Sincerely,

Copy to:
Mr. Russell L. Smith, Jr., Director of Chief Engineer
Attention: Mr. John Lee
Department of Public Works, C & C Honolulu
650 South King Street
Honolulu, Hawaii 96813

August 12, 1985

Captain P. O'Connor, Chief of Staff
U.S. Naval Base Headquarters
Box 110
Pearl Harbor, Hawaii 96860-5020

Dear Captain O'Connor:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

Russell L. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FAX

(P)1382.5

RUSSELL SMITH, JR.
DIRECTOR

JUN 22 1985

R 85-834-1184F

August 12, 1985

Mr. John P. Whalen
Director
Department of Land Utilization
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Leeward District Sanitary Landfill
Revised EIS Addendum

We have reviewed the subject document and have no comments to offer.

Very truly yours,

J. Tomiaga
TEUANE TOMIAGA
State Public Works Engineer

CT:jk
/cc: Mr. Russell L. Smith, Jr.

Mr. Teuane Tomiaga
State Public Works Engineer
Division of Public Works
Department of Accounting and General Services
State of Hawaii
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Tomiaga:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

R. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

GEORGE R. ANIYOSIN
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 96822

August 7, 1985

Mr. John P. Whalen
August 7, 1985
Page 2

MEMORANDUM

To: Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu

Subject: Addendum to Revised Environmental Impact
Statement (EIS) for Leeward District Sanitary
Landfill at Waimanalo Gulch Site
Department of Public Works
City and County of Honolulu
TRK: 9-2-03; por. 13, 2, 40 Waianae, Oahu
Acres: 57

We believe that the establishment of the proposed sanitary landfill at the Waimanalo Gulch site will not adversely affect the agricultural resources of the area.

Thank you for the opportunity to comment.

JACK K. SUWA
Chairman, Board of Agriculture
cc: Department of Public Works, c/c of Honolulu
Attn: Mr. John Lee

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

We understand that the purpose of the subject Addendum is to expand specific sections found in the "Revised Environmental Impact Statement for the Proposed Leeward Sanitary Landfill at Waimanalo Gulch and Ohikilolo Site, 5-7-84" which was determined not acceptable by your Department in July, 1984.

According to our records and as confirmed by the City and County Department of Public Works (DPW), we did not receive a copy of the Revised EIS for our review and comment. We were informed by the DPW that the sections in the Revised EIS referring to the proposed Waimanalo Gulch site is substantially the same as that found in the "Environmental Impact Statement for Leeward Sanitary Landfill at Waimanalo Gulch Site and Ohikilolo Site" dated August 25, 1983. Therefore, our specific comments on the proposed Waimanalo Gulch site should be read with that in mind.

According to the indicators of agricultural potential as found in the Agricultural Lands of Importance to the State of Hawaii (ALISH) system, the Soil Conservation Service Soil Survey and the Land Study Bureau Detailed Land Classification for Oahu, the subject parcel has poor productivity potential for most agricultural uses. To our knowledge, there are no agricultural uses within or adjacent to the subject parcel.

"Support Hawaiian Agricultural Products"

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-842

August 30, 1985

Mr. Jack K. Suwa, Chairman
Board of Agriculture
Department of Agriculture
State of Hawaii
P.O. Box 22159
Honolulu, Hawaii 96822

Dear Mr. Suwa:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. We note that your comments are based on the "Environmental Impact Statement for Leeward Sanitary Landfill at Waimanalo Gulch Site and Ohikilolo Site", dated August 25, 1983, on the assumption that sections in the Revised EIS referring to the proposed Waimanalo Gulch site are substantially the same as found in the EIS. In addition, we offer the following response to your comment.

Comment:

"According to the indicators of agricultural potential as found in the Agricultural Lands of Importance to the State of Hawaii (ALISH) system, the Soil Conservation Service Soil Survey and the Land Study Bureau Detailed Land Classification for Oahu, the subject parcel has poor productivity potential for most agricultural uses. To our knowledge, there are no agricultural uses within or adjacent to the subject parcel."

"We believe that the establishment of the proposed sanitary landfill at the Waimanalo Gulch site will not adversely affect the agricultural resources of the area."

Mr. Jack K. Suwa
August 30, 1985
Page 2

Response:

We appreciate your comment that the proposed sanitary landfill is not anticipated to adversely affect agricultural resources of the area.

Your letter will be incorporated into the Final Addendum.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
DIRECTOR

R 85-834-1184F

ALBERT S. LUM
DIRECTOR
PLANNING DIVISION

DAVID E. C. JO
COMMISSIONER
PLANNING DIVISION



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
394 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96813

JUL 17 1985

HIENG

Mr. John P. Whalen, Director
Dept. of Land Utilization, C&C Hnl.
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Leeward District Sanitary Landfill Revised EIS Addendum
Waimanalo Gulch Site, Waianae, Oahu

Thank you for providing us the opportunity to review the above subject development.

We have completed our review and have no comments to offer at this time.

Yours truly,

Jerry M. Matsuda
Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

Enclosure

cc: Dept. of Public Works, C&C Hnl.

August 12, 1985

Major Jerry M. Matsuda
Office of the Adjutant General
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Major Matsuda:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

Russell L. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



R 85-834-1184F

August 12, 1985

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

Dear Dr. Koizumi:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

Russell L. Smyth, Jr.
RUSSELL L. SMYTH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

CHARLES G. CLARK
Director of Health

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

July 15, 1985

COPY

MEMORANDUM

To: Mr. John P. Whalen, Director, Department of Land Utilization
City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Leeward District Sanitary Landfill
Revised Addendum, Waimanalo Gulch Site, Waiānana, Oahu

Thank you for allowing us to review and comment on the subject EIS. On the basis that the project will comply with all applicable Administrative Rules, please be informed that we do not have any objections to this project.

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

Melvin K. Koizumi
For MELVIN K. KOIZUMI

cc: Mr. Russell L. Smith, Jr.



**DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT**

COMMUNICATIONS SECTION
500 SOUTH KING STREET, HONOLULU, HAWAII 96813

GEORGE R. ANGELO
DIRECTOR
LEWARD DISTRICT SANITARY LANDFILL
PROJECT

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
500 SOUTH KING STREET, HONOLULU, HAWAII 96813

Ref. No. P-2230

August 6, 1985

The Honorable John Mhalon
Director
Department of Land Utilization
City and County of Honolulu
450 South King Street
Honolulu, Hawaii 96813

Dear Mr. Mhalon:

Subject: Addendum to Revised IIS for Leeward District Sanitary
Landfill, Waimanalo Catch Site, Oahu

We have reviewed the addendum to the subject revised environmental
impact statement (EIS) and have no comments.

Thank you for the opportunity to review the subject document.

Very truly yours,

Murray E. Tomich
Director

cc: Mr. Russell M. Smith, Director of Land Utilization
Department of Public Works, City and County of Honolulu
Office of Environmental Quality Control

**DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



MAIL ROOM

R 85-842

August 23, 1985

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

Dear Mr. Keith:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be
incorporated into the Final Addendum.

Very truly yours,

Russell M. Smith
RUSSELL M. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-842

LETITIA M. UYEHARA
DIRECTOR
TELEPHONE NO.
948-9111

FRANCE FARR
EDITOR



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
808 HALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

August 5, 1985

GEORGE P. WHALEN
DIRECTOR

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Comments to Leeward District Sanitary Landfill
Revised EIS Addendum

We suggest that viable sanitary landfill sites be identified with steps taken to insure that residential encroachment is limited near such sites. The Underground Injection Control Line limits the siting of landfills to coastal areas to protect groundwater sources and residential development has already tremendously restricted potential landfill sites in those the foreseeable future, even with the H-POWER project. For this reason, we must take steps through proper land use planning to insure that future landfill sites will be available.

Sincerely,

Letitia M. Uyehara
Director

cc: Mr. John Lee, DPM, C&C Hnl.

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

Dear Ms. Uyehara:

Subject: Leeward District Sanitary Landfill Addendum
to Revised Environmental Impact Statement

We appreciate your review of the document and offer the following response to your comment.

Comment:

"We suggest that viable sanitary landfill sites be identified with steps taken to insure that residential encroachment is limited near such sites. The Underground Injection Control Line limits the siting of landfills to coastal areas to protect groundwater sources and residential development has already tremendously restricted potential landfill sites in those areas. For the foreseeable future, even with the H-POWER project, landfills will continue to be needed for refuse disposal. For this reason, we must take steps through proper land use planning to insure that future landfill sites will be available."

Response:

Landfill site selection criteria are largely dependent upon existing governmental regulations and state-of-the-art technology for solid waste management. The Underground Injection Control Line does not limit the siting of sanitary landfills to coastal areas. It does, however, establish groundwater zones which require protection. Current

Ms. Letitia N. Uyebara
August 28, 1985
Page 2

technological measures required to protect these groundwater areas beneath inland landfills are unnecessarily costly, given the availability of more easily developed alternative sites. Given the existing situation, coastal sites outside the UIC protected area were given the highest priority for development of a sanitary landfill.


Proximity to residential communities was also considered in finding a site; however, this criterion did not necessarily preclude the siting of a sanitary landfill. If a site could be found that was not in close proximity to a residential area, then that site would receive highest priority for the proposed project. There are sites elsewhere in the nation which have successfully managed sanitary landfills adjacent to residential communities. Proportionately, a landfill adjacent to a residential community would require higher development costs and higher annual operational costs to mitigate potential adverse effects of a landfill.

Realizing the diminishing land resources available to the island's needs, the City actively pursued a resource recovery program for Honolulu and recently succeeded in signing a contract for the design, construction, and operation of a facility at Campbell Industrial Park. This facility will drastically reduce Oahu's need for landfill space and greatly extend the life of a landfill constructed at Waimanalo Gulch.

We have been and will continue to coordinate our plans with agencies establishing land use policies for optimum use of Oahu's land. We appreciate your understanding and support of our efforts in this regard.

Your letter will be incorporated into the Final Addendum.

Very truly yours,


RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2530 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 944-7301

August 7, 1985

RE:0418

Mr. John P. Whalen
Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Draft Addendum to the
Revised Environmental Impact Statement Addendum
Leeward District Sanitary Landfill
Waimanalo Gulch Site, Waianae, Oahu

Thank you for the opportunity to review the above cited document prepared to expand and clarify specific sections of the proposed sanitary landfill at Waimanalo Gulch site. The original REIS was determined not acceptable by the Department of Land Utilization on July 13, 1984, which has led to the preparation of this Draft Addendum.

The Environmental Center review has been prepared with the assistance of Paul Ekern, Agronomy and Soils; Martha Diaz, Environmental Studies; and Jim Woodruff, Environmental Center.

Disposal/Processing Methods

The Addendum states that incineration is the most effective means of reducing the volume of waste material and thus extending the life of a landfill.

The disposal of ash and noncombustibles may present some problems not experienced with typical municipal waste.

Fine ash would certainly create a potential dust problem that is not present with typical waste. This may require immediate burial or wetting down if water is available. We recommend careful planning regarding this aspect of incinerated material.

We further suggest that the cumulative impacts on air quality of incineration, hauling, disposal and general handling of ashes and recovered by-products be incorporated into the Revised Addendum for the REIS.

AN EQUAL OPPORTUNITY EMPLOYER

Mr. John P. Whalen

-2-

August 7, 1985

Drainage and Leachate

Ash could produce a leachate consisting of more concentrated toxic substances than unincinerated waste, prompting us to restate our concern over a possible leachate problem. We strongly recommend that a peripheral drainage system and other measures be included in the landfill design to reduce this risk. The proximity of the proposed landfill to recreational beach areas down slope makes this an especially important factor.

We wonder what documentation was used to substantiate the following statements:

"Leachate may be generated in areas where annual rainfall exceeds 30 inches" (p. 63) and "...rainfall 20 inches per year; leachate generation not expected..." (p. 67)

Alternative Sites

It is our understanding that the Makaiwa site has now been approved for a sanitary landfill by a private organization. This site is near the proposed Waimanalo Gulch site and met significant community opposition during the public information process. The revised Addendum EIS should acknowledge and address the approval of this site along with the possible cumulative impacts of two landfill areas in such close proximity.

Thank you for the opportunity to comment.

Sincerely,

Jim Woodruff
Acting Associate Director

cc: Patrick Takahashi, Acting Director
✓ Russell L. Smith, Jr.
OEQC
Paul Ekern
Jim Woodruff
Martha Diaz
Pamela Bahnsen

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK PASH
DIRECTOR



RUSSELL L. SMITH, JR.
ENGINEERING AND ENVIRONMENTAL ENGINEER

August 28, 1985

R 85-868-1091E

Ms. Jacquelin N. Miller
Acting Associate Director
Environmental Center
University of Hawaii
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Ms. Miller:

Subject: Addendum to the Revised Environmental Impact
Statement (REIS) for the Proposed Leeward District
Sanitary Landfill at Waimanalo Gulch Site
(THK: 9-2-03:7,13,40) and Ohikilolo Site
(THK: 8-3-01)

We appreciate your review of the addendum and offer the
following responses to your comments:

Comment:

"Disposal/Processing Methods"

"The Addendum states that incineration is the most
effective means of reducing the volume of waste
material and thus extending the life of a landfill.

"The disposal of ash and noncombustibles may present
some problems not experienced with typical municipal
waste.

"Fine ash would certainly create a potential dust
problem that is not present with typical dust
may require immediate burial or wetting down. This
is available. We recommend careful planning regarding
this aspect of incinerated material.

Ms. Jacquelin N. Miller
August 28, 1985
Page 2

"We further suggest that the cumulative impacts on air
quality of incineration, hauling, disposal and general
handling of ashes and recovered by-products be
incorporated into the Revised Addendum for the REIS.

"Response"

All ash is vetted with water before it is discharged
from the incinerator. It is then hauled directly to a
landfill for disposal. Ash placed at a landfill
presents no more of a dust problem than soil cover
material, and the dust can be controlled by periodic
sprinkling with water.

A detailed discussion of the cumulative air quality
impacts of incineration and ash disposal is beyond the
scope of this addendum. However, the information you
seek is presented in Section 4.11 of the Revised
Environmental Impact Statement for the Proposed Solid
Waste Processing Resource Recovery Facility,
August 18, 1983.

Comment

"Drainage and Leachate"

"Ash could produce a leachate consisting of more
concentrated toxic substances than unincinerated
waste, prompting us to restate our concern over a
possible leachate problem. We strongly recommend that
a peripheral drainage system and other measures be
included in the landfill design to reduce this risk.
The proximity of the proposed landfill to recreational
beach areas down slope makes this an especially
important factor.

"We wonder what documentation was used to substantiate
the following statements:

" 'Leachate may be generated in areas where
annual rainfall exceeds 30 inches' (p. 63) and
'...rainfall 20 inches per year; leachate
generation not expected...' (p. 67)"

Ms. Jacquelin N. Miller
August 28, 1985
Page 3

Response:

We agree that possible leachate contamination of recreational beach areas is a serious concern. To prevent such contamination, the following mitigative measures will be taken at Waimanalo Gulch:

- a. The landfill subgrade will be graded and compacted to form a semi-impermeable barrier beneath the refuse.
- b. A leachate collection system will be installed before filling begins.
- c. A peripheral drain will be installed to intercept runoff before it enters the landfill.
- d. Lifts will be covered and sloped to shed rainfall.
- e. Completed lifts will be landscaped to increase evapo-transpiration.
- f. Monitoring wells will be installed to detect lateral leachate movement.

Should leachate migration be detected, other steps can be taken, if deemed appropriate, such as installing an impermeable cap over the landfill, using suction wells to remove the leachate, or constructing interceptor trenches to stop its lateral movement.

The statements regarding rainfall are based on the Leachate Study conducted by EMCOR Associates (see reference 4.2 of the REIS).

Comment:

Alternative Sites

"It is our understanding that the Makaiwa site has now been approved for a sanitary landfill by a private organization. This site is near the proposed Waimanalo Gulch site and met significant community

Ms. Jacquelin N. Miller
August 28, 1985
Page 4


opposition during the public information process. The Revised Addendum EIS should acknowledge and address the approval of this site along with the possible cumulative impacts of two landfill areas in such close proximity."

Response:

Although the Makaiwa site has been included in Oahu's Development Plan, we believe that a landfill on the site is a long way from realization. It is doubtful that two major landfills could be operated economically on the leeward side at the same time, and we expect that one will be filled before the second is opened.

Your letter will be incorporated into the Final Addendum.

Very truly yours,


RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: DLU



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 20 • 2540 Dole Street
Honolulu, Hawaii 96822

26 July 1985

Mr. John P. Whalen, Director
Department of Land Utilization
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Revised Environmental Impact Statement Addendum,
Leeward District Sanitary Landfill, Waimanalo
Guich Site, July 1985

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

Sincerely,

Edwin T. Murabayashi
Edwin T. Murabayashi
EIS Coordinator, WRRC

ETH:jmn

cc: Russell L. Smith
(Attn: John Lee)

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



IN F 2000

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-834-1184F

August 12, 1985

Mr. Edwin T. Murabayashi, EIS Coordinator
Water Resources Research Center
University of Hawaii at Manoa
2540 Dole Street, Holmes Hall 283
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Very truly yours,

Russell L. Smith, Jr.

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization



COPY

July 19, 1985

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY


SUBJECT: LEeward DISTRICT SANITARY LANDFILL, REVISED
ENVIRONMENTAL IMPACT STATEMENT ADDENDUM FOR
WAINANALO GULCH SITE, WAIANAE

Thank you for the opportunity to review the environmental document for the proposed sanitary landfill.

We agree that a guarantee that leachate will not pollute ground water resources is not practical; therefore, we recommend that the City install an impervious liner to minimize potential degradation of potable ground water resources (Ref.: p. 29). We may impose additional conditions when the construction drawings are submitted for our review and approval.

Regarding Condition 4 on the replacement of polluted sources, the matter should be left "open" for future legal interpretation.

If you have any questions, please contact Lawrence Whang at 527-6138.


KAZU HAYASHIDA
Manager and Chief Engineer

cc: Department of Public Works
(Attention: John Lee)

August 2, 1985

R 85-805-1146F

MEMORANDUM

TO: MR. KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: ADDENDUM TO THE REVISED ENVIRONMENTAL IMPACT STATEMENT (REIS) FOR THE PROPOSED LEeward DISTRICT SANITARY LANDFILL AT WAINANALO GULCH SITE (TMK: 9 2-03: 2, 13, 40) AND OHIKILOLO SITE (TMK: 9-3-01)

We appreciate your review of the addendum and offer the following responses to your comments.

Comment:

"We agree that a guarantee that leachate will not pollute ground water resources is not practical; therefore, we recommend that the City install an impervious liner to minimize potential degradation of potable ground water resources (Ref.: p. 29). We may impose additional conditions when the construction drawings are submitted for our review and approval."

Mr. Kazu Hayashida
August 2, 1985
Page 2

Response:

Since its formation in 1981, we have worked closely with the Technical Advisory Committee on Underground Injection Control (TAC UIC) to identify and protect aquifers which are underground courses of drinking water (USDW). These protected aquifers are now delineated by the UIC line, which encompasses most of the inland areas of Oahu. Conversely, the UIC line separates exempted aquifers from the USDW, and thereby identifies coastal areas which might be suitable for siting sanitary landfills. The Waimanalo Gulch site was selected specifically because it is beyond the UIC line, within an exempted area, and poses no danger of pollution to the USDW. We therefore believe that a sanitary landfill at Waimanalo Gulch presents no potential for "degradation of potable ground water resources" and will not require an "impermeable liner" made of clay or geotextile. Such a liner should not be a prerequisite to constructing the landfill.

Measures will be taken, however, to prevent the formation and migration of leachate into the underlying brackish aquifer or to nearby ocean waters. These measures include: installing a leachate collection system before landfilling commences; sloping the subgrade toward the collection pipes and compacting the soil to impede percolation; placing daily cover over the refuse to minimize rainfall infiltration; constructing a perimeter drain to intercept offsite runoff and divert it around the landfill; installing monitoring wells and conducting a sampling program to detect leachate migration. We believe that these safeguards will be more than adequate to prevent pollution of the underlying aquifer and the ocean. If necessary, more drastic measures such as suction wells, interceptor trenches, and an impermeable landfill cap could be implemented should leachate movement be detected.

Mr. Kazu Hayashida
August 2, 1985
Page 3

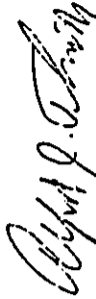
Comment:

"Regarding Condition 4 on the replacement of polluted sources, the matter should be left 'open' for future legal interpretation."

Response:

The possibility of future legal interpretation of source replacement liability is noted.

Your memorandum will be included in the revised addendum.



FOR RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: DLU w/o incoming memo

bcc: SEY w/memo
✓ Diane Hirsch w/memo

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

LF FASJ
11/000

PB 85-655

July 15, 1985

August 12, 1985

R 85-834-1184F

TO: MR. JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: LEEHARD DISTRICT SANITARY LANDFILL
ADDENDUM TO THE REVISED ENVIRONMENTAL
IMPACT STATEMENT

We have reviewed the subject Addendum to the Revised Environmental Impact Statement and have no comments.

Thank you for the opportunity to review the Addendum.

HERBERT K. MURAOKA
Director and Building Superintendent

TH:ft
cc: Dept. of Public Works/
(John Loe)
J. Harada

MEMORANDUM

TO: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT
BUILDING DEPARTMENT

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEEHARD DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



DONALD A. CLEGG
Chief Planning Officer
GENE CONNELL
Chief Planning Officer

JB/DGP 7/85-1780

July 18, 1985

MEMORANDUM

TO: Mr. John Whalen, Director
Department of Land Utilization

SUBJECT: Leeward District Sanitary Landfill
Waimanalo Gulch Site
Addendum to the Revised EIS

We have the following comments for your consideration.

1. Development of a Leeward District Sanitary Landfill at Waimanalo Gulch is in basic accord with the Development Plan Public Facilities Map for the Ewa district.
2. We understand the landfill property may be acquired by condemnation.
The Community Planning Branch of the Department of General Planning should be notified as soon as acquisition of the landfill site is completed. Steps will then be taken to amend the DP land use map by changing the land use designation of the landfill site from Agricultural to Public Facility use.
3. Discussions relative to alternative sites and to alternative processing methods seem adequate.

Mr. John Whalen
July 18, 1985
Page 2

Thank you for affording us the opportunity to comment on the revised EIS addendum.

cc: OEQC
DPM (John Lee)

Donald A. Clegg
DONALD A. CLEGG
Chief Planning Officer

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
DIRECTOR

RUSSELL L. SMITH, JR.
DIRECTOR OF LAND UTILIZATION

R 85-842

August 15, 1985

Mr. Donald A. Clegg
August 15, 1985
Page 2

RESPONSE:

Your department will be kept informed during the land acquisition process.

COMMENT:

"Discussions relative to alternative sites and to alternative processing methods seem adequate."

RESPONSE:

We appreciate your comment on the adequacy of the discussions of alternative sites and alternative processing methods.

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEeward DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document and offer the following responses to your comments.

Comment:

"Development of a Leeward District Sanitary Landfill at Waimanalo Guich is in basic accord with the Development Plan Public Facilities Map for the Ewa district."

RESPONSE:

Your confirmation that the proposed project is consistent with the Public Facilities Map is appreciated.

COMMENT:

"We understand that landfill property may be acquired by condemnation."

The Community Planning Branch of the Department of General Planning should be notified as soon as acquisition of the landfill site is completed. Steps will then be taken to amend the DP land use map by changing the land use designation of the landfill site from Agricultural to Public Facility use."

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
830 SOUTH KING STREET
HONOLULU, HAWAII 96813

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
830 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
DEPUTY

ALVIN K. PANG
DIRECTOR

HELE FASI
DEPUTY



RUSSELL L. SMITH, JR.
DIRECTOR

July 26, 1985

August 12, 1985

R 85-834-1184F

MEMORANDUM

TO: John P. Whalen, Director
Department of Land Utilization

FROM: Alvin K. H. Pang, Director
Department of Housing and Community Development

SUBJECT: Revised EIS Addendum
Leeward District Sanitary Landfill

MEMORANDUM

TO: ALVIN K. H. PANG, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEEWARD DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate the opportunity to review and comment on the addendum to the REIS for the Leeward District Sanitary Landfill project.

We have no objections or comments at this time to the alternate sites presented. As the plans become more detailed, we may have some comments on the project.

Alvin K. H. Pang
ALVIN K. H. PANG

cc: Russell L. Smith, Jr.

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Russell L. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
 830 SOUTH KING STREET
 HONOLULU, HAWAII 96813



FRANK P. FARH
 MAYOR

JOHN P. WHALEN
 DIRECTOR

(RF)

August 5, 1985

MEMORANDUM

TO: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER
 DEPARTMENT OF PUBLIC WORKS

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: DRAFT ADDENDUM TO REVISED ENVIRONMENTAL IMPACT
 STATEMENT FOR THE LEeward DISTRICT SANITARY LANDFILL

We have reviewed the subject addendum. The discussion of alternative processing methods and alternative sites is well-written and appears to be complete.

We note that you are no longer recommending a landfill be developed at Ohikilolo, but that it remains an alternative site, as indicated by Table 3 (p. 32). However, Ohikilolo is not discussed within the "Alternative Site Descriptions" section. Could you clarify this matter?

Should you have any questions, please contact Lorrie Chee of our staff at extension 4248.

Lorrie Chee
 JOHN P. WHALEN
 Director of Land Utilization

JPM:ey
 1569E

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
 830 SOUTH KING STREET
 HONOLULU, HAWAII 96813



FRANK P. FARH
 MAYOR

RUSSELL L. SMITH, JR.
 DIRECTOR AND CHIEF ENGINEER

August 28, 1985

R 85-842

MEMORANDUM

TO: MR. JOHN P. WHALEN, DIRECTOR
 DEPARTMENT OF LAND UTILIZATION

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEeward DISTRICT SANITARY LANDFILL ADDENDUM TO
 REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document and offer the following responses to your comments.

Comment:

"The discussion of alternative processing methods and alternative sites is well-written and appears to be complete."

Response:

We appreciate your comment.

Comment:

"We note that you are no longer recommending a landfill be developed at Ohikilolo, but that it remains an alternative site, as indicated by Table 3 (p.32). However, Ohikilolo is not discussed within the "Alternative Site Descriptions" section. Could you clarify this matter?"

Response:

Ohikilolo is no longer proposed as the second site. This will be clarified in the Final Addendum.

Your letter will be incorporated into the Final Addendum.

Russell L. Smith, Jr.
 RUSSELL L. SMITH, JR.
 Director and Chief Engineer

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-842

FRANK P. PASTOR
DIRECTOR

July 17, 1985

TO: JOHN P. MALECH, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: TOM T. NEKOTA

SUBJECT: LEEWARD DISTRICT SANITARY LANDFILL
REVISED EIS ADDENDUM

We have reviewed the revised EIS addendum and have no objections to development of a sanitary landfill at the Waimanalo Gulch site.

The Department of Parks and Recreation has long range plans for development of the Koko Crater area into a nature park. Therefore, we are opposed to this site being considered as an alternative location for the proposed landfill.

Thank you for the opportunity to review the environmental document.

Tom T. Nekota
TOM T. NEKOTA, Director

TH:ras (Paul Nagamine, Planning)
cc: Russell L. Smith, Jr., DPW

August 15, 1985

MEMORANDUM

TO: TOM T. NEKOTA, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEEWARD DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document. Your long range plans for development of the Koko Crater area into a nature park and your opposition to its consideration as an alternative location for the proposed sanitary landfill have been noted.

Your letter will be incorporated into the Final Addendum.

Russell L. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. PASI
MAYOR

JOHN E. HIRTEEN
DIRECTOR

JOSEPH M. WAGLE, JR.
DEPARTMENT OF TRANSPORTATION SERVICES

TE7/85-3034
PL 1.0025

July 29, 1985

MEMORANDUM

TO: JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: JOHN E. HIRTEEN, DIRECTOR

SUBJECT: LEeward DISTRICT SANITARY LANDFILL
REVISED EIS ADDENDUM - MAIHANALO GULCH SITE

We have reviewed the Revised EIS Addendum and have no comments. We thank you for providing us this opportunity to review and comment on the project.

Sincerely,

John E. Hirtien
for JOHN E. HIRTEEN

cc: JWP

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



R. F. FASI
MAYOR

RUSSELL L. SMITH, JR.
DIRECTOR

August 12, 1985

R 85-834-1184P

MEMORANDUM

TO: JOHN E. HIRTEEN, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEeward DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

Russell L. Smith, Jr.
RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1333 BERTHOUD STREET, ROOM 200
HONOLULU, HAWAII 96813



FRANK P. FARR
SAISON

FRANK K. KAHOOHANOHANO
FIRE CHIEF
LIONEL E. CAMARA
SAISON FIRE CHIEF

August 8, 1985

TO : JOHN P. WHALEN, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

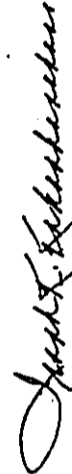
FROM : FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: LEEWARD DISTRICT SANITARY LANDFILL REVISED
EIS ADDENDUM
WAIMANALO GULCH SITE, WAIANA, OAHU
TAX MAP KEY: 9-2-03: 13, 2 & 40

We have reviewed the above application for the proposed facility and submit the following comments:

1. Provide all-weather paved access roadway within 150 feet of proposed facility.
2. Provide an approved source of water supply for firefighting purposes on site or within 350 feet of proposed facility. A minimum storage of 15,000 gallons shall be provided.

Should additional information be required, please direct your staff to contact Captain John P. Souza of our Fire Prevention Bureau at 523-4186.


FRANK K. KAHOOHANOHANO
Fire Chief

FKK:smh
cc: Russell L. Smith, Jr.
Director & Chief Engineer

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. FARR
SAISON

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-842

August 30, 1985

MEMORANDUM

TO: FRANK K. KAHOOHANOHANO, FIRE CHIEF
FIRE DEPARTMENT

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEEWARD DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document and offer the following responses to your comments.

Comment:

"Provide all-weather paved access roadway within 150 feet of proposed facility."

Response:

We plan to provide such a roadway to the proposed facility.

Comment:


"Provide an approved source of water supply for firefighting purposes on site or within 350 feet of proposed facility. A minimum storage of 15,000 gallons shall be provided."

Mr. Frank K. Kaboobanobano
August 30, 1985
Page 2

Response:

During the final design phase of the proposed project, fire-fighting requirements will be evaluated and provisions will be made to meet those needs.

Your letter will be incorporated into the Final Addendum.



RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

100 SOUTH KING STREET
HONOLULU, HAWAII 96813

HONOLULU, HAWAII 96813



OUR REFERENCE DI-GP

July 15, 1985

Mr. John P. Whalen, Director
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Whalen:

Subject: Leeward District Sanitary Landfill Revised
EIS Addendum
Waimanalo Gulch Site, Waiānae, Oahu

We have completed our review of the Leeward District Sanitary Landfill Revised Environmental Impact Statement Addendum, and have concluded that we do not have any objections to the proposed project at this time.

Thank you for allowing us to comment on this project.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

cc: Mr. Russell L. Smith, Jr.

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



HONOLULU, HAWAII 96813

HONOLULU, HAWAII 96813

HONOLULU, HAWAII 96813

August 12, 1985

R 85-834-1184P

MEMORANDUM

TO: CHIEF DOUGLAS G. GIBB
HONOLULU POLICE DEPARTMENT

FROM: RUSSELL L. SMITH, JR., DIRECTOR AND CHIEF ENGINEER

SUBJECT: LEEWARD DISTRICT SANITARY LANDFILL
ADDENDUM TO REVISED ENVIRONMENTAL IMPACT STATEMENT

We appreciate your review of the document. Your letter will be incorporated into the Final Addendum.

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

THE ESTATE OF JAMES CAMPBELL

August 7, 1985

Mr. John Whalen
Director
Dept. of Land Utilization
City & County of Honolulu
650 S. King Street, 7th Floor
Honolulu, HI 96813

Dear Mr. Whalen:

Thank you for the opportunity to review and comment on the "Addendum to the Revised Environmental Impact Statement (EIS) for the Proposed Leeward District Sanitary Landfill at Waimanalo Gulch Site."

The EIS identifies most of the critical environmental issues associated with the construction and operation of a sanitary landfill at Waimanalo Gulch, however, a number of items do not appear to be covered. Landfill operations require certain mitigative measures to prevent odors, debris, vermin, leachate contamination, gas accumulation, storm runoff, etc., from adversely impacting adjacent areas. The following are considered acceptable mitigative measures in the industry.

1. Leachate:

An impermeable layer of material should be installed on the floor of the landfill to prevent leachate percolation into the ground. As the landowner of adjacent areas, we believe the installation of an impermeable layer to be a necessary, long-term protective measure.

In addition, a leachate collection and treatment system should be installed.

2. Visual:

There should be a prearranged order of filling the sanitary landfill. This is accomplished by filling in "lifts" and then adequately landscaping the lifts as they are completed.

Mesh fencing is necessary around the landfill to prevent debris from blowing into surrounding areas.

3. Compacting Requirements:

As it is dumped, refuse should be compacted and covered with soil to a depth of not less than six inches. The

Mr. John Whalen
August 7, 1985
Page 2

compacting should be firm and comply with industry standards.

When the surface of the fill is utilized as a temporary road base, the cover material should be compacted to a depth of not less than 12 inches.

4. Drainage:

When a lift has been completed, cover material is then needed to a depth of not less than three feet. Proper grading, landscaping, and drainage is required to divert surface runoff and prevent erosion. Proper drainage facilities include the installation of interceptor ditches and siltation basins to collect runoff discharge.

5. Methane Gas:

A collection system for methane gas should be installed to prevent gas from accumulating in unwanted areas.

6. Air Quality:

Frequent sprinkling during operations is necessary to control dust.


7. Access:

Access to the landfill should be strictly controlled through entrance gates and close supervision of activities. Fencing is necessary to control unauthorized access.

Strict control of vehicles entering and leaving the landfill is necessary. No vehicles should be permitted to remain in the area after unloading.

We appreciate this opportunity to review the document and hope you find our comments useful.

Sincerely,


Russell W. Alger
Director, Hawaii Operations

✓cc: Russell Smith, Jr.,
Director and Chief Engineer
Department of Public Works

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. PARI
DIRECTOR

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-842

August 30, 1985

Mr. Russell W. Alger
Director, Hawaii Operations
The Estate of James Campbell
828 Fort Street Mall, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Alger:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document and offer the following responses to your comments.

Comment:

"The EIS identifies most of the critical environmental issues associated with the construction and operation of a sanitary landfill at Waimanalo Gulch, however, a number of items do not appear to be covered. Landfill operations require certain mitigative measures to prevent odors, debris, vermin, leachate contamination, gas accumulation, storm runoff, etc., from adversely impacting adjacent areas."

Response:

All of these items are addressed in the "Revised Environmental Impact Statement for the Proposed Leeward Sanitary Landfill at Waimanalo Gulch Site and Ohikilolo Site, 5-7-84", specifically Sections 4 and 5. The document you recently reviewed was the Addendum (7-1-85) to that document, which was prepared to fulfill the Department of Land Utilization's (DLU) request to expand particular sections of the Revised EIS which DLU found to be deficient. These specific areas were identified as: (1) statements on Alternative Waste Processing Methods and conclusions on

Mr. Russell W. Alger
August 30, 1985
Page 2

how they fit into the City's plans; (2) descriptions of Alternative Sites; and (3) presentation of anticipated visual impact of the proposed sanitary landfill.

Comment:

"...The following are considered acceptable mitigative measures in the industry."

"1. Leachats:"

"An impermeable layer of material should be installed on the floor of the landfill to prevent leachate percolation into the ground. As the landowner of adjacent areas, we believe the installation of an impermeable layer to be a necessary, long-term protective measure."

"In addition, a leachate collection and treatment system should be installed."

Response:

The installation of an impermeable liner is not warranted because: the landfill will be located outside the UIC line and thus poses no threat to the City's potable groundwater supply; there is low potential for leachate formation since Waimanalo Gulch is an area of low rainfall; hazardous wastes will not be accepted at the landfill; other precautionary measures will be taken, including grading and compacting of the landfill floor and installation of leachate collection and monitoring systems as described in the REIS.

Comment:

"2. Visual:"

"There should be a prearranged order of filling the sanitary landfill. This is accomplished by filling in 'lifts' and then adequately landscaping the lifts as they are completed."

"Mesh fencing is necessary around the landfill to prevent debris from blowing into surrounding areas."

Response:

We agree with your comment and have described such measures in the Revised EIS and in the Addendum to the Revised EIS.

Mr. Russell W. Alger
August 30, 1985
Page 3

Comment:

"3. Compacting Requirements:"

"As it is dumped, refuse should be compacted and covered with soil to a depth of not less than six inches. The compacting should be firm and comply with industry standards."

"When the surface of the fill is utilized as a temporary road base, the cover material should be compacted to a depth of not less than 12 inches."

Response:

We agree with your comments and these procedures and design provisions of the proposed project are described in the Revised EIS. In our existing operations, we have found that adding gravel, as needed, in addition to cover material as a temporary road base works well.

Comment:

"4. Drainage:"

"When a lift has been completed, cover material is then needed to a depth of not less than three feet. Proper grading, landscaping, and drainage is required to divert surface runoff and prevent erosion. Proper drainage facilities include the installation of interceptor ditches and siltation basins to collect runoff discharge."

Response:

In addition to six inches of daily cover (12 to 18 inches, in actual practice), completed areas of the landfill will receive a final cover layer of at least two feet of soil. Completed areas will be sloped to promote drainage and revegetated to prevent erosion. Drainage facilities and siltation basins will be incorporated into the design of the landfill as described in the REIS.

Comment:

"5. Methane Gas:"

"A collection system for methane gas should be installed to prevent gas from accumulating in unwanted areas."

Mr. Russell W. Alger
August 30, 1985
Page 4

Response:

As described in the Revised EIS, a methane gas monitoring system will be installed to detect lateral gas movement. Landfill buildings will be designed to vent gas and will be equipped with gas detection alarms.

Comment:

"6. Air Quality:"

"Frequent sprinkling during operations is necessary to control dust."

"7. Access:"

"Access to the landfill should be strictly controlled through entrance gates and close supervision of activities. Fencing is necessary to control unauthorized access."

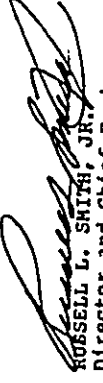
"Strict control of vehicles entering and leaving the landfill is necessary. No vehicles should be permitted to remain in the area after unloading."

Response:

We agree with your comments and these operational and maintenance procedures are described in the Revised EIS.

Your letter will be incorporated into the Final Addendum.

Very truly yours,


RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
430 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
First Hawaiian Bank President

R 85-842

W F FAX
11/85

First Hawaiian Bank

P.O. Box 3200
Honolulu, Hawaii 96847

July 23, 1985

DAVID W. BALLIE
Vice President
Bank Properties Department

Mr. Russell L. Smith, Jr.
Director and Chief Engineer
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Subject: Addendum to the Revised Environmental Impact Statement
for Proposed Leeward District Sanitary Landfill at
Waimanalo Gulch Site

Dear Mr. Smith:

We acknowledge with thanks your letter of July 19, 1985 with attached
EIS Addendum reference the above subject matter.

In response to your query, we wish to state that we do not have any
comments regards the proposed Waimanalo Gulch Landfill site. We are
pleased that the proposed Ohikilolo Landfill site located next to the Bank's
employee recreation facility has been deleted from the current proposed
site plan. Should the development of the Ohikilolo site become necessary,
we would like to be advised and we will be prepared to comment at that
time.

As requested, we are returning the Addendum, Leeward District Sanitary
Landfill.

Sincerely,

David W. Ballie
Vice President

DWB:jkh

Enclosure

August 15, 1985

Mr. David W. Ballie
Vice President
First Hawaiian Bank
P.O. Box 3200
Honolulu, Hawaii 96847

Dear Mr. Ballie:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review and comments regarding the document.
Should development of the Ohikilolo site become necessary, First
Hawaiian Bank will be advised and consulted.

Your letter will be incorporated into the Final Addendum.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization



ASSOCIATES, INC. ENVIRONMENTAL ENGINEERING CONSULTANTS,
 745 First Street, Suite 610 - Honolulu, Hawaii 96813 - Telephone: (808) 521-4711

July 29, 1985

Department of Land Utilization
 City and County of Honolulu
 650 South King Street, 7th Floor
 Honolulu, Hawaii 96813

SUBJECT: Addendum to the Revised Environmental Impact
 Statement (EIS) for the Proposed Leeward District
 Sanitary Landfill at Waimanalo Gulch Site
 (TMK: 9-2-03: 2, 13, 40) and Ohikilolo Site
 (TMK: 8-3-01)

GMP acknowledges receipt of the City's letter of July 19,
 1985 and has no comment on the subject Addendum.

Respectfully,

GMP ASSOCIATES, INC.

Wayne Mitter

Wayne Mitter
 Senior Engineer

WM/nh

cc: Department of Public Works

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
 650 SOUTH KING STREET
 HONOLULU, HAWAII 96813



OFFICE FAX
 51000

RUSSELL L. SMITH JR.
 DIRECTOR AND CHIEF ENGINEER

R 85-834-1184P

August 12, 1985

Mr. Wayne Mitter, Senior Engineer
 GMP Associates, Inc.
 745 Fort Street, Suite 610
 Honolulu, Hawaii 96813

Dear Mr. Mitter:

Subject: Leeward District Sanitary Landfill
 Addendum to Revised Environmental
 Impact Statement

We appreciate your review of the document. Your letter will be
 incorporated into the Final Addendum.

Very truly yours,

Russell L. Smith, Jr.
 RUSSELL L. SMITH, JR.
 Director and Chief Engineer

cc: Department of Land Utilization

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET
HONOLULU, HAWAII 96813



RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

R 85-842

August 28, 1985

FRANK P. FAU
1911

1911 Keeaumoku Street
Honolulu, Hawaii 96822

Mr. Russell L. Smith, Jr.
Director and Chief Engineer
Deputy of Land Utilization
City and County of Honolulu
630 South King Street
7th Floor
Honolulu, Hawaii 96813

Dear Mr. Smith:

With reference to your letter dated July 19, 1985, please be advised that myself and my family are strongly opposed to the Leeward District Sanitary Landfill project which contemplates the acquisition of portions of our property and ask that the project be located elsewhere.

Very truly yours,

ROBERT W.K. AU

Mr. Robert E.K. Au
1911 Keeaumoku Street
Honolulu, Hawaii 96822

Dear Mr. Au:

Subject: Leeward District Sanitary Landfill
Addendum to Revised Environmental
Impact Statement

We appreciate your review of the document. Your opposition to the siting of the proposed project has been noted. Your letter will be incorporated into the Final Addendum.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Department of Land Utilization

Appendices

Appendix I

APPENDIX I

Disposal at sea essentially is prohibitive for the reasons stated under the following headings A, B and C. These excerpts are from "Environmental Protection Agency Ocean Dumping Regulations and Criteria, 40 CFR 220-225, 227-229" and illustrate that ocean disposal is not a viable alternative to landfilling:

A. Obtaining a permit in any of the permit categories is unlikely (220.3) due to the following excerpted clauses:

1. "General Permits. General permits may be issued for the dumping of certain materials which will have a minimal adverse environmental impact and are generally disposed of in small quantities, or for specific classes of materials that must be disposed of in emergency situations. . . . "

2. "Special Permits. Special permits may be issued for the dumping of materials which satisfy the criteria and shall specify an expiration date no later than three years from the date of issue."

3. "Emergency Permits. refers to situations requiring action with a marked degree of urgency, but is not limited in its application to circumstances requiring immediate action. . . . "

4. "Interim Permits. No interim permit will be granted for the dumping of waste from a facility which has not previously dumped wastes in the ocean, from a new facility, or for the dumping of an increased amount of waste from the expansion or modification of an existing facility after the effective date of these regulations (except when the facility is operated by a municipality now dumping such wastes)."

5. "Research Permits. Research permits shall specify an expiration date no later than 18 months from the date of issue." [The proposed sanitary landfill project would not qualify as a research project.]

6. "Permits for Incineration at Sea. will be issued only as research permits or as interim permits until specific criteria to regulate this type of disposal are promulgated,"

B. Municipal refuse would have to be containerized to fulfill requirements before deposition. Even with containerization, however, the studies required to guarantee the stipulations of the approval would be prohibitive:

"227.11 Containerized Wastes.

(a) Wastes containerized solely for transport to the dumping site and expected to rupture or leak on impact or shortly thereafter must meet the appropriate requirements of 227.6, 227.7, 227.8, 227.9 and 227.10.

(b) Other containerized wastes will be approved for dumping only under the following conditions:

(1) The materials to be disposed of decay, decompose or radiodecay to environmentally innocuous materials within the life expectancy of the containers and/or their inert matrix; and

(2) Materials to be dumped are present in such quantities and are of such nature that only short-term localized adverse effects will occur should the containers rupture at any time; and

(3) Containers are dumped at depths and locations where they will cause no threat to navigation, fishing, shorelines, or beaches."

C. "227.15 Factors Considered" also would make ocean disposal prohibitive since sanitary landfilling is an appropriate alternative to ocean dumping:

"The need for dumping will be determined by evaluation of the following factors:

(a) Degree of treatment useful and feasible for the waste to be dumped, and whether or not the waste material has been or will be treated to this degree before dumping;

(b) Raw materials and manufacturing or other processes resulting in the waste, and whether or not these materials or processes are essential to the provision of the applicant's goods or services, or if other less polluting materials or processes could be used;

(c) The relative environmental risks, impact and cost for ocean dumping as opposed to other feasible alternatives including but not limited to:

- (1) Landfill;
- (2) Well injection;
- (3) Incineration;
- (4) Spread of material over open ground;
- (5) Recycling of material for reuse;
- (6) Additional biological, chemical, or physical treatment of intermediate or final waste streams;
- (7) Storage.

(d) Irreversible or irretrievable consequences of the use of alternatives to ocean dumping."

Appendix II

APPENDIX II

Presented below, in full, are the criteria used to select and evaluate all of the potential sanitary landfill sites in the 1977 Inventory Study and the 1979 Supplemental Study.

SITE SELECTION AND EVALUATION CRITERIA

In this study, the selection and evaluation of landfill sites were based primarily on the following criteria, not necessarily listed in order of importance:

Capacity: Each potential site must have sufficient volume to make it worthwhile, since opening a new landfill involves major capital cost. Capacity is a very important factor in landfill development economics. Desirable minimum capacity should provide for approximately 5 years life based on 500 tons/day of refuse.

Access to Adequate Roads: Any major landfill operation will attract additional traffic to the roadways in the area and an adequate, modern highway is needed to prevent excessive congestion and hazards. Site should be within 2,000 feet of an adequate main highway.

Availability of Utilities: All major landfill sites will need power, communication, sanitary and water systems for proper operation. The immediate availability of these utilities can be a major factor in the evaluation of the site.

Proximity in Incompatible Land Uses: A landfill operation is a nuisance type activity, similar to heavy construction work, and most land uses would conflict with it. Generally, a buffer area with landscaping is needed to isolate the landfill if its location is not in low land use areas or is not remote.

Pollution and Ground and Surface Water: A landfill can produce leachates and silt. Our potable ground water supply sources must be protected from leachates and our surface water needs protection from siltation. The protection of our potable ground water supply is absolute.

Availability of Cover Material: Cover material is an important ingredient in a sanitary landfill. Without it, an ordinary dump exists. The economic availability of this cover material can be decisive. When cover material must be imported, the cost, depending on the location, of the landfill site can vary from \$1.50 to \$5.00 per ton.

Travel Distance: When conditions permit, landfill sites should be located close to the refuse generation centers. Hauling is an important factor in the economic operation of a landfill.

General Nuisance: A landfill operation will cause noise, dust, litter, odor and other nuisances. Unless these nuisances are properly provided for, the site should be remote. Wind direction is a factor. This item relateds directly to "Proximity to Incompatible Land Uses" and to "Travel Distance."

Existing Land Use: The existing land use of sites should be low or open so as not to be objectionable to owners and interested groups.

Final Land Use of Landfill: The final land use after the landfill operation should be of equal or higher use than at present and should be compatible with the surrounding land uses. This item relates directly to "Existing Land Use."

Zoning, City General Plan and State Land Use District: An active landfill may operate for an extended time and could affect the overall growth plan of the island. This item relates directly to land acquisition cost, the overall general plan of the island and to "Existing Land Use" and to "Final Land Use of Landfill."

Geology: The geology of the site must be considered to protect the ground water supply and to determine the amount of cover material available. This item relates directly to "Pollution of Ground and Surface Water" and "Availability of Cover Material." It must be studied in greater detail in the environmental impact statement stage.

Drainage: On and off site drainage systems are required to minimize the generation of leachates and silt and for protection against floods. Gullies with large drainage basins behind them present major drainage problems and costs.

Topography: The topography of the site determines the capacity and a substantial portion of the development cost. It also determines the visual impact of the site. Generally, gullies, swamps and low lying areas are desirable sites.

Objection by Landowners, Adjacent Landowners, Public and Community Organizations, etc.: This item can be an important factor, as the City's need for additional landfill space is becoming critical. Protests by owners or interested groups can cause major delays and produce a crisis situation, but should not be the major consideration in the landfill site selection process.

Destruction of Natural Resources: Our natural resources must be protected from irreparable damages as much as possible while providing suitable landfill sites for the general welfare of the public.

Other Environmental Factors, Including Displacement, Historical and Archaeological Sites, and Flora and Fauna: Historical and archaeological significance and flora and fauna of the sites must be studied. Also visual pollution and displacement of persons and businesses must be considered. This item must be studied further in the environmental impact statement stage.

Safety: Site must have safe access and must not present any hazard to the public or to property. Site must be able to meet State Department of Health requirements, Public Health Regulations, Chapter 46, Solid Waste Management Control.

Major Development Costs: These costs are generally related to most of the items previously discussed. These costs can become prohibitive when:

- Leachate abatement measures are required.
- New access to site must be constructed to an adequate roadway.
- Utilities are not available nearby and must be brought in from remote sources.
- Cover material is not available on site or nearby and must be hauled in from afar and stored.
- Land is zoned for high uses such as residential of higher, or when land is in use.

Although this tabulation lists nineteen items as the criteria, each site was only required to have the following essential basic characteristics before being considered for further evaluation as a potential landfill site:

1. Adequate capacity.
2. Adequate protection of our ground water supply.
3. No apparent significant environmental damage to the land, air, ocean or population.
4. Apparent economical feasibility.

To rank the sites, all of the nineteen criteria were considered in total. Due to some of the criteria not lending themselves to measurement, an attempt to obtain objectivity was made by placing weighted subjective values on the criteria.

LANDFILL LIFE COMPUTATION CRITERIA: For this study, the computations for capacity and life of the landfill were based on the following:

- theoretical refuse disposal rate of 500 tons/day*
- compacted refuse density of 1,000 pounds/cubic yard
- refuse to earth cover ratio of 3:1
- 365 days/year*

- * Computations for the REIS and this Addendum are based on:
 - theoretical refuse disposal rate of 1000 tons/day
 - 312 working days/year (6-day work week)

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