

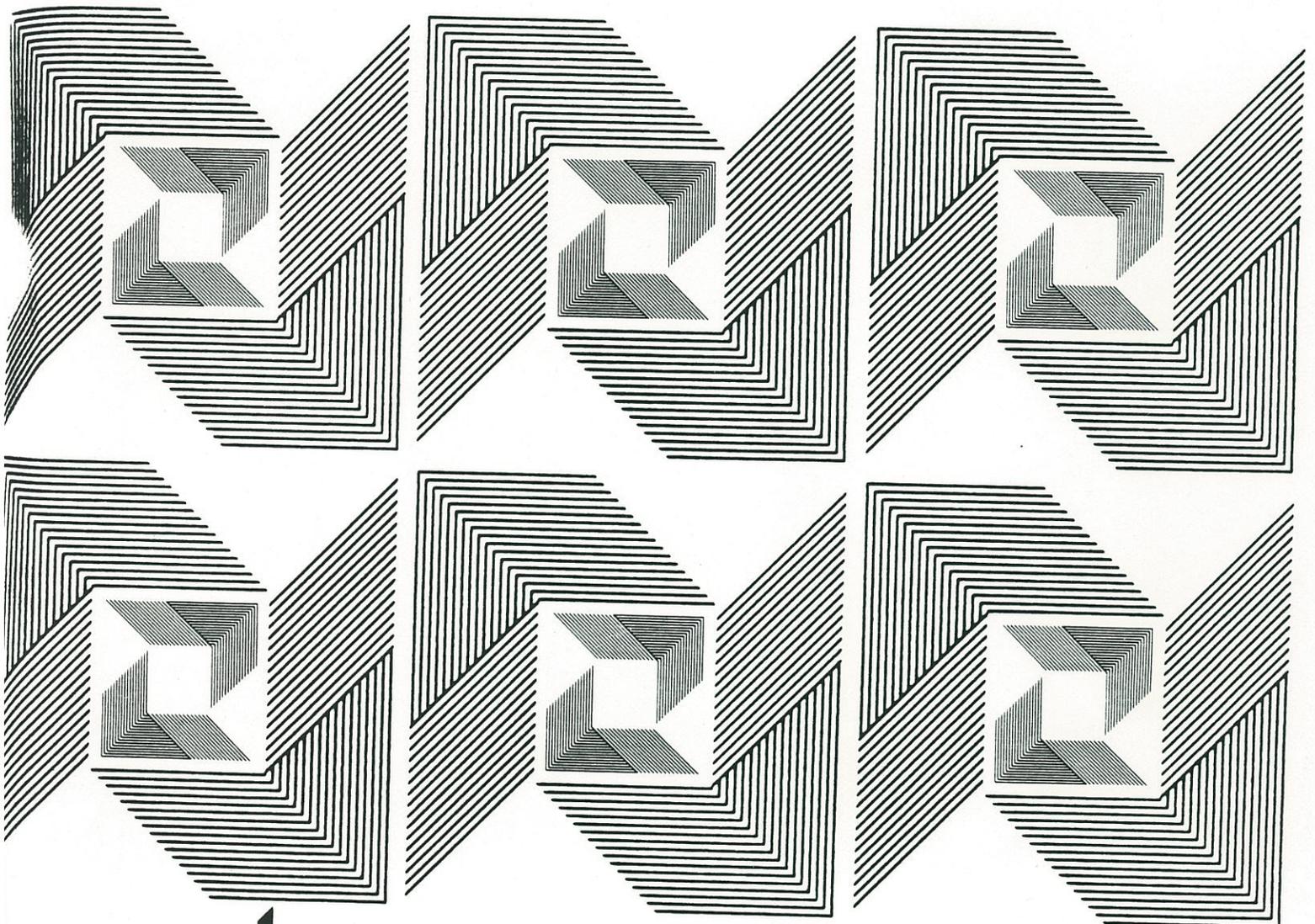
REPORT NO. 87-17

AUGUST 1987

STUDY OF SITES FOR A STATE VETERANS CEMETERY

CONDUCTED BY R. M. TOWILL CORPORATION

A REPORT TO THE LEGISLATURE OF THE STATE OF HAWAII



SUBMITTED BY THE LEGISLATIVE AUDITOR OF THE STATE OF HAWAII

**STUDY OF SITES
FOR A STATE VETERANS CEMETERY**

**Conducted by
R. M. Towill Corporation**

A Report to the Legislature of the State of Hawaii

**Submitted by the
Legislative Auditor of the State of Hawaii
Honolulu, Hawaii**

Report No. 87-17

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FOREWORD

With the adoption in the 1987 legislative session of Senate Concurrent Resolution No. 13, S.D.1, H.D.1, the Hawaii State Legislature requested that the Office of the Legislative Auditor conduct an assessment of suitable land sites on Oahu appropriate for developing a state veterans cemetery.

There are currently about 100,000 veterans living in Hawaii. Many of these veterans and their dependents are eligible for burial at Punchbowl, the National Memorial Cemetery of the Pacific. However, Punchbowl is quickly reaching its capacity for burials and, under existing federal policy, no new national cemeteries will be authorized for Hawaii. Other than Punchbowl, the closest regional national cemetery is at Riverside, California.

To provide the professional and technical capability to conduct the assessment, the Office of the Legislative Auditor engaged the services of R. M. Towill Corporation. The consultant assessed the suitability of selected sites for a state veterans cemetery and prepared a comparative analysis of the advantages and disadvantages of each of the sites.

We join R. M. Towill Corporation in expressing our appreciation to the many individuals, in government as well as in the private sector, who cooperated in this study. We extend our thanks especially to Mr. William E. Rodgers, Jr., the Administrator of the National Memorial Cemetery of the Pacific.

Clinton T. Tanimura
Legislative Auditor
State of Hawaii

August 1987

STUDY OF SITES FOR A
STATE VETERANS CEMETERY

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PART I: INTRODUCTION

HISTORICAL OVERVIEW

The National Memorial Cemetery of the Pacific (Punchbowl) began operations in 1949. Since that time over 32,500 veterans and dependents have been interred there. As of June 1987, Punchbowl had 939 gravesites available for casket burials. If current trends continue, gravesites for casket burials will be depleted by December 1988; niches for cremated remains in columbariums are expected to last for 20 years.

Testimony at public hearings conducted during the 1987 legislative session indicated that there are currently about 100,000 veterans living in Hawaii; many of whom are eligible for burial at Punchbowl or other national cemeteries. Under existing federal policy, however, no new national cemeteries will be authorized. When available burial space is depleted at Punchbowl, Hawaii veterans will either have to be buried at regional national cemeteries on the mainland, the closest of which are at Riverside, California, or Willamette, Oregon, or at a private cemetery at their personal expense.

In lieu of developing new national cemeteries, the federal government has a program of grants-in-aid for states to establish, expand, and improve veterans cemeteries. Under the Veterans Housing Benefits Act of 1978, Public Law 95-476, the State Cemetery Grants Program authorizes the Veterans Administration to provide matching funds to states to establish veterans cemeteries. Hawaii is eligible for 20 percent of the funds currently available for the grants-in-aid program, approximately \$1.5 million out of a total \$7.8 million available. Approximately \$5 million of this available funding is scheduled to lapse by September 30, 1987.

A proposal for a state veterans cemetery was endorsed and approved by various veterans organizations in the state of Hawaii; the Hawaii State Veterans Affairs Advisory Council in its report to former Governor Ariyoshi in 1985, designated it as a first priority project. Based on this interest and support and the scheduled lapsing of federal funds, the 1987 Hawaii State Legislature adopted a concurrent resolution (S.C.R. No. 13, S.D.1, H.D.1) requesting that the Office of the Legislative Auditor, in consultation with the Department of Land and Natural Resources, conduct an assessment of suitable land sites on Oahu appropriate for the development of a state veterans cemetery. The resolution also requested that a report of the site assessment findings be provided to the President of the Hawaii State Senate and the Speaker of the Hawaii State House of Representatives on or before August 15, 1987.

The purpose of this site assessment report is to fulfill the requirements of the Senate Concurrent Resolution. The objectives of the site assessment analysis are set forth in the following section.

STUDY OBJECTIVES

1. To determine the adequacy, suitability, and appropriateness of various land sites on Oahu for the development of a state veterans cemetery based on standards specified by the Veterans Administration.

2. To determine and identify any special geographical, environmental, social/cultural, or legal problems or barriers that might affect the suitability of these land sites for use as a state veterans cemetery.
3. To analyze and compare, from the standpoint of appropriate criteria, the sites determined to be adequate, suitable, and appropriate for use as a state veterans cemetery.

ORGANIZATION OF THE REPORT

The report that follows is organized in the following manner:

Part II: Describes the methodology for determining minimum acreage requirements for a state veterans cemetery; sets forth the criteria used to evaluate alternative sites; and describes the process used to identify and select potential sites for consideration.

Part III: Presents a description of each of four candidate sites selected for detailed evaluation; sets forth the specific advantages and disadvantages of each site; and evaluates each as to its suitability for a state veterans cemetery.

Part IV: Presents a comparison and evaluation of the four sites and recommends the most suitable site.

PART II: SITE EVALUATION AND SELECTION PROCESS

DETERMINATION OF ACREAGE REQUIREMENTS

A minimum acreage requirement of 80-100 acres was used for preliminary site selection based on the following considerations. In its requirements for approval of State Cemetery Grants, the Veterans Administration Department of Memorial Affairs (VAMA) requires that selected sites contain sufficient acreage to meet a projected 20-year need for gravesites. Key factors in determining this potential need include: (1) the estimated number of veteran deaths projected for a 20-year period; (2) estimates of the proportion of veterans and dependents who would request interment at a state veterans cemetery; and (3) the expected ratio of casket burials to inurnments (cremation).

Estimated Number of Veteran Deaths in Hawaii

The expected number of veteran deaths in the State of Hawaii over a 20-year time period was calculated by the Veterans Administration Research Division, Office of Information Management and Statistics, using a detailed demographic model which utilized mortality rates from the U.S. Census Bureau. According to projections of the model, an estimated 43,910 Hawaii veterans will die during the 20-year period from 1989 to 2008.

Estimates of Expected Interments at the Proposed State Veterans Cemetery

According to estimates from the Veterans Administration, total veteran deaths in Hawaii averaged 1,175 per year between 1980 and 1985. During these same years, the average annual number of veteran burials at Punchbowl was 505. This indicates that roughly 43 percent of the veterans who died during the first half of the 1980s chose to be buried at the National Cemetery of the Pacific. During that time period, the number of dependent burials has remained generally constant, ranging from 41 to 45 percent of annual veteran burials at Punchbowl.

Expected Ratio of Casket Burials to Inurnments

Since 1949, a total of 87 percent of the interments at Punchbowl Cemetery were casket burials. Since the mid-1970s, however, the percentage of casket burials has decreased from 71 percent to 54 percent of the total interments at the cemetery. One factor that may be affecting the proportion of casket burials at Punchbowl is the number of out-of-state veterans buried there and the relatively high cost of transporting caskets from the mainland compared with the much lower cost of transporting ashes. For example, at a privately-owned cemetery on Oahu the proportion of casket burials to total interments is approximately 80 percent.

Estimates of Acreage Required

To determine the acreage necessary to accommodate the potential need, the VAMA guidelines specify 600 gravesites per acre. The guidelines also state that the acreage required for gravesites may be only 50 percent of the total acreage to be used for a cemetery. An additional 50 percent is to be available for support facilities such as administration buildings, chapel, etc. These guidelines were used to develop a range of acreage requirements under a high alternative scenario and a

low-alternative scenario. Table 1 presents a summary of estimates under the two scenarios.

High Alternative Scenario. A high scenario for the period 1989 to 2008 was developed based on the following assumptions which were derived from the preceding information: (1) that 43,910 or 100 percent of the Hawaii veterans who die during the period will want to be buried at the proposed cemetery; (2) that an additional 19,760 or 45 percent will be added to the yearly total of estimated veteran burials to account for dependent burials; and (3) that between 50 to 80 percent of the future interments will be casket burials.

The total number of casket burials for the 20-year period from 1989 to 2008 calculated under this scenario using 50% casket burials would be 31,835. Increasing the proportion of casket burials to 80 percent of the total, results in an estimate of 50,936 casket burials during this time period. Using a ratio of 600 gravesites per acre, the land area required for casket burials under this scenario would range from 53 to 85 acres. Following the VAMA guidelines that 50 percent of the land area be devoted to burial sites and 50 percent to support facilities, the acreage required to satisfy the burial needs of the veterans community for the next 20 years would range between 106 and 170 acres.

Low Alternative Scenario. Based on experience at the National Cemetery of the Pacific, the low scenario assumes that only 50 percent of the veterans who die during the 20-year time period would be buried at the state veterans cemetery. Assuming a 45 percent factor for dependents and a 50 percent rate of casket burials, the total number of casket burials for the 20-year period from 1989 to 2008 calculated under this scenario would be 15,918. Increasing the proportion of casket burials to 80 percent of the total, results in an estimate of 25,468 casket burials during this time period. Using a ratio of 600 gravesites per acre, the land area required for casket burials under this scenario would range from 27 to 43 acres. Following the VAMA guidelines that 50 percent of the site be devoted to burial sites and 50 percent to support facilities, the acreage required to satisfy the burial needs of the veterans' community for the next 20 years would range between 54 and 86 acres.

EVALUATION CRITERIA

The criteria described in this section were used in evaluating potential sites for a state veterans cemetery. Particular emphasis was placed on conforming to the general standards for site selection and construction of state veterans cemeteries set forth in Appendix B of "Application Procedures and VA Requirements For State Cemetery Grants" (VAMA, 1981).

Veterans Administration Standards

The Veterans Administration requires states to conform to the following criteria in applying for a cemetery grant:

Location. The land should be located as closely as possible to the densest veteran population in the area under consideration.

TABLE 1
ESTIMATES OF ACREAGE REQUIREMENTS

	Scenarios	
	High Alternative (100% veteran burials)	Low Alternative (50% veteran burials)
Total no. veteran deaths 1989-2009	43,910	43,910
No. wishing burial	43,910 (100%)	21,955 (50%)
45% dependents	19,760	9,880
Total estimated burials	63,670	31,835
No. if 50% in casket	31,835	15,918
No. of acres needed (600 graves per acre)	53	27
No. if 80% in casket	50,936	25,468
No. acres needed	85	43
Range of acres for gravesites	53-85	27-43
Add equal no. acres for support facilities	53-85	27-43
Total acreage required	106-170	54-86

Size. Sufficient acreage should be available to provide gravesites (estimated at 600 per acre based on VAMA guidelines) for estimated needs for at least 20 years. Acreage could vary depending on the state veteran population and national cemetery availability.

Accessibility. The site should be readily accessible by highway or public transportation.

Topography. The land should range from comparatively level to rolling and moderately hilly terrain. Natural rugged contours are suitable only if development and maintenance costs would not be excessive and burial areas would be accessible to elderly or infirm visitors.

Water Table. The water table should be lower than the maximum proposed depth of burial.

Soil Requirement. The soil should be free from rock, muck, quicksand, and other materials that would hamper the economical excavation of graves by normal methods. In general, the soil should meet the standards of good agricultural land that is capable of supporting lawns, shrubs, and trees, with normal care and without the addition of topsoil.

Utilities. Electricity and/or gas should be available (if required).

Water Supply. An adequate supply of water should be available.

Sanitary Sewer. An approved means to dispose of storm flow and sewage from the facility should be available.

Additional Site Suitability Standards

Review of testimony at public hearings and discussions with state and federal agency personnel identified additional factors that were considered to be important in evaluating the the suitability and appropriateness of potential sites. These criteria include:

Ownership of Site. State ownership of the land was considered preferable in order to avoid the cost of acquisition and the sometimes lengthy process of condemnation. The value of state land can also be included in computing the state's contribution in applying for the State Cemetery Grant Program.

Existing Land Use. Currently vacant, unencumbered land or land in agricultural use, where withdrawal from production could be accomplished with minimum impact to the owner or lessee, was preferred.

Land Use Controls. Sites located within the State Urban or Agricultural Districts were considered preferable to those within the Conservation District.

Expansibility. Sites with adjacent undeveloped land suitable for cemetery expansion were considered preferable to accommodate the long-term needs of the state and uncertainty of demand for burial sites at a state veterans cemetery (and thus the actual acreage requirements).

Aesthetics. Preference was expressed for sites with exceptional visual qualities that were not located adjacent to potential industrial or noncompatible activities.

Drainage. Sites outside of flood plains that did not require extensive drainage improvements were considered preferable.

SELECTION PROCESS

The process leading to a final list of potential sites for the proposed cemetery involved a number of steps. The following sections provide an overview of this process.

Sites Identified During Public Hearings

Testimony during public hearings conducted in the spring of 1987 identified several sites that were considered to have potential as a location for a veterans cemetery. These included: (1) land owned by Castle and Cooke in Central Oahu near the existing Mililani Memorial Park Cemetery; (2) state and privately-owned lands located in Kaneohe, adjacent to the existing Hawaiian Memorial Park Cemetery; and (3) Diamond Head crater. Because these sites were identified in testimony on the resolution to conduct a site assessment study, it was decided to include them in the evaluation process.

Federal Lands

In order to identify other lands potentially suitable for cemetery development, the Real Estate Sales Office of the General Services Administration in San Francisco was contacted concerning surplus federal lands on Oahu. The consultant team was informed that a recent review of lands by the military indicated a shortage of land for future housing needs, therefore, there are no surplus federal lands available on Oahu at the present time. In addition, a letter from Admiral Ronald J. Hays, Commander in Chief, U.S. Pacific Command to Senator James Wong (dated April 2, 1987) confirmed that there are no surplus federal lands on Oahu.

State Lands

The Land Management Division of the Hawaii State Department of Land and Natural Resources (DLNR) provided a list of all state-owned parcels on Oahu. This detailed list indicated the size, zoning, current use, and other pertinent information for each parcel.

From the list of parcels obtained from DLNR, sites that were described as vacant or were known to be relatively unencumbered by structures (parcels used for extensive agricultural uses such as pasture and plantation agriculture were considered suitable), and which had a minimum of 80 acres of land, were identified. This process resulted in a listing of approximately 25 parcels of state-owned property on Oahu which might be suitable for a state veterans cemetery.

Preliminary Evaluation of Identified Sites

Mr. Michael Elliot, Chief of the Technical Support Division of the Department of Memorial Affairs in Washington D.C., informed the consultant team that an

important criterion in VA evaluation of State Cemetery Grant applications is the location of a proposed cemetery site in relation to the number of veterans residing in the area. According to 1980 U.S. Census data, 50 percent of Oahu's veterans lived in the Central Honolulu area, 24 percent lived in Central Oahu (including Pearl City and Ewa Beach north to Wahiawa), and 11 percent in the Kaneohe-Kailua area on Windward Oahu. Based on the above concentrations of veterans residences, parcels located in Koolauloa (Kaaawa to Kahuku), North Shore, and Waianae districts were eliminated from further consideration.

A second criterion used to eliminate unsuitable sites during the preliminary evaluation was topography as it related to total developable area. Research at the City and County of Honolulu Tax Office and a review of topographic maps resulted in the elimination of several parcels in the Central Honolulu and Pearl City areas due to slope and overall size suitability.

The preliminary evaluation and elimination process resulted in the selection of nine sites that were to be analyzed in further detail. These included the three initial sites, plus six sites identified in the review process.

Secondary Review of Potential Sites

More detailed information concerning the remaining nine sites was obtained. This process involved: (1) phone calls to appropriate individuals in order to more fully document the existing and/or potential use of identified sites; (2) field trips to personally observe conditions at each site; and (3) additional review of topographic maps to verify specific site characteristics.

Five sites were eliminated from further consideration as a result of this process because of such factors as unsuitable slope conditions, noncompatible uses or inadequate space.

Selection of Four Candidate Sites

The secondary review process resulted in the selection of four candidate sites as potential cemetery locations. These four sites are:

Diamond Head - TMK 3-1-42:06;

Kaneohe - TMK 4-5-33:01 and 4-5-33:02;

Mililani - TMK 9-4-06:10 and 9-6-04:21, and;

Kunia - TMK 9-4-12:02.

The locations of the four sites are shown in Figure 1. Each of the above sites is described in detail in Part III of this report.

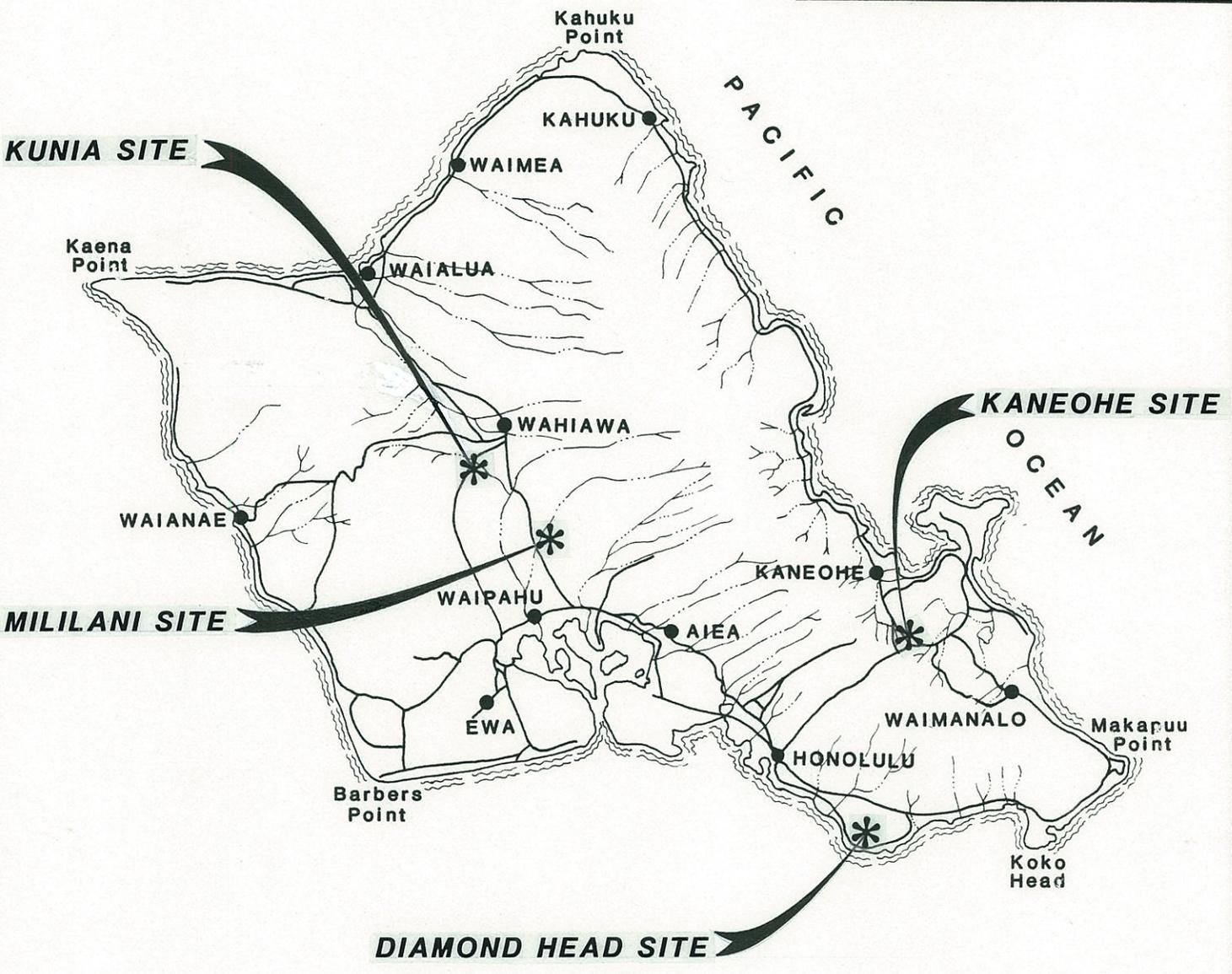
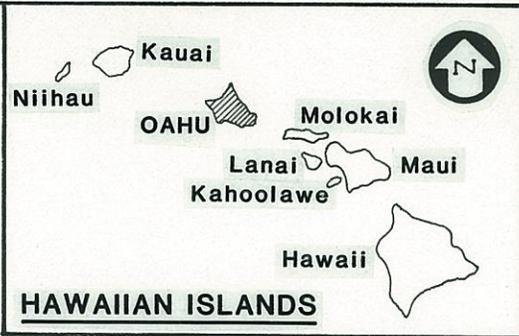
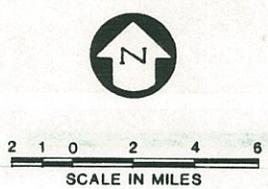


FIGURE 1

CANDIDATE LOCATIONS
State Veterans Cemetery Study



PART III: CANDIDATE SITE ANALYSIS

DIAMOND HEAD CRATER (Figure 2)

Description

Diamond Head (TMK 3-1-42:06) is a natural volcanic crater located in Central Honolulu at the edge of Waikiki. Table 2 summarizes selected information about the suitability of Diamond Head as a site for a state veterans cemetery based on the standards and criteria described in Part II of this report.

There are an estimated 150+ acres of unused land within the caldera that would be suitable for cemetery development. The available acreage would be sufficient to meet land requirements well beyond the required 20-year time frame.

Slopes within the crater range from 2 to 12 percent. Soils are primarily a sticky clay that is difficult to excavate; significant rock outcrops cover some areas. A filled area of approximately five acres, located in the center of the 150 vacant acres, is frequently subject to sink holes. Drainage within the crater is slow because of the relatively impervious clay soils; at times of heavy rain, a pump operated by the military is required to drain the crater floor and pump the excess water out of the caldera.

The primary access to the crater floor within Diamond Head is through a single 20-foot wide tunnel. Traffic through this tunnel is often impeded by large military vehicles.

Electricity and county water and sewer service are available in Diamond Head. The water and sewer lines are old and barely adequate to meet current needs.

Diamond Head, which is owned by the state, would provide a setting similar to the existing National Cemetery at Punchbowl. Because of its scenic importance, Diamond Head is listed as a national, state, and county historical site.

Advantages and Disadvantages of the Site

Advantages. There are two major advantages to locating the proposed cemetery at the Diamond Head Site; they are:

- o Location. The major advantage of Diamond Head Crater as a veterans cemetery is its location within the central Honolulu area where an estimated 50 percent of the veterans living on Oahu reside.
- o Aesthetics. Punchbowl has provided a dramatic and unique setting for veterans burials during the past 40 years; a cemetery within Diamond Head would be similar in character.

Disadvantages. There are three major disadvantages to the Diamond Head site; they are:

- o Characteristics of the soils. Excavation would be very difficult because of the sticky and plastic nature of the clay and the numerous rock outcrops.

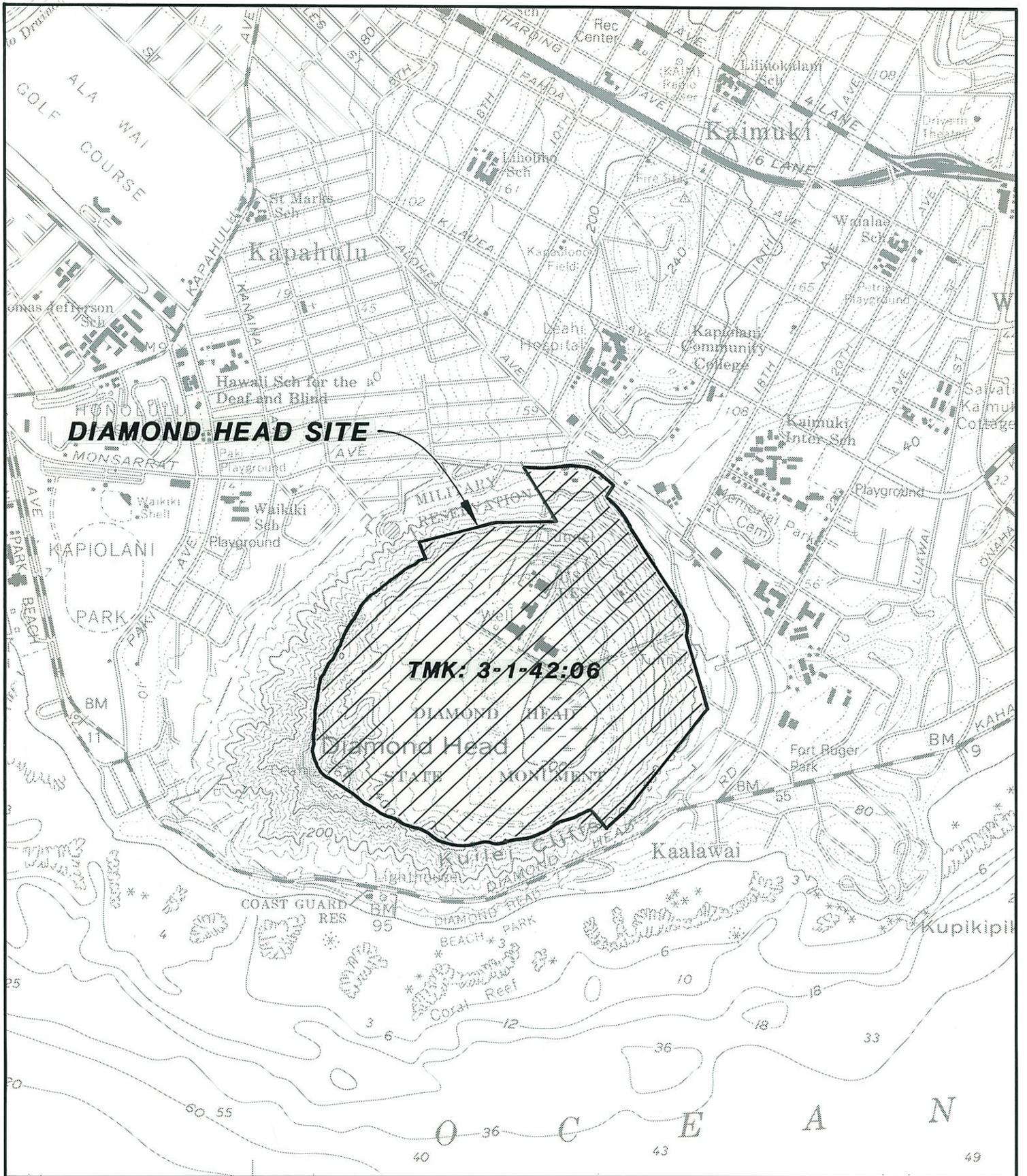


FIGURE 2

DIAMOND HEAD CRATER

State Veterans Cemetery Study



1500 1000 500 0 1500



SCALE IN FEET

Table 2
 SITE DESCRIPTION
 DIAMOND HEAD: TMK: 3-1-42:06

LOCATION	SIZE	ACCESSIBILITY	TOPOGRAPHY
Central Honolulu, just outside of Waikiki.	150 acs.+ suitable for cemetery development; sufficient to meet requirements for 20 year planning period.	Readily accessible via public streets; public transportation is available to the entrance of the crater.	Crater floor has slopes ranging from 2% to 12%; half of area is less than 6%.
WATER TABLE	SOIL REQUIREMENTS	ELECTRIC POWER	WATER SUPPLY
Underlying water perched on impervious strata which serves as caprock; depth to water table appears to be adequate according to Soil Conservation Service data.	Primarily Makalapa clay series; sticky and plastic and difficult to work; shrink-swell potential high; crack widely on drying; permeability and runoff slow; about 5 acs. in crater consist of land fill materials which cause sink holes.	Electricity is available to the site.	A single 2-in. line serves the interior of crater; shortages occur due to inadequate size and low head pressure; water for irrigation limited.
SANITATION	EXPANSIBILITY	OWNERSHIP OF SITE	EXISTING LAND USE
Served by single 4 in. line through the main tunnel; old but adequate for present use.	No potential once land inside crater used.	State of Hawaii	Inside the crater existing activities include the FAA primary control center & the headquarters of the State DOD; outside residential, cemetery, parks, and some commercial uses.
AESTHETICS	DRAINAGE	LAND USE CONTROLS	SPECIAL ISSUES
Would provide setting similar to Punchbowl; would alter the natural state of much of the crater floor.	Pumps in the crater floor are required during times of heavy rainfall; collected storm-water is pumped out through the tunnel.	National Landmark site; State Monument; Conservation Dist.; C & C Historic, Cultural and Scenic District #2; Special Management Area; Special Design District.	Potential opposition; single tunnel access.

Drainage would be a serious problem due to the slow permeability of the soils.

- o Access. The narrow access through a single tunnel could become a significant bottleneck as increased traffic from funeral processions and cemetery visitors competes with existing vehicular traffic generated by the Federal Aviation Administration, Department of Defense (DOD) and the State Park.
- o Land use controls applicable to the site. The unused acres within Diamond Head are under executive order to the DOD. It is unknown whether or not the DOD has future plans for their use. In addition, as shown in Table 2, Diamond Head is protected and regulated through a variety of national, state, and county designations. There are also several community and/or preservation groups that would oppose any development that would change the natural character of the crater.

Evaluation

According to discussions with individuals at the Veterans Administration Department of Memorial Affairs in Washington D.C., two of the disadvantages listed above--soil conditions and land use controls--are significant factors in the VA review of potential cemetery sites. Excavation may not be economical since soil conditions in the crater floor would very likely require other than normal methods, thus increasing costs. From past experience, areas of historical significance will take longer to develop due to the number and type of approvals that must be obtained. These two major disadvantages, coupled with the serious access problem, discourage consideration of Diamond Head Crater as a site for a veterans cemetery.

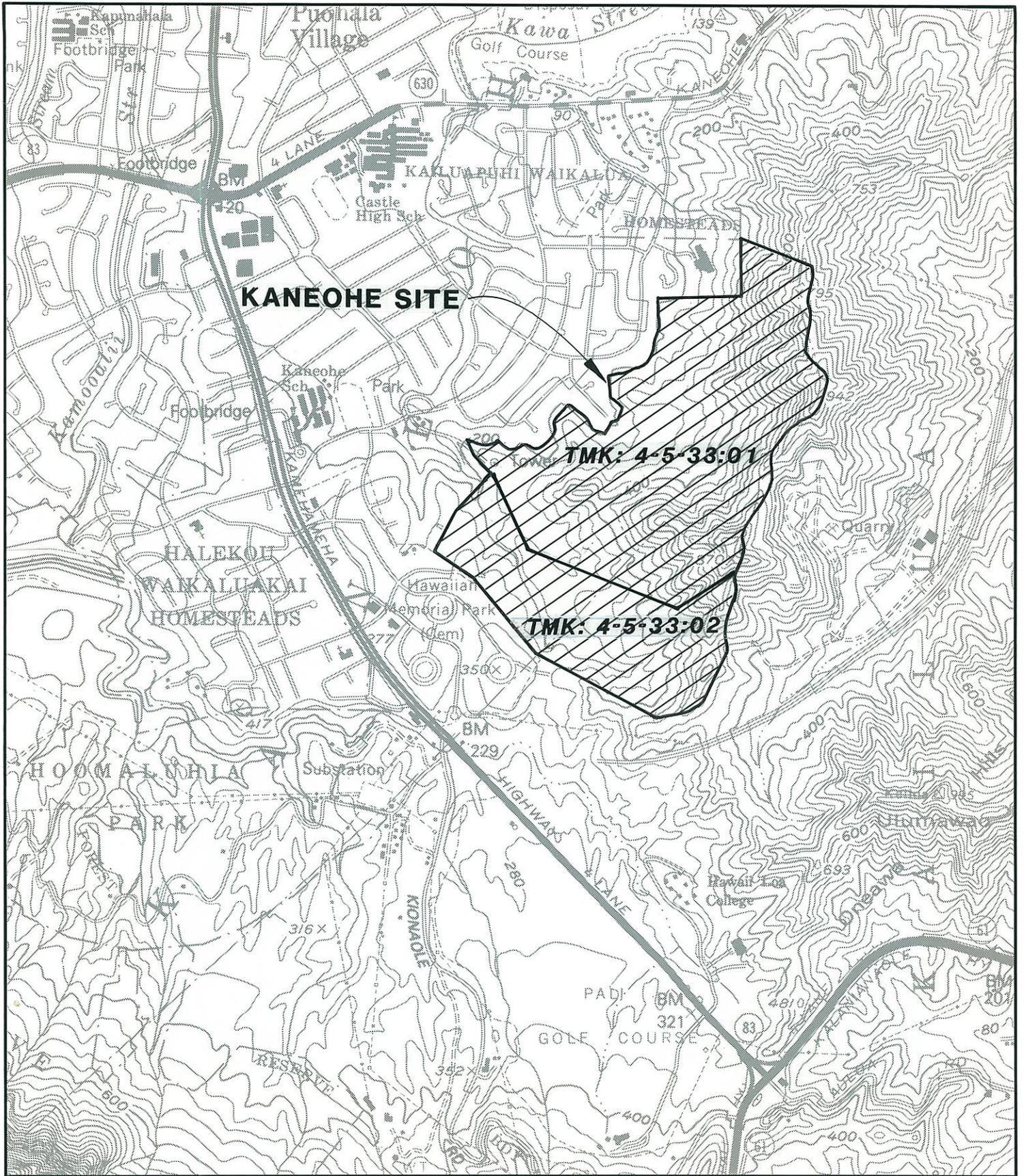
KANEOHE AREA ADJACENT TO HAWAIIAN MEMORIAL PARK (Figure 3)

Description

The two parcels of land in the Kaneohe area that were evaluated have a combined total area of 293 acres. They are located off of Kamehameha Highway between the Pali and Likelike Highways, behind the existing Hawaiian Memorial Park Cemetery. Parcel one, TMK 4-5-33:02, which is owned by the State of Hawaii (Hawaii Housing Authority), encompasses approximately 89 acres. This parcel is located immediately adjacent to the existing cemetery. Parcel two, TMK 4-5-33:01, which is owned by Hawaiian Memorial Park, encompasses approximately 203 acres. This parcel is located behind the state-owned land.

Table 3 summarizes selected information about the suitability of the Kaneohe sites for a state veterans cemetery based on the standards and criteria described in Part II of this report.

Approximately 65 acres of the 89-acre state-owned parcel (Parcel one) have generally moderate slopes, ranging from 2 to 15 percent. Ninety acres of the 203-acre privately-owned parcel (Parcel two) have slopes of 15 percent or less. Based on the criterion of slope, approximately 155 acres of the combined parcels would be suitable for development as a state veterans cemetery. It is possible that the state-owned parcel could satisfy casket burial acreage requirements for a 20-year period, however, acquisition of additional land from Hawaiian Memorial Park would probably be required, at least in the long term.



1500 1000 500 0 1500

SCALE IN FEET

FIGURE 3

KANEHOE

State Veterans Cemetery Study

Table 3
SITE DESCRIPTION
KANEHOHE: TMK 4-5-33:01 and 4-5-33:02

LOCATION	SIZE	ACCESSIBILITY	TOPOGRAPHY
On Kam Hwy. in Kaneohe mid way between the Pali and Likelike Hwys; near the center of the Kaneohe-Kailua urban area; about 10 miles from central Honolulu; will be next to H-3 interchange if constructed.	Total of 293.21 acs. The private parcel has a total of 203 acs. The state parcel has a total of 89 acs. State parcel may satisfy 20 year acreage requirements, but additional land from the private parcel may be needed.	Readily accessible via public highways; public transportation is available along Kam Hwy.	About 65 acres of the State land has slopes ranging from 2% to 15%; the private parcel has an estimated 90 acres under 15% slope.
WATER TABLE	SOIL REQUIREMENTS	ELECTRIC POWER	WATER SUPPLY
Depth to water table appears to be adequate according to Soil Conservation Service data.	Various soil series, primarily silty clays; on slopes of 15% or less, permeability is moderately rapid; shrink swell potential is low to moderate; soil depths to 5+ feet.	Electricity is available off of Kam Hwy.	12-inch county line runs along Kam Hwy and services the existing cemetery site.
SANITATION	EXPANSIBILITY	OWNERSHIP OF SITE	EXISTING LAND USE
County sewer line runs along Kam Hwy and services existing cemetery operations.	State land is bounded by the existing Hawaiian Memorial Park Cemetery and vacant land also owned by HMP, by a steep ridge line, and by residential units; any expansion would require using vacant land currently owned by the HMP.	Hawaii Housing Authority (State of Hawaii) and Hawaiian Memorial Park Cemetery Association.	Both parcels are unused at present.
AESTHETICS	DRAINAGE	LAND USE CONTROLS	SPECIAL ISSUES
Site has panoramic view of Windward Oahu; site topography is varied and would provide for interesting layout of cemetery facilities.	The site is generally well drained.	State and county Ag zoning on state parcel; private parcel is zoned P-2.	Access; housing plans.

Soils on both parcels are primarily silty clays which are relatively free of rocks. The soils have moderately rapid permeability for good drainage and a low to moderate shrink swell potential which make them generally easy to excavate.

The only access to the potential sites would be through the existing cemetery. Electricity, water, sewer, and public transportation are all available along Kamehameha Highway. The state-owned parcel is zoned for agriculture and is currently unused. The privately-owned lands are zoned P-2, General Preservation District, by the City and County of Honolulu. Cemeteries are considered a principal use in P-2 Districts.

Advantages and Disadvantages of the Kaneohe Site

Advantages. There are three major advantages to the Kaneohe site; they are:

- o **Ownership.** One of the two parcels which make up the site is unused state land.
- o **Aesthetics.** The site has a varied topography which would provide for an interesting and attractive cemetery design. The state-owned parcel has dramatic views of the Koolau Mountains; the privately-owned parcel has both mountain and ocean views.
- o **Accessibility.** Because of its convenient location near Kamehameha Highway, a major thoroughfare, the site is easily accessible to the two trans-Koolau highways as well as to the areas north and south of Kaneohe along the Windward coast.

Disadvantages. Disadvantages of the Kaneohe site include:

- o **Access.** Access to the parcel from Kamehameha Highway is and will continue to be through the existing cemetery; arrangements will have to be made with Hawaiian Memorial Park for access rights; a veterans cemetery developed on the Kaneohe site would not be a "free-standing" entity of its own.
- o **Expansibility.** Under the high alternative scenario, the developable portions of the state-owned parcel would not be sufficient to satisfy the needs for veterans burials for the next twenty years. Acquisition of private lands at some future date would be subject to both the availability of the lands when they are needed and the availability of sufficient funds to acquire the lands at some appropriate time in the future.

Evaluation

With the exception of the disadvantages discussed above, based on the criteria set forth in Part II of this report, the Kaneohe site would be suitable for development as a state veterans cemetery.

PRIVATELY OWNED PARCELS AT MILILANI (Figure 4)

Description

The Mililani site, which consists of two parcels of land owned by Castle and Cooke, is located in Central Oahu about 2.5 miles north of the Waiawa interchange. Parcel one, TMK 9-4-06:10, which surrounds the existing Mililani Memorial Park Cemetery, contains 362 acres. Parcel two, TMK 9-6-04:21, consists of 73 acres of land located adjacent to the mauka boundary of the Parcel one. Total acreage for the two parcels of land is 435 acres, however, because the gulches that bisect the parcels leave some small unusable areas of land, approximately 190 acres could be considered suitable for cemetery development.

Table 4 summarizes selected information about the suitability of the Mililani site for a state veterans cemetery based on the standards and criteria described in Part II of this report.

The 190 acres of land within the developable area are primarily gently rolling with slopes less than eight percent. The soils are silty clays, which are easy to excavate and have good drainage characteristics. The entire site is currently in use for the production of pineapple.

Access to the site is via the existing road to the Mililani Memorial Cemetery. The primary development area is several hundred yards from this road along the unpaved access road to the Waiawa Correctional Facility. Electricity is available to the site; water and sewer lines, however, would have to be extended from the opposite side of the H-2 Freeway.

The lands comprising the proposed cemetery site have been designated agriculture by both the state and the county. The site has an excellent panoramic view of the Central Oahu region.

Advantages and Disadvantages of the Site

Advantages. There are several major advantages to the Mililani site; they are:

- o Location. The site is located in Central Oahu where a high proportion of veterans reside.
- o Development characteristics. Because of the excellent soils, drainage and topography of the site, basic on-site development costs would be moderate.
- o Aesthetics. The visual quality of the site would provide a pleasing environment for a veterans cemetery.

Disadvantages. There are several disadvantages which could detract from the overall suitability of the site; they are:

- o Ownership. The site is privately owned; the cost of acquisition is unknown; acquisition would involve condemnation proceedings which could delay the construction of a cemetery on the site.
- o Existing land use. The site is currently in pineapple production.

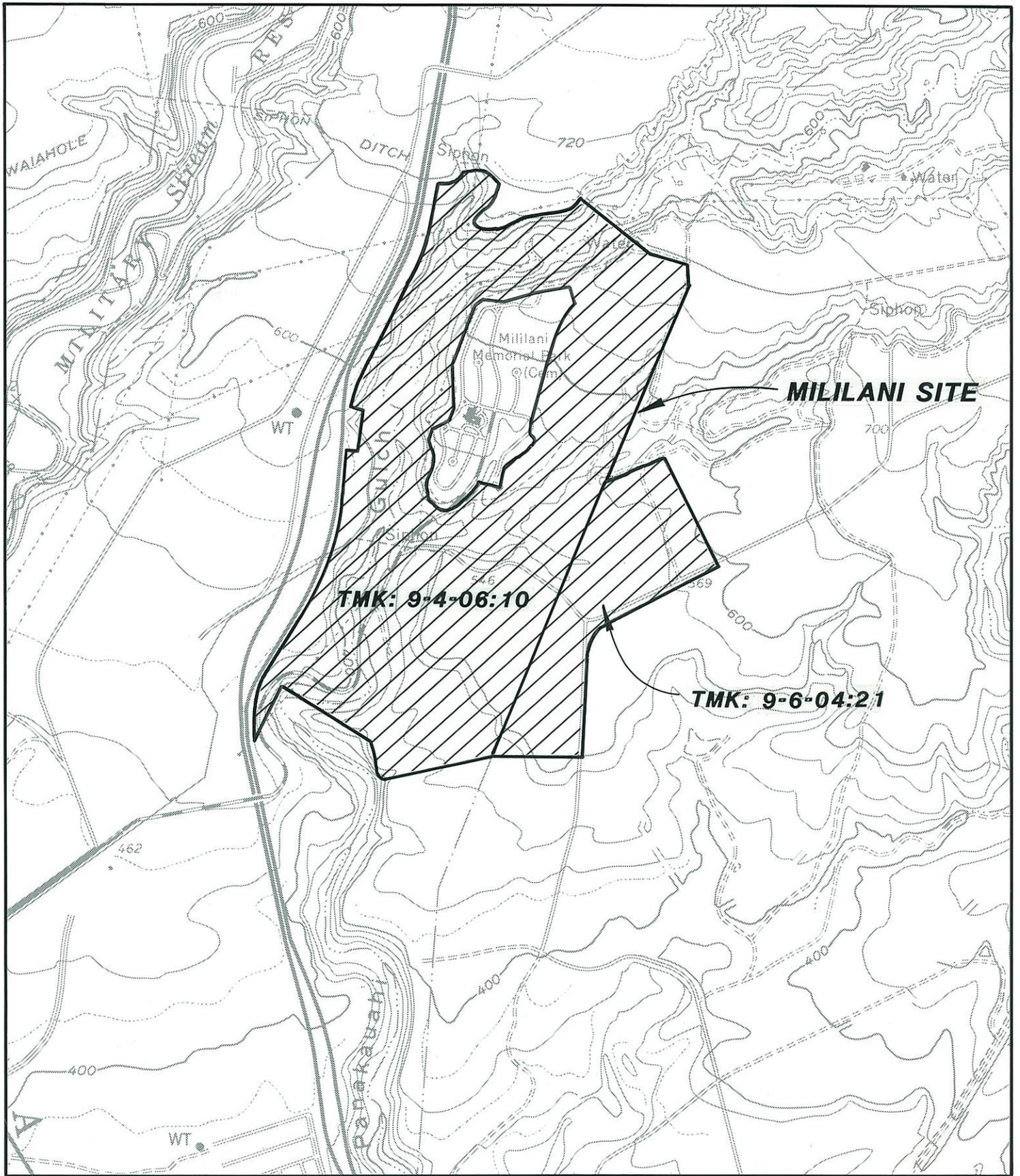


FIGURE 4

MILILANI

State Veterans Cemetery Study



Table 4
 SITE DESCRIPTION
 MILILANI: TMK 9-4-6:10 and 9-6-4:21

LOCATION	SIZE	ACCESSIBILITY	TOPOGRAPHY
In Central Oahu; about 13 miles from Honolulu; 2.5 miles north of the Waiawa interchange, 2 miles south of Mililani.	Total of 435.52 acs. TMK 9-4-6:10 has 362.15 acs. and 9-6-4-21 has 73.37 acs.; the primary development area would provide about 190+ acs. suitable for development, sufficient to satisfy 20 year need for burial acreage.	Site is located about 2 miles from Kam Hwy.; State Dept. of Transportation plans to begin construction of interchange at the junction of the access road and H-2 Fwy. during the next year; public transportation does not service the site.	Total site bisected by large gulches; suitable lands however, are gently rolling with slopes all under 8%.
WATER TABLE	SOIL REQUIREMENTS	ELECTRIC POWER	WATER SUPPLY
Depth to water table appears to be adequate according to Soil Conservation Service data.	Primary development site has soils in the Wahiawa series; soils are silty clays with moderately rapid permeability and a low shrink-swell potential; soil depth is greater than 5 feet.	Electric lines are available to the primary development area.	The county water line ends at the junction of the H-2 Fwy and the existing access road, a distance of about 1 mile from the primary development site.
SANITATION	EXPANSIBILITY	OWNERSHIP OF SITE	EXISTING LAND USE
The county sewer system ends in the Waipio Gentry industrial area, a distance of about 1.5 miles from the primary development site.	Primary development area sufficient to meet requirements for 20+ years; site is adjacent to an extensive residential project which has yet to receive necessary government approvals.	Castle & Cooke	Land currently in pineapple; separated from existing cemetery by gulch areas; adjacent to unused sugar lands; 90 acs. below the site has C&C Development Plan zoning for comm/ind uses; other adjacent lands planned for residential use in long-term.
AESTHETICS	DRAINAGE	LAND USE CONTROLS	SPECIAL ISSUES
The site has a panoramic view of the Central Oahu basin.	The site is generally well drained.	State Ag District; C & C Ag-1 District.	Private land; prime ag land.

- o Off-site development costs. Improvements to the existing access road and extension of water and sewer lines from the opposite side of the H-2 Freeway could require a significant expenditure of funds.

Evaluation

Based on the preceding analysis, with the exception of the identified disadvantages, Mililani would be a suitable site for a veterans cemetery.

STATE-OWNED LANDS AT KUNIA (Figure 5)

Description

The Kunia site (TMK 9-4-12:02) consists of a 487-acre parcel of state-owned land in Central Oahu. The land is located off Kunia Road about one-half mile south of Schofield Barracks. The site is currently leased to the Del Monte Corporation for the production of fresh pineapple. The lease expires in 1994.

Table 5 summarizes selected information about the suitability of the Kunia site for a state veterans cemetery based on the standards and criteria described in Part II of this report.

The site has gentle slopes ranging from 2 to 5 percent. The soils have good drainage and are generally free from rocks.

The primary access road to the area is the H-2 Freeway, which terminates about two miles from the potential site. Kunia Road provides direct access to the site. Electricity is available along Kunia Road, but county water and sewer lines end at the junction of Kunia Road and Wilikina Drive, a distance of about 1.5 miles.

The site is zoned for agriculture and has a panoramic view of the entire Central Oahu region, extending to Diamond Head.

Advantages and Disadvantages of the Site

Advantages. The Kunia site has many advantages that enhance its suitability as a potential cemetery site; they are:

- o **Ownership.** The primary advantage of the Kunia site is that it is owned by the state. Even though the land is currently in pineapple production, the state may withdraw any or all of the land at any time during the term of the lease for public use or purposes. Although the site is important to Del Monte operations, the state could withdraw lands incrementally as needed for cemetery use in a manner that would minimize any negative impacts to Del Monte's operations.
- o **Expansibility.** Even looking well beyond a 20-year period, the potential need for cemetery acreage is not likely to exceed more than 25 percent of the parcel's overall land area.
- o **Location.** The site is located in Central Oahu where a high proportion of veterans reside.

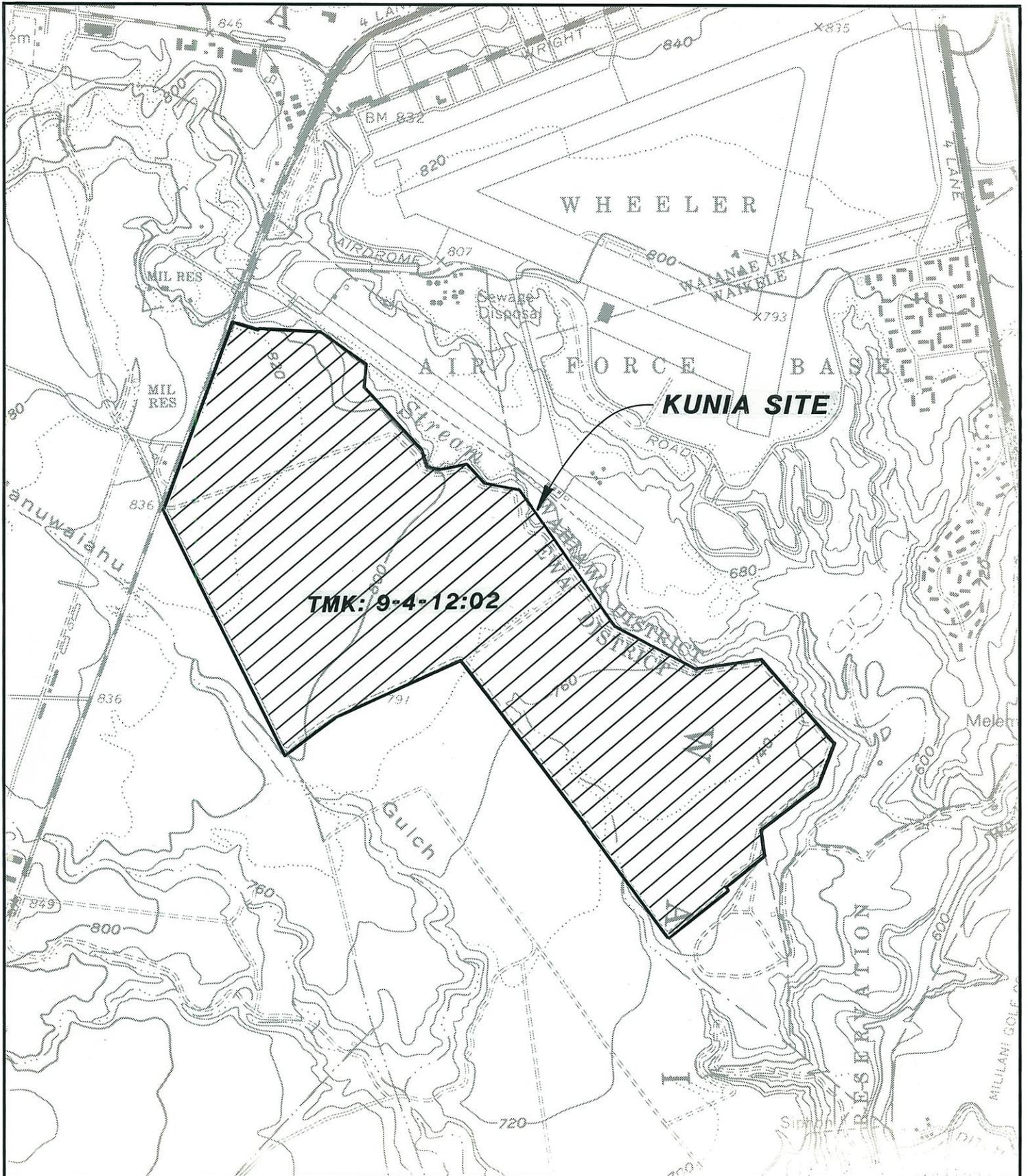


FIGURE 5

KUNIA

State Veterans Cemetery Study

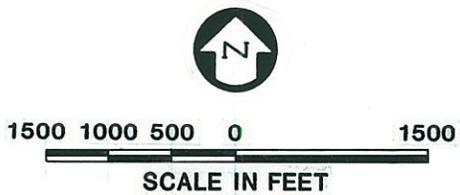


Table 5
 SITE DESCRIPTION
 KUNIA: TMK 9-4-12:02

LOCATION	SIZE	ACCESSIBILITY	TOPOGRAPHY
Central Oahu near Wahiawa; just one-half mile south of Schofield barracks; about 21 miles from Central Honolulu.	487.05 acres, nearly all of which is suitable for development; provides sufficient area to meet requirement for burial acreage beyond the 20 year planning period.	About 2.0 miles from the end of the H-2 Freeway; access directly from Kunia Rd.; public transportation is not available to the site.	Relatively flat agricultural land; some gentle slopes varying from 2% to 5%.
WATER TABLE	SOIL REQUIREMENTS	ELECTRIC POWER	WATER SUPPLY
Depth to water table appears to be adequate according to Soil Conservation Service data.	Wahiawa silty clay soils; permeability moderately rapid, shrink-swell potential low; soil depths greater than 5 feet; bedrock greater than 5 feet in depth.	Electricity is available to the site off of Kunia Rd.	The nearest county water line is at the junction of Kunia Rd. and Wilikina Dr. about 1.5 miles from the site.
SANITATION	EXPANSIBILITY	OWNERSHIP OF SITE	EXISTING LAND USE
The nearest county sewer line is at the junction of Kunia Rd. and Wilikina Dr., about 1.5 miles from the site.	Sufficient acreage to meet needs far beyond 20 year planning timeframe.	State of Hawaii; under lease to Del Monte until 12/31/94.	Currently in pineapple production for fresh fruit; surrounded by other ag, military communications facilities, and gulches.
AESTHETICS	DRAINAGE	LAND USE CONTROLS	SPECIAL ISSUES
Panoramic view of entire Central Oahu basin.	The site is generally well drained.	State Ag District; C & C Ag-1 District.	Prime ag land

- o Development characteristics. Because of the excellent soils, drainage and topography of the site, basic on-site development costs would be moderate.
- o Aesthetics. The visual quality of the site would provide a pleasing environment for a veterans cemetery.

Disadvantages. The major disadvantage of the site relates to state policies regarding agricultural lands. Development of the cemetery on the Kunia site could result in a 100 acre reduction of lands currently in agricultural production and the use of prime lands for other than agricultural purposes.

Evaluation

The numerous advantages and minimal disadvantages of the site contribute to its suitability for a state veterans cemetery.

PART IV: FINDINGS

COMPARATIVE ANALYSIS OF ALTERNATIVE SITES

Evaluation Process

In order to determine if one site is superior to the others, and thus should be recommended as the most appropriate site for the cemetery, each of the potential cemetery locations described in Part III was rated either excellent, good, or poor in relation to each criterion and standard used during the site selection process. Excellent ratings were given when the particular characteristic of the site exceeded the standard, good when the site was adequate according to the standard, and poor when the particular characteristic of the site did not meet the standard as defined in Part II of this report. Table 6 summarizes these ratings in an evaluation matrix. Special issues associated with each site are summarized on the last line of the matrix.

Comparison of Alternative Sites

As shown on Table 6, all of the sites were rated excellent with respect to size, water table level, utilities and aesthetics. Variations among the sites occur in ratings on the other standards. An analysis of these differences and an evaluation of their significance follows:

Location. According to VA guidelines, the land selected for a cemetery site should be located as closely as possible to the densest veteran population in the area which would be served. Diamond Head was rated excellent in this respect because it is located within the central Honolulu area where an estimated 50 percent of the veterans living on Oahu reside. The other three sites were all rated good; although not near the densest veteran population on Oahu, they each have a high proportion of veterans residing near them.

Accessibility. The VA standard states that a site should be readily accessible by highway or public transportation. Both the Diamond Head and Kaneohe sites were rated excellent by this standard. Diamond Head is located in central Honolulu near public transportation; the Kaneohe site is readily accessible from all parts of the island of Oahu via several major highways and public transportation. The Mililani and Kunia sites were rated good. Although they are readily accessible by highway, neither is served by public transportation.

Topography. The VA guidelines state that the land should range from comparatively level to rolling and moderately hilly terrain. Natural rugged contours are suitable only if development and maintenance costs would not be excessive and burial areas would be accessible to elderly or infirm visitors. Diamond Head, Mililani and Kunia were rated excellent because they all have comparatively level to gently rolling terrain. Kaneohe, which exhibits a hilly terrain, was rated good because some of the areas for burial sites might not be readily accessible to elderly or infirm visitors.

Soil Requirements. According to the VA, the soil should be free from rock, muck, quicksand, and other materials that would hamper the economical excavation of graves by normal methods. All of the candidate sites, except Diamond Head, were

Table 6
EVALUATION MATRIX

SITE STANDARDS	SITES			
	Diamond Head	Kaneohe	Mililani	Kunia
Location	EXCELLENT	GOOD	GOOD	GOOD
Size	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
Accessibility	EXCELLENT	EXCELLENT	GOOD	GOOD
Topography	EXCELLENT	GOOD	EXCELLENT	EXCELLENT
Water Table	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
Soil Requirements	POOR	EXCELLENT	EXCELLENT	EXCELLENT
Utilities	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
Water Supply	GOOD	EXCELLENT	GOOD	GOOD
Sanitation	GOOD	EXCELLENT	GOOD	GOOD
Expansibility	POOR	POOR	POOR	EXCELLENT
Ownership	EXCELLENT	GOOD	POOR	EXCELLENT
Existing Land Use	POOR	EXCELLENT	EXCELLENT	EXCELLENT
Aesthetics	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
Drainage	POOR	EXCELLENT	EXCELLENT	EXCELLENT
Land Use Controls	POOR	EXCELLENT	EXCELLENT	EXCELLENT
Special Issues	Access; potential opposition	Access; housing plans	Private land; prime ag land	Prime ag land

rated excellent by this standard. Diamond Head was rated poor because the sticky and plastic nature of the clay and the numerous rock outcrops would make the area difficult to excavate. In addition, sinkholes often appear in a 5-acre filled portion of the site.

Water Supply and Sanitation. The VA standards state that an adequate supply of water and an approved means to dispose of storm flow and sewage from the facility should be available. On both of these two criteria, Kaneohe was rated excellent because the existing county water and sewer lines run along Kamehameha Highway close to the proposed cemetery site. The Mililani and Kunia sites were both rated good; both water and sewer lines would have to be extended for some distance in order to service them. Diamond Head was also rated good because the water and sewer lines are old and barely adequate to meet current needs.

Expansibility. Because of the uncertain predictability of demand for burial sites at a state veterans cemetery (and thus the actual acreage requirements), sites of sufficient size to accommodate long-term growth or sites with adjacent undeveloped land suitable for cemetery expansion were considered preferable. The Kunia site was rated excellent; the 487-acre state-owned parcel would provide a land reserve that could serve the needs of a veterans cemetery for many years beyond the 20-year planning time frame. The Diamond Head, Mililani, and Kaneohe sites were rated poor by this standard because the number of acres available beyond the minimum required for a 20-year period is limited.

Ownership of Site. State ownership of the land was considered preferable in order to avoid the cost of acquisition and the sometimes lengthy process of condemnation. In this respect, both the Diamond Head and Kunia sites were rated excellent. The Kaneohe site was rated good. Although one of the two parcels that make up the site is owned by the state, any additional land that might be required for the cemetery would have to be acquired through condemnation of private property. The Mililani site rated poor by this standard because the entire site is privately owned.

Existing land use. Currently vacant, unencumbered land, or land in agricultural use, where withdrawal from production could be accomplished with minimum impact to the owner or lessee, was preferred. Kaneohe, Mililani and Kunia all were rated excellent by this criterion. The Kaneohe site is currently vacant and the Mililani and Kunia sites are in agricultural production. Diamond Head was rated poor because the unused acres within the crater floor are under executive order to the DOD; other uses within the crater include a State Park and DOD, FAA, and Civil Defense operations facilities.

Drainage. Potential sites should be located outside of flood plains and should not require extensive drainage improvements. Kaneohe, Mililani, and Kunia were all rated excellent by this criterion. Diamond Head was rated poor; the crater floor is frequently subject to flooding, and pumps must be used to remove water from the area during times of heavy rainfall.

Land use controls. Sites located within the State Urban or Agricultural Districts were considered to be more suitable than those within the State Conservation District. Other land use designations, such as historic significance, were also considered to be less suitable. Kaneohe, Mililani and Kunia are located within the State Agricultural District and were rated excellent. Diamond Head

was rated poor by this criterion because it is located within the State Conservation District and it is designated a National Landmark Site. From past experience, areas of historical significance will take longer to develop due to the number and type of approvals that must be obtained.

Special issues. Potential sites were not given a rating for special issues since they differ for each site. Special issues for Diamond Head crater would be possible opposition to any proposed change in use and restricted access to the site through the tunnel. Issues for Kaneohe would be access to the site through privately held land and possible use of the site for housing. Mililani poses the problem of private land ownership and the use of prime agricultural land. Prime agricultural land is also a special issue with Kunia, in addition to the existing lease with Del Monte.

SUMMARY AND RECOMMENDATIONS

In summary, the Kunia site was rated good or excellent by all standards. Although primarily rated good or excellent, the Kaneohe site rated poor with respect to expansion potential. The Mililani site was rated poor with respect to both expansion potential and ownership. Diamond Head crater was rated poor on five criteria: soil requirements (a VA standard); expansibility; existing land use; land use controls; and drainage. These major disadvantages, coupled with the serious access problem, discourage consideration of Diamond Head Crater as a site for a veterans cemetery.

Kaneohe, Mililani, and Kunia were all rated good or excellent by VA criteria; each could be a suitable site. However, because the area available for casket burials at the National Memorial Cemetery of the Pacific will be completely committed by 1988, ownership and ease of acquisition become significant factors in the site selection process. In this respect, the privately-owned Mililani site would be the least suitable of the three parcels due to the cost of acquisition and the sometimes lengthy process of condemnation necessary to acquire the site. Both the Kaneohe and Kunia sites are located on state-owned lands which could more easily be converted to cemetery use.

Under the high alternative, however, the developable portions of the state-owned parcel at Kaneohe would not be sufficient to satisfy the needs for veteran burials for the next 20 years. Because of uncertainties in the projection of the number of acres required for casket burials in the next 20 years, the state would risk being land short if the Kaneohe site was selected. Future acquisition of private lands adjacent to the Kaneohe site would be subject to both the availability of the lands when they are needed and the availability of sufficient funds to acquire the lands at some appropriate time in the future.

The state-owned Kunia site rates high on all of the site selection criteria. It is large enough to provide burial sites for over twenty years under the most liberal projections. Although the parcel is currently leased to Del Monte for pineapple production, a clause in the lease allows the state to withdraw any or all of the land at any time during the term of the lease for public use or purposes. The site is important to Del Monte operations, but the state could withdraw lands incrementally as needed for cemetery use in a manner that would minimize negative impacts to Del Monte's operations. Even looking well beyond a 20-year

period, the potential need for cemetery acreage is not likely to exceed more than 25 percent of the parcel's overall land area.

Based on the preceding analysis and evaluation, it is recommended that the Kunia parcel be selected as the site for the proposed State of Hawaii Veterans Cemetery.

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