

Hawaiian Memorial Park Cemetery Expansion Final Environmental Impact Statement

Kāneʻohe, Oʻahu, Hawaiʻi



September 2008
Volume 1

Hawaiian Memorial Park Cemetery Expansion

Final Environmental Impact Statement

Kāneʻohe, Oʻahu, Hawaiʻi

Prepared for:
Hawaiian Memorial Life Plan Ltd.

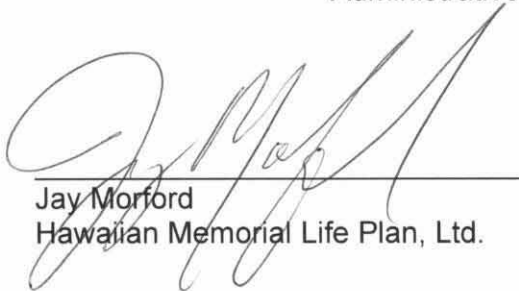
Prepared by:
Helber Hastert & Fee, Planners

Accepting Authority:
State of Hawaiʻi Land Use Commission

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Final
Environmental Impact Statement
Kāneʻohe, Oʻahu, Hawaiʻi

This final environmental impact statement, and all ancillary documents were prepared under the signatory's direction or supervision, and the information submitted, to the best of the signatory's knowledge, fully addresses document content requirements as set forth in sections 11-200-17 and 11-200-18, Hawaiʻi Administrative Rules, as appropriate.



Jay Morford
Hawaiian Memorial Life Plan, Ltd.

9/25/08
Date

Hawaiian Memorial Park Cemetery Expansion

Prepared for Hawaiian Memorial Life Plan, Ltd.
Prepared by Helber Hastert & Fee, Planners

September 2008

PREFACE

Based on comments received on the Draft Environmental Impact Statement (DEIS), a number of revisions were incorporated into this Final Environmental Impact Statement (FEIS). To facilitate review of the FEIS, additions to text are shown as being double underlined. Text that has been deleted is ~~shown with a line through it~~. The highlights of changes include the following:

- The project development program has been modified in two ways: (1) elimination of the 20-lot residential subdivision and the Lipalu Street extension intended to service these lots; and (2) establishment of a 9.4-acre cultural preserve that encompasses five archaeological sites, and large areas where the laua'e fern is plentiful, east of the Kawa'ewa'e Heiau.
- Eight graphic figures have been revised including: Figure 1: Regional Location; Figure 7: Phasing Plan; Figure 11: Proposed City and County of Honolulu Zoning; Figure 15: Land Study Bureau; Figure 28: Proposed Shallow Water Retention Concept Plan; and Figures 29a and 29b: Shallow Water Retention Area Profiles. Figure 30 (Alternative III) has been revised and moved to become Figure 4a.
- Description and discussion related to the residential subdivision has been deleted throughout the document in relevant sections.
- Section 3.1.1 under Hawai'i State Plan Section 226-15 and 226-16, and Section 6.6, Power and Communication, includes descriptions of the various water and energy conservation strategies to be employed as part of the project.
- Section 3.1.1 has added a section discussing the Conservation Lands Functional Plan and relevance to the project.
- Section 3.2.2 contains greater detail of the suggested language changes for the Sustainable Communities Plan.
- A new Section 3.1.6 describes the Kāne'ohē Bay Master Plan and the goals and policies relevant to the project.
- Section 4.6, Natural Hazards, has added information pertaining to the existing conditions and probable impacts associated with civil defense facilities.
- Section 4.7, Flora, has been expanded to include new species found within the Petition Area as a result of an additional biological survey performed to locate laua'e fern communities (the complete addendum has been added to Appendix D).
- Section 4.8, Fauna, has been expanded to include the results of native invertebrate resources survey conducted for the Petition Area in August 2008 by Steven Lee Montgomery, Ph.D.
- Section 4.9, Historic, Cultural, and Archaeological Resources includes updated information regarding the State Historic Preservation Division comments on the Archaeological Inventory Survey performed for the project.

- Section 4.10, Scenic and Visual Resources, has been expanded to include additional visual analysis performed for the project. Several figures have also been added (Figure 22b, Figures 23b-g).
- An air quality review was conducted in September 2008 by B.D. Neal & Associates, and their findings have been incorporated in Section 4.11, Air Quality.
- A noise review was conducted in August 2008 by D.L. Adams Associates, and their findings have been incorporated in Section 4.12, Noise.
- Section 5.4, Fiscal Impacts, includes additional information on fiscal impacts related to the project.
- Section 5.5, Traditional Customs and Practices, has been expanded (including a new Figure 25: Laua'e Fern Communities-Revised Proposed Action) to describe the cultural preserve that will be incorporated into the project's concept plan.
- Section 6.1.3, Transportation, clarifies the mitigation to occur in coordination with the State of Hawai'i Department of Transportation Traffic Branch to provide a traffic signal warrant study for the intersection of Kamehameha Highway, Halekou Road, and the HMP primary driveway.
- Section 6.4, Drainage, has been expanded to describe the manner in which the retention areas will contribute to increased water quality and flood control.
- Section 6.5, Solid Waste, has been expanded to clarify the destination of the solid waste from the project.
- Chapter 8 includes more detailed analysis and information (qualitative and quantitative) on each alternative, including an alternative location. Section 8.3, Cemetery Expansion Only Alternative has been expanded to provide a more detailed discussion of this alternative which is now the preferred alternative, henceforth referred to as the "Revised Proposed Action".
- Agency and community comments on the DEIS and the associated response letters are included in a new Chapter 12.
- Changes to Appendices include: Appendix C now contains the Final Preliminary Engineering Report; an addendum has been added to Appendix D, Botanical Resources Assessment; an invertebrate survey has been added as Appendix F; an Air Quality Assessment has been added as Appendix H; a Noise Review has been added as Appendix I; and a TMDL Analysis Report has been added as Appendix L.

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- B Report Assessment of Hazard from Rockfall and Slope Stability (Shinsato Engineering, Inc.)
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- D Botanical Resources Assessment (LeGrande Biological Surveys, Inc.)
- E Avifaunal and Feral Mammal Field Survey (Philip L. Bruner)
- F Survey of Native Invertebrate Resources (Steven Lee Montgomery, Ph.D.)
- FG Archaeological Inventory Survey (Cultural Surveys Hawai’i, Inc.)
- GH Air Quality Impact Assessment (B.D. Neal & Associates)
- I Noise Review (D.L. Adams Associates, Ltd.)
- J Cultural Impact Assessment (Cultural Surveys Hawai’i, Inc.)
- HK Traffic Impact Study (Perazim Consulting, LLC)
- L TMDL Analysis Report (Element Environmental LLC)

ACRONYMS AND ABBREVIATIONS

- § Section
- AeE Alaeloa silty clay, 15 to 25 percent slopes
- AIS Archaeological Inventory Survey
- ALF Alaeloa silty clay, 40 to 70 percent slopes
- ALISH Agricultural Lands of Importance to the State of Hawai’i
- AMSL above mean sea level
- BMP Best Management Practice
- BWS Board of Water Supply
- cfs cubic feet per second
- CIA Cultural Impact Assessment
- CSH Cultural Surveys Hawai’i, Inc.
- CWRM Commission on Water Resource Management
- cy cubic yards
- DEIS Draft Environmental Impact Statement
- DOH Department of Health
- DLNR Department of Land and Natural Resources
- DP Development Plan
- DPP Department of Planning and Permitting

EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EPA	Environmental Protection Agency
°F	degrees Fahrenheit
<u>FEIS</u>	<u>Final Environmental Impact Statement</u>
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
ft	foot (feet)
<u>FTE</u>	<u>Full-Time Equivalent</u>
gpd	gallons per day
gpm	gallons per minute
GPS	geographic positioning system
HAR	Hawai'i Administrative Rules
HECO	Hawaiian Electric Company
HMP	Hawaiian Memorial Park
HPD	Honolulu Police Department
HRS	Hawai'i Revised Statutes
KBAC	Kailua Bay Advisory Council
<u>kg</u>	<u>kilogram</u>
KgC	Kaneohe silty clay, 8 to 15 percent slopes
KHOF	Kaneohe silty clay, 30 to 65 percent slopes
lb	pounds
LOS	Level of Service
LSB	Land Study Bureau
LUO	Land Use Ordinance
mgd	million gallons per day
NPDES	National Pollutant Discharge Elimination System
OHA	Office of Hawaiian Affairs
PER	Preliminary Engineering Report
ROH	Revised Ordinances of Honolulu
SCP	Sustainable Communities Plan
sf	square feet
SHPD	State Historic Preservation Division
SIHP	State Inventory of Historic Places
SLC	Szabian, Landrun & Cleghorn
SMA	Special Management Area
TMDL	Total Maximum Daily Load
TN	total nitrogen
TP	total phosphorus
TSS	total suspended solids
UH	University of Hawai'i
UIC	Underground Injection Control
US	United States
WWTP	Wastewater Treatment Plant
yr	year

1.0 INTRODUCTION AND SUMMARY

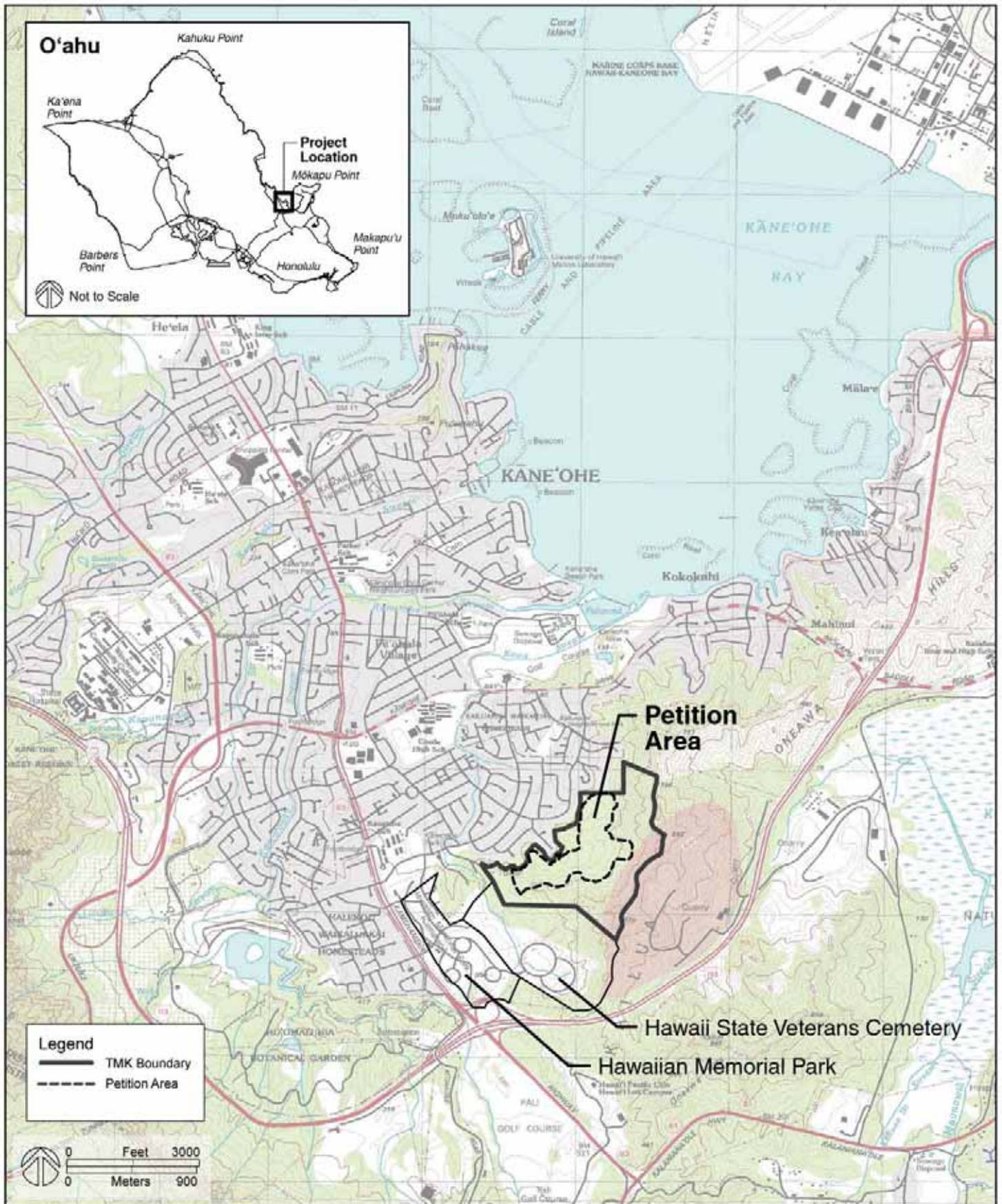
1.1 INTRODUCTION

This ~~Draft~~ Environmental Impact Statement (DEIS) is being prepared in support of a Petition for a State Land Use District Boundary Amendment filed by Hawaiian Memorial Life Plan Ltd. ("Petitioner"), to reclassify approximately ~~56.6~~ 56.459 acres of land from the State Land Use Conservation District to the Urban District ("Petition Area"), and a subsequent City and County of Honolulu Zone Change Application, pursuant to Chapter 24, Article 3, Section (§) 24-3.7, Revised Ordinances of Honolulu (ROH). Additionally, an amendment to the Ko'olau Poko Sustainable Communities Plan (SCP) is needed to permit cemetery and residential use in the Petition Area. The Petition Area is located in Kāne'ohe, O'ahu, Hawai'i in the Ko'olau Poko district, Kāne'ohe *ahupua'a* (See Figure 1 for regional location). The DEIS circulated for public comment in June 2008 included four alternatives to the Proposed Action. As a result of the analysis and comments received during the public comment period, the Petitioner has determined that Alternative III, Cemetery Only, (with slight modification), is the preferred alternative and will replace the Proposed Action as the development proposal to be implemented by the Petitioner. Modification to Alternative III includes addition of a 9.4-acre cultural preserve for the preservation of historic sites and locations of *laua'e* fern for gathering purposes. Consequently, the Final Petition that will be submitted to the State Land Use Commission for processing as a State Land Use District Boundary Amendment will be based on Alternative III.

Throughout this EIS, the term "Former Proposed Action" references the project that consists of a cemetery expansion and 20-lot residential subdivision. The term "Revised Proposed Action" references Alternative III, Cemetery Only, as described in Chapter 8.

The Petitioner proposes to expand the existing developed portion of the Hawaiian Memorial Park (HMP) Cemetery owned lands, an area totaling approximately 80 developed acres to the south and east of the Petition Area. The approximately 80 acres are classified as in the Urban District.

In accordance with Chapter 343, Hawai'i Revised Statutes (HRS) and Title 11, Chapter 200, Hawai'i Administrative Rules (HAR) of the Department of Health (DOH), an environmental review is required as the Revised Proposed Action includes reclassification from the State Land Use Conservation District to the Urban District and an amendment to existing county general plans. The State of Hawai'i Land Use Commission (Commission) has (1) agreed to be the Accepting Authority pursuant to Chapter 343(c), HRS and Title 11-200-4(b), HAR and (2) determined that the Former Proposed Action and alternative actions may have a significant effect upon the environment to warrant the preparation of an environmental impact statement (EIS) (Commission Order filed December 13, 2007 (Docket No. A07-777)).



Regional Location

Hawaiian Memorial Park Cemetery Expansion Environmental Impact Statement
 Kaneohe, Oahu, Hawaii

Figure 1

1.2 DEVELOPMENT SUMMARY

Project Name: Hawaiian Memorial Park Cemetery Expansion

Former Proposed Action: Reclassify approximately 56.6 acres of land from the State Land Use Conservation District to the Urban District to expand the acreage of the existing Hawaiian Memorial Park cemetery and develop a 20-lot residential subdivision.

Revised Proposed Action: Reclassify 56.459 acres of land from the State Land Use Conservation District to the Urban District to expand the acreage of the existing Hawaiian Memorial Park cemetery.

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Honolulu, HI 96813
Contact: Scott Ezer
Telephone: (808) 545-2055

Accepting Authority: State of Hawai'i Land Use Commission

Chapter 343, HRS "Trigger": Proposed reclassification of land currently designated as Conservation District by the State Land Use Commission (§ 343-5(7)) and proposed amendment to existing county general plans (§ 343-5(6)).

Location: Kāne'ōhe, Ko'olau Poko district, O'ahu, Hawai'i

Tax Map Key Parcels: (1) 4-5-033: por. 001

Landowners: Hawaiian Memorial Life Plan Ltd.
1929 Allen Parkway, 8th floor
Houston, TX 77019

Existing Uses: Vacant land

Proposed Uses: Cemetery, ~~residential~~

Existing State Land Use District: Conservation

Proposed State Land Use District: Urban

Existing City and County of Honolulu Ko'olau Poko Sustainable Communities Plan:	Open Space/Preservation Area
Proposed City and County of Honolulu Ko'olau Poko Sustainable Communities Plan:	Allow cemeteries in the Preservation Boundary
Existing City and County of Honolulu Zoning:	P-1 Restricted Preservation
Proposed City and County of Honolulu Zoning:	P-2 General Preservation/ R-7.5 Residential District
Other Land Use Approvals:	City and County of Honolulu Zone Change Approval of Cemetery's Location and Boundaries by Honolulu City Council

1.3 SUMMARY OF PROBABLE IMPACTS AND MITIGATION MEASURES

The Former Proposed Action identified ~~33.8~~ 33.8 acres for use as cemetery areas, 1.1 acres for the preservation of historic sites, 6.4 acres for a proposed 20-lot residential subdivision, and 15.3 acres of land to be graded, revegetated, and kept in open space. The Revised Proposed Action identifies 35.6 acres for use as cemetery areas, 9.5 acres for the preservation of historic sites and a cultural preserve, and 11.4 acres of land to be graded, revegetated, and kept in open space. The total Petition Area occupies 36% of the 156-acre portion of the 164 acre Parcel 1 that is classified in the State Land Use Conservation District. The remaining 64% of the land classified in the Conservation District will not be developed. Although the Petition Area totals ~~56.65~~ 56.65 acres, at build-out only 40.2 acres, or ~~24.26~~ 24.26% of the remaining 156 acres of Parcel 1 in the Conservation District, ~~will be in~~ was proposed to be devoted to a developed use (cemetery and residential areas) ~~for under the Former Proposed Action.~~ For the Revised Proposed Action, 35.6 acres, or 23% of the 156 acres of Parcel 1 is proposed to be in developed use (cemetery area). ~~The~~ 1.1 acres of historic sites and the 15.3 acres revegetated to native and appropriate adaptable plants ~~will be~~ would have been maintained in an undeveloped condition. For the Revised Proposed Action, the areas to remain in undeveloped condition have been increased to 9.5 acres of cultural preserve and historic sites, and 11.4 acres of revegetated areas. The multi-phased Concept Plan created for the Revised Proposed Action reflects carefully considered design elements to best complement the physical, social, and scenic characteristics of the region. A summary of probable direct, indirect, and cumulative impacts and mitigation is provided below.

Physical Environment. The Revised Proposed Action will not have an adverse direct or indirect impact on climate, topography and soils, slope stability, agricultural capability, botanical resources, groundwater resources, historic, cultural, and archaeological resources, scenic and visual resources, air quality, and noise. The Petition Area has no agricultural productivity and no populations of threatened or endangered plant or animal species. The Former and Revised Proposed Actions ~~has~~ have a potential for natural hazards associated with rockfall, all of which can be mitigated. The source of potable

~~drinking water for the project. Former Proposed Action will no longer need to~~ will be coordinated with the Board of Water Supply (BWS) and the State Commission on Water Resource Management (CWRM), ~~and the availability of water for the project will be confirmed by the BWS when building permits are approved.~~ The only viable option for the 20-lot subdivision is to ~~The Revised Proposed Action will no longer require development of a new~~ an on-site drinking water system. Discussions with the Honolulu Board of Water Supply (BWS) have indicated that water quantities and pressure may currently be available using existing systems to fully service the approximately 30 acres of turf landscaping requiring a peak demand of 90,000 gallons per day (gpd) for the cemetery expansion area during high demand periods. Existing potable sources would only be tapped if on-site wells could not be developed for irrigation purposes. Cultural and archaeological resources have been carefully studied and several sites have been identified for preservation or data recovery. Following resolution of mitigation measures in consultation with the State of Hawai'i Department of Land and Natural Resources (DLNR) Historic Preservation Division (SHPD), it is anticipated that the proposed development will have "no effect" on the historic resources located within the Petition Area. The Kawa'ewa'e Heiau, a historic site listed on the National Register of Historic Places is located outside the Petition Area. The Petitioner has stated the intent to continue to allow access to Native Hawaiian groups to maintain the *heiau* and continue cultural practices. In the area of the proposed cemetery expansion, the character of the open space will transition from non-native Schefflera/Java Plum Forest to a different form of green open space characterized by open lawns and scattered trees with appropriate native and Polynesian-introduced plants. ~~The views of the proposed residential development will be changed from open space to both one and two-story single family homes, similar in character to the existing adjacent residential neighborhoods.~~ No recognized public view planes will be significantly affected. Implementation of Best Management Practices (BMPs) during the construction period will minimize noise and air quality impacts to non-significant levels.

Socio-Economic Environment. The Revised Proposed Action will not have an adverse direct or indirect impact on population, will have no impact on housing, and will have a beneficial impact on ~~housing~~, employment and fiscal resources. In regards to traditional customs and practices, a Cultural Impact Assessment (CIA) prepared for this DEIS identified that portions of the Petition Area are used for gathering of plant material for *hula* and *lei* adornment. The Petitioner has stated the intent to preserve and protect these areas and to allow continued access to them by traditional practitioners. In this regard, additional field work conducted after the publication of the DEIS identified the main communities of the *laua'e* fern east of the Kawa'ewa'e Heiau. These communities will be included in a 9.4-acre cultural preserve, which includes most of the identified archaeological sites, as part of the Revised Proposed Action. The Revised Proposed Action will ~~also~~ allow the Petitioner to provide continued important social and cultural services to families on O'ahu and the rest of the State.

Public Facilities and Services. The Revised Proposed Action will not have a significant direct or indirect impact on public transportation systems, including adjacent State Highways. The Revised Proposed Action will not have an adverse impact on utilities and public infrastructure systems (water supply, wastewater, drainage, solid waste, power and communications).

Cumulative Impacts

Cumulative impacts of the Revised Proposed Action are summarized below and are discussed in detail in Chapter 7.0 of this DEIS.

Physical Environment. The Revised Proposed Action will not have a cumulative effect on climate, agricultural capability, natural hazards, air quality, or noise.

The Revised Proposed Action will not have a significant adverse cumulative effect on topography, slopes, soils, groundwater resources, biological resources, historic, cultural, and archaeological resources, or scenic and visual resources. The available supply of water should be sufficient to support the Petition Area for ~~both domestic and~~ irrigation use. The proposed development will not be a potential source of contamination to the underlying groundwater and will cause no significant degradation of the ~~potable drinking~~ water supply. Historic, cultural, and archaeological resources have been analyzed and recorded, and appropriate mitigation will be implemented. Some subtle alteration will occur in the view of the Petition Area, but as a result of the difference in elevation between the street and the proposed area and a planned generous vegetative buffer between the adjoining residential property lines and the Petition Area, visual impacts will not be significant. The Revised Proposed Action will contribute construction period noise which is by its nature, short term. The construction period noise will be reduced as no residential construction will be involved.

There will be some beneficial cumulative impact to biological resources by increasing the native Hawaiian flora on the site and increasing foraging areas for migratory birds.

Socio-Economic Environment. The Revised Proposed Action will not have a significant adverse cumulative impact on population or traditional customs and practices. The Former Proposed Action ~~will would~~ have had a beneficial cumulative impact on housing, employment, and fiscal resources. The Revised Proposed Action will not have any impact on housing, and will have a beneficial cumulative impact on employment and fiscal resources.

Public Facilities and Services. The Revised Proposed Action will not have a significant cumulative impact on transportation facilities, power and solid waste systems; and will have no cumulative impact on power and communications, or other public services such as schools, recreational facilities, police, fire protection, or emergency services.

Mitigation

Mitigation was indicated for soils, groundwater resources, natural hazards, flora, historic and cultural resources, scenic and visual resources, air quality, housing, traditional customs and practices, transportation, drainage, and parks and recreational facilities.

Temporary and permanent erosion control measures will be implemented as BMPs during grading, construction, and operational activities, including: mulching; timing of construction activities during dry months of the year; using silt fences; catch basin and inlet protection; and grading to provide proper drainage. In addition, a network of retention areas totaling 1.3 acres will be scattered throughout the Petition Area to control

storm water runoff during operational phases (See Section 6.4). These retention areas will be designed to a depth of 18 inches and will be lined with grass. The size of the retention areas will vary from 5,000 to 20,000 approximately 730 to 17,500 square feet (sf), and will be designed to meet the requirements of the City and County of Honolulu Department of Planning and Permitting (DPP) county design storm event.¹

To ensure groundwater impacts and downstream impacts to Kāneʻohe Bay are minimized from any potential impacts from fertilizer application, HMP will work with the Kailua Bay Advisory Council (KBAC) and maintain fertilizer maintenance logs as part of a fertilizer management plan. In addition, as recommended by the KBAC report *Koʻolaupoko Watershed Restoration Action Strategy (2007)*, soil or tissue samples (grass) will be submitted to the University of Hawaiʻi's (UH) Agricultural Diagnostic Service Center to test if fertilizer is necessary before semi-annual fertilizer application.

Construction of the retention areas will result in a net reduction in Total Maximum Daily Loads (TMDL) pollutants (Total Suspended Solids, Total Nitrogen, Total Phosphorus) from existing levels (see Section 6.4).

There is a potential for hazards associated with rockfall on the eastern portion of the Petition Area. These hazards can be mitigated using available technology. Mitigative measures may include one or a combination of the following: securing existing boulders using netting or chaining; removal of boulders; installation of fencing uphill from proposed improvements; and constructing a buffer zone between the rockfall hazard source and the proposed improvement. The choice of mitigative measure will depend on the specific site condition.

Proposed improvements to the Petition Area include landscape treatments to introduce native species when re-vegetating areas that have been graded or filled. The areas will be revegetated with appropriate and indigenous species to the extent possible. Some soil and climate adaptive Polynesian introduced plants may be used as well. The newly revegetated areas will include spreading foliage trees along the bottom reaches of transition slopes and buffer areas adjacent to the residential uses and trees of a variety of shapes and heights above and throughout the proposed cemetery grounds. These improvements will also ensure impacts to the scenic and visual resources are mitigated.

A preservation plan will be prepared for the historic and cultural resources within and near the Petition Area in accordance with §13-277-3, HAR, to address buffer zones and protective measures for all historic properties recommended for preservation. Several sites have been found to require preservation, in the form of avoidance and protection; several do not require any further work as sufficient information regarding the historic properties has already been generated. Preservation recommendations for sites in and near the Petition Area are summarized in Table 1.

¹ The county design storm event is based upon DPP's Rules Relating to Storm Drainage Standards of January 2000, which states that any increased runoff generated by a project be retained on-site for the duration of the 1-hour, 10-year storm event.

**Table 1
Historic Properties Mitigation Summary**

Site #	Type (features)	Probable Function	Age	Mitigation Recommended
Sites within Petition Area				
-4680	Terrace (1)	Agricultural/water control	Historic	No further work
-4683	Pit feature (1)	Charcoal Kiln	Historic	No further work
-4684	Complex-enclosures and terracing (7)	Habitation	Pre-Contact	Preservation, in the form of avoidance
-4686	Stone alignment (1)	Boundary marker	Historic	No further work
-6930	Stone enclosure (1)	Ceremonial	Pre-Contact	Preservation, in the form of avoidance
-6932	Stone storage feature (1)	Storage	Historic	No further work
-6933	Pit feature with associated stonewall (2)	Charcoal kiln	Historic	No further work
Sites near Petition Area				
-354	Enclosure, Platforms, Terraces (2+)	Ceremonial	Pre-Contact	Preservation, in the form of avoidance
-4681	Complex-Enclosures and terracing (5)	Habitation/Agricultural	Pre-Contact	Preservation, in the form of avoidance
-6929	Quarry (2)	Raw Material Collection	Pre-Contact	Preservation, in the form of avoidance
-6931	Stone Alignment (2+)	Ceremonial	Pre-Contact	Preservation, in the form of avoidance

Standard construction and erosion control techniques will be employed to mitigate any impacts to air quality from the project. Appropriate dust control measures during construction activities will minimize the potential for fugitive dust emissions including: frequent watering of exposed soil; covering all moving, open-bodied trucks transporting materials; applying mulching or wind screens to control wind erosion; and establishing the landscaping early in the construction schedule. Appropriate landscape screening will be constructed along the west perimeter of the Petition Area to minimize noise, odor, dust, and security lighting impacts from the nearby residential areas.

For the Former Proposed Action, affordable housing opportunities would have been provided for low and moderate income residents of the State of Hawai'i to the satisfaction of the City and County of Honolulu. The method of satisfying the affordable housing requirement would have come from negotiation of an Affordable Housing Plan, approved by appropriate City and County of Honolulu agencies. The Plan could have included a range of options, including sale of lots to qualifying affordable owners, construction of dwelling units elsewhere, or payment of an in-lieu fee. Because the Revised Proposed Action no longer includes a residential element, there will be no affordable housing requirements.

Impacts to traditional customs and practices will be mitigated by following the recommendations in the CIA. All significant archaeological sites within and near the Petition Area will be preserved, and A 9.4-acre cultural preserve area will be included as part of the Revised Proposed Action in order to protect archaeological sites and habitat of the laua'e fern buffer zones will be incorporated. Mitigation measures will include:

1. integration of cemetery plans and design with the cultural significance of the significant archaeological sites and cultural features;
2. the Kawa'ewa'e Heiau, currently on the National Register of Historic Places, will be registered with the State of Hawai'i register of historic places;
3. all cultural properties and archaeological sites in and near the Petition Area will be investigated, preserved, and protected through the creation of an approximate 9.4-acre cultural preserve area ~~kipuka~~ as appropriate;
4. consultation will occur with appropriate state agencies, such as the Office of Hawaiian Affairs (OHA), throughout the planning and development process to ensure appropriate evaluation and protection of archaeological and cultural resources;
5. if there is need for further consultation regarding handling of archaeological sites, the Petitioner will have the project reviewed by OHA's Native Hawaiian Historic Preservation Council or other appropriate groups;
6. should cultural or burial sites be identified during ground disturbance, all work will immediately cease, and the appropriate agencies will be notified pursuant to applicable law;
7. archaeological monitoring will be conducted during all phases of development;
8. on-going cultural practices, such as gathering of *hula* and *lei* plants, will be recognized and accommodated (subject to safety and liability issues) as provided by law;
9. areas where the *hula* plant *laua'e* (*Phymatosorus grossus*) is most concentrated will be protected ~~to the degree feasible and practicable~~ within the cultural preserve area. An addendum to the Botanical Survey was conducted in August 2008 by LeGrande Biological Surveys, Inc. (and is included in Appendix D). As a result, 2.5 acres of *laua'e* fern communities were identified as shown in Figure 25, 2.3 acres of which will remain untouched (1.2 acres within the cultural preserve that is now part of the Revised Proposed Action, and 1.1 acres outside the Petition Area that will remain in the Conservation District);
10. consultation will continue with those responsible for the long-term care of the Kawa'ewa'e Heiau, as well as those who utilize the area for gathering and cultural education activities, throughout the planning, development, and operation of the proposed cemetery ~~and residential development.~~

The Traffic Impact Analysis found that the Level of Service for the intersection of Kamehameha Highway, Halekou Road, and the HMP primary driveway will be at "F" during the afternoon peak, with or without either the Former or the Revised Proposed Action. The State of Hawai'i Department of Transportation Traffic Branch has recommended a traffic signal warrant study to determine if this intersection should be signalized. The Petitioner will conduct this study subsequent to entitlement, and will contribute a pro-rata share of the cost of this signal, if necessary.

For parks and recreational facilities, as a result of the Former Proposed Action, the Petitioner would have will provided in-lieu payment for the fair market value of the 7,000 sf (0.16 acres) of required park and playground space based on the proposed 20-lot residential development, as required by City and County of Honolulu Park Dedication Rules and Regulations. The Revised Proposed Action will not have a Park Dedication requirement, as residential development is no longer proposed.

1.4 ALTERNATIVES CONSIDERED

In addition to the Former Proposed Action (expansion of the existing HMP cemetery and development of a 20-lot residential subdivision), four alternatives were considered, and a fifth alternative of constructing on another site was considered and dismissed from further analysis.

The option of alternative locations for the Former Proposed Action was considered but dismissed from further analysis due to the following: the Petitioner does not own other land on O'ahu; use of land in another location will compete with both urban and agricultural uses on the new site; land in another location will not have the needed existing supporting infrastructure (administration space, chapel, grounds maintenance facilities, crematorium); and selecting another site ignores the synergistic aspects of expanding in an area already developed with cemetery uses and proximity to existing populations in need of services provided by HMP.

The following four development alternatives were considered for the Petition Area:

- No Action
- Cemetery Expansion with Residential Retirement Community Component (Alternative II)
- Cemetery Expansion Only (Alternative III)
- Larger Residential Community with Cemetery Expansion Component (Alternative IV)

The No Action Alternative assumes there will be no additional expansion of the HMP Cemetery ~~and no development of 20 lots for residential development~~. This alternative will result in reduced supply and selection of interment choices available to the general public. This means that Hawai'i families will have to find alternative locations to inter loved ones and assumes that there is other space available for cemetery use elsewhere on O'ahu, or that other cemeteries will be developed in other locations. In addition, no new opportunities for single-family dwelling construction will emerge from this property. No environmental consequences are anticipated from this action in this location. However, if burial space is developed elsewhere on O'ahu to accommodate projected demand, potential impacts similar to those anticipated as a result of the Revised Proposed Action will be expected at other sites. In other words, impacts would be displaced to another site. For these reasons, this alternative was rejected.

Alternative II is similar in concept to the Former Proposed Action except the 20-lot subdivision would be replaced with a residential retirement facility similar to the adjacent Pohai Nani facility. These facilities could include senior living apartments, cottages,

residential care facilities, and skilled nursing facilities. The overall design treatment for these new facilities would be similar to Pohai Nani, with a central residential tower of about seven stories. This land use would appropriately respond to the growing demand for retirement housing. This is a viable alternative due to the high demand in the future for retirement facilities similar to Pohai Nani. However, the Petitioner determined that unless access could be provided through the existing Pohai Nani facility (with Pohai Nani as the new facility operator), this alternative would require direct access through Lipalu Street which would impact traffic in the surrounding residential neighborhood. Although there is a significant demand for retirement facilities like Pohai Nani on the Windward side, the Pohai Nani operations were not interested in undertaking additional management responsibilities at this time. As such, this alternative was not viable to pursue.

Alternative III proposes entails development of ~~40.2~~ 35.6 acres solely for cemetery area, with no residential component to the Proposed Action. This alternative creates ~~34.129.5~~ acres for burial areas, providing even more space for O'ahu families to inter their loved ones. Traffic impacts are virtually the same for this alternative as the Former Proposed Action, with access through the two existing driveways off of Kamehameha Highway. The long-term result of this alternative meets many of the Petitioner's objectives for continued service to the community and operational security, and remains a viable after analysis and comments received through this EIS process, the Petitioner has determined this alternative to be the preferred alternative. This alternative is referred to as the "Revised Proposed Action".

Alternative IV would be predominantly a residential project, with a smaller portion for cemetery expansion. It would consist of a 20.8 acre residential community, and a smaller area of 5.5 acres of total burial areas (11.4 acres total for cemetery area). While serving the housing needs of O'ahu residents, this alternative provides less space for cemetery area and is less able to meet the interment needs of those on O'ahu and the corporate objectives of the Petitioner. Traffic impacts for this alternative would be significantly greater in the existing residential subdivision streets, and a higher volume of storm water runoff would be generated. For these reasons, this alternative was rejected.

1.5 SUMMARY OF UNRESOLVED ISSUES

Unresolved issues for the Revised Proposed Action include: (1) determining specific arrangements and protocols for accommodating gathering of plant material within the Petition Area; (2) determining specific access agreements through the property to allow for continued care of the historic resources within and near the Petition Area, including Kawa'ewa'e Heiau; (3) determination of the need for a signalized intersection at the Kamehameha Highway/Halekou Road/HMP Main Driveway intersection~~selecting a specific source for potable water.~~

1.6 SUMMARY OF COMPATIBILITY WITH LAND USE PLANS AND POLICIES

The Revised Proposed Action is ~~generally~~ compatible with and supportive of relevant State and County land use policies, plans and controls, as described in Chapter 3. ~~Given the competing nature of many of these plans, policies and objectives, the Proposed Action supports many while it is inconsistent with others.~~

1.7 NECESSARY PERMITS AND APPROVALS

Development of the Petition Area will require a number of permits and approvals from State and County agencies. A summary of possible required approvals is provided below.

Permit/Approval	Approving Authority	<u>Projected Submittal Date</u>
<u>State of Hawai'i</u>		
State Land Use District Boundary Amendment	State Land Use Commission	<u>November 28, 2007</u>
National Pollutant Discharge Elimination System Permit	State Department of Health, Clean Water Branch	<u>October 2009</u>
Water Use Permit	State DLNR, Commission on Water Resources Management	<u>January 1, 2010</u>
Well Construction/Pump Installation Permit	State DLNR, Commission on Water Resource Management	<u>September 1, 2009</u>
<u>City and County of Honolulu</u>		
Zoning District Amendment	Honolulu City Council	<u>April 1, 2009</u>
Sustainable Communities Plan Amendment	Honolulu City Council	<u>April 1, 2009</u>
Subdivision	County Department of Planning and Permitting	<u>April 2010</u>
Grading Permit	County Department of Planning and Permitting, Civil Engineering Branch	<u>April 2010</u>
Water System Facilities Charges <u>(if necessary)</u>	Honolulu Board of Water Supply	<u>April 2010</u>

1.8 STATEMENT OF PURPOSE OF AND NEED FOR ACTION

The Petitioner has filed a Petition for a State Land Use District Boundary Amendment to reclassify approximately 56.65 acres of the Petition Area from the Conservation District to the Urban District (Docket No. A07-777). Reclassification from the Conservation District to the Urban District will allow the Petitioner to expand the acreage of the existing HMP ~~as a cemetery and develop a 20-lot residential subdivision~~ (“Revised Proposed Action”). The Revised Proposed Action identifies 33.835.6 acres for use as cemetery areas, 9.51.4 acres for the preservation of historic sites and cultural preserve, 6.4 acres ~~for a proposed 20-lot residential subdivision~~, and 15.311.4 acres of land to be temporarily disturbed and re-vegetated.

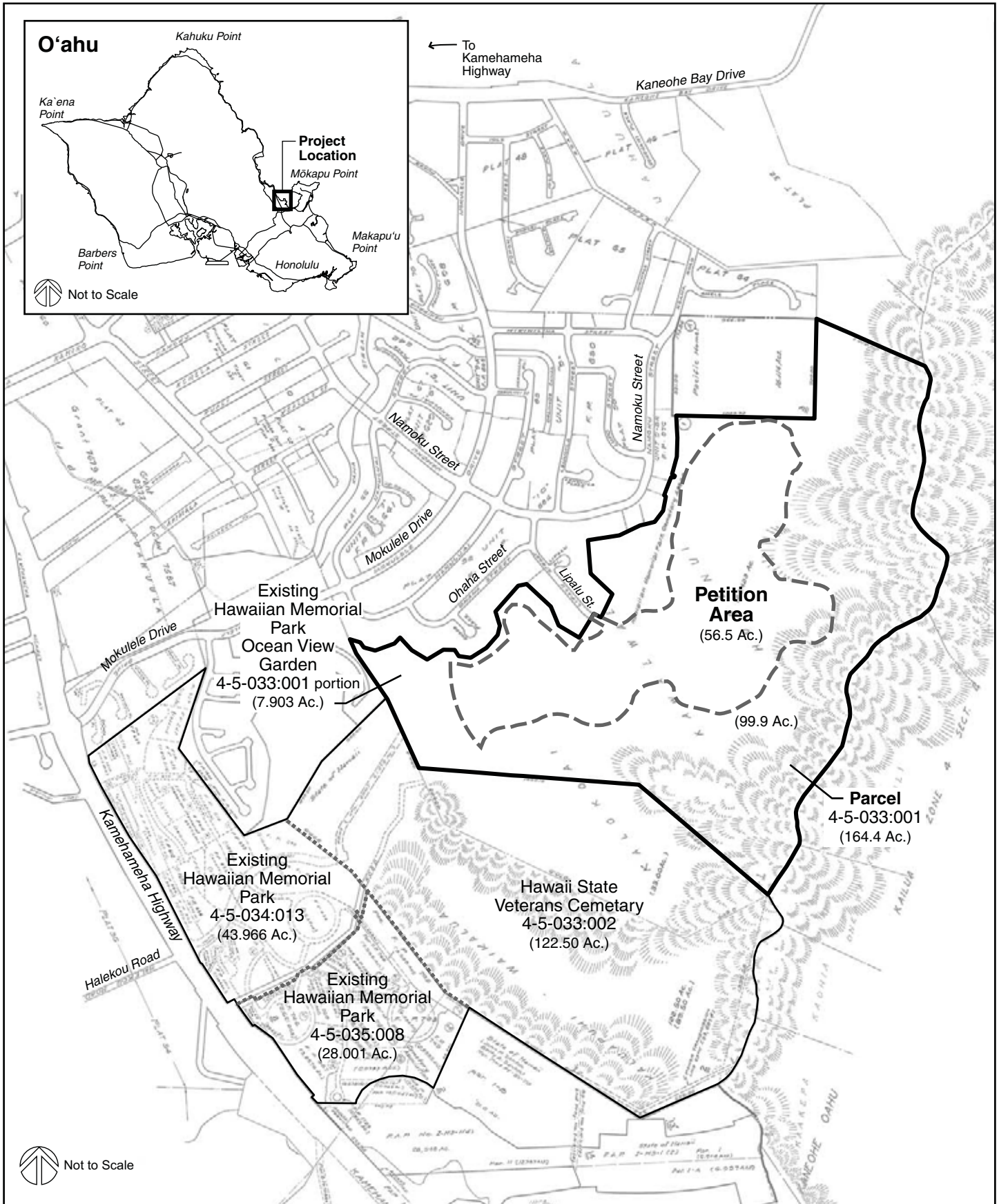
Hawaiian Memorial Park first opened in 1961, offering a variety of interment options for the residents of Hawai'i. HMP is the final resting place for over 30,000 people and accommodates an average of 700-800 interments and 200 inurnments a year from families across Hawai'i. Since 1961, as sections of the cemetery have filled, HMP has grown from an initial size of six acres to its existing size of approximately 80 acres

situated on three tax map parcels: (1) 4-5-034:013 (43.966 acres); (2) 4-5-035:008 (28.001 acres); and (3) 4-5-033: por 1 (7.903 acres) (Figure 2). Parcels 13 and 8 are contiguous, but separated from Parcel 1 by the Hawaii State Veterans Cemetery (4-5-033:002) (Figure 3).

Over the years, as the need for additional burial space has increased, HMP has met the demand by increasing the land area available for burials within the inventory of its ownership and accommodates approximately 25% of all burials in Hawai'i. The most recent expansion occurred on 7.903 acres of Parcel 1, which entailed a ~~State Land Use Boundary District amendment from Agricultural to Urban, and a subsequent change in City and County of Honolulu zoning from the AG-1 Restricted Agricultural District to the P-2 General Preservation District approved by the Honolulu City Council in 1997.~~ HMP anticipates it will exhaust its available supply of burial plots in the near-term, and is approaching its future expansion plans in a master planning effort that it hopes will eliminate the need to re-apply for separate entitlements to expand the cemetery in the future. Given the length of the land use entitlement processes, and subsequent construction design and implementation schedules, it is critical for HMP to begin to ensure adequate space beyond this period. New inventory must be available well in advance of using the last remaining burial spaces within the current inventory. A *Market Need Analysis* was prepared for the project by Clark & Green Associates in 2008. Findings are summarized below and in Section 5.1, and the full report is attached as Appendix A.

Management of cemeteries requires a large number of available inventory, especially ground burial spaces, in order to adequately service the community. Although there are between 6,000 and 7,000 ground burial spaces currently developed and available at HMP, these spaces fulfill very different needs for the community. Since HMP must be able to satisfy all of these different demands, it is necessary to have vacant inventory available scattered throughout the cemetery, even as new inventory is developed. Future planning must occur well in advance of the depletion of existing inventory. The underlying need and the variety of demands requiring the scattered inventory is described below.

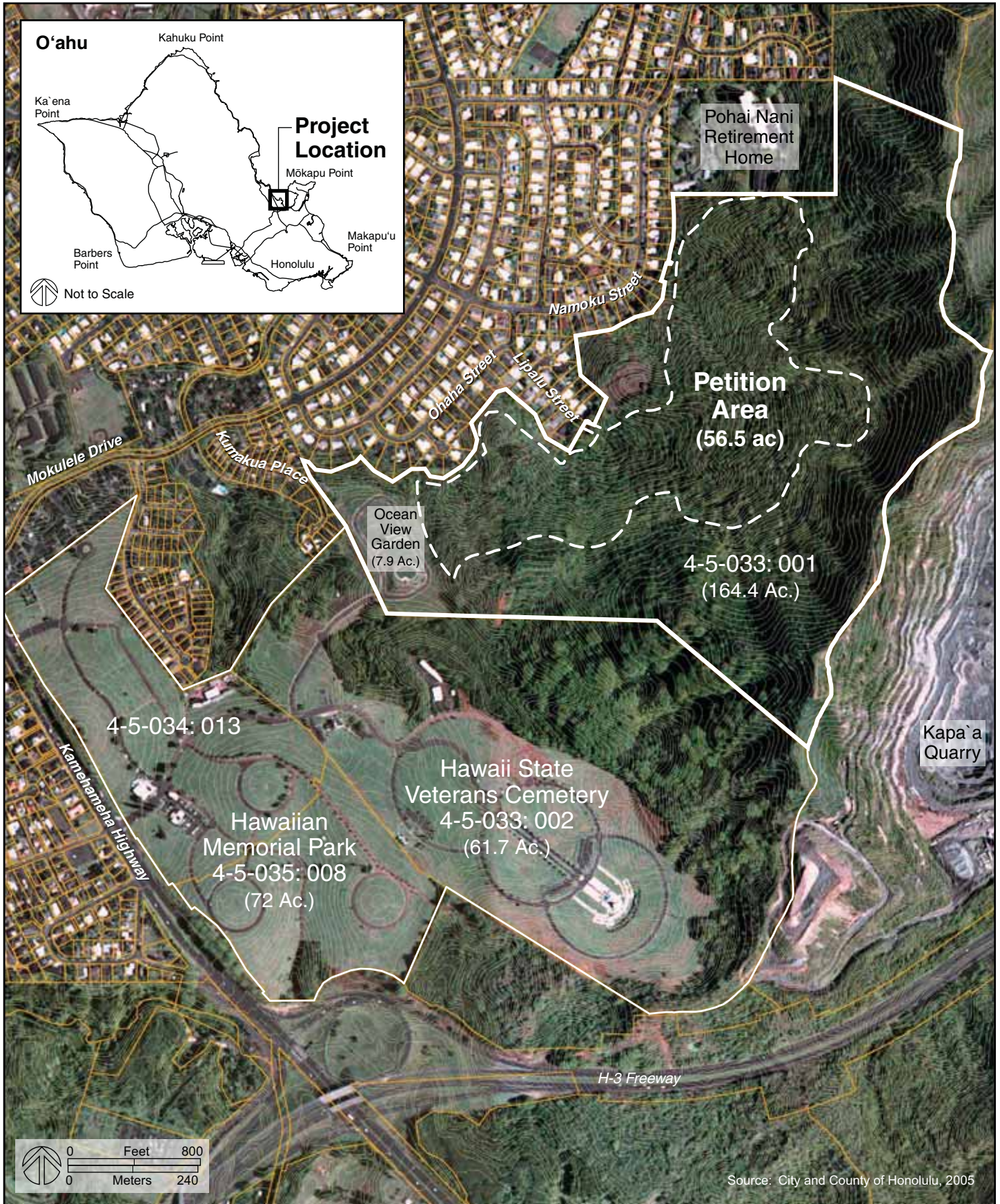
“Heritage” Gardens: Just as there is a societal tendency for families and friends to settle in the same neighborhood or community, many families desire to have burial space in the same garden area of the cemetery as their parents and other relatives. This is called “Heritage” and is an important part of the end of life experience and choice. This places long-term demands on memorial parks to fulfill these important desires. As a result, space management for the cemetery requires that vacant burial plots be scattered throughout the park, to allow families to locate close to other family members as a final resting place.



Tax Map Key

Hawaiian Memorial Park Cemetery Expansion Environmental Impact Statement
Kāne'ohe, O'ahu, Hawai'i

Figure 2



Vicinity Map

Figure 3

Religious and Ethnic Gardens: Another form of “Heritage” is the very important desire for religious and ethnic groups in the greater community to have special affinity gardens tailored to their customs, rituals, and symbolism. These gardens also need to plan for the inevitable expansion required over time to accommodate these groups and their members. Hawai‘i’s community is constantly changing and new groups or communities often approach HMP for their own special garden areas.

Personal Choice and Selection Opportunities: The personal choice of interment type often includes an intense desire for a place in a memorial park that has a special attribute or meaning to the specific family members, such as a special tree, view, or location.

Pre-Need Inventory: Many families plan ahead for this inevitable occurrence and will purchase space years in advance of need. This requires inventory to be developed and ready for use in the event of an untimely passing once it has been purchased.

Cemetery Space Demand

The need for burial services in Hawai‘i is **rising** for several reasons. Hawai‘i’s resident population over the age of 55 is on the rise, a trend which reflects the baby boomer generation moving into and through their 50s and 60s. At the current annual rate of ground burial and with the expected increase in numbers of burials associated with Hawai‘i’s aging population (also see discussion in Section 5.1 of this DEIS), HMP will need to expand its inventory in order to meet increasing demand while maintaining vital heritage opportunities. HMP will have significantly constrained inventory resources over the next five years. In addition to addressing the current rate of use, there are a number of demographic factors that will influence the demand for new burial space in the future. The total of Hawai‘i residents that are 55+ years of age is projected to increase from 19.8% of the population in 1990 to 30.6% of the population in 2030, more than doubling in 40 years. Numbers for cohorts age 70+ are even more dramatic. As a percentage of the overall population, this group will grow from 7.1% of the population in 1990 to a projected 14.7% of the population in 2030, which translates to a 300% increase, from 79,421 in 1990 to a projected 239,150 in 2030.

The annual average number of deaths in Hawai‘i is projected to increase by 62% between 2000-2005 and 2030-2035. The preferences for post-death care for Hawai‘i residents has seen changes over the last 25 years. While burial used to be almost equal to cremation as a method of disposition, cremation has risen to over twice the percentage of burials (See Table 8 in Section 5.1 of this DEIS). In 1980, 45% of those interred in Hawai‘i were buried; in 2005 that number had dropped to 29%. In contrast, in 1980, 43% of those interred in Hawai‘i were cremated; in 2005 that number reached 64%. While percentages have declined, the actual number of burials has remained steady and will continue to do so in the future.

In addition to the demographic trends which support the need for more burial space, a critical reason for needing the cemetery expansion is based on the personal nature of the decisions surrounding the final passage of human life. There are two moments in an individual’s life ~~that~~ when family, friends, acquaintances, and business associates come together to celebrate that life: weddings and funerals. There will continue to be a slow transformation towards more land-efficient interment options like cremation, but the

desire for casketed ground burial is a decision based on family tradition and heritage, and religious and cultural beliefs, and demand will remain strong for the foreseeable future.

At the base of the Ko'olau Mountains, HMP provides a convenient location for Windward and Leeward communities for both initial interment and subsequent visitations to the burial site. Many of these visitors are elderly, and ease of travel is a vital aspect of the need for HMP's expansion. Also, there is a significant community heritage (i.e., existing interments of family members) with the built-up demand that accrues as a result of families' desire to have a final resting place near other family members who are already interred at HMP.

The need for new interment space will not disappear if HMP cannot expand its facilities. Instead, new facilities will need to be built in other areas of O'ahu. Support facilities (such as chapel space, administrative offices, and crematorium) already exist at HMP, which might have to otherwise be constructed elsewhere. It is more efficient to capitalize on the availability of these facilities, in a location already known for its burial tradition, with easy and convenient access for the greater Honolulu area.

In summary, the need for the proposed cemetery expansion is based on the following:

- The annual interment demand will amortize the remaining inventory opportunities within HMP in the next few years.
- The interment demand will at least remain constant at approximately 800 per year due to population growth and an aging population, and recognized demand for HMP as a final resting place.
- There is a significant built-up heritage demand that will continue to grow as family members request interment space within the cemetery.
- The proximity and ease of access to the major population centers of O'ahu is economically and socially desirable for the majority of the community.
- Existing facilities at HMP would need to be duplicated elsewhere, if permission for cemetery expansion is not granted.

Housing Demand

O'ahu's resident population is expected to grow to over 1,600,000 residents by 2030, with the Ko'olau Poko region supporting a small percentage (10%) of the island's population (City and County of Honolulu DPP 2008). O'ahu's household size is expected to continue to decrease in the future, leading to a greater number of households needing housing, thereby reflecting a need for housing within the region. The Island of O'ahu is projected to reach 429,026 housing units by 2030, an increase of 35% from 2000. By comparison, the Ko'olau Poko region is projected to reach 39,278 housing units in 2020 and through to 2030. Even though the region's share of O'ahu's population is small, projections still estimate that between 2010 and 2030, there will be a need for 1,020 additional housing units 820 of which do not have any identified projects to fulfill them (City and County of Honolulu DPP 2008). The residential component of the Proposed Action will help to fill the need for new housing in the region, increasing O'ahu's housing inventory by 20 new homes, all expected to be primary residences.

The development will provide affordable housing opportunities in accordance with applicable City and County of Honolulu affordable housing requirements. The method of satisfying the affordable housing requirement will come from negotiation of the Affordable Housing Plan, approved by appropriate City and County of Honolulu agencies. The Plan could include a range of options, including sale of lots to qualifying affordable owners, construction of dwelling units elsewhere, or payment of an in-lieu fee.

Kāneʻohe, one of the major urban centers of the Koʻolau Poko region, is a stable windward Oʻahu community that experienced its greatest population increases in the 1960s. Kāneʻohe’s population grew from 1,762 in 1940, to 34, 970 in 2000, as indicated below.

<u>Year</u>	<u>1940</u>	<u>1950</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2000</u>
<u>Population</u>	<u>1,762</u>	<u>3,208</u>	<u>14,414</u>	<u>29,903</u>	<u>29,919</u>	<u>35,448</u>	<u>34,970</u>	<u>35,129</u>

The primary factor influencing Kāneʻohe’s growth during the 1960s was the construction of the two tunnel systems (Pali and Wilson Tunnels, which opened in 1957 and 1960, respectively) through the Koʻolau Mountains, which provided windward residents a quick vehicular transportation route to urban Honolulu, the employment center of Oʻahu. Kāneʻohe’s character as a “bedroom” community of Honolulu is evidenced by the number of its residents who find employment in Honolulu. Between 2002 and 2004 an average of 65% of Kāneʻohe residents with jobs worked in Honolulu; an average of 8.6% worked in Kāneʻohe.

The stable nature of Kāneʻohe’s projected population is seen in the data presented in the most recent “Annual Report of the Status of Land Use on Oʻahu” prepared by DPP. The projected population for the Koʻolau Poko Development Plan area will increase only marginally from 117,999 in 2000 to 119,569 in 2020, and will decrease to 116, 666 in 2030. The Revised Proposed Action no longer includes a residential component. Therefore, the Revised Proposed Action will have no effect on addressing need for housing in the Koʻolau Poko region.

1.9 PURPOSE AND NEED FOR THIS ENVIRONMENTAL IMPACT STATEMENT

Under the provisions of §343-5 (a)(6) and (7), HRS, an environmental evaluation of the Proposed Action is required because it involves reclassification of state Conservation District lands and a proposed amendment to the existing county general plan (§343-5 (a)(6) and (7), HRS). The EIS Preparation Notice (EISPN) for this DEIS was published in the January 8, 2008 edition of *The Environmental Notice*. The DEIS was published in the June 6, 2008 edition of *The Environmental Notice*.

The purpose of this EIS is to disclose and provide information on all known or potential effects that the Former and Revised Proposed Actions may have on the environment, economic, and social welfare of the community and State. It describes the potential impacts of the Former and Revised Proposed Actions, both beneficial and adverse, and proposes measures to either avoid or minimize adverse impacts to the environment. A

discussion of alternatives considered in addition to the Former Proposed Action is presented in Chapter 8.

1.10 ORGANIZATION

The EIS is organized into 12 chapters to address the content requirements set forth in §11-200-17, HAR.

1. Introduction and Summary
2. Project Description
3. Relationship of the Proposed Project to Land Use Plans, Policies, and Controls
4. Assessment of Affected Environment, Probable Impacts, and Mitigation:
Physical Environment
5. Assessment of Affected Environment, Probable Impacts, and Mitigation:
Socio-Economic Environment
6. Assessment of Affected Environment, Probable Impacts, and Mitigation:
Public Facilities and Services
7. Cumulative Impacts
8. Alternatives to the Proposed Action
9. Irreversible and Irretrievable Commitments of Resources
10. Relationship Between Local Short-Term Uses of the Environment and
Maintenance and Enhancement of Long-Term Productivity
11. Parties Consulted During the Preparation of the Draft Environmental Impact
Statement
12. Parties Consulted During the Preparation of the Final Environmental Impact
Statement
13. References

2.0 PROJECT DESCRIPTION

2.1 LOCATION AND OWNERSHIP

The Petition Area is located within the Windward O'ahu *moku* (district) of Ko'olau Poko, and is situated within the *ahupua'a* (traditional land division) of Kāne'ohe. Kāne'ohe is a large *ahupua'a* of approximately 11,000 acres, extending from the Windward crest of the Ko'olau Mountain Range to include most of the Mōkapu Peninsula and is bordered by the *ahupua'a* of He'eia to the west and Kailua to the east. Elevations on the Petition Area range from 100 feet (ft) above mean sea level (AMSL) to 945 AMSL, and annual rainfall is approximately 50 inches (Giambelluca *et al.* 1986). The Petition Area is approximately 10 miles northeast of downtown Honolulu, and located mid-way between the two largest towns on the Windward side of O'ahu; Kailua to the east and Kāne'ohe to the west. Kailua and Kāne'ohe, with populations of 45,800 and 35,200 respectively, are suburban "bedroom communities" predominantly comprised of single-family homes and supporting commercial and service establishments. They represent stable, major population centers in Windward O'ahu. The Ko'olau Mountain Range extends west of the Petition Area, and Kāne'ohe Bay is situated approximately one mile to the north (see Figure 1 for regional location). The existing HMP cemetery adds to the "open" ambience of Windward O'ahu.

The 164.4-acre parcel identified by O'ahu Tax Map Key (1) 4-5-033:001 (Parcel 1), is owned by Hawaiian Memorial Life Plan Ltd. The parcel is bounded by residential housing (the Pikoiloa Tract Units 9 and 10 residential subdivisions, totaling 280 lots) to the west, and a natural ridgeline to the east. A high ridge separates the parcel from Kapa'a Quarry and the H-3 Freeway beyond. Pohai Nani Good Samaritan Retirement Community (Pohai Nani) is just beyond the northernmost section of the Petition Area. The Pohai Nani complex includes a main 14-story tower and other accessory buildings. Facilities range from independent living to assisted care. The south-southeastern boundary of Parcel 1 is marked by a steeply sloped, vegetated portion of the Hawaii State Veterans Cemetery, which has a total area of 61.7 acres.

Major roadways in the vicinity of the Petition Area are the H-3 Freeway to the east, Kamehameha Highway to the south, and Mokulele Drive, which serves the surrounding residential neighborhoods southwest and west of the Petition Area. The main entrance road to HMP Cemetery, (which is shared by the Hawaii State Veterans Cemetery), is approximately 1,200 ft northwest of the H-3 Freeway. A paved, two-lane loop road runs *makai* (northeast) leading to the cemetery grounds at HMP from the Kamehameha Highway entrance.

The Former and Revised Proposed Actions will occur on an approximately 56.65-acre portion of the 164.4-acre Parcel 1, adjoining a portion of the existing HMP cemetery known as "Ocean View Garden."

2.2 BACKGROUND

HMP is a full-service, privately-owned cemetery located in Kāne'ohe, O'ahu, Hawai'i. It has been at its present location since 1961. Hawaiian Memorial Life Plan Ltd. has owned and managed HMP for the past 15 years. HMP is the final resting place for over 30,000 people, representing families across Hawai'i. Since 1961, as sections of the

cemetery have filled, HMP has grown from an initial size of six acres to its existing size of approximately 80 acres situated on three tax map parcels: (1) 4-5-034:013 (43.966 acres); (2) 4-5-035:008 (28.001 acres); and (3) 4-5-033: por 1 (7.903 acres). Parcels 13 and 8 are contiguous, but separated from Parcel 1 by the Hawaii State Veterans Cemetery (4-5-033:002).

2.3 EXISTING AND SURROUNDING LAND USES

The Petition Area is currently vacant. Previous land uses within the last 50-75 years include grazing and possibly agriculture (pineapple cultivation). Surrounding land uses include single-family homes, a school (Kaneohe Elementary School), an assisted living facility (Pohai Nani), and the Hawaii State Veterans Cemetery.

The adjacent neighborhoods are predominantly comprised of single-family homes typical of the suburban “bedroom community” of Kāne’ohe. The average lot size in the surrounding community is about 9,000 sf. Homes in the Pikoiloa subdivisions, directly adjacent to the Petition Area, were mostly constructed between 1956 and 1970. Development of the Parkway subdivision, which adjoins the existing HMP grounds at its northwest boundary, occurred during the 1980s. In the last 20 years, land uses surrounding the Petition Area have been stable, with little new construction except for the Hawaii State Veterans Cemetery.

2.4 PROJECT DESCRIPTION

The Petition Area comprises ~~56.6~~ 56.5 acres, with the following program of use for the Revised Proposed Action: ~~33.8~~ 35.6 acres for use as cemetery areas; ~~9.5~~ 4.4 acres for the preservation of historic sites and a cultural preserve; ~~6.4 acres for a proposed 20-lot residential subdivision~~; and ~~15.3~~ 11.4 acres of land to be temporarily disturbed and revegetated (Table 2). The total Petition Area occupies 36% of the 156 acre portion of Parcel 1 that is classified in the State Land Use Conservation District; the remaining 64% of land classified in the Conservation District will remain undisturbed in the Conservation District. Although the Petition Area totals ~~56.6~~ 56.5 acres, at build out only ~~40.2~~ 35.6 acres or ~~24~~ 23% of the remaining 156 acres of Parcel 1 in the Conservation District will be in a developed use (cemetery ~~and residential areas~~), and overall, 51.7 acres (91.5%) of the Petition Area will remain in open space. The ~~9.5~~ 4.4 acres of historic sites and cultural preserve, and the ~~15.3~~ 11.4 acres revegetated to natural and appropriate adaptable plants will be maintained in an undeveloped condition.

Cemetery Expansion. The majority of the approximately ~~56.6~~ 56.5 acres included as part of the Revised Proposed Action will be used for expansion of the cemetery (~~60~~ 63% of the total Petition Area). The cemetery expansion will involve the construction of an internal roadway system extending from the Ocean View Garden section of HMP, as shown in Figure 4a. The roadway will be paved to a width of 26 ft, and will be suitable to accommodate two-way traffic. Of the total ~~56.6~~ 56.5 acres, approximately ~~33.8~~ 35.6 acres will be utilized for burials, mausoleums, drainage retention, and internal roadways within the cemetery. After grading to establish appropriate slopes, the majority of the land will be landscaped with turf and appropriate trees. Approximately 21 acres will be non-cemetery open space (historic sites and cultural preserve which will be left intact except for a modest access road, and revegetated land).

Table 2
Former and Revised Proposed Action Land Use Summary

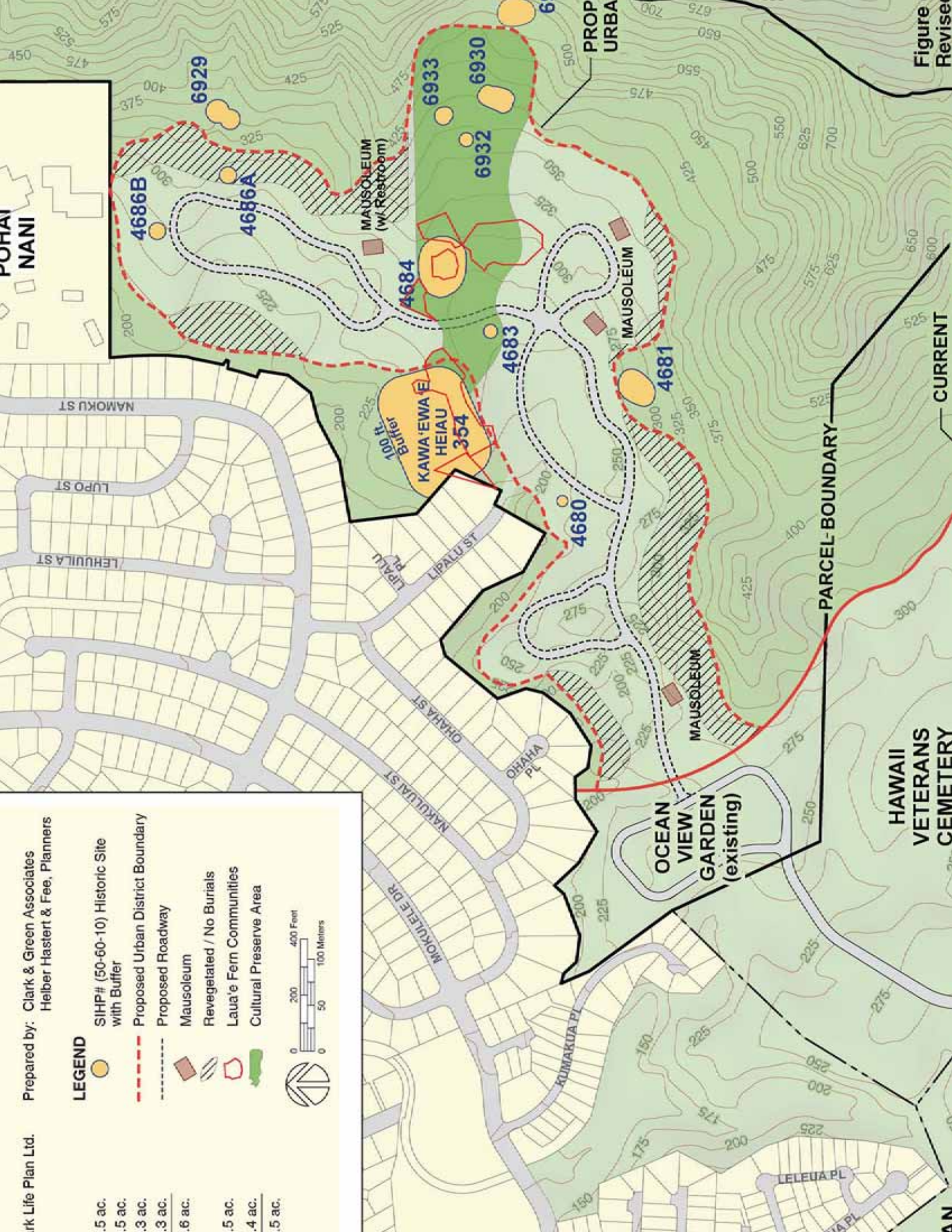
Land Use Summary	<u>Former Proposed Action (Acres)</u>	<u>Revised Proposed Action (Acres)</u>
Cemetery Area	33.8	<u>35.6</u>
Total Burial Areas	(27.8)	<u>29.5</u>
Internal Roadway	(3.9)	<u>(4.5)</u>
Drainage Retention Areas	(1.8)	<u>(1.3)</u>
Mausoleums	(0.3)	<u>(0.3)</u>
<u>Non-Cemetery Open Space</u>	<u>16.4</u>	<u>20.9</u>
Historic Sites/Cultural Preserve	1.1	<u>9.5</u>
Lands to be revegetated	15.3	<u>11.4</u>
Residential Area	6.4	<u>0</u>
TOTAL Petition Area	56.6	<u>56.5</u>

Four structures comprised of one-story mausoleums approximately 3,500 sf in size are proposed to be distributed throughout the cemetery expansion area. The mausoleums will be used for the above-ground entombment of casketed and cremated remains in crypts and niches. One of the mausoleums will be designed with restroom facilities. A typical mausoleum is shown in Figure 5. These buildings will be constructed of concrete, with approximate dimensions of 24 ft high, 24 ft wide, and 200 ft long. Other small private or family mausolea structures may be placed throughout the cemetery grounds with special features, statuary, low garden walls, walkways, and monuments. The family mausolea will be small structures to inter casketed remains that are commonly placed throughout cemeteries and are requested and purchased by families. Examples of these modest designs and special features are shown in Figure 6.

Residential Subdivision. A 20-lot single family residential subdivision is was proposed as part of the Former Proposed Action for a portion of the Petition Area that is immediately adjacent to and south of Pohai Nani (Figure 4). A connecting road for the subdivision pushes the total area for the residential uses of the Petition Area to 6.4 acres. The subdivision will include 20 single-family lots. After receiving comments during the public review period of the DEIS, and conducting additional analysis, the owner has determined that deletion of the residential subdivision portion of the project will most appropriately meet the needs of the local community and be an environmentally superior project. The Revised Proposed Action will have no residential component.

~~The residential lots will range from 7,500 to 8,000 sf in size to maintain consistency with the residential zoning and character of existing lots in the area. The development will provide affordable housing opportunities in accordance with applicable City and County of Honolulu affordable housing requirements. The method of satisfying the affordable housing requirement will come from negotiation of the Affordable Housing Plan, approved by appropriate City and County of Honolulu agencies. The Plan could include a range of options, including sale of lots to qualifying affordable owners, construction of dwelling units elsewhere, or payment of an in-lieu fee.~~

~~The residential subdivision will be serviced by a private roadway connecting the subdivision via an approximately 1,600-ft roadway extension from the end of Lipalu~~



Prepared by: Clark & Green Associates
 Heiber Hastert & Fee, Planners

LEGEND

- SIHP# (50-60-10) Historic Site with Buffer
- Proposed Urban District Boundary
- Proposed Roadway
- Mausoleum
- Revegetated / No Burials
- Laua'e Fern Communities
- Cultural Preserve Area

0 200 400 Feet
 0 50 100 Meters

.5 ac.
 .5 ac.
 .3 ac.
 .3 ac.
 .6 ac.
 .5 ac.
 .4 ac.
 .5 ac.

Figure
 Revised

HAWAII
 VETERANS
 CEMETERY

CURRENT

PARCEL BOUNDARY

PROP
 URBA

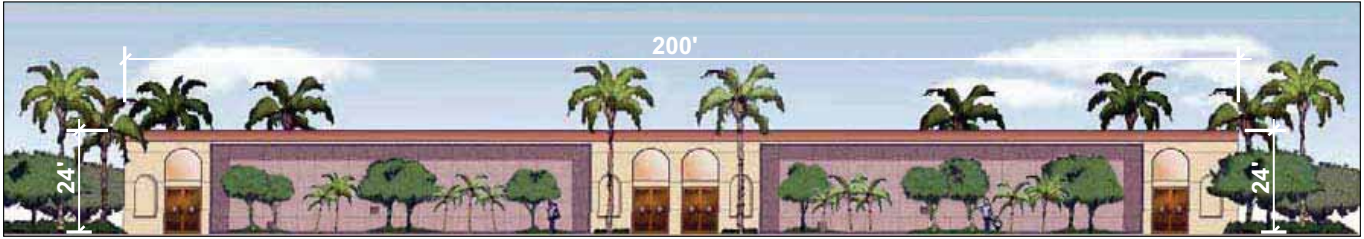
OCEAN
 VIEW
 GARDEN
 (existing)

MAUSOLEUM
 (w/ Restroom)

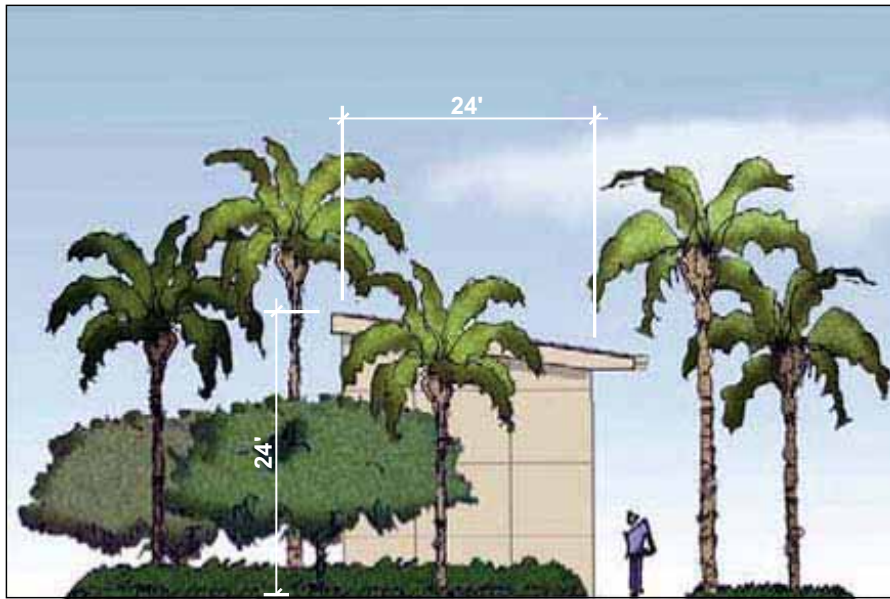
MAUSOLEUM

KAWA'EWA'E
 HEIAU
 100 ft
 Buffer

POHAI
 NANI



Front Elevation



Side Elevation

Not to Scale

Typical Mausoleum Elevations

Figure 5



All images shown were taken at the existing Ocean View Garden of Hawaiian Memorial Park.

Typical Family Gardens and Mausolea

Figure 6

Street. The subdivision will be provided with an internal roadway system as shown in Figure 4, and underground utilities including water, sewer, electric, telephone, and cable.

2.5 PROJECT PHASING

Construction for the cemetery expansion will commence after all required permits for the project are received and will be completed in phases over a 10 to 20-year period including permitting. It is anticipated that the entitlement phase of the project will be completed by mid-~~2009~~2010. The Petitioner intends to commence design and construction of the backbone infrastructure for development of the entire Petition Area in a single integrated system as soon as all permits or exemptions have been obtained. A preliminary target date for completion of Phase 1 of construction is mid-~~2010~~2011. Without assurance that the entire the project may be built as planned, it would not be feasible for the Petitioner to proceed to design and build large scale infrastructure improvements with the capacity needed to accommodate development of the entire project. Therefore Petitioner anticipates a majority of the Petition Area will be completed or under construction within 10 years after all permits have been obtained. In addition, due to the relatively small size of the portion of the Petition Area to be developed, the Petitioner submits that it would not be appropriate for the project to be approved in increments.

Expansion of the cemetery will extend from the existing Ocean View Garden section and proceed in a northerly direction ~~toward the residential subdivision~~. Phases are anticipated to be completed every three to five years, depending on demand, thus limiting the area that will be under development at any one time. Phase 1 will include ~~42~~ 14.6 acres of cemetery and natural revegetated slope areas ~~and the 6.4 acres of residential subdivision~~. Phase 2 will include ~~167~~ acres of cemetery and natural revegetated slope areas; and Phase 3, the final 16.57 acres of cemetery and revegetated slopes; and Phase 4, ~~the final 7.6 acres of cemetery area~~ (See Figure 7 for Phasing Plan).

2.6 PROJECTED DEVELOPMENT COSTS

Development costs for the cemetery ~~and the residential subdivision construction are is~~ estimated to be \$6 million (in 2008 dollars) at \$8.1 million (in 2007 dollars).

3.0 RELATIONSHIP OF THE PROPOSED PROJECT TO LAND USE PLANS, POLICIES, AND CONTROLS

3.1 STATE OF HAWAII

3.1.1 Hawai'i State Plan

The *Hawai'i State Plan*, established through the State's legislative process, represents public consensus regarding expectations for Hawai'i's future. Chapter 226, HRS, as amended, describes the purpose of the State Plan as follows:

"[it] shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State of Hawai'i; provide the basis for determining priorities and allocating limited resources, such as public funds, services, manpower, land, energy, water, and other resources; improve coordination of state and county plans, policies, programs, projects, and regulatory activities; and establish a system for plan formation and program coordination to provide for an integration of all major state and county activities" (Chapter 226-1, HRS; Findings and Purpose).

The goals, objectives, policies, and guidelines of the Hawai'i State Plan are, on occasion, in conflict with one another. As a result, the Revised Proposed Action supports some of the goals while it is inconsistent with others. The following discussion analyzes the impacts of the Revised Proposed Action with respect to relevant State Plan goals, objectives, policies, and priority guidelines:

Section 226-11 Objective and policies for the physical environment – land-based, shoreline, and marine resources.

Section 226-11(b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

Discussion: The Revised Proposed Action will involve development of cemetery grounds and a residential subdivision that are integrated into the gently sloping terrain in an environmentally sensitive manner. In general, the topographic profile of the Petition Area will include changes in slope to eliminate sharp changes in contour. Overall drainage flow patterns and drainage ways will remain in current configurations, and new contours will tie into existing contours to provide consistent topographic profiles.

Section 226-12 Objective and policies for the physical environment - scenic, natural beauty, and historic resources.

Section 226-12(b)(1) Promote the preservation and restoration of significant natural and historic resources.

Section 226-12(b)(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.

Section 226-12(b)(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.

Discussion: No threatened or endangered plant or animal species are present within the Petition Area. There are several significant historic sites located in the Petition Area which will be preserved as part of a 9.4-acre cultural preserve, with appropriate buffering dimensions. These specific design elements will be determined during the preparation of an Archaeological Preservation Plan, in consultation with SHPD and Native Hawaiian cultural groups and organizations (see Section 4.9). In addition, the Kawa'ewa'e Heiau is located to the northwest of the Petition Area (listed on the National Register of Historic Places). At the present time, Hawaiian civic groups care for the *heiau*. Proposed elements of the Revised Proposed Action will be designed to maintain the integrity of and minimize impacts to the cultural sites. Also, preparation of a CIA for this DEIS indicated that there are groups of *hula* practitioners who use the property owned by the cemetery to gather the *laua'e* fern for use as part of their *hula* activities. Prior to finalization of this EIS, an addendum to the Botanical Survey prepared for this project was conducted and portions of the Petition Area were identified to have communities of *laua'e*. ~~As this time, the specific locations used for these activities have not been delineated.~~ However, the Petitioner has stated the intent to continue to accommodate these activities in a manner that is respectful to the practitioners, and a 9.4-acre cultural preserve area will be established as part of the Revised Proposed Action which will encompass the significant archeological sites and areas of *laua'e* fern (see Figure 4a). ~~Discussions in this regard are on-going.~~

For the Revised Proposed Action, the Petition Area will be marginally visible in some areas, and completely shielded from others by existing natural vegetation and vertical separation. The cemetery expansion will, in general, not be visible from existing residences adjacent to the HMP boundary at the proposed expansion. Where proposed new cemetery area is visible, it will appear as open landscape with scattered trees of intermediate height. The 9.4-acre cultural preserve will retain the same appearance as present, as this area will not be altered, except for a modest access road. Overall, the predominant viewplane will continue to be one of open space and the lush green of grass and trees. Refer to Figures 22a and 22b, and 23a-23g in Section 4.10 for further information on visual impacts.

Section 226-13 Objectives and policies for the physical environment - land, air, and water quality.

Discussion: Storm runoff from developed areas will be controlled by retention areas, which will be scattered throughout the Petition Area to provide the required amount of storage. The retention areas will be designed to ensure that the proposed project is helping to improve the water quality of Kāwā Stream and ultimately Kāne'ohe Bay (see Section 6.4 for a more detailed discussion) through the net improvement in runoff quality compared to current existing conditions.

Section 226-13(b)(7) Encourage urban developments in close proximity to existing services and facilities.

Discussion: The Petition Area lies adjacent to established residential neighborhoods (Pikoiloa Tract Units 9 and 10 residential subdivisions) and two existing fully developed cemeteries (HMP and Hawaii State Veterans Cemetery). The location of the proposed cemetery expansion in this area complements existing similar facilities. ~~The residential~~

component of the Proposed Action is also adjacent to areas already developed for residential use.

Section 226-14 Objective and policies for facility systems – in general.

Section 226-14(b)(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

Discussion: The cemetery expansion portion of the Revised Proposed Action will provide a vital and necessary community support facility to accommodate Hawai'i's growing and aging population. As discussed in Section 5.1 of this DEIS, Hawai'i's resident population over the age of 55 is on the rise. In addition, the annual average number of deaths in Hawai'i is projected to increase by 62% between 2000-2005 and 2030-2035.

It is preferable to locate a new cemetery adjacent to an already existing full service cemetery and mortuary. If HMP cannot expand in the Petition Area, new facilities will need to be built in other areas of O'ahu. Support facilities (such as chapel space, administrative offices, and crematorium) already exist at HMP. Duplicate support facilities which might have to otherwise be constructed elsewhere as a part of a new cemetery if built in another part of Hawai'i. It is more efficient to capitalize on the availability of these facilities, in a location already known for its burial tradition, with easy and convenient access for the greater Honolulu area.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes.

Section 226-15(b)(1) Encourage the adequate development of sewerage facilities that complement planned growth.

Section 226-15(b)(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.

Discussion: The existing 8-inch sanitary sewer line serving Lipalu Street has excess capacity to accommodate the new flows associated with the project. This connection has already been approved by the City and County of Honolulu DPP. Wastewater generated by development of the Petition Area will be accommodated by added wastewater lines and a collection system within the Petition Area. However, with the elimination of the 20-lot residential subdivision, the use of these facilities will not be needed. ~~Development of the Petition Area will not commence until DPP confirms that adequate capacity exists and approves both the project sewer master plan prepared for the project and the sewer connection permit.~~

The use of non-potable water will be explored for cemetery irrigation. In addition, project operation and maintenance protocols already involve recycling green waste, with turf clippings being left in place. In addition, HMP will start a compost program to recycle all of its green waste.

Water conservation measures will be explored, where possible, such as the use of waterless urinals and other water reduction techniques. The proposed project will

include revegetation with appropriate adaptive native and indigenous species. Some adaptive Polynesian-introduced plants may be used as well, all of which will require little or no watering once established. It should be noted that in a typical year, very little supplemental irrigation will be required for the cemetery landscape areas, especially after plant material and turf has been established. For the irrigation that will be needed, the cemetery's irrigation system will employ weather-based "smart" evapotranspiration controllers. In addition, the project will incorporate exfiltration systems under the roadways to maximize infiltration under the pavement.

Section 226-16 Objective and policies for facility systems - water.

Section 226-16(b)(1) Coordinate development of land use activities with existing and potential water supply.

Section 226-16(b)(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

Discussion: ~~Potable Drinking~~ water for the residential aspect of the ~~Former~~ Proposed Action ~~will~~ would have come from creating an on-site water system, including an on-site well and storage facility. The proposed on-site well system for irrigation water could also ~~have~~ provided the necessary ~~potable drinking~~ water supply if the water tested successfully for potability and/or if additional on-site treatment is performed. ~~Actual water commitments will not be issued by BWS until building permit applications are submitted. However, no new drinking water supply or infrastructure will be needed as the residential subdivision will no longer be developed.~~

Water conservation measures will be explored, where possible, such as the use of waterless urinals and other water reduction techniques. The proposed project will include revegetation with appropriate adaptive native and indigenous species. Some adaptive Polynesian-introduced plants may be used as well, all of which will require little or no watering once established. It should be noted that in a typical year, very little supplemental irrigation will be required for the cemetery landscape areas, especially after plant material and turf has been established. For the irrigation that will be needed, the cemetery's irrigation system will employ weather-based "smart" evapotranspiration controllers. In addition, the project will incorporate exfiltration systems under the roadways to maximize infiltration under the pavement.

Section 226-19 Objectives and policies for socio-cultural advancement – housing.

Section 226-19 (b)(1) Effectively accommodate the housing needs of Hawaii's people.

Section 226-19 (b)(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.

Discussion: The Proposed Action will provide 20 residential lots similar to those found in surrounding neighborhoods. The Petition Area's location in the Kāneʻohe region ensures that adequate public and community services as well as employment opportunities are accessible to future residents.

Section 226-104 Population growth and land resources priority guidelines.

Section 226-104(b)(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.

Discussion: The Petition Area is located in the Kāne'ohe region, surrounded by existing residential communities and contiguous to existing cemeteries. Due to its topography and soils types, use of the Petition Area for long-term agriculture production is not likely. According to the Agricultural Lands of Importance to the State of Hawai'i (ALISH) rating system, approximately 26 acres (46%) of the Petition Area are rated as "Other." However, the location of the property adjacent to a residential area would make intensive agricultural use of the property difficult. Historical use records from the State Department of Agriculture indicate no historic agricultural use of the property or surrounding area as of 1982, nor are agricultural activities currently underway. The remaining portion of the Petition Area has no value under the ALISH system.

3.1.2 State Functional Plans

The Hawai'i State Plan directs the appropriate State agencies to prepare functional plans for their respective program areas, including: agriculture, conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, transportation, and water resources development. While the Hawai'i State Plan establishes long-term objectives for Hawai'i, the State functional plans serve as the primary implementing vehicle for the Hawai'i State Plan and delineate specific strategies of policies and priority actions that should be addressed in the short term.

The State Functional Plans have been adopted by the Hawai'i State Legislature and approved by the Governor. The plans set forth "...the policies, statewide guidelines, and priorities within a specific field of activity, when such activity or program is proposed, administered, or funded by any agency of the State" (§226-2, HRS). Each functional plan contains objectives to be achieved and policies to be pursued within the specific areas. "...Such policies shall address major programs and the locations of major facilities" (§226-57(b), HRS). The Hawai'i State Plan mandates that the State Functional Plans "...shall be taken into consideration in amending the county general plans" (§226-52 (a)(3), HRS).

The Revised Proposed Action generally supports the objectives and policies of the following State Functional Plans:

State Housing Functional Plan

~~The Housing Finance and Development Corporation coordinated the preparation of this functional plan. The State Housing Functional Plan provides a comprehensive strategy for the development, preservation, and management of housing within the State to meet Hawai'i's future housing needs. Areas of concern addressed in the Plan include homeownership, rental housing, rental housing for the elderly and other special need groups, and designating and acquiring land that is suitable for residential development.~~

Issue Area: Homeownership

Policy A(2): Encourage increased private sector participation in the development of affordable for-sale housing units.

Policy A(3): Ensure that (1) housing projects and (2) projects which impact housing provide a fair share/adequate amount of affordable homeownership opportunities.

Discussion: Expected modest increases in household formation in the Ko'olau Pōke region will necessitate new housing. The Petition Area will increase O'ahu's housing inventory by 20 new lots, all expected to be primary residences. This will fill a small percentage (2.5%) of the projected need of 820 housing units in the region by 2020 (City and County of Honolulu DPP 2008). The development will provide affordable housing opportunities in accordance with applicable City and County of Honolulu affordable housing requirements. The method of satisfying the affordable housing requirement will come from negotiation of the Affordable Housing Plan, approved by appropriate City and County of Honolulu agencies. The Plan could include a range of options, including sale of lots to qualifying affordable owners, construction of dwelling units elsewhere, or payment of an in-lieu fee.

State Recreation Functional Plan*Issue Area II. Mauka, urban, and other recreational opportunities*

Objective IIA (1): Plan and develop facilities and areas that feature the natural and historic/cultural resources of Hawaii. Develop interpretative programs for these areas.

Discussion: Several significant archaeological sites and cultural resources exist within and adjacent to the Petition Area. These sites have been investigated by the project's AIS and CIA, and will be protected according to the recommendations of these reports. In an effort to provide the maximum protection and context for these resources, a 9.4-acre cultural preserve has been created east of the Kawa'ewa'e Heiau which will encompass significant archaeological sites.

State Historic Preservation Functional Plan

The Historic Preservation Functional Plan lays out guidance for how Hawai'i should preserve its past. The plan discusses proper management and treatment of historic properties, stressing the importance of rehabilitating, restoring, or preserving historic sites or buildings by private property owners, providing financial incentive to do so if necessary. The functional plan also emphasizes providing the public with information pertaining to the historic resources.

I. Issue Area: Preservation of historic sites

Objective A: Identification of historic properties

Objective B: Protection of historic properties

Objective C: Management and treatment of historic properties

Discussion: Several historic archaeological sites exist within and in the Petition Area (discussed in Section 4.9). These sites have been surveyed by the project's AIS and CIA, and will be protected according to recommendations of these reports.

State Conservation Lands Functional Plan

The State Conservation Lands Functional Plan lays out guidance for protection and preservation of Hawai'i's Conservation Lands. The plan presents an inventory of Hawai'i's natural resources, and discusses the best management strategies to resolve the conflicting interests relating to natural resources. In order to protect the remaining pristine areas in the State, development is called for only on formerly developed lands. The functional plan also emphasizes providing the public with information pertaining to these resources.

The four priority guidelines for the Conservation Lands Functional Plan include:

- 1) Direct future urban development away from critical environmental areas or impose mitigating measure so that negative impacts on the environment would be minimized;
- 2) Identify critical environmental areas in Hawai'i to include but not be limited to the following: watershed and recharge areas; wildlife habitats on land and in the ocean; areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources;
- 3) Utilize Hawai'i's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations;
- 4) Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.

Discussion: It is probable that portions of the Petition Area were used for pineapple and grazing in the past. According to the botanical survey conducted for the project, existing vegetation found in the Petition Area is characterized by the alteration of native plant habitat; 86% are alien or introduced species. Similarly, the fauna and arthropod surveys conducted for the Petition Area found a low presence of native species. There are no known endangered or threatened or species of concern of flora, fauna, or arthropods. The Petition Area is almost completely devoid of native Hawaiian species, and is probably the site of prior agricultural activity.

All significant historic and cultural sites known on or adjacent to the Petition Area shall be preserved and protected and future access to these sites will be ensured for cultural practitioners and custodians of Kawa'ewa'e Heiau. The Revised Proposed Action includes establishment of a 9.4-acre cultural preserve area that encompasses five archaeological sites within the Petition Area east of Kawa'ewa'e Heiau. This cultural preserve will also include significant areas where the *laua'e* fern is found, to provide

future supply for those who gather this plant. This preserve area will be designed in careful consideration of site boundaries and in relationship to contiguous sites.

The views from Kamehameha Highway across the landscaped cemetery lawns through to the foothills separating Kāne'ohe and Kailua will be preserved. Some view alteration will occur, as the landscaped cemetery will extend up and across what is now a primarily overgrown non-native Schefflera/Java Plum Forest. In the area of the proposed cemetery expansion, the character of the open space will be changed from non-native forest to open lawns and scattered trees. While the project will be visible from some generally distant vantage points, views will generally not be significantly impacted, as shown and described in further detail in Section 4.10 of this EIS. In general, the open space feeling and view will remain, as 91.5% (51.7 acres) of the Petition Area will remain in vegetated open space. All negative impacts to the environment will be mitigated.

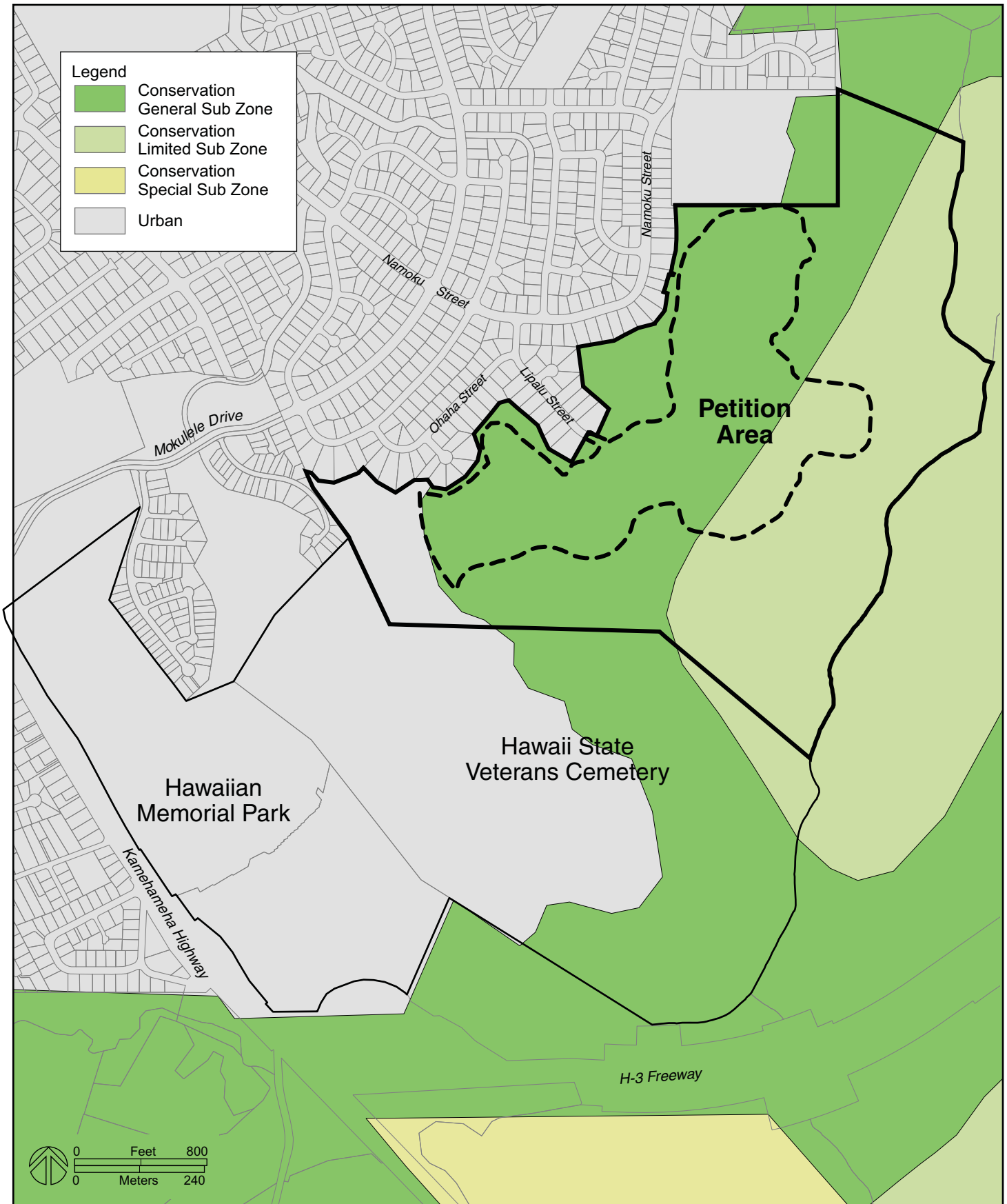
3.1.3 State Land Use Law

The State Land Use Commission, pursuant to Chapter 205, HRS, has classified all lands in the State of Hawai'i into one of four land use districts. The four land use districts are: (1) Conservation; (2) Agricultural; (3) Urban; and (4) Rural. The area comprising the Petition Area lies within the State Conservation District, although a small area of Parcel 1 (approximately 7.903 acres), mostly in the southwestern section of the parcel, already lies within the State Urban District (Figure 8).

The Conservation District is further subdivided into five subzones: General; Limited; Protective; Resource; and Special. The Petition Area is within the General and Limited Subzones. The General subzone is considered the least sensitive subzone. The objective of the General Subzone "is to designate open space where specific conservation uses may not be defined, but where urban use would be premature" (§13-5-14 (a), HAR). Among others, including one single-family dwelling, the Conservation District Rules and Regulations suggest that the General Subzone could accommodate "lands suitable for farming, flower gardening, operating of nurseries or orchards, grazing; including facilities accessory to these uses where the facilities are compatible with the natural physical environment" (§13-5-14 (b) (2), HAR).

The majority of the Petition Area (approximately 47 acres; 83%) is located in the General subzone. The physical characteristics of the Petition Area have been described as a highly disturbed Schefflera/Java Plum Forest. Only eight percent of the plant species identified on-site are native. The property does not function as a forest reserve for water recharge purposes. The property will remain predominantly in vegetated open space, which is consistent with the intent of Conservation Land. Approximately 11.4 acres will be revegetated with appropriate native and Polynesian-introduced species and landscaping for the cemetery expansion will result in over 300 new trees. The existing significant historic sites and cultural practices will be preserved and retained.

The objective of the Limited subzone is "to limit uses where natural conditions suggest constraints on human activities" (§13-5-12 (a), HAR). Cemetery uses and residential units are not permitted in the State Conservation District; therefore a re-designation to the State Urban District by the State Land Use Commission is being sought.



Land Use Districts Sub Zones

Figure 8

Only 17% (9.6 acres) of the Petition Area will be reclassified from the Limited subzone to the Urban District. Of this total, 4.7 acres will be located within the cultural preserve area and its use will not be changed from its existing character except for construction of an access road. Therefore, of the total 56.5-acre Petition Area, only 4.9 acres (8.7%) are within the Limited subzone and will be converted to cemetery use under the Revised Proposed Action. The majority of the area will remain in open space (cemetery use), and human activity will be minimal in the steep sloped areas. The results of the Slope Stability and Rockfall Hazard performed for this EIS are discussed further in Sections 4.2 and 4.6, and the full report is attached as Appendix B. The slope stability analysis found there to be no apparent potential for hazards associated with slope stability. Most slopes in the Petition Area are less than 20%; although some land with higher slope will need to be graded in order to ensure all land within the Petition Area is stable. Most of these steeper lands will be revegetated and will not be used for burials, and therefore will not be areas where human activity is expected. There is a potential for hazards associated with rockfall, but these can be mitigated using available technology.

Urban District

In reviewing petitions for reclassification of district boundaries, the State Land Use Commission follows eight (8) standards for urban district boundaries as set forth in §15-15-18, HAR. The standards are presented below, followed by a brief discussion of each.

(1) It shall include lands characterized by “city-like” concentrations of people, structures, streets, urban level of services and other related land uses;

Discussion: The Petition Area lies adjacent to areas already developed for residential use (Pikoiloa Neighborhood Tract Units 9 and 10), and two existing fully developed cemeteries (the existing HMP and Hawaii State Veterans Cemetery).

(2) It shall take into consideration the following specific factors:

(A) Proximity to centers of trading and employment except where the development would generate new centers of trading and employment;

(B) Availability of basic services such as schools, parks, wastewater systems, solid waste disposal, drainage, water, transportation systems, public utilities, and police and fire protection; and

(C) Sufficient reserve areas for foreseeable urban growth;

Discussion: The Petition Area lies immediately adjacent to established residential neighborhoods, and cemetery uses, ~~with employment opportunities in Kāne‘ohe readily accessible to future residents.~~ Public facilities and services such as transportation systems, schools, parks, wastewater, water systems, and other utilities are already in existence in the Kāne‘ohe area. Kamehameha Highway ~~services provides access to~~ the cemetery, and the H-3 Freeway is approximately ¼ mile to the east.

(3) It shall include lands with satisfactory topography, drainage, and reasonably free from the danger of any flood, tsunami, unstable soil condition, and other adverse environmental effects;

Discussion: The Petition Area is not in an identified flood hazard area or tsunami inundation zone. The slope stability analysis performed for this DEIS found there to be no apparent potential for hazards associated with slope stability. Most slopes in the Petition Area are less than 20%; although some land with higher slope will need to be graded in order to ensure all land within the Petition Area is stable. Most of these steeper lands will be revegetated and not used for burials. There is a potential for hazards associated with rockfall, but these can be mitigated using available technology. Drainage will be managed by a series of on-site retention areas, in compliance with County drainage requirements. There are no known endangered or threatened or species of concern. Most plant species on the site are introduced. All significant historic and cultural sites known on or adjacent to the Petition Area shall be preserved and protected, and future access to these sites will be ensured for cultural practitioners and custodians of Kawa'ewa'e Heiau.

Most of the land within the Petition Area generally sloped at 20% or less will be graded to provide suitable areas for gravesites. Areas with slopes exceeding 25% are not suitable for land burial use. In general, the topographic profile of the Petition Area will include changes in slope to eliminate sharp changes in contour. Some topographic features will be altered, but overall drainage flow patterns and drainage ways will remain in current configurations, and new contours will tie into existing contours to provide consistent topographic profiles.

(4) Land contiguous with existing urban areas shall be given more consideration than non-contiguous land, and particularly when indicated for future urban use on state or county general plans;

Discussion: The Petition Area is located contiguous to urban areas which have been in urban use since the 1950s and 1960s.

(5) It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on state and county general plans;

Discussion: The Petition Area is not shown on any State or City and County of Honolulu General Plans as an area of urban growth, and does not conform to this standard (See Standard 6 below).

(6) It may include lands which do not conform to the standards in paragraphs (1) and (5):

(A) When surrounded by or adjacent to existing urban development

(B) Only when those lands represent a minor portion of this district;

Discussion: The Petition Area ~~does~~ conforms to this standard, as it is adjacent to existing urban community of Kāne'ohe to the north, west, and south (See Figure 8), and the Petition Area is a minor portion of the district. In addition, with approval of the boundary amendment, Parcel 1 will still have over 60% of its total area within the State Conservation District.

(7) *It shall not include lands, the urbanization of which will continue toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services; and*

Discussion: The reclassification of the Petition Area to the Urban land use district will be contiguous to areas already classified as urban, and will not lead to scattered urban development. In fact, the requested Boundary Amendment will prevent urbanization of other land in a different location for the same purpose, as the need for the expansion will not disappear if the Petition Area is not available for cemetery expansion or housing.

(8) *It may include lands with a general slope of 20 per cent or more if the commission finds that those lands are desirable and suitable for urban purposes and that the design and construction controls, as adopted by any federal, state, or county agency, are adequate to protect the public health, welfare and safety, and the public's interests in the aesthetic quality of the landscape.*

Discussion: Most of the land within the Petition Area will be graded to provide suitable areas for gravesites ~~and residential development~~, generally sloped at less than 20%. As stated in #3 above, some lands have a general slope exceeding 20%, but they are needed within the Petition Area to stabilize the entire grading scheme. Most of these areas will be returned to a vegetated state, and will not be used for burial areas ~~or housing~~. The proposed cemetery will be visible from distant higher elevation vantage points, but overall the public's view and aesthetic enjoyment of the open space of the Oneawa Hills will continue and be consistent with the general visual of the Windward foothills. The viewplanes of the area will continue to be characterized by the green backdrop of the hills with cemetery development on the lower flanks.

3.1.4 Environmental Impact Statement Law (Chapter 343, HRS)

According to §11-200-5, HAR, Chapter 343, HRS shall apply to projects or actions which are required to obtain an agency approval prior to proceeding with implementing actions which are either located in certain specified areas, or actions that require certain types of amendments to existing county general plans. The provisions of Chapter 343, HRS also require that the significance of an action's potential impacts shall be assessed at the earliest practicable time.

HRS §343-5(a)(7), requires environmental review for various actions, including actions that "propose any reclassification of any land classified as conservation district by the state land use commission under chapter 205". Further, HRS §343-5 (a)(6), provides that the provisions of Chapter 343 apply to "any amendment to existing county general plans where the amendment would result in designations other than agriculture, conservation or preservation..." A State Attorney General opinion (Opinion No. 85-30) has broadened the scope of the definition of county general plans to include "...non-county initiated actions which propose amendment or change to a county's planning documents, however denominated, and development plans or otherwise, and which would result in a designation other than agriculture, conservation or preservation." The Former and Revised Proposed Actions ~~is~~ are subject to the provisions of Chapter 343, HRS because the proposed cemetery expansion ~~and residential development (1) are~~ is on land currently designated ~~as in the State Land Use Conservation District by the State Land Use Commission;~~ and (2) will require an amendment to the Ko'olau Poko SCP.

3.1.5 Coastal Zone Management Program

Objectives and policies of the Coastal Zone Management Program are described in Chapter 205A-2, HRS, Part I. The Petition Area lies within the State's Coastal Zone Management Area, which includes all lands of the State and the area extending seaward from the shoreline.

The project's conformance with objectives of the Coastal Zone Management Program is discussed below:

Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Discussion: Development of the Petition Area does will not affect coastal recreational opportunities because it is located approximately 0.8 miles from the coast.

Historic Resources

Objective: Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Discussion: Several historic and archaeological sites have been identified in the Petition Area (see Section 4.9 of this DEIS). Each of these sites will be preserved or documented in accordance with SHPD requirements, and in consultation with Native Hawaiian civic groups and individuals. Appropriate mitigation measures will be incorporated into Archaeological Preservation and Monitoring Plans. An Archaeological Inventory Survey (AIS) conducted by Cultural Surveys Hawai'i, Inc. (CSH) for the Petition Area has been submitted to SHPD for review and is pending determination. A comment letter from SHPD relating to the AIS was received on September 22, 2008. The recommendation of the agency included four main points: (1) preservation of sites 354, 4684, 6932, and 6931 as a complex, not individually; (2) no relocation of the grinding stone; (3) consultation with ethnic organizations or members of a group for whom some of the historic properties may have significance, as well as with OHA; and (4) appropriate additional testing of the area to be developed as determined via communication with SHPD. All of the recommendations of SHPD will be followed, and the AIS will be revised accordingly and resubmitted for review and concurrence. Since the Revised Proposed Action will include a 9.4-acre cultural preserve, the sites of concern will be protected as a complex, including leaving the grinding stone in place. Further consultation will occur with OHA and members of a group or organizations for whom the area has significance, and additional testing will be done as required by SHPD.

Scenic and Open Space Resources

Objective: Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.

Discussion: The Revised Proposed Action will not significantly impact views of ridgelines or upper slopes of coastal headlands and mountains from the vantage points of coastal waters, major roads, parks, and other public places.

Coastal Ecosystems

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Discussion: Grading and drainage for the Revised Proposed Action will comply with requirements of the National Pollutants Discharge Elimination System (NPDES) permit and the County grading ordinance and standards. Storm runoff from developed areas will be controlled by retention areas, which will be scattered throughout the Petition Area to provide the required amount of storage. The retention areas will be designed to ensure that the project is helping to improve the water quality of Kāwā Stream and ultimately Kāneʻohe Bay, as discussed in detail in Section 6.4, through a net improvement of runoff quality compared to existing conditions. A detailed drainage master plan will be prepared and submitted to DPP for review and approval along with construction drawings after land use entitlements have been obtained. The drainage master plan will include maintenance practices for the entire drainage system. BMP's will be employed during construction periods. These could range from silt curtains and interim revegetation of exposed slopes to use of interim silt basins and detention areas.

Economic Uses

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Discussion: The proposed cemetery facilities are a quasi public facility which provides an invaluable cultural service, as many of Hawaii's people will prefer interment rather than cremation. By locating new facilities adjacent to existing facilities, residents will have the opportunity to visit the final resting places of many family members and loved ones with one trip, and facilities that would otherwise have been required if new cemetery space is created elsewhere on O'ahu, will not be required.

Coastal Hazards

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Discussion: The Petition Area is not in an identified flood hazard area or tsunami inundation zone, and the project will not significantly increase risk of human health or property due to exposure to natural hazards.

Managing Development

Objective: Improve the development and review process, communication and public participation in the management of coastal resources and hazards.

Public Participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Discussion: The Petitioner has made presentations on the HMP Cemetery Expansion project to residents in the region (January 31, 2007, February 1, 2007, and July 23, 2007), and appeared before the Kaneohe Neighborhood Board #30 (on numerous occasions) in an effort to keep the communities nearest to the Petition Area informed of the project. In addition, Petitioner's representatives belong to a standing committee of the Kaneohe Neighborhood Board specifically constituted to discuss the Former Proposed Action. This committee meets once per month. The Petitioner will continue to participate in community meetings during the development process. In addition, consultation as part of the EISPN and DEIS included a wide range of government agencies, community organizations, and neighborhood groups (see Section 11.2 of this DEIS).

Beach Protection

Objective: Protect beaches for public use and recreation.

Discussion: The Revised Proposed Action will not interfere with public beach or ocean recreational activities, or result in beach erosion.

Marine Resources

Objective: Implement the State's ocean resources management plan.

Discussion: The Revised Proposed Action will not affect the State's implementation of its ocean resources management plan.

3.1.6 Kāne'ōhe Bay Master Plan

The Hawai'i State Legislature created the Kāne'ōhe Bay Master Plan Task Force in 1990 to create a master plan for Kāne'ōhe Bay (Act 208, SLH 1990). Formalized in 1992, the resulting Kāne'ōhe Bay Master Plan (the Plan) is intended to protect and preserve Kāne'ōhe Bay for recreational and commercial use and enjoyment by the general public, as well as evaluate how these uses affect the overall ecology of the Bay. While the Plan provides guidance for in-water use of the Bay, it also recognizes the link between land-based activities and influences on the Bay. The Plan intends to ensure that future development in the Ko'olau Poko region does not adversely affect Kāne'ōhe Bay. The Kāne'ōhe Bay Regional Council is an advisory body tasked with ensuring the Plan is implemented. The following principles and goals of the Plan are relevant to the Revised Proposed Action:

Protect natural streams and preserve existing stream water flows into Kāne'ōhe Bay:

Preserve in their natural state existing wetlands, natural riparian zones, and hillsides with slopes of 20 percent or more:

Mitigate deteriorating water quality in key watersheds by installing pollution control measures and restoring historic wetlands at the confluence of Kāneʻohe and Kawa streams:

Discussion: The slope stability analysis performed for this EIS found there to be no apparent potential for hazards associated with slope stability. Most slopes in the Petition Area are less than 20%; although some land with steeper slope will need to be graded in order to create proper grade transitions. Most of these transition slopes will be revegetated to native plant materials and placed in permanent open space. There is a potential for hazards associated with rockfall, but these hazards can be mitigated using standard grading practices.

Retention areas are included in the Concept Plan as the preferred method to control storm water runoff. The retention areas will hold storm water and allow sediment to settle as storm water percolates. The areas will be scattered throughout the cemetery to provide the required amount of storage and they will be grass lined to a minimum depth of 18 inches (see Section 6.4 in this EIS for further discussion).

In compliance with the guidelines and recommendations contained in the Total Maximum Daily Load (TMDL) analysis performed for this EIS (summarized in Section 6.4 with the full report attached as Appendix L) regarding pollutant control within the Kāwā Stream Watershed, the retention areas will be designed to ensure that the project is helping to improve the water quality of both Kāwā Stream and ultimately Kāneʻohe Bay by providing some reduction necessary to achieve the TMDLs for Kāwā Stream. A retention area capacity of 1.3 acres (631,730 gallons) will lead to a net reduction of storm runoff that will not enter Kāwā Stream. The retention areas will help to meet the load allocations required to meet the TMDL goals set for Kāwā Stream by providing 27.5% of the net load allocations reduction in TSS, 17.5% of the net reduction in TN, and 17% in net TP

Water Quality Recommendation (Section 4.8.3)

Non-point source pollution recommendations: Monitoring

Non-point source pollution recommendations: Erosion and Sedimentation

Discussion: As discussed in Section 6.4 of this EIS, the Petitioner commits to developing an appropriate monitoring protocol in cooperation with the State Department of Health to build on past monitoring efforts of the TMDL Program, and to evaluate long-term success of the Petition Area's retention areas in helping to meet the necessary TMDL reductions for Kāwā Stream that are associated with the Petition Area.

In addition, temporary and permanent erosion control measures will be implemented as Best Management Practices during grading, construction, and operation of the cemetery. During construction, the contractor will use mulching to provide the necessary erosion control after soils have been exposed. Commencement of construction activities will occur during dry months of the year. Temporary erosion control measures can also include: using silt fences, stabilized construction entrances, catch basin and inlet protection, and dust control. Proper grading, pavement, and permanent grassing and landscaping of all open areas created by the grading operations will minimize soil loss

from the site to acceptable levels. Permanent erosion control measures will include grading to provide proper drainage. Exposed areas will have appropriate permanent and temporary erosion protection in place. Grass sod will be planted to minimize erosion. The permanent erosion control measures will protect the Petition Area against future soil erosion.

Streams (Section 4.8.4)

Recommendation #4. Install sediment retention basins of sufficient capacity and expand existing wetlands to mitigate sediment pollution and influx of toxic chemicals via Kāneʻohe and Kawa streams.

Discussion: Retention areas are proposed as the preferred method to control runoff. The retention areas will hold storm water and allow sediment to settle as storm water percolates. See discussion above on how the planned retention areas will work to reduce the sediment pollution to both Kāwā Stream and Kāneʻohe Bay.

3.2 CITY AND COUNTY OF HONOLULU

3.2.1 General Plan

The General Plan for the City and County of Honolulu was adopted in 1977, and has been subsequently amended (most recently in 2003). The General Plan is a comprehensive statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of the people of Oʻahu. Included in the General Plan are broad policy statements that facilitate the attainment of the Plan's objectives. The growth policy presented in the Plan calls for full development of the Primary Urban Center (including lands between Kahala and Pearl City), development of the secondary urban center at Kapolei and the ʻEwa and Central Oʻahu urban-fringe areas, and management of the physical growth and development in the remaining urban-fringe and rural areas to sustain their low densities. This section analyzes the impacts of the Revised Proposed Action with respect to the relevant General Plan objectives, policies, and programs. The Revised Proposed Action is consistent with the following General Plan objectives and policies:

III. Natural Environment, Objective A: To protect and preserve the natural environment.

Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water- recharge areas, distinctive land forms, and existing vegetation.

Policy 7: Protect the natural environment from damaging levels of air, water and noise pollution.

Policy 8: Protect plants, birds, and other animals that are unique to the State of Hawaiʻi and the Island of Oʻahu.

Discussion: The Petition Area is not in an identified flood hazard area or tsunami inundation zone. The Revised Proposed Action will not result in significant impacts to air or water quality, or ambient noise level. Storm water runoff from the Petition Area will be

controlled by retention areas, which will be scattered throughout the Petition Area to provide the required amount of storage. The retention areas will be designed and monitored to ensure that the proposed project is helping to improve the water quality of Kāwā Stream and ultimately Kāne'ohē Bay (see Section 6.4 for a more detailed discussion). The project will not impact threatened or endangered species. No candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543), were found in the Petition Area. There is no apparent potential for hazards to the Petition Area associated with slope stability. There is a potential for hazards associated with rockfall. These hazards can be mitigated using available technology.

IV. Housing, Objective C: To provide the people of O'ahu with a choice of living environments which are reasonably close to employment, recreation, and commercial centers and which are adequately served by public utilities.

Policy 1: Encourage residential developments that offer a variety of homes to people of different income levels and to families of various sizes.

Discussion: ~~The Proposed Action will provide 20 residential lots consistent with the pattern of development in the surrounding neighborhoods. The development will include affordable housing opportunities in compliance with City and County requirements. The Petition Area is located adjoining existing residential subdivisions, and will provide residential opportunities in close proximity to the Kāne'ohē region's variety of recreational activities and employment and commercial centers.~~

X. Culture and Recreation, Objective B: To protect O'ahu's cultural, historic, architectural, and archaeological resources.

Policy 2 Identify, and to the extent possible, preserve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance.

Discussion: An AIS conducted by CSH for the Petition Area ~~was~~ has been submitted to SHPD in April 2008 ~~and is currently pending review.~~ A comment letter from SHPD relating to the AIS was received on September 22, 2008. The recommendation of the agency included four main points: (1) preservation of sites 354, 4684, 6932, and 6931 as a complex, not individually; (2) no relocation of the grinding stone; (3) consultation with ethnic organizations or members of a group for whom some of the historic properties may have significance, as well as with OHA; and (4) appropriate additional testing of the area to be developed as determined via communication with SHPD. The AIS will be revised accordingly and submitted to SHPD for acceptance. Significant historic sites within the Petition Area (a total of seven sites) and four immediately adjacent to the Petition Area, including the Kawa'ewa'e Heiau, will be preserved in accordance recommendations in the AIS. On-going cultural practices, such as gathering of *hula* and *lei* plants, will be recognized and accommodated (subject to safety and liability issues) ~~as provided by law.~~ To the degree feasible, these plant communities will be enhanced and expanded within the buffer areas and permanent open space areas as appropriate. The availability, abundance, and quality of the *hula* plant *laua'e* will be protected through creation of a cultural preserve ~~plant-gathering kīpuka~~, including maintenance of an intact overstory.

3.2.2 Ko'olau Poko Sustainable Communities Plan

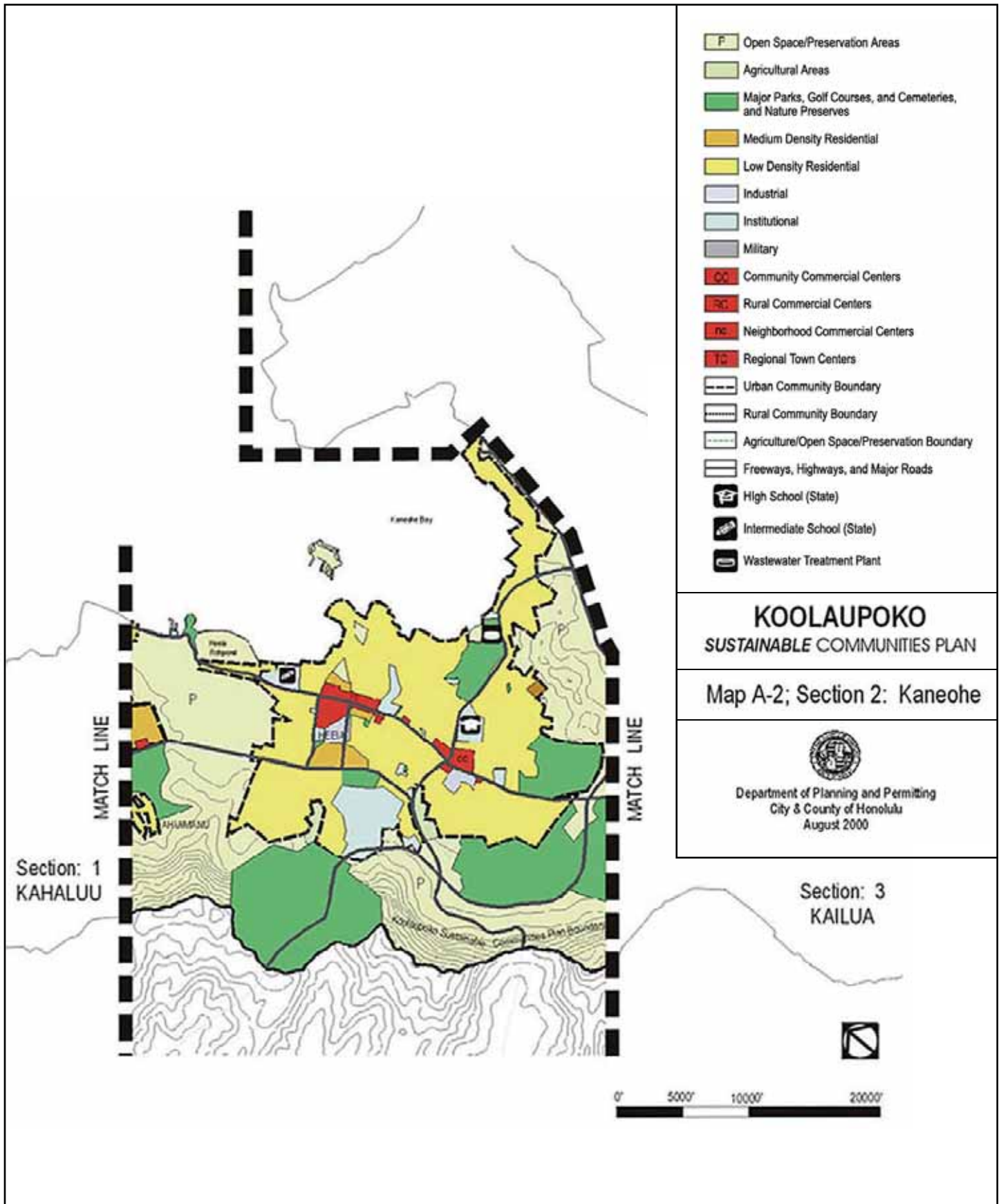
The City and County of Honolulu's Development Plan (DP) program provides a framework for implementing General Plan objectives and policies for the growth and development of O'ahu at a regional level. The DP program establishes eight geographical DP areas, including the Ko'olau Poko SCP area where the Petition Area is located.

The Ko'olau Poko SCP area spans the windward areas of O'ahu from Makapu'u Point to Ka'ō'io Point at the northern end of Kāne'ōhe Bay. The Ko'olau Poko SCP, which was adopted in 2000 and codified as Ordinance No. 00-47, ROH, articulates conceptual, long-range visions, and policies for regional land use, public facilities and infrastructure investment, and includes land use maps intended to illustrate the policy statements expressed in the SCP. The Ko'olau Poko SCP supports the General Plan and recognizes the region's urban fringe and rural areas as areas where growth will be managed so that an "undesirable spreading of development is prevented." The SCP is shaped around two main concepts, including protection of the community's natural, scenic, cultural, historical, and agricultural resources and systems. Key elements of the SCP's vision call for preserving and promoting open space throughout the region, and preserving and enhancing scenic, recreational, and cultural features that define Ko'olau Poko's sense of place. An organizing component of the Ko'olau Poko SCP is the Land Use Key map (Figure 9). This map establishes Urban Community, Rural Community, Agriculture, and Preservation boundaries. The project's conformance to the relevant major components of the Ko'olau Poko SCP is examined below.

Protect Community Resources (SCP Section 2.1.1)

Protection of natural and scenic resources

Discussion: The views from Kamehameha Highway across the landscaped cemetery lawns through to the foothills separating Kāne'ōhe and Kailua will be preserved. Some view alteration will occur, as the landscaped cemetery will extend up and across what is now a primarily overgrown non-native Schefflera/Java Plum Forest. In the area of the proposed cemetery expansion, the character of the open space will be changed from non-native forest to open lawns and scattered trees. ~~The views of the proposed residential development will be changed from open space to both one- and two-story single family homes, similar in character to the existing adjacent residential neighborhoods.~~ Revegetation of ~~15.311.4~~ acres of the Petition Area will be landscaped with adaptive native and indigenous species, as appropriate. Some adaptive Polynesian introduced plants may be used as well (see Section 4.7.2 of this DEIS for an extended discussion). The cemetery expansion area will contain up to four mausoleaums approximately 24 ft high. The mausoleaums will not be visible from surrounding neighborhoods due to the difference in elevation between most viewing points and the proposed development area, and the presence of a planned, generous vegetative buffer between adjacent residential property lines and the Petition Area and the landscaped screening of the mausolea themselves. Long-range views of the mausolea will be mitigated by vegetative screening and appropriate roof and building colors. The current concept plan indicates a minimum 50 ft buffer of existing vegetation between the adjoining residential property line and the cemetery areas. Some areas will include a graded transition slope and re-vegetated buffer of approximately 100 ft in addition to the



Ko'olaupoko Sustainable Communities Plan

Figure 9

existing vegetation buffer. See Figure 24 in Section 4.10 for a typical profile of how the elevation difference and landscaped buffer will shield the Petition Area from view in the adjacent residential neighborhoods because of ample vegetative buffers and the topographic differences.

Preserve cultural and historical resources

Discussion: The Petition Area contains several cultural and historic sites within and adjacent to the property. These include archaeological sites and areas used to gather plant materials for *hula* purposes. ~~Mitigation measures, such as appropriate buffering of sites will be implemented to ensure protection of these sites. These resources will be protected through inclusion within a 9.4-acre cultural preserve created east of the Kawa'ewa'e Heiau.~~ In addition, the Petitioner has stated a commitment to work with affected groups and individuals to include protection of areas used to gather plant materials, and access to these areas. An archaeological monitoring plan, written to fulfill the requirements of Chapter 13-279, HAR, will be reviewed for approval by SHPD prior to any land disturbing activities within the Petition Area. A cultural resource preservation plan will be prepared for the proposed project, in accordance with Chapter 13-277-3, HAR, to address buffer zones and protective measures for all historic properties recommended for preservation within and near the Petition Area. This plan will detail the short and long term preservation measures that will safeguard the historic properties during project construction and subsequent use of the Petition Area, and will include some sites located outside the Petition Area, such as the Kawa'ewa'e Heiau, which is listed on the National Register of Historic Places.

Establish Urban Community, Rural Community, Agriculture and Preservation Boundaries (SCP Section 2.2.7)

Urban Community Boundary

Discussion: The guidelines of the Ko'olau Poko SCP exclude lands that are within the State Conservation District from the area within the Urban Community Boundary. The guidelines also suggest that land "within the current inventory of Hawaiian Memorial Park" should be within the Urban Community Boundary. Therefore, in order to be considered for inclusion within the Urban Community Boundary, the property must satisfy the dual conditions of: (1) not being in the State Conservation District; and (2) being in the inventory of Hawaiian Memorial Park. However, the Petition Area is within the State Conservation District, and thus, would otherwise be excluded from the Urban Community Boundary until the State Land Use Urban District Boundary is amended, and the Petition Area reclassified from Conservation to Urban.

The Revised Proposed Action requires changing the SCP to be consistent with the proposed cemetery and residential uses. Options for changes include:

1. If the State Land Use Commission boundary is amended from Conservation to Urban, the Urban Community Boundary could then be moved to include the Petition Area. While the current SCP states that the boundaries should remain fixed through the year 2020, there are mechanisms in place for requesting changes to the SCP. Also, the SCPs are mandated to be reviewed and updated

- every five years (Sec. 24-6.10 of Ordinance 00-47). During this update, all existing language and land use maps are open to revision.
2. The language of the SCP that describes the Urban Community Boundary could be amended to state that it is intended to include the Oneawa Hills to an elevation of 400 ft, or include HMP's modest expansion, instead of excluding Oneawa Hills completely. The provisions of Section 2.2.7.1 p. 2-20 could be changed to read "The Urban Community Boundary is intended to exclude the following areas: Undeveloped parcels on the slopes of Kaiwa Ridge, Oneawa Hills, except below the 400-foot elevation on the western side adjacent to Hawai'i State Veterans Cemetery and Puu o Ehu."
 3. The definition of the Preservation Boundary could be amended to allow cemetery use. Section 2.2.7.4 Preservation Boundary, 3rd bullet p. 2-24 language could be changed to read "Golf courses and cemeteries not located within the urban community and/or agriculture boundaries described above." This option supports Section 3.1.2 in providing passive or active open space, is consistent with 3.1.3.8, Cemeteries; and is consistent with Section 2.2 Key Elements of the Vision 2nd bullet, "preserve and promote open space throughout the region" (p. 2-2).

Planning Principles for Open Space Preservation (SCP Section 3.1.2)

Provide Passive and Active Open Spaces

Discussion: The expansion of the cemetery comports with the general policy for open space preservation by adding to the inventory of passive open space in the region. The SCP refers to cemeteries as important contributors to open space in the region.

Planning Principles for Historic and Cultural Resources (SCP Section 3.4.3)

Preservation and Protection

Compatibility Setting

Accessibility and Interpretation

Discussion: The historic sites within the Petition Area (a total of seven sites) and the four immediately adjacent to the Petition Area, including the Kawa'ewa'e Heiau and areas used to gather *hula* plant materials, will be preserved and managed in accordance with SHPD requirements, and arrangements with Native Hawaiian custodial organizations and practitioners. As part of this effort, a 9.4-acre cultural preserve will be created east of the Kawa'ewa'e Heiau. Care will be taken in the planning and design of adjacent use to historic and cultural resources to avoid conflicts or abrupt contrasts that detract from or destroy the physical integrity and historic or cultural value of the sites.

3.2.3 LAND USE ORDINANCE

The Land Use Ordinance (LUO) (Chapter 21, ROH, 1990, as amended) and accompanying maps define the allowable uses of land within the City and County of Honolulu. The LUO describes the various zoning districts throughout the City and County of Honolulu, the uses allowed within each zoning district, and the applicable development standards for each district.

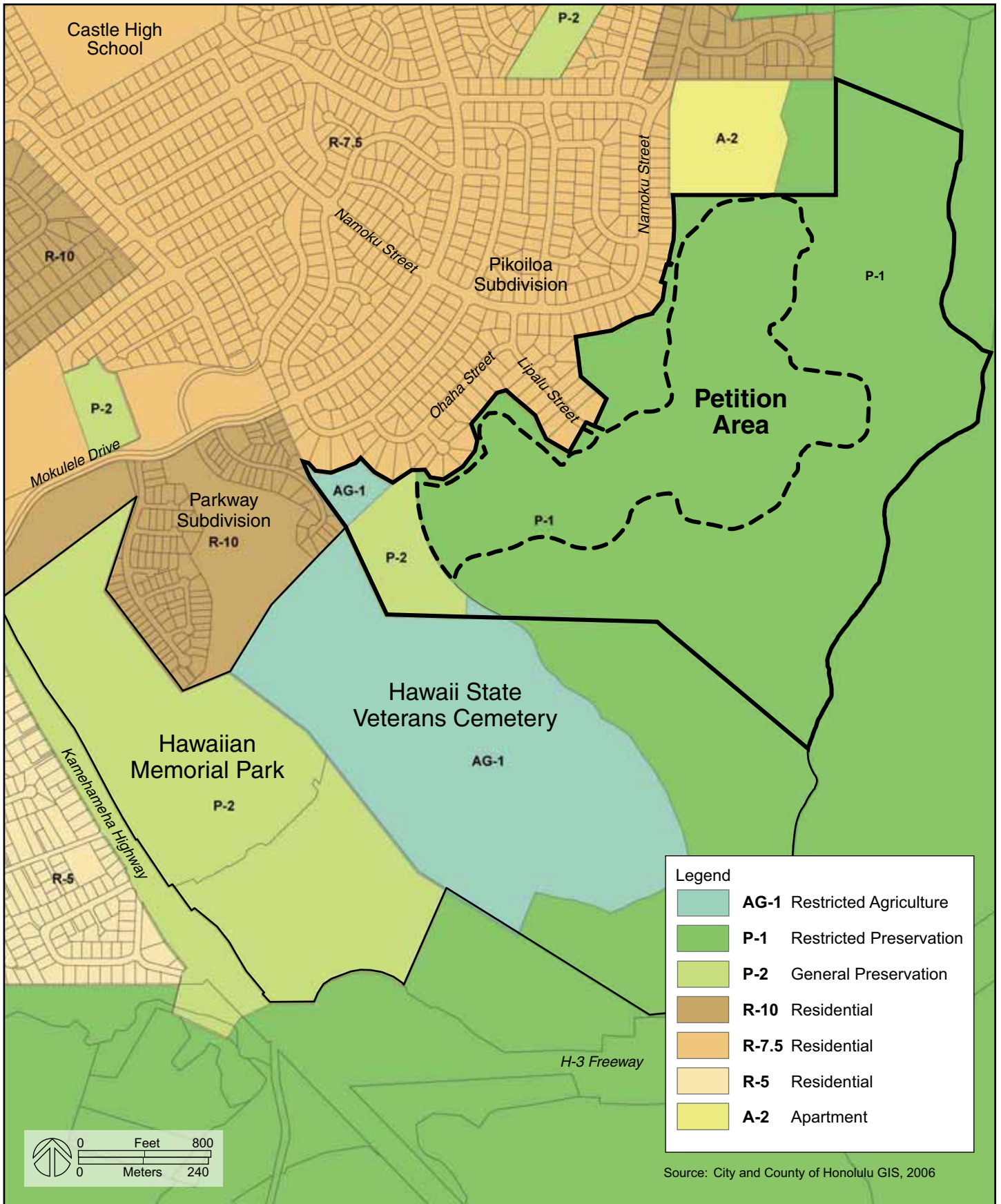
Figure 10 presents the current zoning for the Petition Area and the surrounding parcels. The Petition Area is currently zoned P-1 Restricted Preservation. At present, the Ocean View Garden section of HMP (approximately 7.9 acres of Parcel 1), is zoned P-2, General Preservation District. Roughly 2.7 acres of Parcel 1 fall within the existing AG-1 Restricted Agricultural District and approximately 154 acres are within the P-1 Restricted Preservation District. The cemeteries south of the Petition Area are zoned Ag-1 Restricted Agricultural District (portion of the Hawaii State Veterans Cemetery) and P-2 General Preservation District (Hawaiian Memorial Park Cemetery). Lands to the west are zoned R-10 and R-7.5 Residential Districts.

There are two zoning districts in the LUO that pertain to open spaces: (1) P-1 Restricted Preservation District; and (2) P-2 General Preservation District. The P-1 Restricted Preservation District corresponds to the State Conservation District. All activities within the P-1 District are administered by the DLNR. Cemeteries are not listed as an allowable use within the State Conservation District. The P-2 District is intended for uses characterized by open space (parks, golf courses, cemeteries) within the State Urban District.

Implementation of the Proposed Action will require rezoning of the Petition Area to be consistent with the proposed cemetery and residential land uses. Proposed zoning will consist of approximately ~~50~~ 56.5 acres of Parcel 1 being rezoned from the P-1 Restricted Preservation District to the P-2 General Preservation District for the cemetery expansion, although 51.7 acres within this 56.5-acre expansion area will remain in a vegetated open space condition, and ~~approximately 6 acres be rezoned to the R-7.5 Residential District for the proposed residential development~~ (Figure 11). The proposed cemetery expansion is a permitted use within the proposed P-2 General Preservation District zoning under the LUO. The project alternatives will require a different combination of re-zoning request based on the proposed land uses.

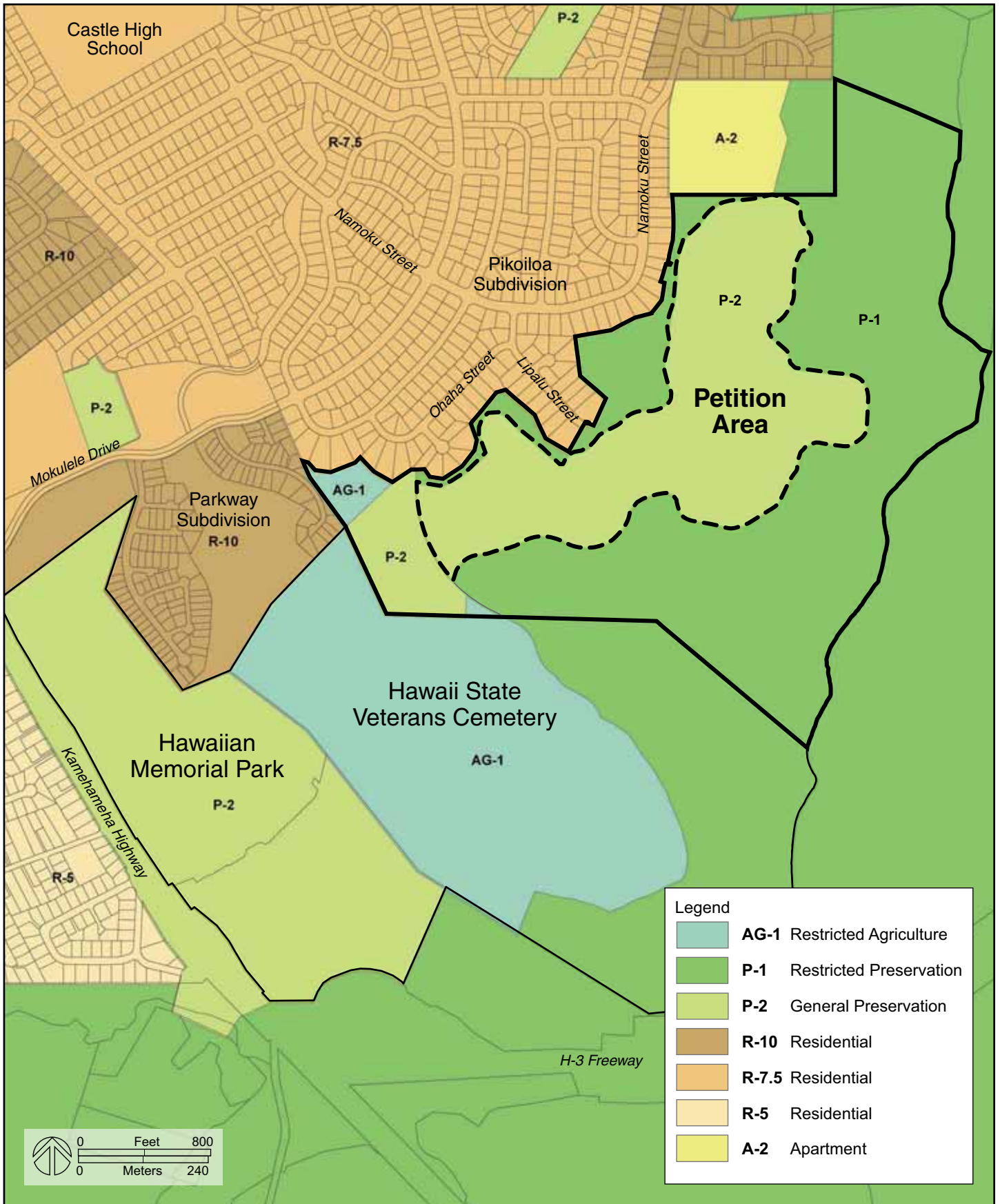
3.2.4 SPECIAL MANAGEMENT AREA

The City and County of Honolulu, similar to other counties in Hawai'i, has adopted: (1) boundaries which identify the Special Management Area (SMA); and (2) rules and regulations which are consistent with Chapter 205A, HRS that control development within the SMA. The purpose of the SMA is to preserve, protect, and where possible, restore the natural resources of the coastal zone of Hawai'i. The Petition Area is not located within the SMA.



Existing City and County of Honolulu Zoning

Figure 10



Proposed City and County of Honolulu Zoning

Figure 11

4.0 ASSESSMENT OF AFFECTED ENVIRONMENT, PROBABLE IMPACTS AND MITIGATION: PHYSICAL ENVIRONMENT

4.1 CLIMATE

Located at the northern edge of the tropics, the Hawaiian Islands enjoy a moderate climate with almost continual trade winds. Generally, the islands' climate has little day-to-day and month-to-month variability. Situated on the eastern side of O'ahu, the Ko'olau Poko district is on the wet windward side of the island. O'ahu's rain is mostly the result of air masses driven by prevailing trade winds rising upon contact with high mountain ranges. The Ko'olau Range affects the trade winds in this manner, and rainfall is higher within a mile of the ridge. The Petition Area is further than a mile from the ridge, and receives rain as a result of trade wind showers and other island-wide storm systems. Rainfall is most often intense and of short duration. The Petition Area receives between 59 and 79 inches of rain annually. Average low temperatures range from about 62 degrees Fahrenheit (°F) in the winter to about 69°F in the summer. Average high temperature ranges from approximately 75°F in the winter to 81°F in the summer.

Trade winds flow from east to west and are more persistent in the afternoon, and during summer months. Winds from the north-northeast and east blow 86% of the time. Kona winds, or southerly winds, blow for approximately 10% of the time and winds are calm for the rest of the time. The trade winds tend to break down during the fall, giving way to lighter, more variable wind conditions through the winter and into the early spring. Storms generally occur between October and March.

The effect of vegetation on climatic conditions is generally accepted. There is certainly a different ambient condition between a forest and a busy intersection in Honolulu. Some of the factors known to impact microclimate are: sunlight exposure, wind exposure, cloud cover, precipitation, vegetation type, temperature (air and soil), and moisture content (air and soil). In the circumstance of the proposed HMP expansion, portions of the terrain will be characterized by a change from a forested area dominated by introduced species to an environment characterized by turf grass and both spreading foliage of native plants and groupings of trees.

Research on impacts of land cover change from forest to grass or croplands has predominately looked at large areas of forest, and study results are inconclusive as to the exact effects on both local and global climate. While it is agreed upon that trees produce cooling in the immediate area due to evapotranspiration, it is equally known that grass or croplands produce cooler temperatures than forests due to the albedo effect. The albedo effect describes the ability of surface areas to reflect sunlight. The higher the albedo, the higher the ability to reflect sunlight, and the more likely to reduce the temperature. No exact inferences can be drawn for how the Revised Proposed Action might change the microclimate in the immediate vicinity; the temperature could be warmer and it could in fact be cooler, or both.

The immediate vicinity of the Petition Area is a mix of urban uses and disturbed non-native forest. The interface between the proposed project and existing residences will be tempered by the retention of a generous vegetative buffer ranging from 50 to 200 ft

within an average width of 100 ft. This buffer will provide a wind break and shade as well as a visual buffer for HMP neighbors. The replacement of a portion of the 56.65 acres of the Petition Area's disturbed forest with lawn areas, trees, and other vegetation and a modest road network will not affect the overall climate of the immediate area. It is doubtful there will be appreciable change in microclimate for area residents.

No mitigation is necessary.

4.2 TOPOGRAPHY AND SLOPES

4.2.1 Affected Environment

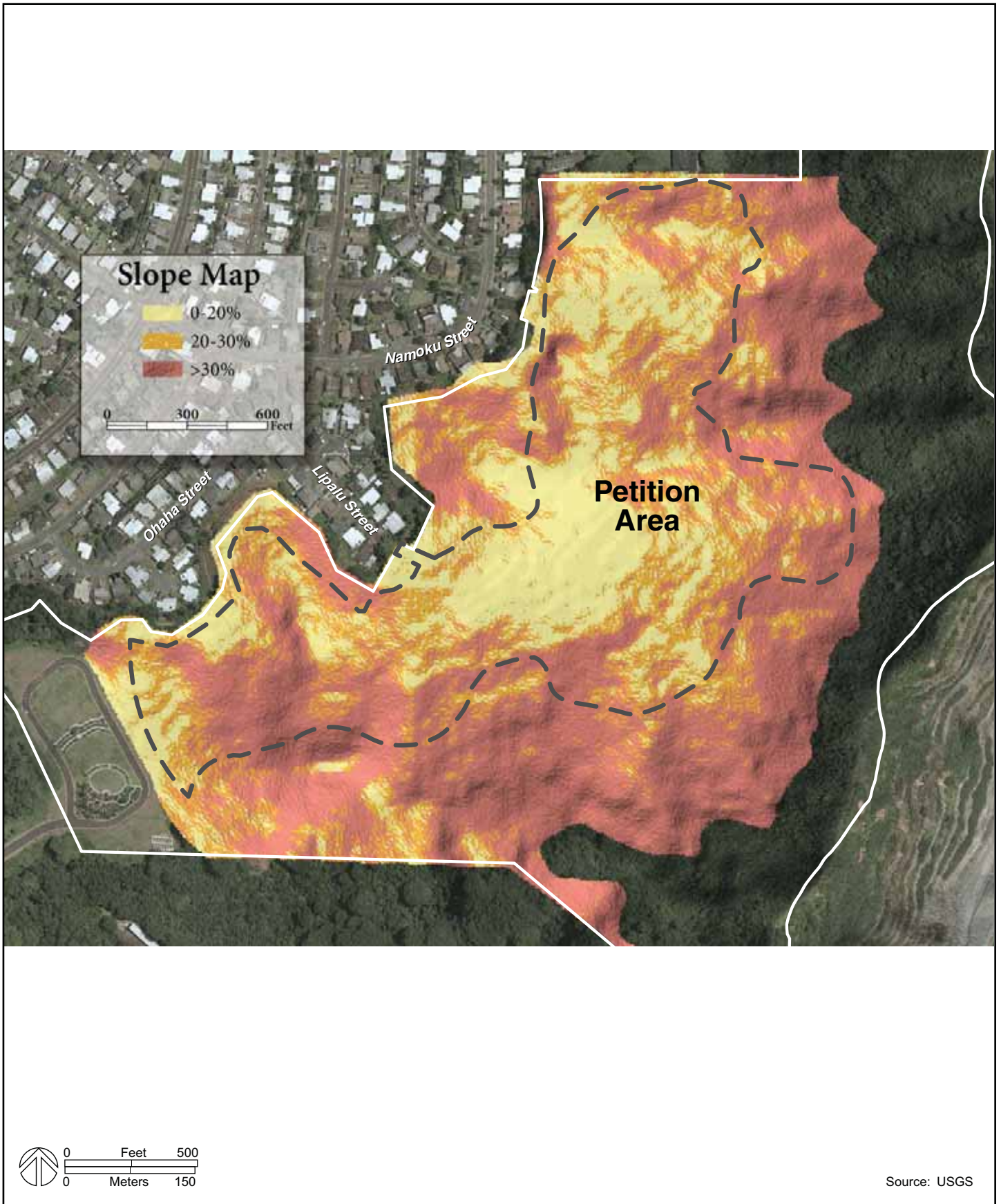
The Petition Area has various ridges, ravines, and valleys as topographic features. It consists of gently sloping areas to the west, adjacent to the Pikoiloa subdivisions, and relatively steep cliff areas to the east. The steep cliff areas descend from a natural ridgeline that drops in elevation and levels out creating several small gulches running east to west. The ground elevation ranges from 945 ft AMSL at the ridge that divides Kailua and Kāne'ōhe to approximately 100 ft AMSL at its lowest elevations at the northwest boundary. The ridge line separates Kapa'a Quarry from HMP property. As shown in Figure 12, the areas of least slope (0-20 percent slope) are found in the center of the Petition Area, with slope rising to 20-30 percent outward to the southeast. The steepest portions (greater than 30 percent slope) of the Petition Area are located at the south and east. Exact elevations and slopes may vary and will be determined when a ground topographic survey is performed for the design of construction documents.

4.2.2 Probable Impacts

Most of the land within the Petition Area will be graded to provide suitable areas for gravesites and residential development, generally sloped at 20% or less. Areas exceeding 25 percent slope are not suitable for land burial use. A *Report Assessment of Hazard from Rockfall and Slope Stability* was prepared for this DEIS in 2008 by Shinsato Engineering, Inc. (discussed in Section 4.6 of this DEIS, and Attached as Appendix B). The slope stability analysis determined that there is no apparent potential for hazards associated with slope stability.

The ~~Draft~~ Preliminary Engineering Report (PER) prepared by SSFM International Inc. in 2008~~7~~ (Appendix C) identifies a Conceptual Grading Plan for the project. At build-out of the project, approximately ~~56.6~~ 44.9 acres will have been graded including ~~15.3~~ 11.4 acres which will be revegetated with appropriate native plant material supplemented with vegetation suited to the local environment. In general, the topographic profile of the Petition Area will include changes in slope to eliminate sharp changes in contour, remain intact, although slopes will be evened out to eliminate sharp changes in contour. Some topographic features will be altered, but overall dDrainage flow patterns and drainage ways will remain in current configurations, and new contours will tie into existing contours to provide consistent topographic profiles. Figures 29a and 29b provide a comparative profile of existing topography and proposed changes.

No mitigation is necessary.



Existing Slope Analysis

Figure 12

4.3 SOILS

4.3.1 Affected Environment

The soils of the Petition Area are characterized on the basis of the Soil Conservation Service's "Soil Survey, Islands of Kaua'i, O'ahu, Maui, Moloka'i and Lāna'i, State of Hawaii" (Foote *et al.* 1972). Four soil types from two different soil series have been mapped on the Petition Area. They are described below and shown in Figure 13.

Alaeloa series

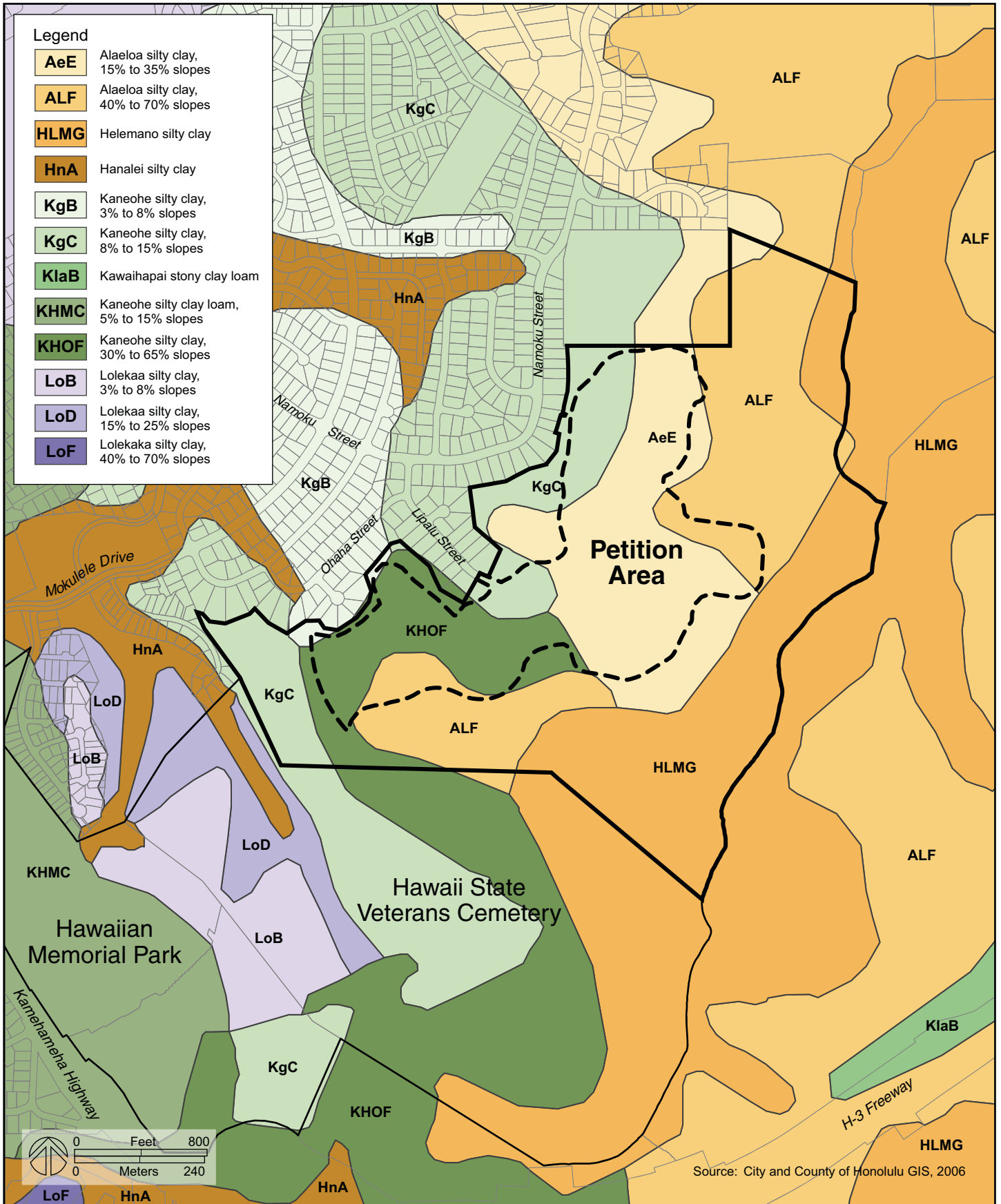
A broad band of soil from the Alaeloa series, the dominant soil series in the Petition Area, exists makai of the ridgeline where the terrain changes from the steeply sloped hillside. The Alaeloa series consists of deep and very deep, well drained soils that formed in material weathered from basic igneous rock. Alaeloa soils are on uplands and have a broad range of slopes. These soils are well drained with slow to very rapid runoff depending on slope. Permeability is moderately rapid. The Petition Area has Alaeloa silty clay with 40 to 70 percent slopes (ALF) on the northern and southern end of the parcel leading up to the change in soil type at the ridge line. In the middle of these pockets of ALF is a large section of Alaeloa silty clay with 15 to 25 percent slope (AeE).

Kaneohe series

The band of soil extending along the western boundary of the Petition Area is comprised of Kaneohe silty clay with slopes ranging from 8 to 15 percent (KgC) and 30 to 65 percent (KHOF). These are well-drained soils on terraces and alluvial fans that typically developed in alluvium and colluvium derived from basic igneous rock. The soils are gently sloping to very steep and are found in elevations ranging from 100 to 1,000 ft. Where existing slope is less than 15 percent, runoff is medium and the erosion hazard is moderate. Where existing slope is greater than 30 percent, runoff is medium to rapid and the erosion hazard is moderate to severe.

4.3.2 Probable Impacts

Of the total estimated ~~56.6~~ 47.0 acres of the Petition Area that will be graded, approximately ~~11.6~~ 9.3 acres will involve cut and fill, totaling about ~~463,000~~ 306,726 cubic yards (cy) of cut and ~~500,000~~ 363,251 cy of fill, resulting in a net fill volume requirement of about ~~37,000~~ 56,525 cy. Spoils from future grave sites will be used as fill material in the cemetery expansion area to "balance" the volume of cut and fill needed to grade the site. Each phase of expansion will have carefully engineered designs for incorporation of ongoing grave dirt generation into the expansion areas. The phases of development will vary from ~~approximately 7 to 25~~ 14 to 16 acres based upon inventory demand and earth work balance. No import or export of soil outside of HMP property will take place.



Soils

Figure 13

Because a geotechnical report and a detailed topographic survey have not been completed yet, the PER was prepared with the following assumptions:

- 1) The on-site soils are useable for landscaping, cemetery activities, and cut/fill;
- 2) All areas are gradable except the area within the historical sites including any rock crop areas;
- 3) Proposed slope gradients within the Petition Area shall not exceed the existing slope gradients;
- 4) The grading volumes are based on conceptual design and do not include swelling or shrinkage;
- 5) All grading design and operations will meet County grading ordinances; and
- 6) All drainage design will meet or exceed County standards of design.

The PER was prepared with the following criteria for cemetery activities:

- 1) The maximum slope for usable cemetery plots is equal to or less than 20%;
- 2) The desired maximum distance to a cemetery plot is 150 ft from the roadway;
- 3) The overall earthwork quantity is estimated at ~~37,500~~ 56,525 cy of fill to be supplied by ongoing gravesite excavation; and
- 4) Each phase of the project must roughly equalize cut and fill quantities. Development phasing will be finalized in the design phase of the project to allow for detailed analysis to create a cut/fill balance with each phase.

4.3.3 Mitigation

Existing soils are classified as having moderate to severe erosion; therefore temporary and permanent erosion control measures will be implemented as BMPs during grading, construction, and operational activities. During construction, the contractor will use mulching to provide the necessary erosion control after soils have been exposed. Commencement of construction activities will occur during dry months of the year. Temporary erosion control measures can also include: using silt fences, stabilized construction entrances, catch basin and inlet protection, and dust control. Proper grading, pavement, and permanent grassing and landscaping of all open areas created by the grading operations will minimize soil loss from the site to acceptable levels. Permanent erosion control measures will include grading to provide proper drainage. Exposed areas will be paved or grassed and/or landscaped to match adjacent landscaping. Grass sod will be planted to minimize erosion. The permanent erosion control measures will protect the Petition Area against future soil erosion. In addition, a network of retention areas will be scattered throughout the Petition Area with the specific purpose of controlling storm water runoff (See Section 6.4). These retention areas will be designed to a depth of 18 inches and will be lined with grass. The size of the individual retention areas will vary from ~~5,000 to 20,000~~ approximately 730 to 17,500 sf. Their design will allow them to blend in with the rest of the cemetery.

A second feature of the retention areas will allow sediments borne by storm water to settle in the retention area, thereby reducing sedimentation impacts to nearby Kāwā Stream and ultimately Kāneʻohe Bay. In order for the retention areas to function properly, they must be maintained properly. Proper maintenance will include a regular

mowing schedule, and periodic removal of collected sediment. Collected sediment will be recycled on-site or removed to a landfill.

4.4 AGRICULTURAL CAPABILITY

4.4.1 Affected Environment

Currently, none of the land in the Petition Area is in agricultural production. Historical use records from the State Department of Agriculture indicate no historic agricultural use of the property or surrounding area. There is anecdotal information that portions of the Petition Area were used for grazing cattle and possibly used briefly during attempts to raise pineapple in the Kāne’ohe area in the early 20th century.

Agricultural Lands of Importance to the State of Hawai’i. ALISH ratings were developed in 1977 by the Natural Resources Conservation Service, the UH College of Tropical Agriculture and Human Resources, and the State of Hawai’i, Department of Agriculture to determine the relative agricultural importance of land throughout Hawai’i. The ALISH system rates the significance of agricultural lands for crop productivity when treated and managed according to modern farming methods. There are three possible designations found on the ALISH maps. These are:

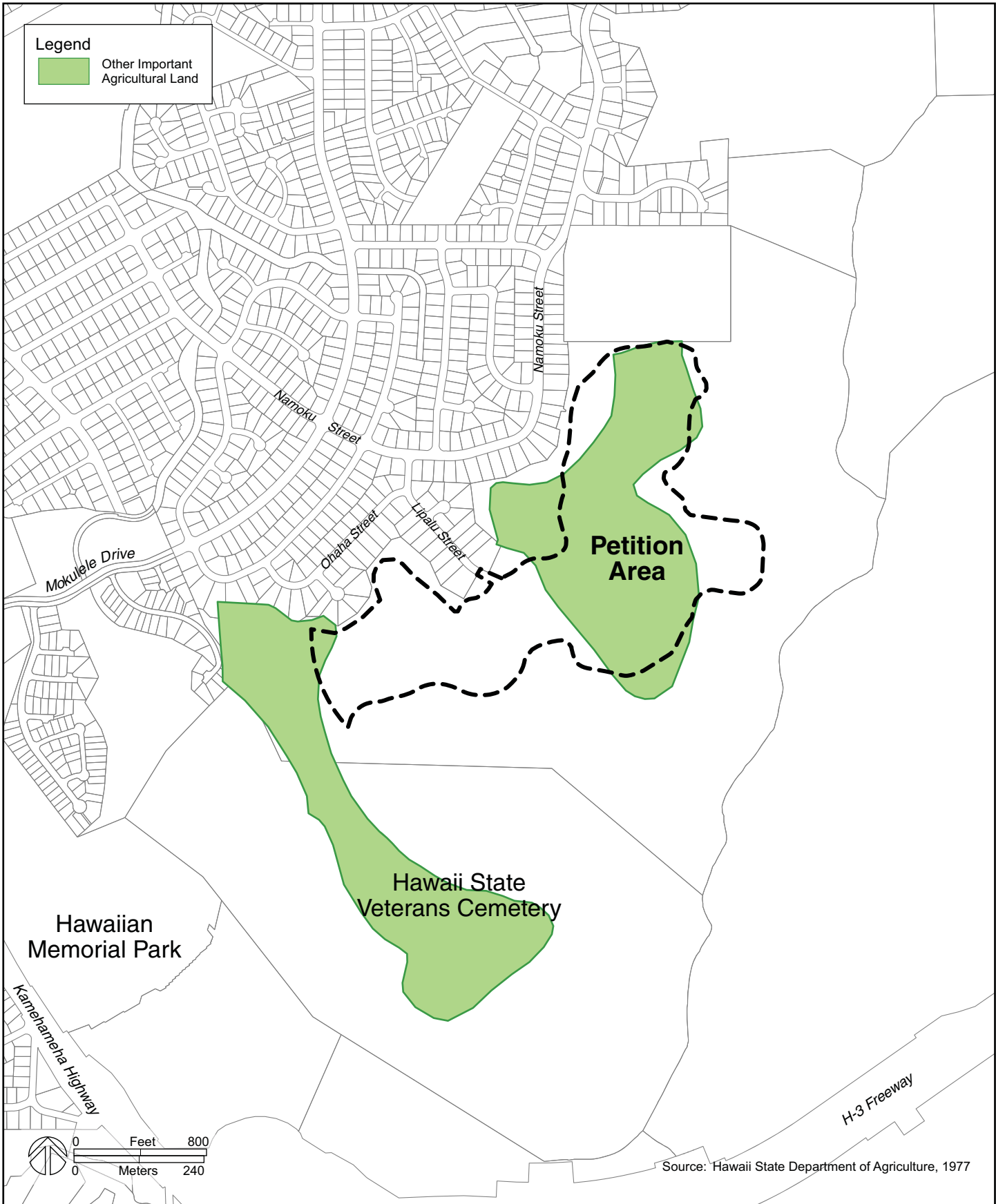
- Prime** Land which has the soil quality, growing season, and moisture needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods.
- Unique** Land that has the special combination of soil quality, location, growing season, moisture supply, and is used to provide sustained high quality and/or high yields of a specific crop when treated and managed according to modern farming methods.
- Other** Land other than Prime or Unique land that is also of State-wide or local importance for agricultural use.

As indicated in Figure 14, approximately 26 acres (46%) of the Petition Area has been classified as “Other.” However, the location of the property adjacent to a residential area would make intensive agricultural use of the property difficult. The remaining portion of the Petition Area is not identified under the ALISH system.

Overall Productivity Rating. In 1972, the UH Land Study Bureau (LSB) developed the Overall Productivity Rating, which classifies soils according to five levels, with “A” representing the class of highest productivity and “E” the lowest. As shown in Figure 15, all of the Petition Area is classified as E, indicating very poor suitability for agricultural use.

4.4.2 Probable Impacts

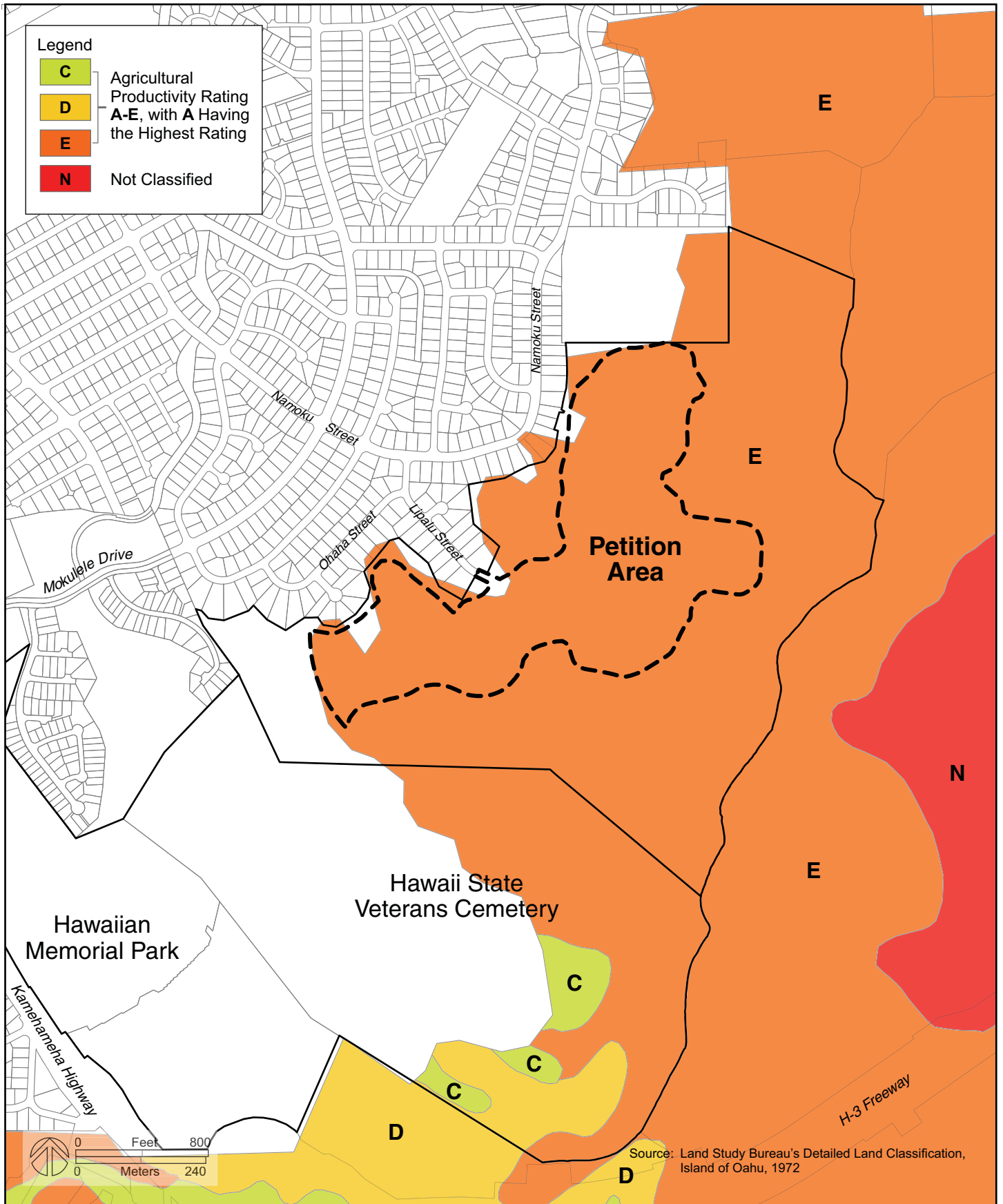
The development of the Petition Area will have no impact on agricultural production on O’ahu as it has no current or recent use for agricultural activities.



Agricultural Lands of Importance to the State of Hawai'i

Figure 14

Hawaiian Memorial Park Cemetery Expansion Environmental Impact Statement
 Kāne'ohe, O'ahu, Hawai'i



Land Study Bureau

Figure 15

Hawaiian Memorial Park Cemetery Expansion Environmental Impact Statement
Kāne'ohe, O'ahu, Hawai'i

4.5 GROUNDWATER RESOURCES

Groundwater resources are discussed in the 2008 PER report prepared for this DEIS by SSFM. The findings regarding groundwater are summarized below and the full report is attached as Appendix C.

4.5.1 Affected Environment

The Petition Area is located on the southwesterly flank of the Oneawa Hills, an area that lies within the old Ko'olau Volcano believed to have formed between 1 and 12 million years ago by lavas flowing from the rift zones along a northwest-trending rift zone. The Ko'olau Volcano formed the eastern part of the island of O'ahu, and the area was further shaped by erosion of this volcanic dome. The hydrothermal activity in the area created complex hydrogeology. Numerous dikes were created from repeated eruptions. Groundwater movement and occurrence in the area is controlled by these dikes. The dikes dam water and create high level groundwater which is distinct from basal water in areas free of dikes.

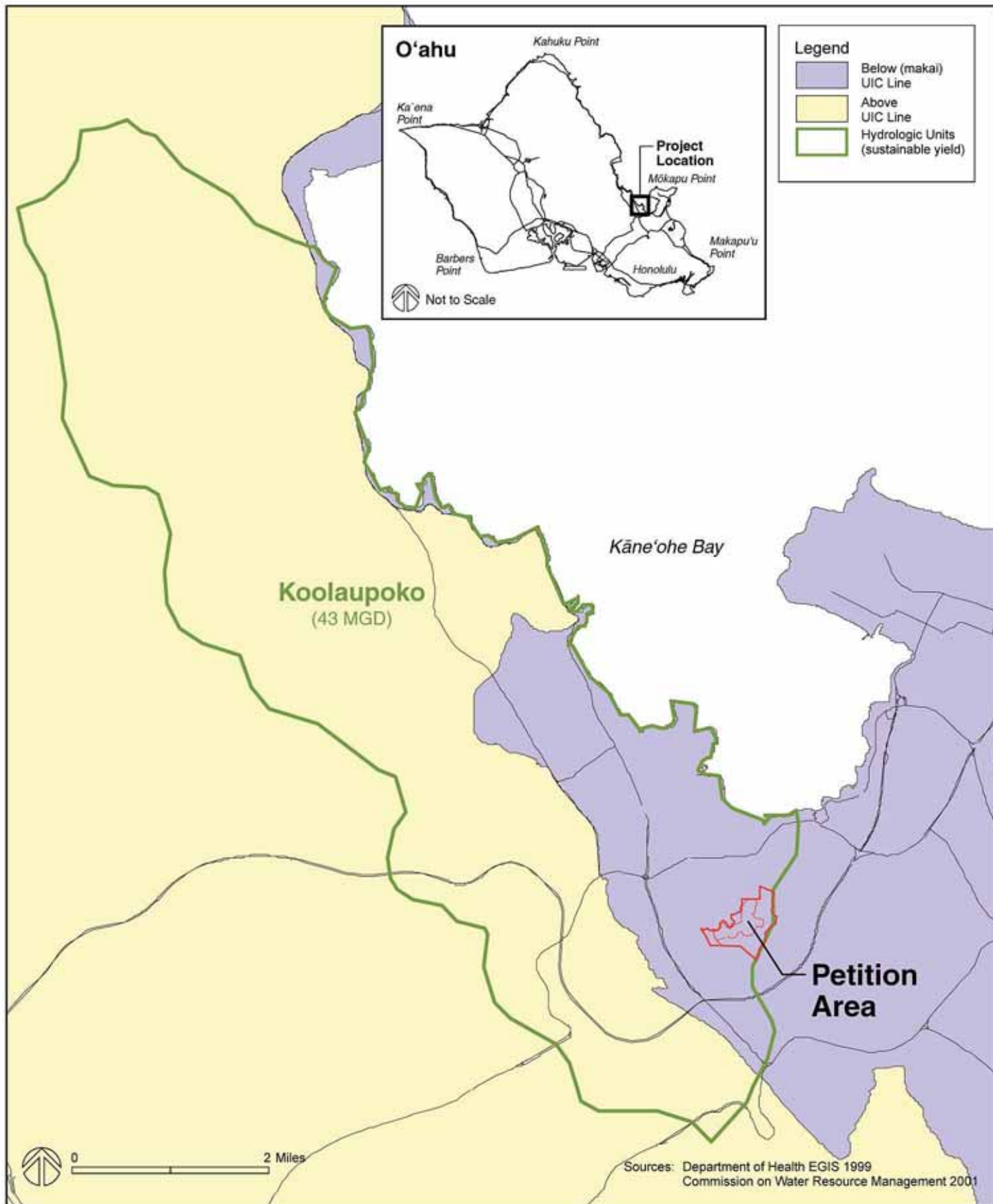
O'ahu has two principal aquifers, the Waianae and Koolau Aquifers; the Petition Area is located in the Koolau Aquifer. The CWRM has divided the island of O'ahu into several hydrologic units, and the Petition Area is located within the Koolaupoko Aquifer System which stretches from the Petition Area on its eastern boundary, northwest to encompass Kāne'ohe up to Waiahole (see Figure 16).

The Petition Area is located in an area where a primary basalt aquifer is overlain with an upper aquifer of sedimentary caprock. The upper aquifer is an unconfined, basal sedimentary system. As classified by Mink & Lau (1990), it is currently used, is ecologically important, is considered irreplaceable, has low salinity (250-1000 mg/l Cl⁻), and a high vulnerability to contamination. The lower aquifer groundwater is confined basal in dike compartments. Its use is classified as drinking water, with fresh salinity <250 mg/l Cl⁻, it is considered replaceable, and has moderate vulnerability to contamination.

The Underground Injection Control (UIC) line was established to protect the aquifers of Hawai'i, as established by §11-23, HAR. Above this line, the groundwater is considered to be useable for drinking water; below it is not. The Petition Area is located below the

UIC line (See Figure 16), and while the survey by Mink and Lau (1990) notes a lower aquifer in the area that contains water suitable for drinking, the State does not consider the area to be viable for developing drinking water as it's been determined to not be worth the expense of establishing potable drinking water in this area.

Groundwater resources are regulated by the CWRM, which is administratively assigned to the DLNR. The CWRM establishes sustainable yield amounts for each aquifer system. The CWRM also regulate special areas designated as water management areas. Any withdrawals in water management areas must be justified to obtain a use permit from the CWRM, as stated in §13-171-11, HAR. The Petition Area is within a designated ground water management area. The BWS has the authority to allocate the use of water from their system within the limits approved by the CWRM for municipal purposes.



Hydrology / UIC Line

Figure 16

At present, the sustainable yield for the Koolaupoko Aquifer System has been established at 43 million gallons per day (mgd). Three non-potable wells exist near the Petition Area, on State property along Kamehameha Highway near the H-3 interchange. The Hawaii State Veteran's Cemetery uses these wells as a source for their irrigation. To date, the wells have operated satisfactorily. According to conversations with a local well driller and the BWS, the non-potable wells that service the Hawaii State Veterans Cemetery were drilled in 1983. The existing HMP cemetery is served by the City's ~~potable drinking~~ water system. The connection point is located at the entrance to HMP in the vicinity of Mahinui Road and Kamehameha Highway. The 6-inch meter located on Kamehameha Highway has a capacity of 1,000 gallons per minute (gpm).

4.5.2 Probable Impacts

Windward O'ahu receives sufficient precipitation to minimize the need for supplemental irrigation of landscaping. During dry hot periods, particularly during establishment of new landscaping, irrigation will be required. In a worst case scenario, an irrigation flow of up to 550 plus gpm could be required to keep the cemetery grounds adequately watered at full build out. This would translate to a peak maximum demand of about 90,000 gpd. Discussions with the BWS have indicated that water quantities and pressure may currently be available to fully service the approximately 30 acres of turf landscaping for the cemetery expansion area. This potential source would be utilized only if an on-site irrigation system could not be implemented.

~~The Petition Area Former Proposed Action would have had~~ an estimated ~~potable drinking~~ water demand of 15,000 gpd, with a peak hour demand of 30,000 gpd to serve both the 20-lot residential subdivision and the proposed cemetery comfort station. The source of ~~potable drinking~~ water for the project ~~will~~ would have been coordinated with the BWS and the CWRM. Correspondence with the CWRM has indicated that the project should have coordinated with City and County of Honolulu's Water Use and Development Plan to ensure the project would have been consistent with these plans. The only available option for ~~potable drinking~~ water ~~is for the residential subdivision would have been~~ the use of an on-site well and storage system. For the Revised Proposed Action, no new domestic drinking water source will be required. To obtain water for the cemetery comfort station and drinking fountain, the project will include an extension of a small line into the cemetery expansion area from the 5/8 inch water meter within the existing HMP Cemetery. If this is not feasible, the cemetery comfort station will be eliminated.

Impervious surfaces can affect hydrology in two ways: 1) by reducing infiltration into the underlying aquifer; and 2) by increasing overland flow to the coast. Denying natural drainage by replacing the natural surface with impervious surfaces may have an effect on nearby Kāwā Stream and coastal waters because seepage of groundwater may decrease. Storm water runoff associated with the proposed project will be increased because of the added impervious surfaces of the roadways and mausoleums within the cemetery expansion area, ~~and from the roadways and structures within the residential development.~~ Of the 56.65 acres, approximately ~~80~~ 91.5% will continue to be pervious surfaces. Only 4.8 acres will be developed as impervious surfaces (roadways and buildings). ~~the cemetery burial areas will account for 27.8 acres; 1.8 acres for drainage retention areas; 1.1 acres for historic sites; and 15.3 acres will be revegetated. The~~

CWRM does not anticipate any impacts to the quantity of ground and surface water flows. The majority of the Petition Area will retain similar percolation rates, as turf and revegetated areas have similar rates to the existing forest flora.

Groundwater can be influenced by turf management practices as well. The new burial areas will be treated with slow release turf fertilizers twice a year; in the fall before the rainy season and in the spring before summer heat. HMP will target applications to dry periods to ensure it is absorbed by the plant material as opposed to fast acting fertilizers that are more likely to be washed into the soils. If herbicides or pesticides are necessary, HMP will use a Certified PCA. This practice is rare and avoided due to operational problems and expense. Impacts on groundwater are expected to be minimal.

The United States (U.S.) Environmental Protection Agency (EPA) does not regulate the burial of human remains under current environmental statutes or regulations. States do have the right to protect waters of their state or commonwealth (which includes groundwater). Human remains can take between 10 and 25 years to fully decompose. As decomposition progresses there may be a very limited potential to release very small quantities of Formaldehyde to the adjacent soil and groundwater. However, the embalming of human remains is typically accomplished using only one pint of Formalin which contains approximately 30% by weight Formaldehyde, which is further diluted with several quarts of water prior to injection. Further, the available Formaldehyde in this solution reacts with proteins in the embalmed body and to a smaller degree evaporates from the body prior to interment, reducing the residual amount of chemical in the remains to a less than significant amount.

In consideration of these chemical processes and other physical burial practices (type of casket and use of concrete outer burial container or vault for all burials at HMP) and setting (soil, groundwater depth, annual rainfall, etc.) the potential for the release of Formaldehyde, which is a decomposable organic fluid, into adjacent soil and groundwater is thought to be very small to non-existent. Recent studies examining this issue have not found significant effects (Bent and Knight 2007). There is no evidence that HMP has contributed to groundwater problems or that the natural decomposition of casketed interments has or will have any impact on groundwater resources. Formaldehyde is one of the most common chemicals used in America for a wide number of products and materials (most commonly furniture manufacture). Its use in modern embalming methods is in very small diluted quantities. It is a biodegradable organic compound which decomposes when exposed. Every non-cremated interment is placed in a casket and then into a concrete outer burial container with a sealed top or lid to allow a stable environment both for compaction of the soil around the grave and for casket exposure to the elements.

4.5.3 Mitigation

As suggested in the *Ko'olaupoko Watershed Regional Strategy Report* (KBAC 2007), HMP will work in cooperation with KBAC to ensure groundwater impacts are minimized. HMP will maintain fertilizer maintenance logs as part of a fertilizer management plan. In addition, soil or tissue samples (grass) will be submitted to UH's Agricultural Diagnostic

Service Center to test if fertilizer is necessary before the semi-annual fertilizer application.

4.6 NATURAL HAZARDS

A Report Assessment of Hazard from Rockfall and Slope Stability was prepared for this DEIS in 2008 by Shinsato Engineering, Inc. Findings are summarized below, and the full report is attached as Appendix B.

4.6.1 Affected Environment

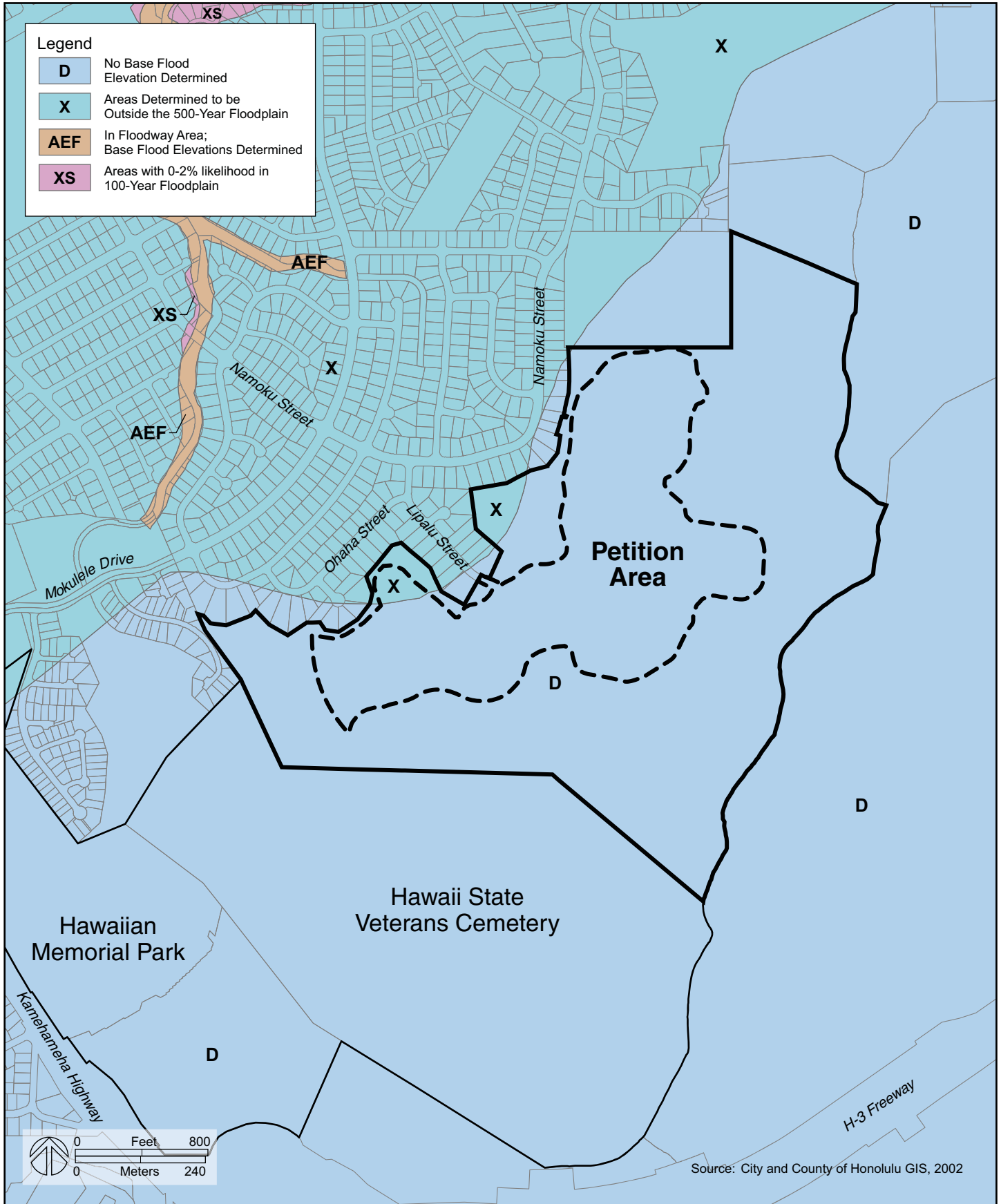
Flood Hazards

According to the Flood Insurance Rate Map (FIRM) number 15003C0270G (effective date: June 2, 2005) published by the Federal Emergency Management Agency (FEMA), the majority of the Petition Area is located within Zone D, and a small portion is designated Zone X (Figure 17). Zone D denotes areas of undetermined flood hazard where flooding is possible; Zone X denotes areas determined to be outside the 500-year floodplain. The neighborhoods north of the Petition Area, closer to the head of Kāwā Stream, and *makai* of the stream, are designated AE. Zone AE areas are subject to a one percent or greater annual chance of flooding in any given year and base flood elevations have been determined. North of the Petition Area *mauka* of Kāwā Stream and around the eastern edge of the existing cemetery boundary to the entry point off Kamehameha Highway is classified as Zone X. These areas have been determined to be outside the 100- and 500-year floodplains. The 100-year tsunami inundation line is based on the FIRM, where areas designated "AE" and "VE" are subject to inundation. The Project Area is outside the tsunami inundation zone.

Public hurricane shelters within the Kāne'ōhe area serving the Petition Area are located at Kaneohe Elementary School, King Intermediate School, and Kapunahala Elementary School. Other public shelters within the region are located at Benjamin Parker Elementary School, Kaneohe District Park, and Puohala Elementary School. Private shelters also exist at many Windward area churches to be used for members of the congregation.

Although the neighborhoods north of the Petition Area are within Zone X, there is anecdotal information that suggests that some of the residences on the eastern side of Nāmoku Street that abut the property owned by the Petitioner are affected by sheet flow, particularly during periods of heavy and prolonged rainfall. During community meetings prior to the preparation of this DEIS, affected area residents commented on their individual experiences of flooding. These accounts range from storm water sheet flowing across yards to water ponding in yards and seeping into homes. Typically, these events were identified related to isolated storm events (several years apart), or to the prolonged period of rain which occurred from late February to late March 2006 (the so-called "40 days and 40 nights").

It is important to understand the physical characteristics that could be influencing these events. The Pikoiloa Tract 10 subdivision was approved by the City and County of Honolulu in 1964. As part of the subdivision, the vast majority of parcels along the eastern sides of Nāmoku and Ōhāhā Streets are encumbered by an easement for slope



Flood

Figure 17

and drainage purposes (Figure 18). These parcels typically are level from the front property line toward the rear of the property, rendering from 1/3 to 1/2 of the property unbuildable because of the slope and the easement, even though the property is zoned for residential use.

The drainage system for these properties was designed as a series of interceptor ditches cut into the slope. These ditches were lined with concrete and extend across all parcels in this system, intending to direct sheet flow to underground storm drains, which eventually empty into Kāwā Stream. The responsibility to maintain these interceptor ditches was left to each individual property owner. It is not the responsibility of the Petitioner. As a consequence, there is a wide range of maintenance quality. Inspection of several homes indicated some owners keep their interceptor ditches free of silt, debris, and vegetation. Other property owners have not kept a maintenance protocol, and ditches are overgrown with trees, shrubs, and other vegetation, and are full of soil, incapable of performing their designed function. It is probable there are several factors contributing to flooding occurrences in this neighborhood: (1) slope profile characteristics of each property; (2) design of the interceptor ditch system; (3) uneven maintenance protocol for the entire system.

Rockfall/Slope Stability Hazards

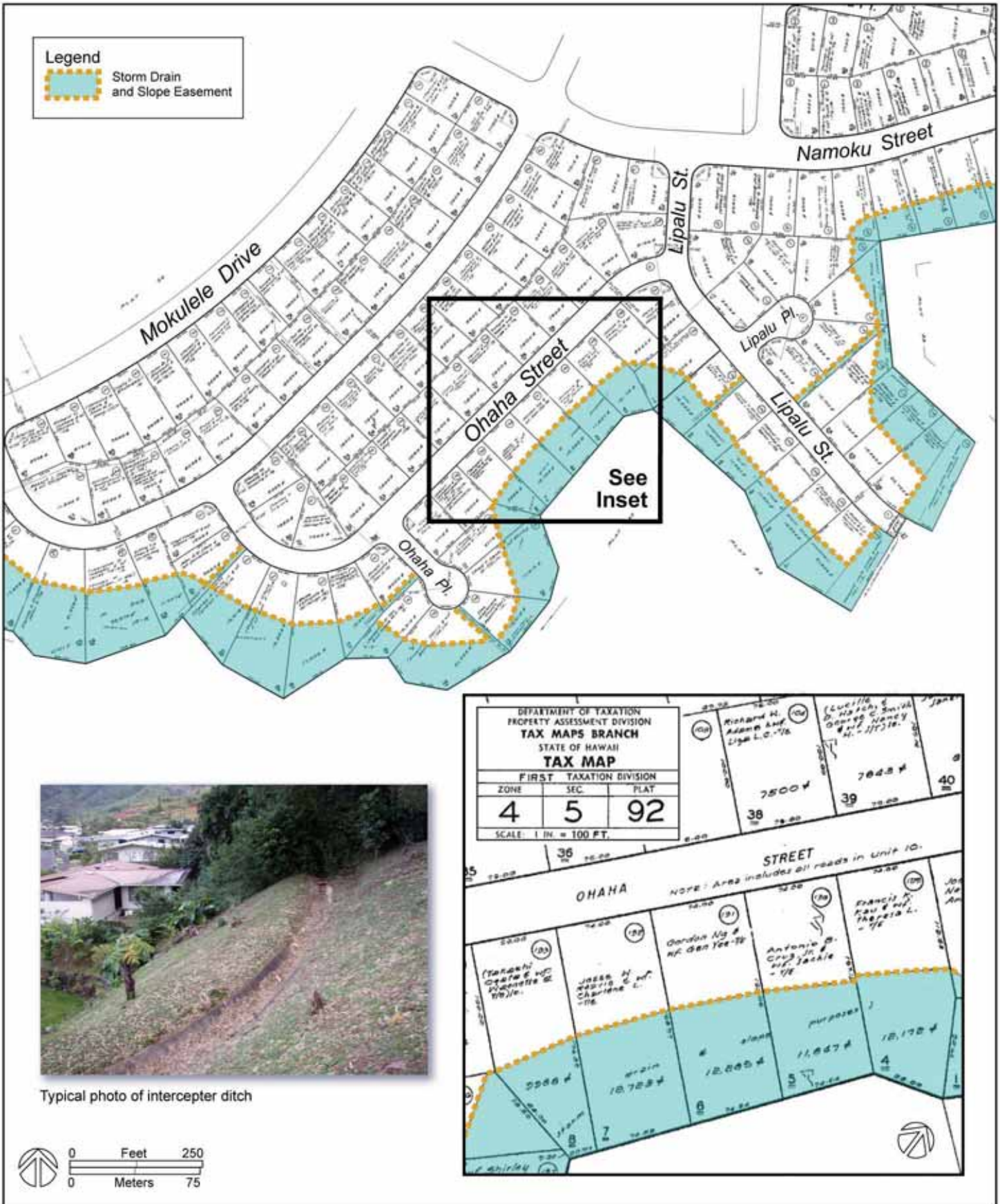
To determine rockfall hazards and slope stability of the Petition Area, Shinsato Engineering, Inc. performed a site reconnaissance to observe and map points of interest as they relate to soil and geologic conditions; collected near surface soil samples; reviewed soil and geologic information of the area; and analyzed the data to determine the stability of the existing slope, and the impact that the Revised Proposed Action may have on the overall stability of the Petition Area as well as potential hazards from rockfalls.

Laboratory tests were performed on the soil samples to determine the in-situ moisture content, and the liquid limit and plasticity index for soil classification. Slope stability analyses of the Petition Area was performed using topographic maps, information on subsurface materials, and data from nearby test boring logs. Both short and long term stability was examined. Rockfall hazard analysis was performed using a modeling program to provide probable rockfall behavior at a given site.

4.6.2 Probable Impacts

Flood Hazards

There is concern among neighboring land owners that expansion of the cemetery ~~and development of 20 residential lots~~ will increase the probability that their property will be affected by an increase in storm water runoff. Discussion of increases in storm water attributable to the Revised Proposed Action is ~~discussed~~ found in Section 6.4 (Drainage) including a detailed description of on-site drainage facilities. However, it is important to note that prior to commencement of any construction activities, the Petitioner must submit a detailed drainage study to the DPP, which must indicate how any increases in storm water runoff for the county design storm event attributable to the development, will be retained on-site.



Pikoiloa Storm Drain and Slope Easements

Figure 18

Hawaiian Memorial Park Cemetery Expansion Environmental Impact Statement
 Kāne'ohe, O'ahu, Hawai'i

As is true for the entire State of Hawai'i, the existing hurricane shelters within the Kāne'ohē region are not adequate to handle the current population. Nevertheless, there is not expected to be a significant impact to the hurricane shelters as the Revised Proposed Action includes no new dwelling units (City and County of Honolulu Department of Emergency Management 2008).

Rockfall/Slope Stability Hazards

A detailed description of existing soil conditions is discussed in Section 4.3 of this DEIS. Shinsato Engineering's report found that both soil types (Kaneohe and Alaeloa) have good suitability as a source of Road Fill, have moderate shrink-swell potential, and have >5 inches to bedrock. The slope stability analysis determined that there is no apparent potential for hazards to the Petition Area that may be associated with slope stability. The factor of safety for the existing slopes and newly graded slopes exceeds 1.5 (the generally accepted minimum factor of safety). Therefore no mitigative measures are deemed necessary to protect the area from slope stability issues.

Based on the results of the rockfall hazard analysis, there are four areas with the potential for hazard due to rockfall. These areas are located along the east and northeast edges of the Petition Area (See Figure 19).

4.6.3 Mitigation

Mitigative measures for rockfall hazards may include one or a combination of the following:

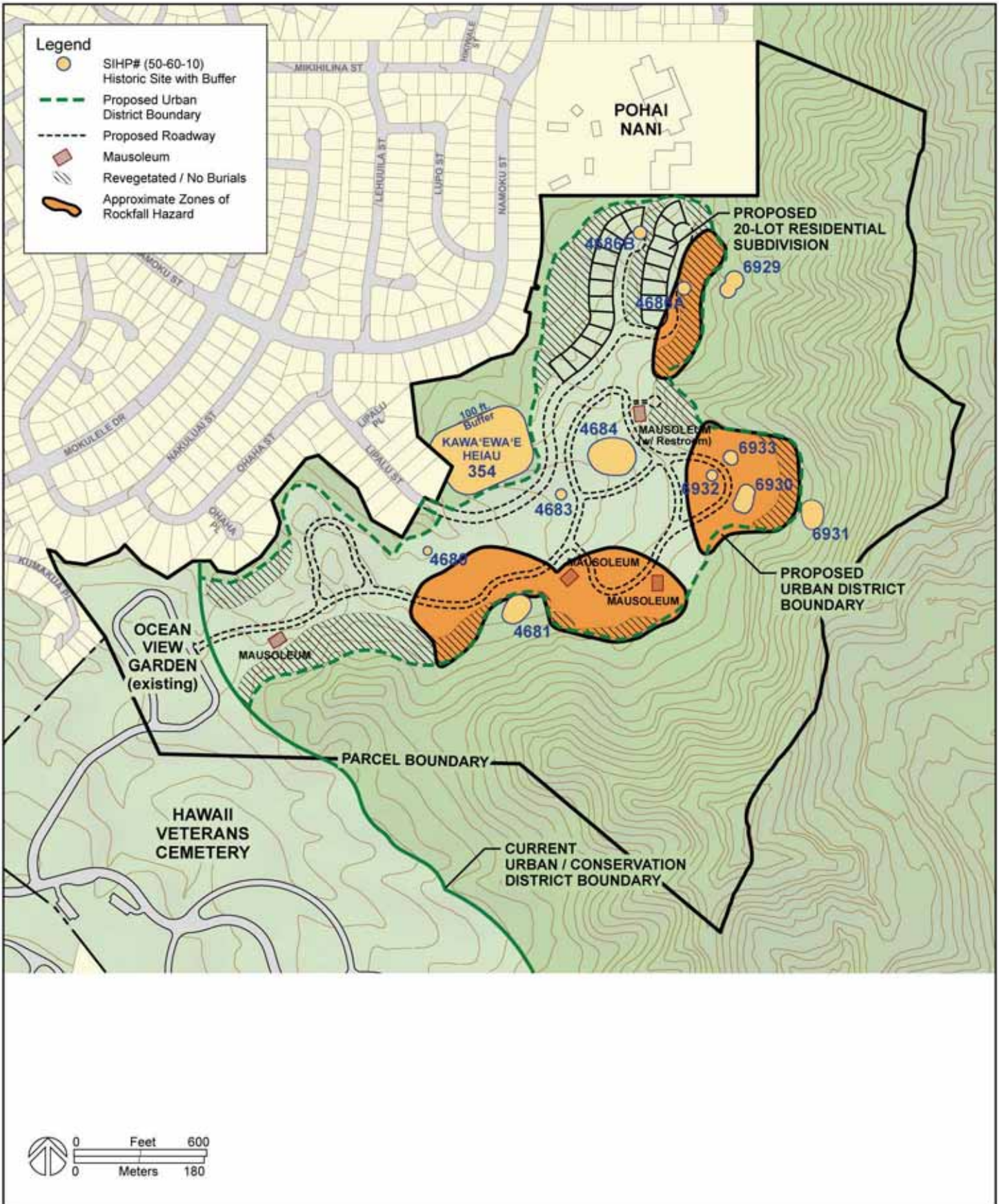
1. Securing existing boulders using netting or chaining.
2. Removal of the boulders.
3. Installation of fencing uphill from proposed improvements.
4. Constructing a buffer zone between the rockfall hazard source and the proposed improvement.

The choice of mitigative measure will depend on the specific site conditions.

4.7 FLORA

4.7.1 Affected Environment

A botanical survey of the Petition Area was conducted in 2006 by LeGrande Biological Surveys, Inc. The findings are summarized below and the complete report is attached as Appendix D. The survey objectives were: (1) to provide a general description of the vegetation in the Petition Area; (2) to inventory the flora; and (3) to search for threatened and endangered species as well as species of concern, following status lists prepared by the U.S. Fish and Wildlife Service (1999) and Department of Interior Federal Register (2002). The survey methodology included a literature search for other relevant botanical surveys, and a walk-through survey with 20-ft interval transects through the interior of the property. The survey area included the Petition Area as well as the existing Ocean View Garden section of HMP, and a buffer that extends *mauka* up to an elevation of 600 ft. An addendum to the Botanical Survey was conducted in August 2008 by LeGrande



Rockfall Hazards

Figure 19

Biological Surveys, Inc. (and is included at the end of the original biological survey in Appendix D) to identify and map the areas where laua'e fern is plentiful (Refer to Section 5.5.1 for further detail).

The Petition Area is a highly disturbed Schefflera/Java Plum Forest. A Schefflera/Java Plum Forest is a further description of an 'Alien Wet Forest' as defined by Wagner *et al* (1990) in the *Manual of Flowering Plants of Hawaii*: "A diverse mosaic of forest communities of recent derivation dominates areas abandoned by early Hawaiian and/or Western cultivation." These forests occur in wetter valleys and on adjacent ridges, and are variously dominated by alien species such as Java Plum. The Petition Area is described as highly disturbed due to several factors acting on the alteration of the site over time, including: human disturbance; alien plant species introductions; and feral ungulate disturbance, all of which are still ongoing within the Petition Area.

Existing vegetation found in the Petition Area is characterized by the alteration of native plant habitat. As a result, very few native plant elements remain in the Petition Area. Of the 958 plant species observed, 843 (867%) are alien or introduced, five six are Polynesian introductions, five six are indigenous (native to the Hawaiian Islands and elsewhere), and two are endemic (native only to the Hawaiian Islands). Only seven eight percent of the existing vegetation is native, most likely because of disturbance when the parcel was used for grazing. In addition, feral pigs (*Sus scrofa*) continue to degrade the vegetation, uproot understory plants, and cause further soil disturbance.

The native species documented in the botanical survey include infrequent occurrences of 'uhaloa (*Waltheria indica*), hala (*Pandanus tectorius*), ka'e'e or sea bean (*Mucuna gigantea*), pala'a (*Sphenomeris chinensis*), 'ekaha or bird's-nest fern (*Asplenium nidus*), and moa (*Pisilotum nudum*). Of the two endemic species, two koa (*Acacia koa*) trees were observed near the Kawa'ewa'e Heiau (outside of the Petition Area), and 'akia (*Wikostroemia O'ahuensis* var. *O'ahuensis*) was documented along the edges of the Ocean View Garden section of HMP and the upper elevations near the ridgeline.

The Polynesian introduced plant species observed during the botanical survey include: ti (*Cordyline fruticosa*); niu or coconut (*Cocos nucifera*); kukui (*Aleurites moluccana*); mai'a or banana (*Musa* sp.); noni (*Morinda citrifolia*); and hau (*Hibiscus tiliaceus*). The kukui and hau were observed scattered throughout the survey area especially in the small gulches and ravines. Ti plants were observed along the boundary of the existing HMP and scrub vegetation as well as along several of the ridges within the Petition Area. A few coconut trees were observed near the gulch bottom at the end of Lipalu Street.

The Petition Area is dominated by octopus (*Schefflera actinophylla*) and Java plum trees (*Syzygium cumini*), two lowland alien wet forest species. Other scattered trees include African tulip (*Spathodea campanulata*), mango (*Mangifera indica* L.), date palm (*Phoenix dactylifera*), Chinese banyan (*Ficus microcarpa*), Coconut (*Cocos nucifera*), and Christmas berry (*Schinus terebinthifolius*). Shrub species include slender mimosa (*Desmanthus pernambucans*), shoebutton ardisia (*Ardisia elleptica*), and kolomona (*Senna surattensis*). In open areas, vines such as *Ipomoea obscura*, little bell (*I. triloba*), and ivy gourd (*Coccinea grandis*) climb along the ground, up into the trees and shrubs. Groundcover consists primarily of fern species such as laua'e (*Phymatosorus grossus*)

and *pala'ā* (*Sphenomeris chinensis*), and *honohono* or basket grass (*Oplismenus hirtellus*), an alien grass species.

The botanical survey also included areas just outside the Petition Area; the Ocean View Garden section of HMP, and the open sloping ridge where the Kawa'ewa'e Heiau is located. The existing Ocean View Garden section is predominantly mowed grass and landscaping plantings. The edges of the Ocean View Garden cemetery consist of weedy sections that are dominated either by tall trees such as Java plum (*Syzygium cumini*), *Falcataria moluccana*, and mango (*Mangifera indica*), or smaller shrubs like *koa haole* (*Leucaena leucocephala*), sourbush (*Pluchea carolinensis*), Hilo holly (*Ardisia crenata*), castor bean (*Ricinus communis*), and golden crown-beard (*Verbesina encelioides*). Grass species include sourgrass (*Digitaria insularis*), broomsedge (*Andropogon virginicus*), molasses grass (*Melinis minutiflora*), and swollen fingergrass (*Chloris barbata*). The main section of the Kawa'ewa'e Heiau is cleared of most plant species. Some weedy plants that are growing within the *heiau* structure include *ti* (*Cordyline fruticosa*), papaya (*Carica papaya*), Spanish needle (*Bidens pilosa*), and balsam pear (*Momordica charantia*). Two juvenile *koa* (*Acacia koa*) trees were observed at the southern end of the *heiau*; they appear to have been planted.

No wetlands were encountered during the survey. None of the three essential criteria for defining a federally recognized wetland (*i.e.* hydrophytic vegetation, hydric soils, and wetland hydrology) were present within the Petition Area.

None of the plant species observed on the Petition Area is classified by the U.S. Fish and Wildlife Service as an endangered or threatened species; nor is any plant species proposed as a candidate for listing as an endangered or threatened species. All of the plants can be found in similar environmental habitats throughout the Hawaiian Islands.

4.7.2 Probable Impacts

The Revised Proposed Action will impact approximately 56.65 acres of the existing non-native Schefflera/Java Plum Forest. Approximately ~~27.8~~ 29.5 acres will be landscaped with turf and scattered groupings of trees such as *koa* (*Acacia koa* A. Gray), *kukui* (*Aleurites moluccana*), *loulou* palms (*Pritchardia martii*), *ohi'a lehua* (*Metrosideros polymorpha*) and *lona mea* (*Sapindus oahuensis*); ~~15.3~~ 11.4 acres will be revegetated with appropriate native plant material, ~~and 6.4 acres will be part of the residential development.~~ No Federal threatened or endangered species, or species of concern have been observed in the Petition Area, and thus, the Revised Proposed Action will have no significant impact on such species.

Community informants for the CIA prepared for the DEIS commented on the importance of the *laua'e* gathering within the Petition Area. The *laua'e* is valued as a *hula* plant, and specimens known in sections of the Petition Area are particularly noteworthy for its thickness, color, and fragrance. The *laua'e* that grows as an understory plant differs considerably from those in open sunny areas. Full sun causes fronds to be a lighter shade of green, which is less culturally desirable than the darker fronds. The crushed leaves of *laua'e* have a faint but distinctive smell reminiscent of another popular *hula* plant; *maile* (*Alyxia oliviformis*). There is a cultural significance of gathering the plant *in situ* within the ideal moist conditions of the Petition Area that creates the abundant, luxuriant and healthy stands of the most coveted forms of *laua'e*, even in a forest of pre-

dominantly non-native trees. It should be pointed out that the *laua'e* found on the Petition Area is not a native plant, and has been found to be a more than an acceptable replacement for a native fern with similar characteristics by practitioners. The Petitioner will continue to allow gathering of the *laua'e* and will establish a 9.4-acre cultural preserve area specifically for this purpose that includes the communities of *laua'e* identified during the fieldwork for the Botanical Survey Addendum.

4.7.3 Mitigation

Proposed improvements to the Petition Area include landscaping treatments to introduce native species when re-vegetating the areas that have been graded or filled. The areas will be revegetated with appropriate and indigenous species to the extent possible. Some Polynesian introduced plants may be used as well. The newly revegetated areas will include spreading foliage trees along the bottom reaches of the transition slopes and buffer areas adjacent to the residential uses, and trees of a variety of structural shapes and heights above and throughout the proposed cemetery grounds. Species such as *koa* (*Acacia koa* A. Gray), *kukui* (*Aleurites moluccana*), and *loulou* palms (*Pritchardia martii*) will be used extensively along the perimeter top of slopes and throughout the grounds, mixed in with the upper edge of the cemetery grounds foliage trees. Other plants could include: *ohi'a lehua* (*Metrosideros polymorpha*) as a perimeter tree, *lona mea* (*Sapindus oahuensis*) to replace the Java Plum trees, *koki'o kea* (*Hibiscus arnottianus*), *hō'awa* (*Pittosporum hosmeri*), *a'ali'i* (*Dodonaea viscosa*), *maile* (*Alyxia olivaeformis*), and *naio* (*Myoporum sandwicense*).

In the area of the proposed cemetery expansion, the character of the open space will be changed from non-native invasive species to open lawns and scattered groupings of trees of intermediate height. The areas where the *hula* plant *laua'e* (*Phymatosorus grossus*) is most concentrated will be protected to the degree feasible and practicable. The availability, abundance, and quality of the *laua'e* ferns will be protected through creation of a cultural preserve area ~~plant gathering kīpuka~~, including maintenance of an intact vegetative overstory. On-going cultural practices, such as gathering of *hula* and *lei* plants, will be recognized and accommodated (subject to safety and liability issues) as provided by law.

4.8 FAUNA

4.8.1 Affected Environment

An avifauna and feral mammal survey of the Petition Area was conducted in 2006 by Philip L. Bruner. The findings are summarized below and the complete report is attached to this DEIS as Appendix E. The objectives of the survey were to document the birds and mammals presently found on or near the Petition Area, and to locate and examine all habitats on the site and note their importance, if any, for native and migratory birds. The survey methodology included a walkthrough of the site on existing trails and an old road bed during early morning, late afternoon, and early evening hours when birds and mammals are more active and observable. All birds seen and heard were tallied, and nine census stations were established to estimate relative abundance of each bird species on the site. Data on mammals were obtained by visual observations only. Survey findings are summarized below.

The second growth forest of the Petition Area provides habitat for a variety of alien birds and mammals, none of which are threatened or endangered. No native land birds were recorded during the survey. Given the location, elevation, and type of habitats available at this site, the absence of native land birds was not unexpected. The short-eared Owl or *Pueo* (*Asio flammeus sandwichensis*) is listed by the State of Hawai'i as endangered on O'ahu but not elsewhere in the State. It forages in grasslands, agricultural fields, and pastures as well as in upland forested habitat. Although this species was not recorded during the present survey it is possible that *pueo* could occasionally forage in the area. The O'ahu 'amakihī (*Hemignathus flavis*) is seen in similar habitat on O'ahu and could possibly also occur at this site.

No native waterbirds were recorded nor were any expected due to an absence of suitable wetland habitat. Similarly, no seabirds were recorded due to unsuitable habitat, the presence of ground predators, and habitat disruption. Some species of seabird may occasionally fly over the property. Migratory shorebirds winter in Hawai'i between the months of August through May. One species of migratory shorebird, the Pacific Golden-Plover or *Kolea* (*Pluvialis fulva*) was observed on lawns adjacent to the Petition Area. *Kolea* can be found in Hawai'i between August and the end of April when they migrate here from their nesting grounds in Alaska. They are not listed as either endangered or threatened species by the U.S. Fish and Wildlife Service, nor proposed as a candidate for listing as an endangered or threatened species.

A total of 14 species of introduced (alien) birds were recorded during the course of the field survey. The more common of these species include: the Spotted Dove (*Streptopelia chinensis*); the Red-vented Bulbul (*Pycnonotus cafer*); the Red-whiskered Bulbul (*Pycnonotus jocosus*); the Japanese White-eye (*Zosterops japonicus*); and the House Finch (*Carpodacus mexicanus*).

Eight feral cats (*Felis catus*), three Small Indian Mongoose (*Herpestes auropunctatus*), and four pigs (*Sus scrofa*) were observed during the survey. Pig tracks and uprooted areas caused by pigs were abundant throughout the site. Mice (*Mus musculus*) and rats (*Rattus* spp.) undoubtedly occur on the property, but none were sighted. The native endangered Hawaiian Hoary Bat was not detected during the survey, and none were expected given the low number of bats reported to occur on O'ahu.

Invertebrates

A survey of native invertebrate resources for the Petition Area was conducted in August 2008 by Steven Lee Montgomery, Ph.D. The findings are summarized below and the complete report is attached to this EIS as Appendix F. The primary purpose of the survey was to determine the presence or absence in the Petition Area of any endemic or indigenous terrestrial invertebrates, especially any species with legal status under federal or state threatened and endangered species statutes.

The survey methodology included a general assessment of terrain and habitats after reviewing maps and prior reports. Surveying efforts were conducted by day and night to ensure a thorough survey. The property was traversed across all habitat types, alternately following established pathways to search for any native botanical resources and substitute host plant options for native invertebrates. The collection methods used

were appropriate for terrestrial invertebrates for the terrain, botanical resources, and target species, and included: 1) host plant searches (visual inspection of resting sites and searching known feeding or breeding sites such as under dead bark); 2) use of sweep nets (a general method of censusing most flying and perching insects where a fine mesh net was swept across plants, leaf litter, etc. to sample any flying or perching insects); 3) visual observation (any visual evidence of arthropod presence or activity. Visual observations provide valuable evidence and are a cross check that extends the reach of sampling techniques); and 4) light sampling, which surveys insects active at night (using a bright light in front of a white cloth sheet).

The survey focused on finding any endemic and indigenous Hawaiian species. No attempt was made to collect or completely document the many common alien arthropod species present in the area. Three native species were encountered: the endemic bug *Trigonotylus hawaiiensis*, the endemic Moss moth (*Eudonia sp.*); and the endemic small moth or micro-moth (*Mestolobes*). No native mollusks were observed and no invertebrate listed under either federal or state endangered species statues was located. The extremely low level of native plants serving as arthropod hosts is most likely the reason for the absence of Hawaiian arthropods in the Petition Area.

4.8.2 Probable Impacts

The Revised Proposed Action is not expected to significantly impact the fauna found on the Petition Area. No Federal threatened or endangered species, or species of concern were observed on the Petition Area. Feral pigs (*Sus scrofa*) have been observed, and the Revised Proposed Action will alter their habitat, resulting in a change to their foraging activities. The clearing of the area and its subsequent conversion to lawn habitat will reduce the immediate, local populations of alien birds, but will provide new foraging space for the wintering *Kolea*, who forage in grassy areas with a good insect supply. The revegetation of the ~~45.3~~ 11.4 acres with a plant palette dominated by native and Polynesian-introduced plants could provide habitat for a number of avian species including the O'ahu 'amakihī, pueo, and any of the alien bird species typically found in Windward O'ahu. There is an abundance of non-native habitat in the lands surrounding the Petition Area, far more habitat than the few Pueo that still exist on O'ahu would require.

No Federal or state listed endangered or threatened invertebrate species were found in the Petition Area; nor were any rare native Hawaiian invertebrate species observed. The few native Hawaiian invertebrates observed are widespread in distribution. The anticipated actions related to the Revised Proposed Action are not expected to have a significant negative impact on an endemic or indigenous species. No part of the property is designated critical habitat for any threatened or endangered species.

4.9 HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

4.9.1 Affected Environment

Regional Background. Several myths and legends are associated with Kāne'ōhe. A few stories provide the origin of the name of the *ahupua'a* of Kāne'ōhe. The word "Kāne" has been interpreted variously as "husband", "man", or as a reference to the god Kāne, the god of creation, while 'ōhe means "bamboo". One account attributes the

name to a story about a woman who compared her husband's cruelty to the cutting edge of a bamboo knife. Kāne'ōhe may also be derived from 'ōhe, which is said to be one of the *kinolau* (body forms) of the god Kāne (CSH 2008a). Another account is as follows:

In Kaneohe proper, the people learned a new use for the Ohe...In olden times anyone who did not conform to the way of life lived so industriously by the shore people, was called E-epa, or non-conformist. They liked to wander off by themselves and dwell among the mysteries of the upland forests where they listened to the music of Nature, and often became poets or musicians. Those upland reaches, all unexplored territory and sacred to the Spirits or Akua of Nature, were referred to as the Wao (upland forest), or places of mystery. In order to keep children from wandering to the uplands, their elders told the little ones, "Do not go up there or the Bamboo Man may keep you. We would mourn your absence in loneliness. Remain at home and learn your useful duties.

Hano-ihu...longed to explore. Pu'ili...longed to accompany her playmate, Hano-ihu, when he wandered far. But, being more timid, she contented herself during the boy's absences and kept his secret of those upland trips he enjoyed.

One sad day, Hano-ihu did not return. The people searched and could find no trace of the disobedient boy. Finally, the villagers decided the boy had died, and they told the other children that the Bamboo Man had taken the boy-wanderer. Pu'ili...decided that he was not dead and she must search for him. Acting upon the thought, the little girl followed the direction often taken by the boy and was soon alone in the dark recesses of the forest lands of Wao, the Mysterious.

She saw nothing to fear. Rather, she delighted in the beauty of the forests, the fragrance of the ferns and blossoms growing besides singing rills of sweet waters, and danced along happily to the whistling of the Wind Gods in the tree tops touching the blue sky far above.

Soon she realized the whistling was not actually the Wind, for it had a bird-like note that repeated itself in a gentle rhythm. Also, she saw the bamboo moving in the breeze and heard how it rattled its branches. She found two lengths of a bamboo branch and, one in each hand, beat time on the two sticks while she followed the plaintive note calls. Before her...she saw her beloved playmate sitting on the bank. Beside him was a tall, thin man whose eyes watched the boy, while the child blew upon a bamboo length. The man's lean hands waved to the rhythm of the notes, and the girl went dancing toward the pair, keeping time with her pair of bamboo sticks.

Hano-ihu and the tall man finished their melody, then praised the little Pu'ili for joining them....She sat with them and learned that the man was Kane'ōhe, the Bamboo Man who, as a child, had followed the lure of Wao and had invented a bamboo flute. Kindly, the old man explained to the children how the art of creativity often is lost unless those inspired do

follow the call. He told them, "Now we shall return to the village, for I have answered the call and you two little ones will be musicians like me. In honor of this occasion, I shall name the flute after you, my boy...we shall name the time-keeping sticks for her.

Gaily, the three went down the forest trail of Wao the Inspiring. They were welcomed with feasting and joy. That is how we have the...Bamboo, instruments today. The Hano-ihu or Nose flute; and the Pu'ili, or notched Bamboo sticks; and the hula named for these gifts of Kane'ohē, the Bamboo Man" (Paki 1972:29-30 in CSH 2008a).

In pre-contact times, the *ahupua'a* of Kane'ohē offered fresh water from *mauka* (upland) springs watering extensive agricultural fields and a well developed fishpond system, making it both an agricultural and aquacultural center on O'ahu. Kane'ohē has been described as:

...an area of little hills with many small streams between them. In 1935 it was still one of the most active communities in planting commercial taro. A goodly proportion of its lowland lo'i, tucked away in pockets flanked and often hidden by low hills or near the town itself, was then still planted in taro by Hawaiians who owned the land and by Orientals who leased land or were hired to cultivate it (Handy and Handy 1972:455 in CSH 2008a).

Pre-contact land use would have consisted mainly of *kalo* (wetland taro) and *kula* (dryland) cultivation of *hala* - pandanus (used for making household furnishings such as mats), *wauke* – paper mulberry (used for making *tapa/kapa* cloth), bananas, and sweet potatoes. Kane'ohē Bay, with about two-dozen walled fishponds, was a bountiful source of fish.

Kane'ohē has long been viewed as a "valuable" *ahupua'a* both in terms of agricultural and fishery productivity. In 1830 the chiefs of Hawai'i, Maui, and O'ahu, in a council meeting concerning the "late doings on Oahu", referred to Kane'ohē as the "most valuable part" of the district of Ko'olau Poko (CSH 2008a).

In the 1860s, both commercial sugar cane and rice cultivation began in Kane'ohē. One of the earliest sugar plantations on O'ahu was owned by Charles Coffin ('C.C.') Harris, who came to Hawai'i in 1850 with a plan to practice law. He established the Kaneohe Sugar Plantation Company (c. 1865) on 7,000 acres of Queen Kalama's land, with Harris as partner and manager. In 1871, C. C. Harris bought Queen Kalama's Ko'olau Poko properties from her heir, Charles Kanaina. The sale included "...livestock, tool, fishponds, and fishing rights". C.C. Harris's plantation shut down in 1891, when the yield was not enough to support the operation. Judge C.C. Harris's daughter and heir, Mrs. David Rice, incorporated the lands as Kaneohe Ranch and converted it to stock farming, to be eventually purchased by James B. Castle in 1907. Harold K.L. Castle, the only child of James B. Castle, owned most of the *ahupua'a* of Kane'ohē in the early 1900s. Eventually he purchased the remaining land from Harris's daughter.

Rice cultivation was to eventually supersede taro and dominate the lowlands of Kane'ohē. By the late 1880s, virtually the entire floodplain areas of Kane'ohē were

under rice cultivation. During the height of rice cultivation (c. 1890-1920), Chinese, who rented or leased the *lo'i* lands from the Hawaiian landowners, dominated the business.

At the same time rice paddies were displacing the *taro lo'i* along the coast, the *kula* (pasture) lands of He'eia were utilized for grazing of cattle and other livestock. Thrum's 1905 Hawaiian Annual notes a cattle ranch in He'eia. By the mid-1880s, grazing animals (cattle, sheep, and goats) were having an impact on the land and water of Kāne'ohe. Alien grasses and other species, such as pigeon peas, were introduced to the area as cattle fodder. Much of the land modification in the upland and hilly portions of Kāne'ohe may be the result of heavy cattle grazing over a long period of time.

The commercial cultivation of pineapple began in the 1890s and the first decade of the 1900s in Kāne'ohe. From approximately 1910 to 1925, pineapple cultivation was a major industry in this area. In 1911, the company of Libby, McNeill and Libby built a pineapple cannery in He'eia. At its peak, 2,500 acres were under pineapple cultivation on Windward O'ahu stretching from Kāne'ohe to Kahalu'u. A *heiau*, Kaulauki Heiau in He'eia, was mostly destroyed by pineapple field clearance during this time – a likely fate of many archaeological sites. In 1919, the Kaneohe Ranch Company and He'eia Agricultural Co., Ltd. leased 1,000 acres of land in He'eia, Kāne'ohe, and Kailua, formerly planted in sugar, to the Libby company. In 1917, Libby leased an additional 600 acres in He'eia. While the rice fields that covered old taro lands were mainly located near streams and near the coast, the pineapple fields were also grown on the slopes of higher lands.

The pineapple fields were abandoned when Moloka'i and Lāna'i pineapple cultivation began to boom, and Libby pulled out of the Ko'olau Poko enterprise. The cannery closed in 1923. Most of the former pineapple land went to grass, and some of it was used to graze cattle. Many of the small farmers returned to rice cultivation. The area along He'eia stream mauka of the viaduct continued to produce rice.

By the end of World War II, ranching was no longer economically viable, and residential developments changed the face of Kāne'ohe *ahupua'a*. The opening of the Wilson Tunnel and the expansion of the Pali Highway in the 1950s and 60s — creating an easier passage from Honolulu thru the Ko'olau mountains to windward communities — led the way to a development boom on the windward side of O'ahu.

The dairy industry rose to prominence in the post-war years. The shortage of available land due to urban expansion, the shortage of fee simple land, and the high price of land leases forced farmers in the dairy districts near Honolulu to relocate to more remote areas of O'ahu. In the 1950s, Kailua-Kāne'ohe was an important dairy district of Windward O'ahu. The land presently occupied by HMP adjacent to Kamehameha Highway was formerly a dairy farm. However, this period was relatively short-lived as the opening of the Pali route, exorbitant land prices in Honolulu, and more automobiles on O'ahu contributed to rapid urbanization in Kailua-Kāne'ohe. Many landowners decided to develop their land for suburban housing and terminated leases with farm leaseholders.

In 1959 Hawai'i was admitted to the Union as the 50th state. A construction boom and rapidly growing economy ensued. HMP opened in 1961 with a land area of 6 acres. It

has gradually expanded to its current size of 80 acres. The Pikoiloa Subdivision lots, which are to the northwest of the Petition Area, were created by subdivision approvals executed in 1964. The Pikoiloa Tract Units 9 and 10 total 280 lots. Pohai Nani was opened in 1964 and is operated by the Evangelical Lutheran Good Samaritan Society.

Kāne'ohē *ahupua'a* was an active area during the pre-Contact period capable of supporting a large population with its abundant natural resources. In post-contact years, Kāne'ohē was employed for the cultivation of rice, sugar and pineapple, and eventually cattle ranching and dairy farming. Subsequently, the ranching and farming areas were replaced by residential subdivisions. The continuous occupation and utilization of the area is also demonstrated in the archaeological record with the presence of pre-Contact and historic resources. The Petition Area has been utilized from as early as the twelfth century up until the middle of the twentieth century for a variety of purposes.

Previous archaeological research has supported these indications with the documentation of pre-contact ceremonial, habitational, and agricultural remains in the immediate vicinity of the Petition Area. Additionally, historic background research has placed the ~~Proposed Action~~ Petition Area within an area employed for cattle ranching following indigenous Hawaiian settlement.

Archaeological Inventory Survey. The earliest systematic archaeological coverage of Kāne'ohē was conducted by J.G. McAllister who recorded major sites throughout O'ahu in the early 1930s. McAllister recorded a number of fishponds and other sites in the vicinity of the Petition Area. Two AISs have been undertaken for the Petition Area; one completed in 1989 by Szabian, Landrun & Cleghorn (SLC); the other by CSH in 2008 (CSH 2008a) which is attached to this DEIS as Appendix G-F. The CSH AIS ~~has~~ was ~~been~~ submitted to the DLNR SHPD for review and approval as part of the EIS process in April 2008. A comment letter from SHPD relating to the AIS was received on September 22, 2008. The recommendation of the agency included four main points: (1) preservation of sites 354, 4684, 6932, and 6931 as a complex, not individually; (2) no relocation of the grinding stone; (3) consultation with ethnic organizations or members of a group for whom some of the historic properties may have significance, as well as with OHA; and (4) appropriate additional testing of the area to be developed as determined via communication with SHPD. All of the recommendations of SHPD will be followed, and the AIS will be revised accordingly and resubmitted for review and concurrence. Since the Revised Proposed Action will include a 9.4-acre cultural preserve, the sites of concern will be protected as a complex, including leaving the grinding stone in place. Further consultation will occur with OHA and members of a group or organizations for whom the area has significance and additional testing will be done as required by SHPD.

A summary of the CSH AIS findings is presented below, including interpretation of the sites, determination of significance, and proposed mitigation measures. In addition, a description of the current state of the sites previously identified by SLC is included.

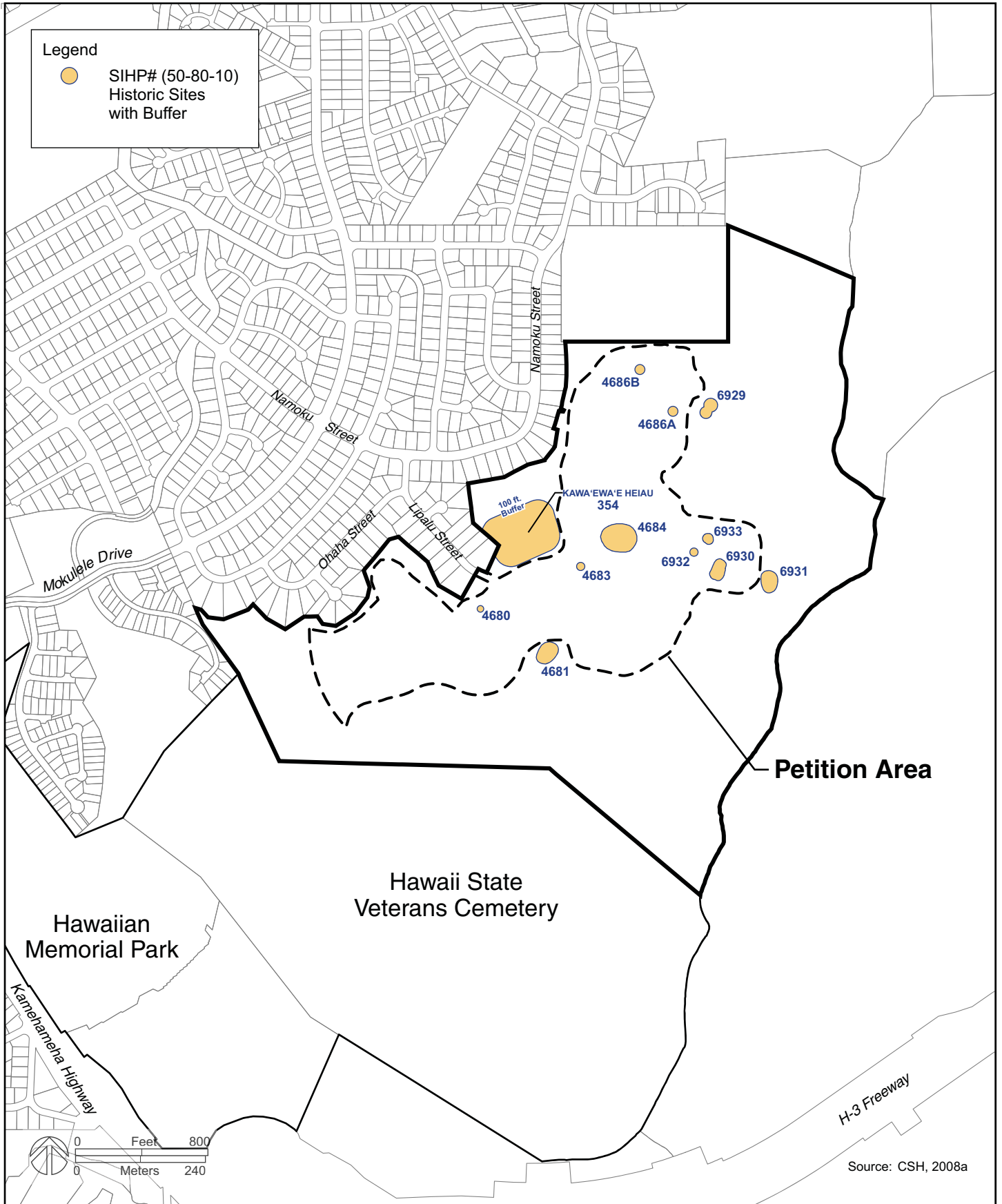
Both survey efforts identified several archaeological sites within and adjacent to the Petition Area. After considerable review and analysis, CSH has determined that they have re-located five sites described by SLC. CSH has also determined that the precise location of many of these sites differs from the location reported by SLC. These differences can be attributed to the methodology employed by each survey team. The

1989 SLC survey used broad transect walk throughs, with the aid of aerial photographs and topographic information, to map their sites, and there was no follow-up to ground survey the sites and map them with precision. The CSH survey included pedestrian inspection with systematic transects across the landscape with 16 to 33 ft-intervals between archaeologists. All historic properties encountered were recorded and documented with a written field description, site map and photographs. Sites were located utilizing the Global Positioning System (GPS) technology of a Garmin GPSmap76S unit or a Trimble PRO XR GPS.

Each historic property identified by the current study was evaluated for significance according to the broad criteria established for the Hawai'i Register of Historic Places. The five criteria are:

- A Associated with events that have made an important contribution to the broad patterns of our history;
- B Associated with the lives of persons important in our past;
- C Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value;
- D Have yielded, or is likely to yield information important for research on prehistory or history;
- E Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property, or due to associations with traditional beliefs, events or oral history accounts – these associations being important to the group's history and cultural identity.

A total of eleven historic properties were recorded within or near the current Petition Area (Figure 20). Of these, one, State Inventory of Historic Places (SIHP) # 50-80-10-354, was previously recorded by McAllister (1933), and five were previously recorded by SLC: 50-80-10-4680; 50-80-10-4681; 50-80-10-4683; 50-80-10-4684; and 50-80-10-4686. The remaining five are new discoveries: 50-80-10-6929; 50-80-10-6930; 50-80-10-6931; 50-80-10-6932; and 50-80-10-6933. Four of the sites (354, -4681, -6929, and 6931) are located outside of the current Petition Area but are close enough for consideration. Also, a previously unrecorded feature associated with 50-80-10-354 was recorded and a large grinding stone was discovered approximately 131 ft south of 50-80-10-4684. In addition, 50-80-10-4682, previously recorded by SLC, was determined to be non-Cultural and is not considered a historic property. In most instances the historic properties previously recorded by SLC were found in the general area as shown on their field map with the exception of -4683 and -4684, where CSH was unable to locate anything resembling the site descriptions in the indicated areas. CSH did however identify sites similar to the descriptions elsewhere within the Petition Area. 50-80-10-4683 was relocated approximately 263 ft north of the location indicated on SLC's 1989 map. Two sites were located resembling the description of 50-80-10-4684; the site closest to the original location plotted by SLC was given this designation. The other, designated SIHP # 50-80-10-6930, also contains attributes similar to the site description recorded by SLC.



Historic Sites

Figure 20

The purpose of CSH's AIS was to document historic properties within the Petition Area, in compliance with state standards. CSH's AIS ~~has been~~ was submitted for review and approval to the SHPD in April 2008. This effort included research of the historic and archaeological background of the area surrounding the Petition Area; consultation with community members to ascertain relevant historical and cultural issues; a 100% coverage pedestrian ground survey to identify and document the historic properties; evaluation of function; interrelationships; and significance; and excavations to determine the presence and significance of subsurface deposits. In addition, the findings were interpreted to ascribe use of the sites based on physical evidence, with recommendations for mitigation.

The individual historic properties are detailed in the following sections, and Table 3 summarizes the sites. The historic properties within the Petition Area are presented first followed by the historic properties located outside of the Petition Area that are close enough for consideration. The previously identified historic properties include the original descriptions by SLC along with additional observations made by CSH.

Historic Properties Within Petition Area

Site 50-80-10-4680. Site 4680 is a historic agricultural/water control feature that consists of a rock concentration forming a crude terraced structure. SLC described the site as "a rock concentration covered with Christmas berry approximately 16 ft (5 m) long and tumbling approximately 20 ft (6 m) down slope". It forms a crude water diversion terrace that retains a large amount of soil runoff that appears to have buried a portion of the site. The terrace forms the top of the hill and is adjacent to a water-cut ditch that drains into a larger drainage at the base of the hill. It is constructed of angular basalt cobbles stacked against a steeply sloping hill. The terrace wall is stacked five levels high (maximum height 4 ft) with 8-inch diameter cobbles. A crude alignment of boulders (2 ft diameter) extends east approximately 7 ft from the southeast corner. The southeast end is the best preserved area.

Because the structure may yield information important for research about the historic utilization of this area, Site 4680 is evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-4683. Site 4683 consists of a large rectangular pit 12 ft east/west by 8 ft north/south that resembles a historic charcoal kiln. East of the rectangular pit is a concentrated area of large stones and boulders. Random partial alignments make the site easily interpreted as man-made terracing, but most likely the site is natural. When first observed by SLC, site 4683 was described as follows: "Located on a fairly level area this site is comprised of two features: Feature A is an apparent excavation, rectangular in shape measuring 12 ft (3.6 m) by 8 ft (2.5 m) and approximately 0.2 ft (0.07 m) deep. Feature B is a series of terraces of undetermined extent." During the CSH survey, the area shown on the SLC field map was devoid of anything resembling the previous description. A rectangular excavation measuring 12 ft by 8 ft and 5 ft deep, that resembles a historic charcoal kiln similar to description of Feature A, was located approximately 262 ft to the north. A concentrated area of large stones and boulders similar to the description for Feature B was found to the east of the pit. Random partial alignments among them suggest man-made terracing but are most likely natural.

Table 3
Overview of Archeological Sites within or near the Petition Area

50-80-10	Formal Site Type	# of Assoc. Features	Probable Function	Approx. Age	Description
Historic Sites located within the Petition Area					
-4680	Terrace	1	Agricultural/ water control	Historic	Historic erosion control and water diversion terrace.
-4683	Pit feature	1	Charcoal kiln	Historic	A rectangular pit and natural terracing.
-4684	Complex-enclosure & terracing	7	Habitation	Pre-contact	Habitation site with several c-shaped structures, a terrace wall, a circular rock feature, and several house terraces.
-4686	Stone alignment	2	Boundary marker	Historic	Feature A is a rock boulder alignment parallel to a large stream cut. Feature B is badly disturbed.
-6930	Stone enclosure	1	Ceremonial	Pre-contact	A rectangular shaped stone enclosure with an irregular notch.
-6934	Stone alignments	2+	Ceremonial	Pre-contact	A possible ceremonial area located on a natural knoll between two intermittent drainages with a series of stone alignments.
-6932	Stone storage	1	Storage	Historic	A storage area dug out beneath a basalt boulder and lined with smaller stones.
-6933	Pit feature w/ stone wall	2	Charcoal kiln	Historic	Large circular pit with burned walls. Cut into a natural rise, it includes a faced, course stone wall on the northeast side.
Historic Sites located near the Petition Area					
-354	Enclosure, platforms, terraces	2+	Ceremonial	Pre-contact	Kawa'ewa'e Heiau consists of one large enclosure with a small terrace on the north side that follows the contours of the land.
-4681	Complex-enclosures & terracing	5	Agricultural/ habitation	Pre-contact	Habitation site with of several c-shaped structures, a terrace wall, and a circular rock feature.
-6929	Quarry	2	Raw material procurement	Pre-contact	Located along an intermittent drainage, has two concentrations of lithic debitage amid basalt cobbles.
-6931	Stone alignments	2+	Ceremonial	Pre-contact	Possible ceremonial area on a natural knoll between two intermittent drainages with a series of stone alignments.
Previously Recorded Historic Properties Considered Non-Cultural					
-4682	Natural terracing	0	Natural	Non-cultural	A series of natural "terraces" formed by lava rocks.

Site 4683 is believed to be a historic (post contact) site, as charcoal production was a widespread industry in windward O'ahu during the later part of the 19th and early part of the 20th century. The remnant charcoal kilns from this land use have been extensively documented in a number of archaeological investigations conducted in Kāne'ōhe and He'eia. Site 4683 is located in a relatively level area of the Petition Area currently utilized illegally by paintball enthusiasts. Makeshift wooden barricades have been constructed; the area is littered with expended air cartridges and colorful splatter patterns on the surrounding vegetation.

These structures may yield information important for research about the historic utilization of this area. The site is evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-4684. Site 4684 is a pre-Contact habitation site that consists of seven features: several c-shaped structures, a terrace wall, a circular rock feature, and several house terraces. To the east, west, and south of the main feature complex is a badly disturbed area with possible terraces. The site is situated on a west-facing slope with a dense canopy of vegetation, large trees, and *laua'e* fern. An intermittent drainage borders the site to the east and south. Site 4684 is approximately 492 ft east of Kawa'ewa'e Heiau.

When first observed by SLC, Site 4684 was described as follows: "Located on a small knoll between streambeds, this large multiple terraced structure is topped by a stacked freestanding wall on three sides, with the fourth wall incorporated into the slope. The overall size of the enclosure is approximately 82 by 59 ft (25 by 18 m) with walls averaging slightly over 3 ft wide (1 m) and 2 ft (0.7 m) high. The structure is comprised of stacked subangular weathered basalt cobbles and boulders. The facings of the north and west walls are intact, with the lower terrace steps collapsed. The level area within the enclosure appears to be soil filled and no surface features were evident. Possible terrace structures were encountered downslope approximately 66 ft (20 m) to the west." The location depicted on the SLC field map was devoid of anything resembling the previous description. However during the CSH survey, a site was observed approximately 492 ft north that shared similar attributes to SLC's description.

Feature A is an enclosure consisting of stacked basalt walls. The eastern corner is the highest, standing approximately 2 ft above the ground surface. The north wall measures 23 ft with the disturbed northwest corner having little to no height. The west wall measures 14 ft, and is badly disturbed with no height. The east collapsed wall measures 25 by 1 ft high, the southern wall measures 23 by 11 ft. The interior of the enclosure provides a space of approximately 16 by 23 ft and is mostly soil with scattered rocks.

Feature B is a stacked basalt cobble/rock terrace wall located southwest of Feature A. It measures 62 ft long, runs at 262 degrees east of north, and ranges in height from 0 to 2.6 ft.

Feature C is a stacked basalt cobble and boulder wall forming an "L" shaped terrace. The long segment measures 66 ft oriented at 333 degrees and the shorter segment measures 23 ft oriented at 252 degrees. This feature appears to be mostly collapsed,

with the highest portion at 2 ft. It encloses three apparent c-shaped features and a possible hearth.

Feature D is a c-shaped feature consisting of basalt boulders and large cobbles. It measures 13 by 12 ft and opens to the southwest.

Feature E is a circular rock feature, possibly a hearth. It measures 8 ft in diameter and 1 ft in height. It is located near the three c-shaped habitation structures (Features D, F, and G).

Feature F is a c-shaped feature consisting of basalt boulders and large cobbles. It measures 13 by 13 ft and opens to the southwest. Contiguous to the southwest is Feature C; Feature E is located about 15 ft to the northwest.

Feature G is a highly eroded c-shaped feature (damaged from unknown processes) that consists of basalt boulders and large cobbles. It is located about 20 ft northwest of Feature F, about 10 ft north of Feature E. Feature G measures approximately 13 ft in diameter and a single course of cobbles/boulders is intermittently present along its circumference.

An isolated artifact, a large grinding stone, was discovered approximately 131 ft south of Site 4684's Feature B, in an area with abundant basalt stone and natural terracing. The stone is 24 by 18 inches and has an oval depression ground into it that is 19 by 13 inches and approximately 0.8 inches deep. No other artifacts or features were observed in the immediate vicinity of Site 4684.

This historic property has the potential to yield additional information concerning pre-Contact habitations in the *ahupua'a* of Kāne'ōhe. It has been evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-4686. Site 4686 consists of two features, shown on Figure 20 as 4686A and 4686B. It was described by SLC as follows. "Feature A is located adjacent to a large stream and dominated by a very large mango tree. This feature contains many alignments and an approximately 164 ft (50.0 m) long collapsed wall of angular basalt. There is a modern chicken coop to the north. Feature B, located adjacent to Pohai Nani has a series of alignments and an abandoned modern chicken coop. There are large mango trees in the area and a great deal of discarded historic rubbish."

Today, Feature A is constructed of boulders (approximately 2 ft in diameter) running east/west parallel to a large stream cut. There are several natural alignments running across the slope, which consist of boulders ranging from 2 to 7 ft in diameter. Feature B, a series of alignments, appears to have been badly disturbed due to landscaping and rubbish piling. The modern chicken coop and large mango trees described by SLC were located; however, a great deal of disturbance has taken place in the area (e.g. road construction and rubbish disposal). The site probably represents historic to modern use of the area by nearby residents.

This structure has the potential to yield information important for research on historic boundaries in this area, and is evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-6930. Site 6930 is a pre-Contact, rectangular shaped enclosure with an irregular notch on the east side of the structure that gives it a L-shaped appearance. It is constructed on the east aspect of a slope with an intermittent drainage immediately to the south and another approximately 66 ft to the north. Although trees and erosion have caused some collapse, the integrity of the structure is considered good. West of the notch, inside of the structure, are remnants of a possible paved surface. Several stone tools were observed in the general site vicinity.

The site is constructed of stacked basalt cobble/boulders four to five courses high. The enclosure measures approximately 46 ft east/west by 72 ft north/south with a total area of 2,756 sf, on the outside. The north, south, and west walls are stacked freestanding walls. The eastern wall is built into the slope. The height of the outside walls ranges from approximately 12 inches in the northeast corner to 5 ft in the southwest corner. The inside of the structure measures approximately 34 ft east/west and 51 ft north/south with a total area of 1,604 sf. The wall height on the inside of the enclosure ranges from 28 inches at the north wall to 38 inches in the southeast corner.

There is a commanding view to the north and west of the valley below the site, now dominated by introduced vegetation such as Christmas berry (*Schinus terebinthifolius*), he'e - octopus tree (*Schefflera actinophylla*), Java plum (*Syzygium cumini*), and lemon and strawberry guava (*Psidium guajava*, *Psidium cattleianum*). In the absence of the dense vegetation, Kawa'ewa'e Heiau would be visible as it is only 1,050 ft to the west and over 164 ft lower in elevation.

The interpreted function of Site 6930 can only be inferred, but based on the dimensions and features of the structure, and on the effort expended on the construction, it seems excessive for a habitation site and is more consistent with that of a pre-Contact ceremonial structure, possibly a *heiau*.

The site is evaluated as significant under both Criterion D and E of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-6932. Site 6932 is a possible storage area excavated beneath a boulder 16.4 ft southeast of an intermittent drainage. The floor inside is lined with small basalt cobbles and the rear of the inside is blocked off by medium sized basalt cobbles. This site is approximately 108 ft southwest of Site 6933, a post-contact charcoal kiln.

Presence of this structure may yield information important for research in determining historic activities within this area, and the site is evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-6933. Site 6933 is a large circular pit with burned walls measuring approximately 13 ft in diameter. It is cut into a natural rise in the topography and includes a faced, two to three course wall on the northeast side. Currently 5 ft in depth, the maximum depth is unknown as it has been subject to slumping and erosion. Similar to Site 4683, this appears to be another historic charcoal kiln.

The site may yield information important for research about the historic utilization of this area. The site is evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Historic Properties in the Vicinity of the Petition Area

Site 50-80-10-354. Site 354, Kawa'ewa'e Heiau is located on a small knoll to the west of the Petition Area. It consists of one large enclosure 120 by 253 ft with a small terrace on the north side. The Kawa'ewa'e Heiau is a *luakini heiau*, thought to have been commissioned by Chief 'Olopana and associated with human and animal sacrifice. Hawaiian legend states that the *heiau* was erected in the beginning of the 12th century by the high chief 'Olopana and constructed by *menehune*. Windward O'ahu is famous for legends of Kamapua'a. This half-man, half-pig demigod is renown for making mischief and for his masterful escapes from retribution for his chicken and taro thievery as well as romantic escapades. One story centers on Kamapua'a and the Kawa'ewa'e Heiau. According to Hawaiian legend, 'Olopana brought Kamapua'a to the *heiau* to be sacrificed, but he escaped.

The *heiau* is presently maintained by several caretaker groups. Because of its prehistoric religious significance, the site was designated as a historic site (#80-10-354, "Kawa'ewa'e Heiau") and placed on the National Register of Historic Places in 1972.

A stone structure outside of the *heiau* at the base of the northern corner has been designated Feature A. It is a rectangular, stacked stone structure that measures approximately 10 ft north/south and 20 ft east/west. Three separate sections exist within the structure. The largest, designated Section 1, is oval in shape and makes up the eastern side measuring approximately 13 ft by 8 ft. Section 2, more round than oval, is approximately 5 by 8 ft and makes up the western portion of the feature. Section 3 is a smaller c-shaped portion along the southern boundary of Section 1 measuring approximately 3 by 1 ft. The function of Feature A is indeterminate.

Site 50-80-10-4681. Site 4681 is a probable pre-Contact habitation site consisting of several c-shaped structures, a terrace wall, and a circular rock feature, five features in all. The site is situated on a north-facing slope with vegetation consisting of dense canopy, *Ti* leaf, and *laua'e* fern. SLC described the site as follows: "Located in the Lipalu Street drainage area, this site is comprised of at least three features: Feature A is a depression 10 ft (3.0 m) in diameter and 2 ft (0.5 m) deep; Feature B is a level terraced area approximately 20 by 16 ft (6.0 by 5.0 m) with large boulders forming the facing; Feature C is a series of possible terraces upslope of Feature B of indeterminable extent."

Feature A is a c-shaped probable habitation structure consisting primarily of stacked basalt cobbles. It has experienced some collapse and at one point may have represented two separate rooms sharing a common wall. Feature A measures 23 ft east/west by 16 ft north/south. The south wall is 3 ft wide; the west wall is 1 ft and the east wall is 2 ft.

Feature B is comprised of a ring of five large cobbles with a slight opening in the southeast end. The ring of stones and soil in the middle of the feature suggests a possible hearth function. It measures 5 ft in diameter. Down slope are three to four possible terraced walls located northeast of Feature A (Features C and D).

Feature C is a terrace wall consisting of basalt cobbles which measure approximately 14 inches in diameter. The terrace wall is 40 ft east/west by 46 ft wide. Some constructed portions have collapsed and the height varies from 12 to 28 inches.

Feature D is a terrace wall constructed of basalt boulders which measure approximately 20 inches in diameter. The terrace wall is 2-4 courses high but collapsed in several places. The terrace appears to be semi-circular. Feature D is located just down slope from Feature C.

Feature E is a c-shaped feature located about 53 ft west of feature C. It measures approximately 16 ft north/south and 10 ft east/west with a maximum wall height of approximately 20 inches. No artifacts or midden were observed at the site, however the possible hearth (Feature B) and the c-shaped structure (Feature E) suggest a temporary habitation with associated agriculture.

This historic property has the potential to yield additional information concerning pre-Contact habitations in the *ahupua'a* of Kāne'ohe, and is therefore evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-6929. Site 6929 is a pre-Contact site located at the base of an eastern trending down slope. The site consists of two concentrations of lithic debitage along an intermittent drainage approximately 492 ft southeast of Pohai Nani. There is an abundance of basalt cobbles and boulders in this area and many large pieces of debitage scattered throughout, indicative of a raw material procurement area (quarry). A natural dike extends away from the concentrations to the southeast. The integrity of the site has been impacted by unauthorized artifact collection. There was a significant decrease in artifact density between the time of discovery and documentation, a matter of months, resulting in a dramatic decrease in the research potential of this site. Although the integrity has been compromised, this area should be considered in the event of any land alteration on the slope near the site.

The site has been evaluated as significant under Criterion D of the Hawai'i Register of Historic Places evaluation criteria.

Site 50-80-10-6931. Site 6931 is a possible pre-Contact ceremonial area located on a natural knoll between two intermittent drainages. The site consists of four features (A-D). Features A-C are a series of stone alignments/terraces on the southern slope of the landform. Feature D is a possible ceremonial area atop the landform. Feature A, located at the base of the slope is a single course stone alignment oriented east/west approximately 20 ft in length. Based on its location, Feature B may be a collapsed terrace/alignment or the result of natural circumstances. Feature C is a one to two course stone alignment oriented east/west and approximately 10 ft in length. Feature D is a cleared/leveled area atop the landform. There is a basalt boulder at the western boundary of the clearing with *kakui* nut fragments at its base.

This historic property has the potential to yield additional information concerning pre-Contact ceremonial areas in the *ahupua'a* of Kāne'ohe. Additionally, this historic property may have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still

carried out, at the property. 50-80-10-6931 is evaluated as significant under both Criterion D and E of the Hawai'i Register of Historic Places evaluation criteria.

Previously Recorded Historic Properties Considered Non-Cultural

Site 50-80-10-4682. Site 4682 is not a cultural site, but a series of natural "terraces" formed by lava rocks that rolled down slope and were caught by exposed bedrock outcrops. SLC described the site as follows: "This site contains two features: Feature A is a possible platform structure formed of large weathered basalt boulders; Feature B is a possible series of terraces of undetermined extent, this area is covered in dense lauā fern." The site is located just *mauka* of a thick hau jungle at the base of a steep slope covered with ferns. None of the three natural "terraces" retain a significant amount of soil.

Test Excavations

Limited subsurface testing was performed at Sites 4684 and 6930. The testing consisted of the partial excavation, by hand, of selected surface archaeological features found during the pedestrian survey of the CSH survey. The purpose of the subsurface testing was to aid in determining the function of located surface sites, as well as to obtain datable materials for later radiocarbon dating. All excavated material was sifted through a 1/8-inch wire mesh screen to separate out the soil matrix; subsequently all cultural material was collected for analysis in the lab. Each test excavation was documented with a scale section profile, photographs, and sediment descriptions. Sediment descriptions included characterizations of Munsell color designations, compactness, texture, structure, inclusions, cultural material present, boundary distinctness, and topography.

Laboratory analyses of material recovered from the subsurface testing included identification and cataloging of traditional Hawaiian artifacts. Any artifacts collected *in situ* at the Petition Area or contained within sediment samples were measured, weighed, and classified by material type and artifact form. The analysis then focused on distinguishing artifact function.

Site 4684. A total of two 3 by 3 ft test units were excavated at Site 4684. Test Unit #1 was excavated in the eastern portion of Feature A. The excavation was located in the eastern corner of the enclosure. The test unit was excavated to a terminal depth of 14 inches. A total of three strata were observed: Stratum I was very dark brown, clay loam sediment composed of leaf litter and humus accumulated on and within the basalt stones, mixing with the clay soil below; Stratum II consisted of a dark reddish brown silty clay generally represented soils developed from material filtering down through Feature A's construction; Stratum III was dark red silty clay consisting of saprolite developed from the decomposition of the underlying basalt bedrock. The test excavation terminated at sterile Stratum III sediments.

A total of four artifacts were recovered from the excavation, three basalt flakes and a small piece of brown bottle glass. Two of the basalt flakes were recovered from between 4 and 8 inches. The remaining flake and a single piece of brown bottle glass were recovered from 8 to 12 inches. All artifacts were recovered from Stratum II.

Test Unit # 2 was located within Feature F, along the southeastern wall. The test unit was excavated to a terminal depth of 16 inches. The stratigraphy was similar to Test Unit 1. Stratum I was very dark brown, clay loam with greater than 50% basalt stone inclusions. Stratum II consisted of a dark reddish brown silty clay and Stratum III was dark red silty clay. The test excavation terminated at sterile Stratum III sediments. No artifacts were recovered from this excavation.

Site 6930. A single exploratory 12 by 12 inch test unit was excavated inside the enclosure of Site 6930 against the southern wall to determine its vertical boundary and to obtain a soil profile. The test unit was excavated to a depth of 15 inches. A total of three strata were observed: Stratum I was dark brown, clay loam sediment composed of leaf litter and humus; Stratum II consisted of a strong brown silty clay; Stratum III was yellow red clay. The wall of the enclosure continues at least one course, 8 inches below the ground surface. No artifacts or cultural features were observed during this excavation.

Site 355 (The Holua Slide)

Site 355 was originally described by J. G. McAllister as a result of his work in the 1930s. A substantial effort was made to relocate Site 355, the *hōlua* slide, during the CSH survey with little success. *Hōlua* sled courses were created by Hawaiians by making a rock track, covering it with grasses, and wetting it down for speed. Additionally, Dr. Hallett H. Hammatt visited the Petition Area in 2007 specifically looking for any remnants or indications of the *hōlua* slide. He reported the following: "We walked all the way up to the top most rise where the slide was previously reported. We were spread apart 1 to 20 ft and saw no indication on the land of a former slide such as rock alignments or depressions in the ground. The soil is red clay laterite which is clearly very slippery when wet. The configuration of the hill with alternating steep and more gradual gradients and an evenly shaped contour seems like the ideal symmetrical configuration for a *holua*. We walked again to the very base of the slope to the ironwood grove following the crest of the slope and again saw no alignments or depressions or ridges in the slope which would indicate the presence of a *holua*. I suspect the hill could be used for that purpose in ancient times with the minimum of modification which may explain the absence of any sign of the former slide. I doubt if this slope was used for pineapple cultivation given its steepness but it may have been cleared or modified as part of the plantation activities. According to Sterling and Sterling (1978:219) J. G. McAllister was also unable to relocate the *holua* slide in 1933. Adding that an informant for McAllister, John Bell, had seen the *holua* slide destroyed when an attempt was made to plant pineapples in this section."

4.9.2 Probable Impacts

The AIS has been completed and the historical and archaeological resources have been identified to fulfill State requirements for an archaeological inventory survey per HAR Chapter 13-13-276 and Chapter 13-13-284. The AIS ~~was has been~~ submitted to the SHPD ~~and is pending review and determination in April 2008.~~ A comment letter from SHPD relating to the AIS was received on September 22, 2008. The recommendation of the agency included four main points: (1) preservation of sites 354, 4684, 6932, and 6931 as a complex, not individually; (2) no relocation of the grinding stone; (3)

consultation with ethnic organizations or members of a group for whom some of the historic properties may have significance, as well as with OHA; and (4) appropriate additional testing of the area to be developed as determined via communication with SHPD. CSH will comply with these recommendations and re-submit the AIS for acceptance. The Revised Proposed Action will comply with SHPD requirements to preserve significant historic sites identified for preservation or documentation prior to future development.

The conceptual site plan has been designed specifically to incorporate these known sites, with ample buffer zones included. Several sites have been found to require preservation, in the form of avoidance and protection; several do not require any further work as sufficient information regarding the historic properties has already been generated. The mitigation recommendations from the AIS are outlined below, and Table 4 summarizes the significant historic sites within and in the vicinity of the Petition Area, with recommendations for further archaeological work or preservation.

One of the concerns of knowledgeable community members was the presence of *lua* (burial pits) associated with Kawa'ewa'e Heiau. This was considered throughout the duration of CSH's survey and none were found. Although no *lua* were observed there is still a potential for subsurface cultural resources.

**Table 4
Significance Assessment for Historic Sites**

SIHP# (50-80-10)	Probable Function	Age	Criteria	Recommendation
Historic Sites located within the Petition Area				
-4680	Agricultural/ water control	Historic	D	No further work
-4683	Charcoal Kiln	Historic	D	No further work
-4684	Habitation	Pre-Contact	D	Preservation, in the form of avoidance
-4686	Boundary marker	Historic	D	No further work
-6930	Ceremonial	Pre-Contact	D, E	Preservation, in the form of avoidance
-6932	Storage	Historic	D	No further work
-6933	Charcoal kiln	Historic	D	No further work
Historic Sites located in the Vicinity of the Petition Area				
-354	Ceremonial	Pre-Contact	A,B,C,D,E	Preservation, in the form of avoidance
-4681	Habitation/ agricultural	Pre-Contact	D	Data Recovery
-6929	Raw Material Collection	Pre-Contact	D	Preservation, in the form of avoidance
-6931	Ceremonial	Pre-Contact	D,E	Preservation, in the form of avoidance

4.9.3 Mitigation

Appropriate actions will be implemented to ensure protection of the historic sites. This includes the establishment of the 9.4-acre cultural preserve area east of Kawa'ewa'e Heiau that incorporates sites -4684, -4683, -6932, -6933, and -6930. The mitigation measures will be completed prior to any land disturbing activities within the Petition Area. These actions will be reviewed by the DLNR SHPD prior to commencement of any such activity. ~~Should SHPD require archaeological monitoring for the project, a~~An archaeological monitoring plan, written to fulfill the requirements of HAR Chapter 13-279, will be reviewed for approval by SHPD prior to any land disturbing activities within the Petition Area. In the event that any significant archaeological resources such as artifacts, shell, bones or charcoal deposits, human burial, or rock or coral alignments, paving, or walls of historic or prehistoric significance are encountered during the development of the property, construction will be halted and immediate archaeological consultation will be sought with SHPD in accordance with applicable regulations. All recommendations for mitigation included in the AIS have been incorporated into the Revised Proposed Action. Additionally, a cultural preserve is included as part of the Revised Proposed Action that encompasses five archaeological sites within the Petition Area east of Kawa'ewa'e Heiau (shown on Figure 4a).

Historic Properties in the Petition Area

Sites 4680, 4686, and 6932 have been thoroughly documented with written descriptions, photographs, scale drawings, and recorded with GPS survey equipment and no further work is recommended. Sufficient information regarding location, function, age, and construction methods of these historic properties has been generated by the CSH AIS to mitigate any adverse effect caused by proposed development activities.

Sites 4683 and 6933 are historic charcoal kilns that have been documented with written descriptions, photographs, scale drawings, and accurately located with GPS survey equipment. No further work is recommended for these historic properties as sufficient information regarding the location, function, age, and construction methods of these historic properties has been generated by the current inventory survey and other investigations (such as Meeker 1995, Dockall *et al.* 2003, and Allen 1987), to mitigate any adverse effect caused by proposed development activities.

Site 4684, a pre-Contact habitation site consisting of several c-shaped structures, a terrace wall, a circular rock feature and several house terraces, was documented with written descriptions, photographs, scale drawings, and accurately located with GPS survey equipment. Limited subsurface testing was also conducted within the Features A and F. Preservation, in the form of avoidance and protection, is recommended for the site. The large grinding stone located south of the site should be moved within the preservation boundary as there is an absence of any other cultural material at the site.

Site 6930, a pre-Contact enclosure/ceremonial structure, was documented with written descriptions, photographs, scale drawings, and recorded with GPS survey equipment. Limited subsurface testing was also conducted within the enclosure. Preservation, in the form of avoidance and protection, is recommended for the site.

Historic Properties in the Vicinity of the Petition Area

Site 354, Kawa'ewa'e Heiau, is located approximately 100 ft to the west of the Petition Area on the Kāne'ōhe side of the ridge that divides Kāne'ōhe and Kailua (Oneawa Hills). It has been on the National Register of Historic Places since 1972 and is maintained by various caretaker groups. A 100 ft buffer has been established around this historic property within property owned by the Petitioner, and cooperative work will continue with concerned groups.

Site 4681 is a pre-Contact habitation site consisting of three, c-shaped features, a terrace wall, and a circular rock feature. The historic property was documented with written descriptions, photographs, scale drawings, and GPS survey equipment. Although sufficient data was observed to qualify Site 4681 as a site, the vegetation in the area, primarily *hau*, was too dense to definitively establish project boundaries. Data recovery is recommended.

Site 6929 is a pre-Contact quarry site consisting of two concentrations of lithic debitage along an intermittent drainage. A natural dike extends away from the concentrations to the southeast. Preservation, in the form of avoidance and protection, is recommended.

Site 6931, a potential pre-Contact ceremonial area, was documented with written descriptions, photographs, scale drawings, and recorded with GPS survey equipment. Preservation, in the form of avoidance and protection, is recommended.

Cultural Resource Preservation Plan

A cultural resource preservation plan will be prepared for the proposed project, in accordance with HAR Chapter 13-277-3 to address buffer zones and protective measures for all historic properties recommended for preservation within and near the Petition Area. This preservation plan will detail the short and long term preservation measures that will safeguard the historic properties during project construction and subsequent use of the Petition Area, including requirements for monitoring during construction activities. A discussion of Site 354 and other sites, in the context of traditional cultural practices is found in Section 5.5.

4.10 SCENIC AND VISUAL RESOURCES

4.10.1 Affected Environment

Kāne'ōhe is noted for its striking topographic features including the mountains and valleys of the Ko'olau Range, perennial streams, Kāne'ōhe Bay, and other natural features that visually create what is known in Hawai'i as a "windward" sense of place. The region to the north of the Petition Area is characterized by one story single-family homes and businesses, with some low-rise apartment and office buildings in Kāne'ōhe's main commercial area. The primary exception to the low-rise built environment in the vicinity is the Pohai Nani Retirement Community, which is north of the Petition Area. The centerpiece of the retirement community is a 14-story building which is prominently visible throughout the region. The area to the east of the Petition Area is a natural ridgeline.

The existing portions of HMP cemetery contribute to the open space of the region by virtue of its size and landscape character. Driving along Kamehameha Highway in either direction, motorists enjoy views across the landscaped cemetery lawns through to the foothills separating Kāneʻohe and Kailua as well as periodic views of Kāneʻohe Bay, depending on topography immediately adjacent to the highway. Approaching HMP from the east on Kamehameha Highway, portions of the existing cemetery are visible as you pass the H-3 interchange. Views makai are then completely obscured by a very high berm/hill at the edge of the HMP property. Views makai do not open up again until you reach the main entry drive for HMP and the Hawaii Veterans Cemetery. At this point, full views of HMP are present, although because of topography, the Veterans Cemetery and the Petition Area are not visible. Figure 21 presents two photographic images of views from Kamehameha Highway.

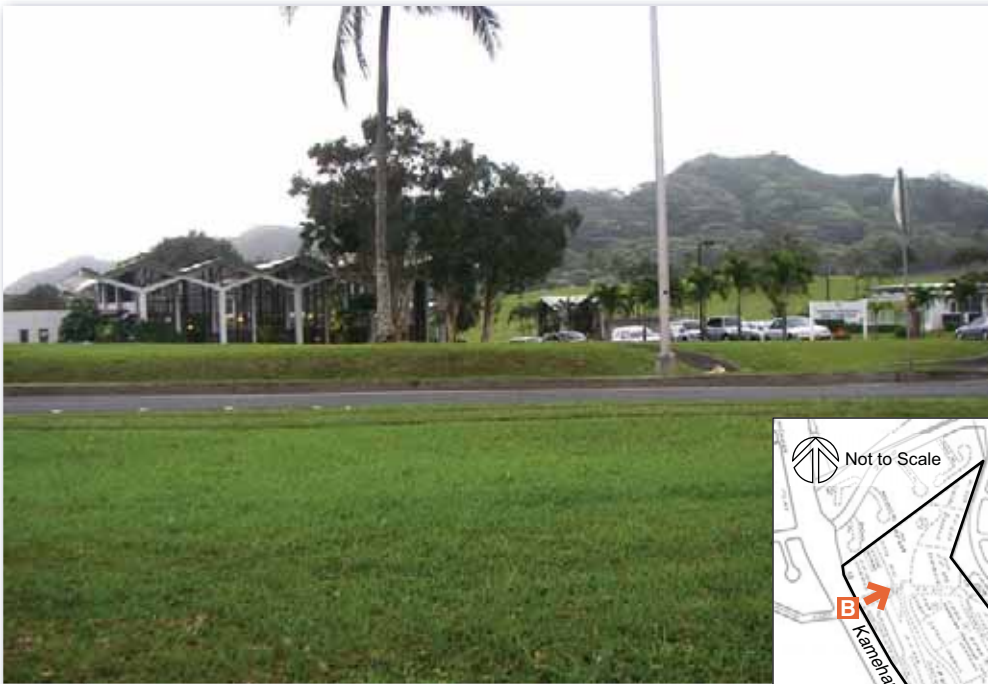
After passing the main access drive, makai views are once again obscured until the secondary access drive to HMP is reached, and views open up once more. Areas of HMP adjacent to the Parkview subdivision are visible, but not the Ocean View Garden or the Petition Area. Views traveling from west to east on Kamehameha Highway are identical to those described in the preceding paragraphs, in reverse order.

The Petition Area is primarily obscured as seen from the surrounding residential areas as a combination of the presence of mature trees, and the difference in elevation between the neighborhood and the Petition Area. The upper slopes of the surrounding hills can be seen and appear as thick vegetation and a tree-filled scene of undeveloped ridges, ravines, and valleys. It consists of gently sloping areas to the west, adjacent to the Pikoiloa subdivisions, and relatively steep areas to the east (see Figure 22a and 22b). The area is primarily overgrown with introduced and invasive vegetation, including non-native Schefflera/Java Plum forest with a variety of trees and grasses (See Section 4.7, Flora). From the existing HMP cemetery, most of the view of the Petition Area is comprised of the trees closest to the cemetery, due to the sloping topography and presence of mature trees.

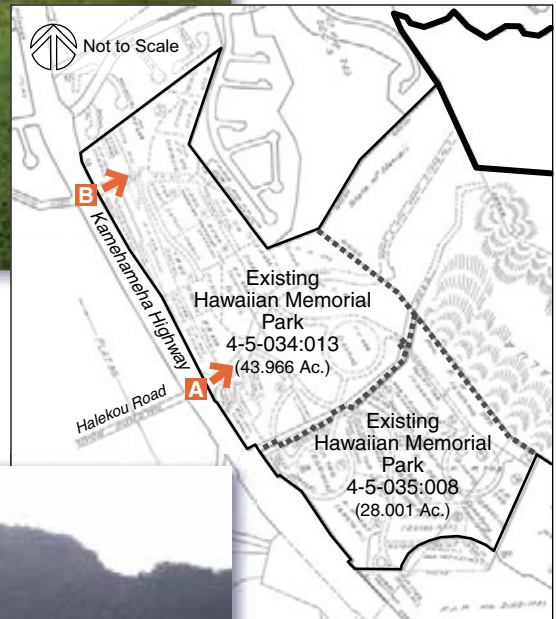
Mokulele Drive is an arterial road that runs through the adjoining residential neighborhoods southwest and west of the Petition Area. From this road, as well as the smaller internal network of streets in the Pikoiloa subdivision, the Petition Area is marginally visible as a result of the difference in elevation between the street and the Petition Area, as well as the vegetative buffer between residential property lines and the Petition Area.

4.10.2 Probable Impacts and Mitigation

The Revised Proposed Action will not significantly impact views of ridgelines or upper slopes of coastal headlands and mountains from the vantage points of coastal waters, major roads, parks, and other public places, as development of the cemetery will be below the 400-ft contour elevation of the 900-ft elevation of the Oneawa Hills.



A View looking makai across Kamehameha Highway toward Hawaiian Memorial Park at main entry drive, from mauka side of Highway. Petition Area is not visible.

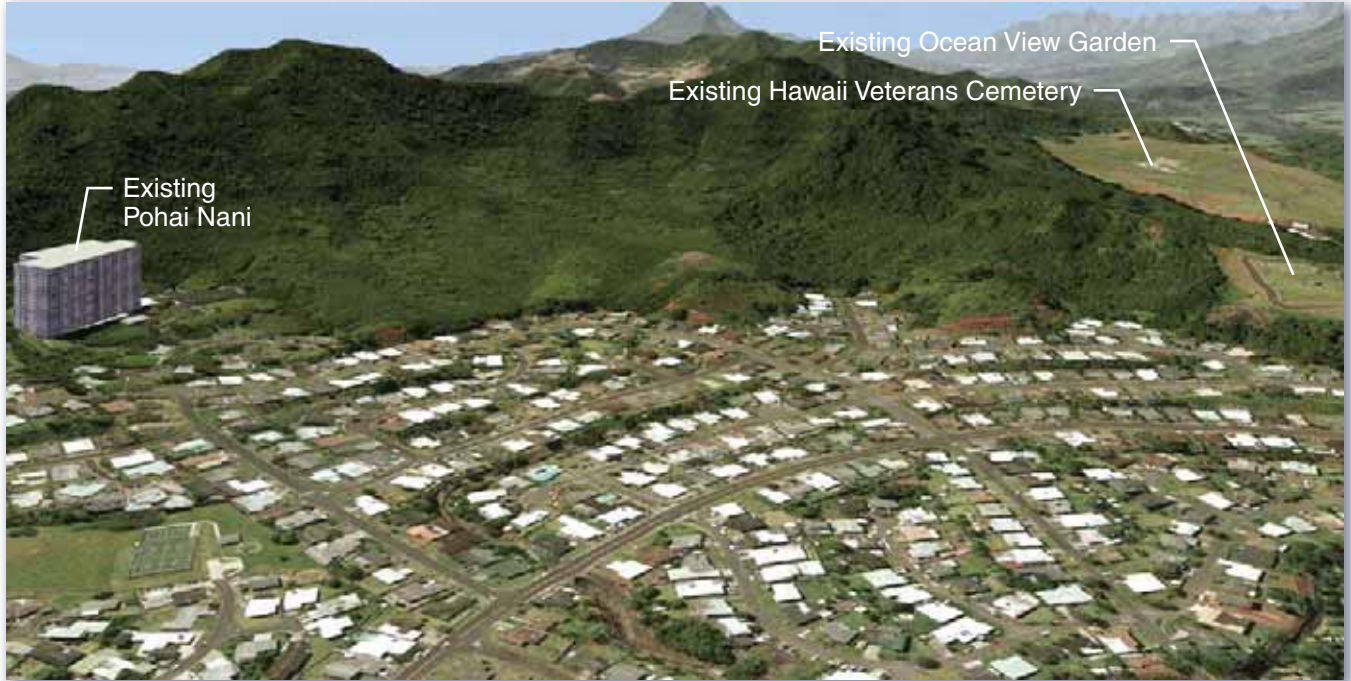


B View looking makai across Kamehameha Highway toward Hawaiian Memorial Park at secondary driveway, from mauka side of Highway. Petition Area is not visible.

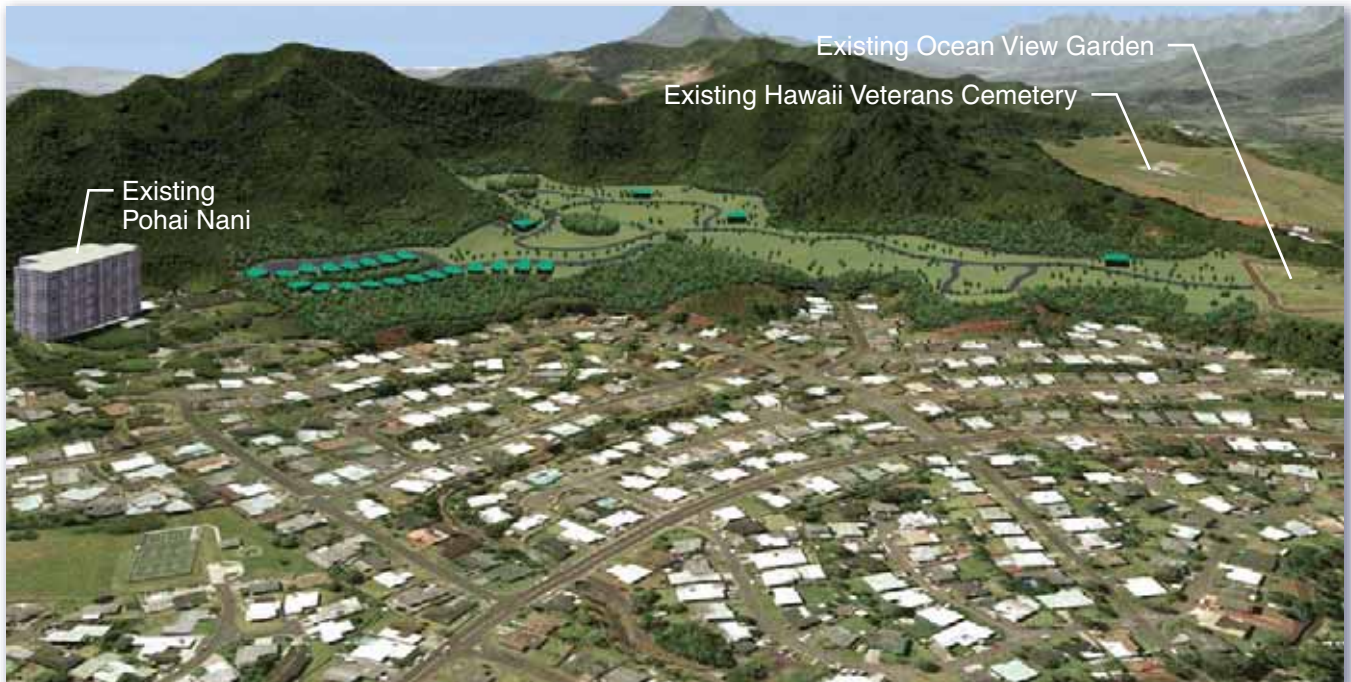
Views along Kamehameha Highway

Figure 21

BEFORE



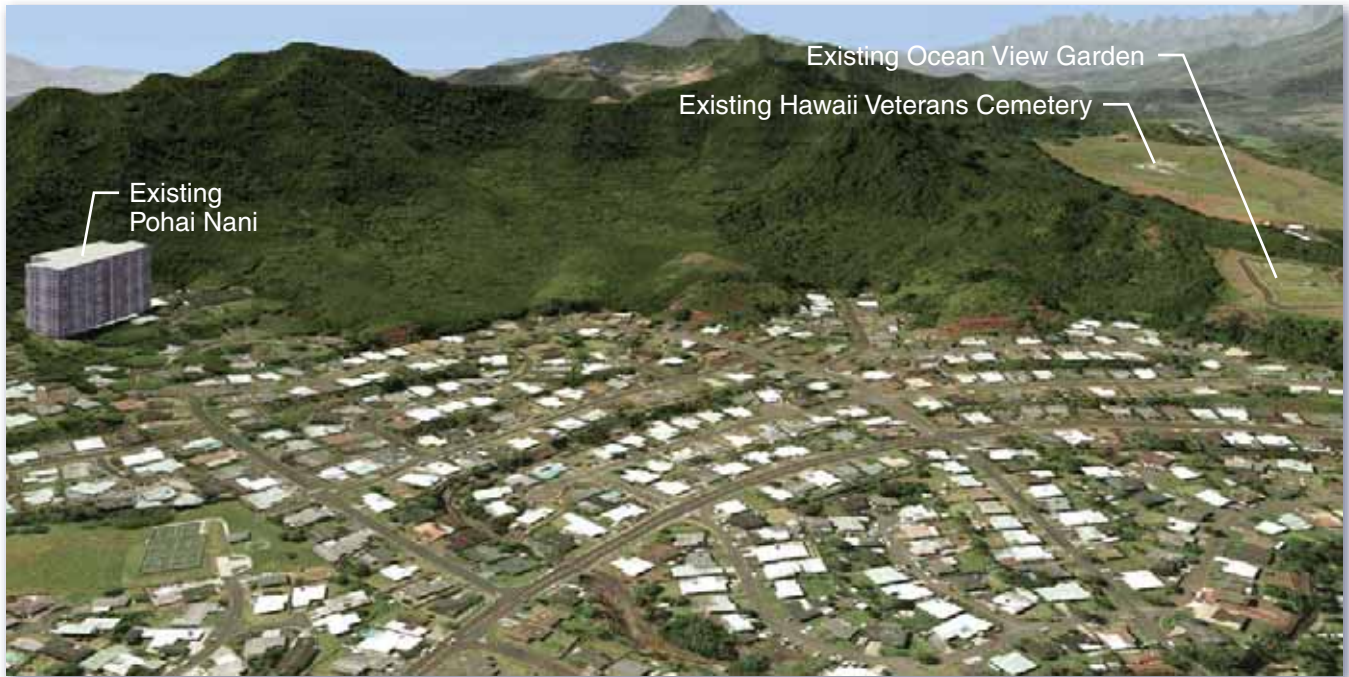
AFTER



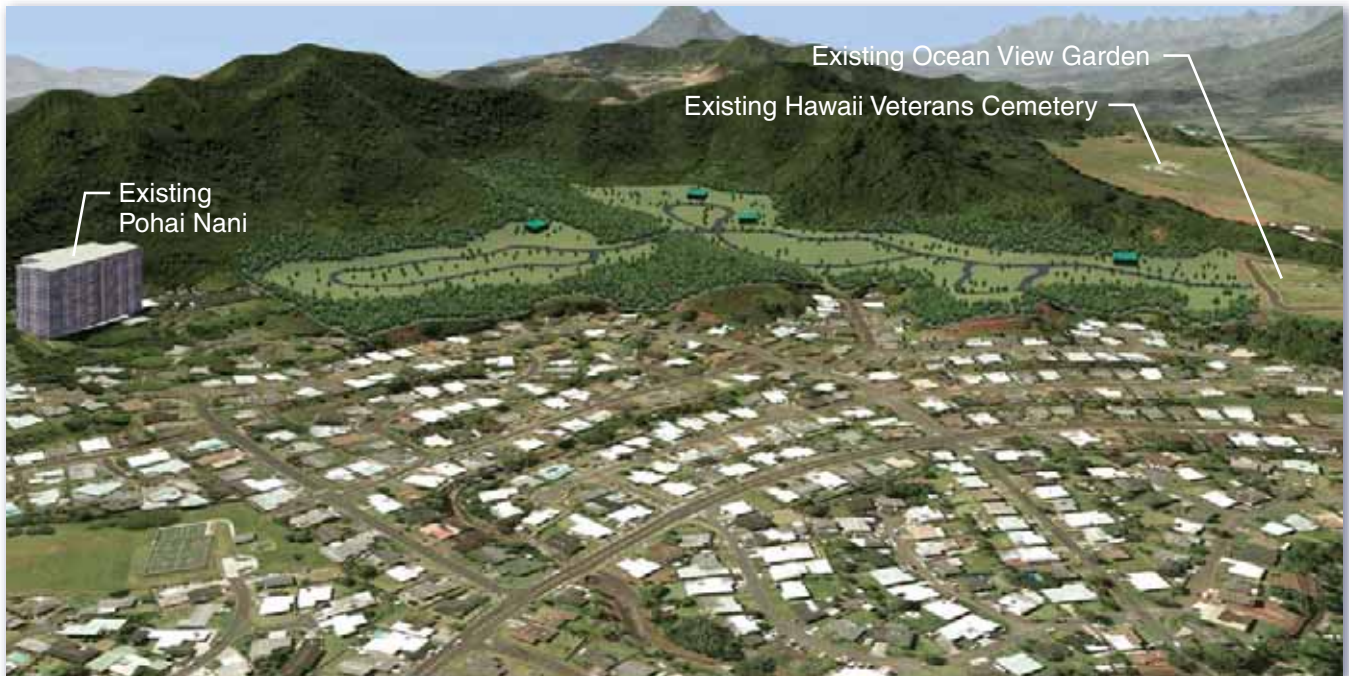
Comparative Oblique Perspective: Former Proposed Action

Figure 22a

BEFORE



AFTER



Comparative Oblique Perspective: Revised Proposed Action

Figure 22b

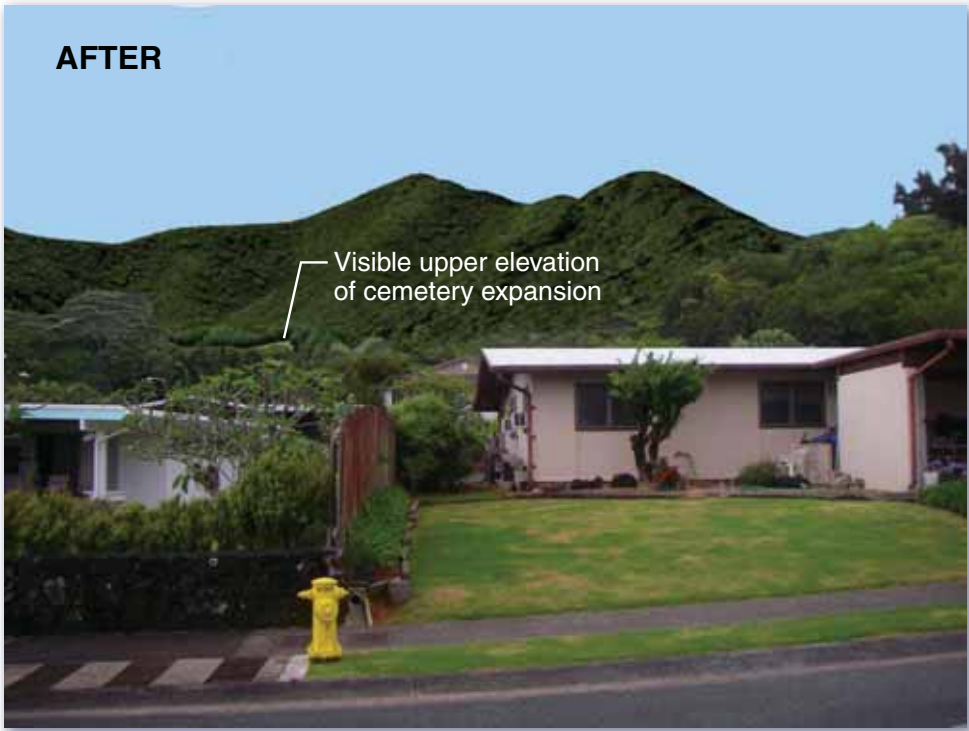
The views from Kamehameha Highway across the landscaped cemetery lawns through to the foothills separating Kāneʻohe and Kailua will be preserved. Some subtle alteration will occur, as the landscaped cemetery will extend up and across what is now a primarily overgrown non-native Schefflera/Java Plum Forest between the Ocean View Garden and Pohai Nani, but this view will not be discernible from Kamehameha Highway or from most of the immediate region of the adjacent residential subdivisions. ~~In the area of the proposed cemetery expansion,~~ The character of the open space will be changed from non-native invasive species to open lawns and scattered groupings of trees of intermediate height. This character is represented by Figure 22a, which demonstrates an oblique aerial view of the Petition Area, as seen from the northwest to the southeast, at an elevation of about 1,000 ft, which is a view that is not visible to the public. The views of the proposed residential development that were included in the Former Proposed Action will ~~would have~~ be changed from open space to both one- and two-story single-family homes, similar in character to the existing adjacent residential neighborhoods. Figure 22b demonstrates an oblique aerial view of the Petition Area for the Revised Proposed Action, as seen from the northwest to the southeast, at an elevation of about 1,000 ft, which is a view that is not visible to the public. ~~The~~ the extent possible, 45.311.4 acres which will be graded and revegetated, but not included in the expanded cemetery or residential subdivision, will be landscaped with appropriate native and indigenous species. Some Polynesian introduced plants may be used as well. The newly revegetated areas will include spreading foliage trees along the bottom reaches of the transition slopes and buffer areas adjacent to the residential uses and trees of a variety of structural shapes and heights above the proposed cemetery grounds. Species may include *koa* (*Acacia koa* A. Gray), *kukui* (*Aleurites moluccana*), and *loulou* palms (*Pritchardia martii*) along the perimeter top of slopes, throughout the grounds, and mixed in the upper edge of the cemetery grounds foliage trees. Other plants could include: *ohi'a lehua* (*Metrosideros polymorpha*) as a perimeter tree, *lona mea* (*Sapindus oahuensis*) to replace the Java Plum trees, *koki'o kea* (*Hibiscus arnottianus*), *hō'awa* (*Pittosporum hosmeri*), *a'ali'i* (*Dodonaea viscosa*), *maile* (*Alyxia olivaeformis*), and *naio* (*Myoporum sandwicense*). Attempts to document views from the surrounding neighborhood are presented in Figures 23a-g. These images show how the view will change after the Revised Proposed Action is developed. The Figure shows 1) an instance of "before" and "after" images depicting pre- and post-development conditions (view 1, from Ōhāhā Street looking south); 2) view looking southeast towards the Petition Area of "before"; and 3) view looking east towards the Petition Area of "before". From most areas in the immediate vicinity of the Petition Area, these differences will not be discernable and the "after" view will be identical to existing conditions (views 2 and 3 of Figure 23b).

View 4 shown in Figure 23c is from Namoku Street near Mokulele Drive looking southeast. The view will be changed from green trees to one predominately of green trees and green cemetery lawn, with one upper corner of a mausoleum protruding above the existing tree line. In view 5, which is a more distant view looking south from Namoku Street in front of Pohai Nani, the view of the Petition Area will become one of rolling green hills and scattered trees, with one mausoleum appearing in the distance amidst the green(Figure 23d).

Figure 23e shows "before" and "after" long-range views of the Former Proposed Action, and Figure 23f shows these same views for the Revised Proposed Action. View 6,



1 View fronting 45-408 Ōhāhā Street looking south (before development).



1 View fronting 45-408 Ōhāhā Street looking south (after development).

Comparative Views of Petition Area: Revised Proposed Action

Figure 23a

BEFORE AND AFTER



2 View from Ōhāhā Street/Ōhāhā Place intersection looking southeast. Views of Petition Area obscured by existing vegetation to remain (before and after development).



BEFORE AND AFTER



3 View from Lupu Street looking east. Views of Petition Area obscured by existing vegetation to remain (before and after development).

Comparative Views of Petition Area: Revised Proposed Action

Figure 23b

BEFORE



4 View looking southeast towards Petition Area from Namoku Street near Mokulele Drive (before development).

AFTER



4 View looking southeast towards Petition Area from Namoku Street near Mokulele Drive (after development).

Comparative Views of Petition Area: Revised Proposed Action

Figure 23c

BEFORE



5 View looking south towards Petition Area from Namoku Street near Mikhilina Steet (before development).

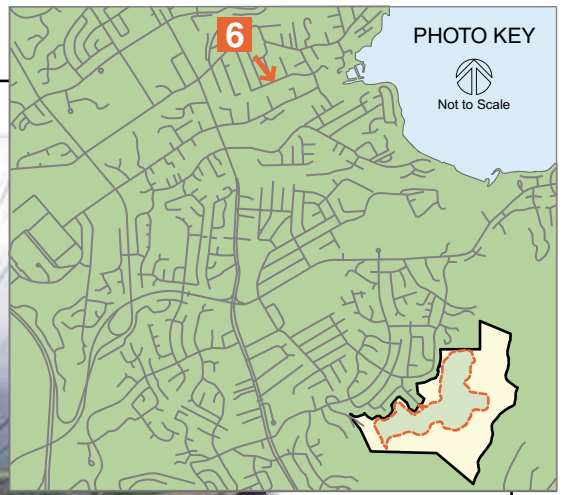
AFTER



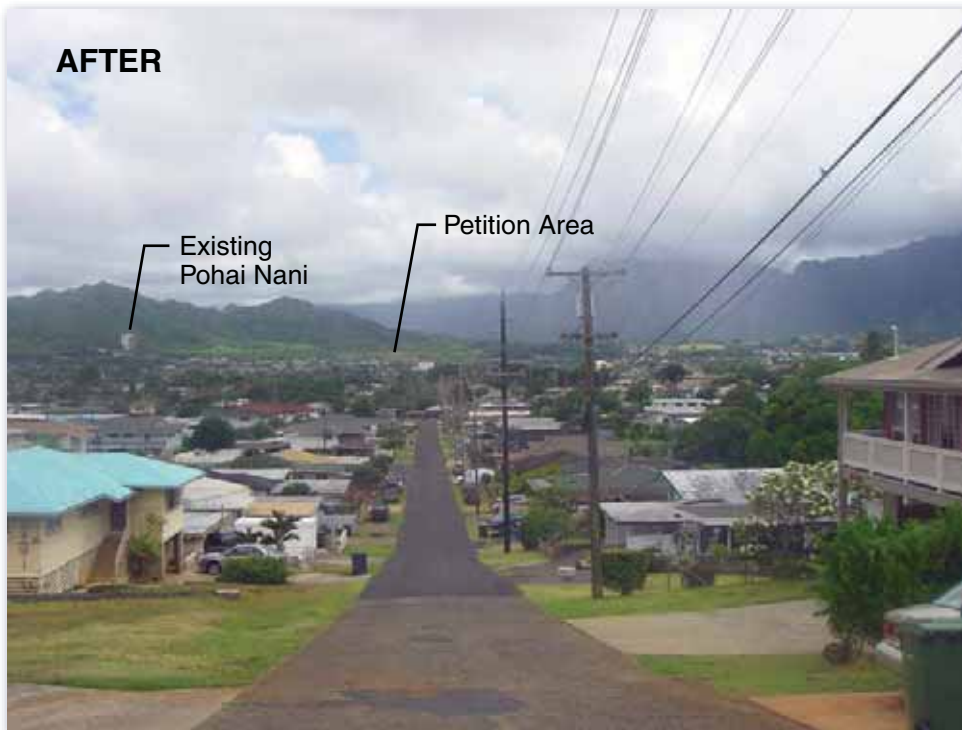
5 View looking south towards Petition Area from Namoku Street near Mikhilina Street (after development).

Comparative Views of Petition Area: Revised Proposed Action

Figure 23d



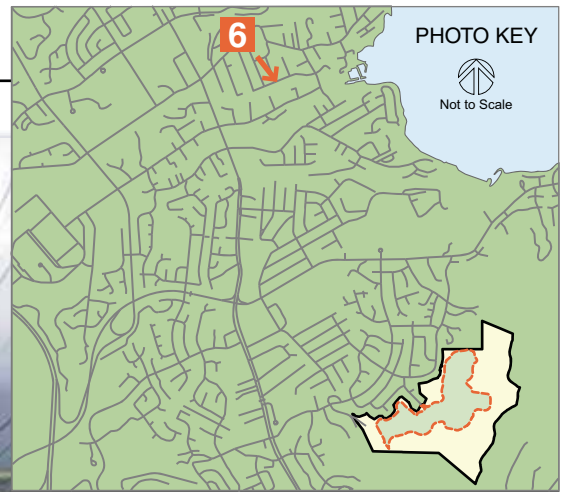
6 View looking east towards Petition Area from Makamae Street at Lilipuna Road (before development).



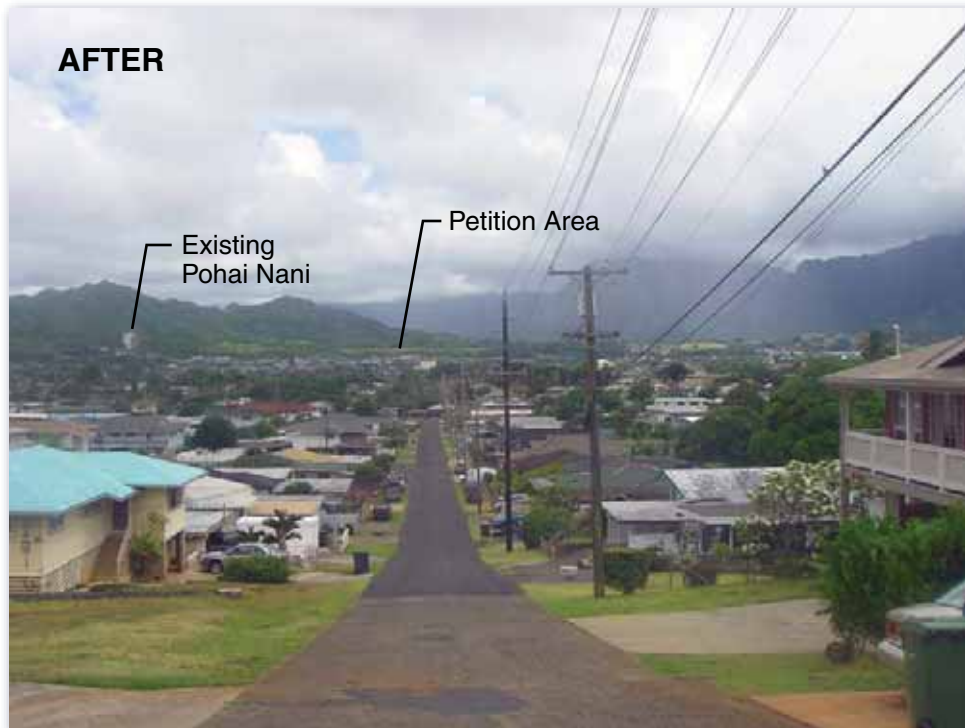
6 View looking east towards Petition Area from Makamae Street at Lilipuna Road (after development).

Comparative Views of Petition Area: Former Proposed Action

Figure 23e



6 View looking east towards Petition Area from Makamae Street at Lilipuna Road (before development).



6 View looking east towards Petition Area from Makamae Street at Lilipuna Road (after development).

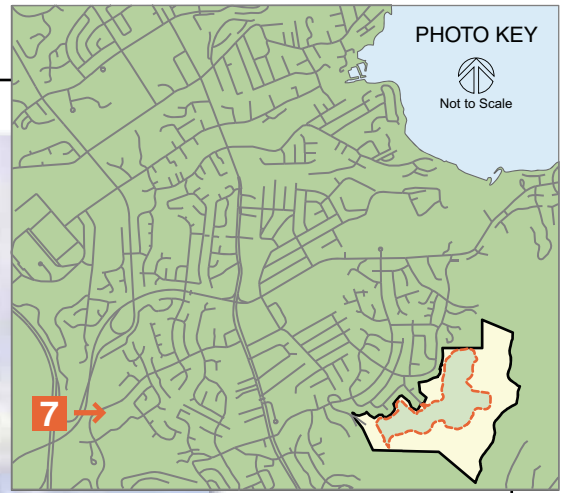
Comparative Views of Petition Area: Revised Proposed Action

Figure 23f

shown in Figure 23e and 23f, is taken from Makamae Street at Lilipuna Road looking southeast. This viewpoint is approximately 1.9 miles from the Petition Area. The viewplane towards the Petition Area is predominately made up of residential housing in the foreground, with the green of the Oneawa Hills and the Ko'olau Mountain Range still the principal background view. The proposed cemetery and residential areas of the Former Proposed Action will be visible, but overall the viewplane is still characterized by a green backdrop to the hills. The roofs of the mausolea and former proposed residential housing units will be visible, but are a minor element of the viewshed. For the Revised Proposed Action, the proposed cemetery expansion area will be visible, but overall the viewplane is still characterized by a green backdrop to the hills. The roofs of the mausolea are visible, but are a minor element of the viewshed.

View 7 is from the H-3 freeway looking east towards the Petition Area and Oneawa Hills, approximately one mile *makai* of the tunnels, and 1.8 miles from the Petition Area (Figure 23g). The Petition Area and associated cemetery will be visible, although as a small portion of the overall viewshed which is predominately one of residential neighborhoods with the Oneawa Hills as a backdrop. Additionally this view is one that is seen for only a matter of seconds while traveling at a high rate of speed. Nevertheless, the project will be visible from this vantage point.

The cemetery expansion area will contain up to four mausoleums that are approximately 24 ft high. The mausoleums will not be visible from most areas of the surrounding neighborhoods because of ample vegetative buffers and the vertical topographic differences. The project will include a buffer of existing vegetation between the adjoining residential property line and the cemetery areas that will range from 50 ft to 200 ft wide. See Figure 5 for typical mausoleum elevation; Figure 24 for graphical visual profiles; and Figures ~~28a-29a~~ and ~~28b-29b~~ for additional sections showing the effect that landscaping will have on views. Mokulele Drive is an arterial road that runs through the residential neighborhoods southwest and west of the Petition Area. From this road, as well as the smaller internal network of streets in the Pikoiloa subdivision, the Petition Area will be marginally visible. This is a result of the difference in elevation between the street and the proposed development area and a planned generous vegetative buffer between residential property lines and the Petition Area. The ~~current~~ Revised Proposed Action concept plan indicates a minimum 50 ft buffer of existing vegetation between the adjoining residential property line and the cemetery areas. Some areas will include a graded transition slope and re-vegetated buffer of approximately 100 ft in addition to the existing vegetation buffer. Figure 24 demonstrates a typical profile of how the elevation difference and landscaped buffers will shield the Petition Area from view in the adjacent residential neighborhoods.



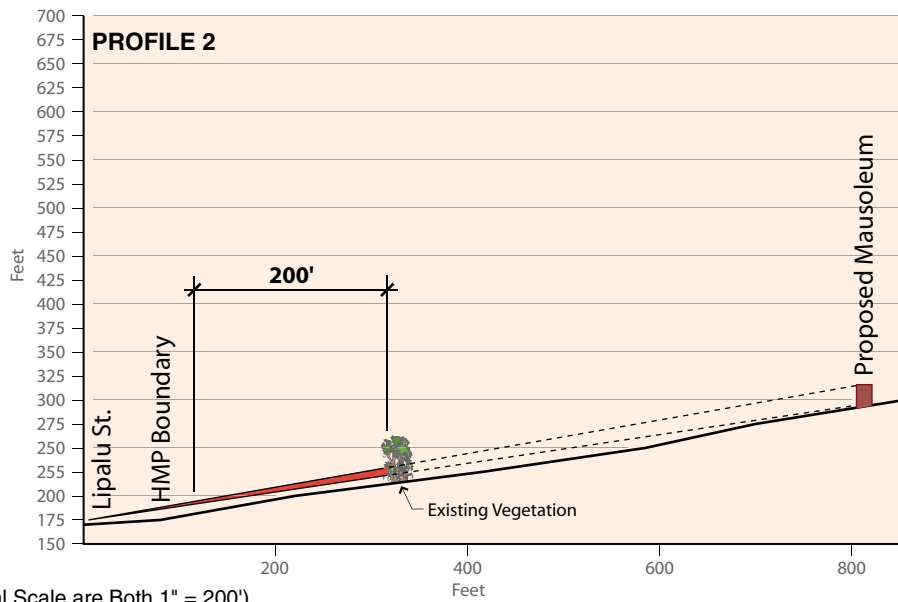
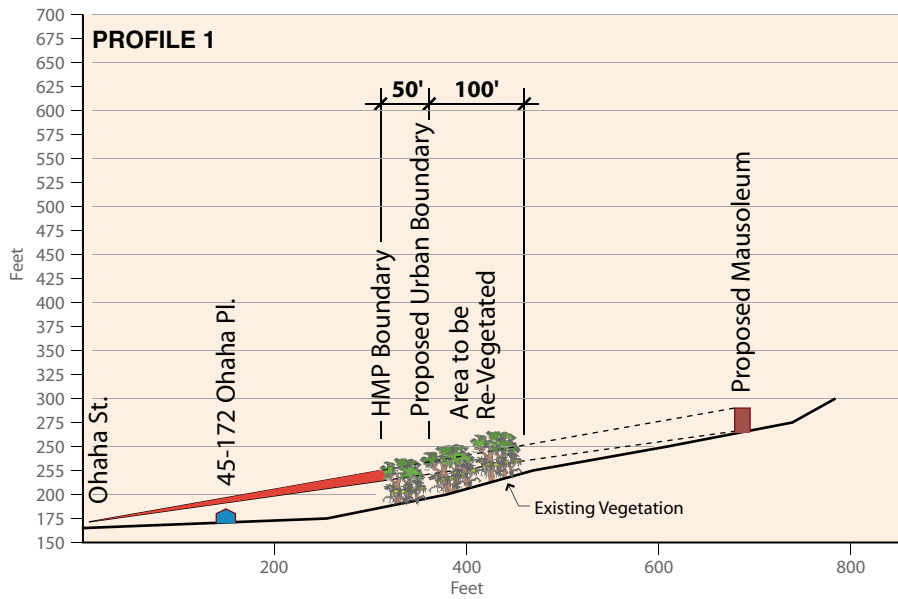
7 View from H-3 looking east towards Petition Area approximately one mile makai of the tunnels (before development).



7 View from H-3 looking east towards Petition Area approximately one mile makai of the tunnels (after development).

Comparative Views of Petition Area: Revised Proposed Action

Figure 23g



(Vertical and Horizontal Scale are Both 1" = 200')

Visual Profiles

Figure 24

4.11 AIR QUALITY

4.11.1 Affected Environment

An air quality impact assessment was conducted for the project by B.D. Neal & Associates in September 2008. Their findings are summarized below and the assessment is included as Appendix H.

Land uses surrounding the subject property are primarily residential in nature. There are no major sources of air pollution in the vicinity of the property to jeopardize air quality. The undeveloped character of the property, prevailing trade winds, and the predominance of residential uses surrounding the property contribute to air pollutant levels below State and Federal ambient air quality standards.

4.11.2 Probable Impacts

Short-term Impacts. Short-term direct and indirect impacts on air quality could potentially occur due to project construction, including construction vehicle emissions and particulate emissions connected with clearing, site preparation work, and construction equipment and workers travelling to and from the Petition Area. Contractors will be required to comply with the State DOH air regulations to minimize such impacts. Factors favoring good air quality include the vicinity of the Petition Area to good exposure to tradewinds, and ample open space.

Fugitive dust emissions from construction activities are difficult to estimate accurately because of their elusive nature of emission and because the potential for dust generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. Uncontrolled fugitive dust emissions from project construction would likely be somewhere near the level estimated by the U.S. EPA's rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium" activity, moderate soil silt content (30%), and precipitation/ evaporation (P/E) index of 50. State of Hawai'i Air Pollution Control Regulations prohibit visible emissions of fugitive dust from construction activities at the project property line. Thus, an effective dust control plan for the project construction phase will be prepared.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in active construction areas from becoming significant sources of dust. On days without rainfall, construction areas will be watered at least twice during the workday to keep dust to a minimum. Open-bodied trucks will be covered at all times when in motion if they are transporting materials likely to give rise to airborne dust. Haul trucks tracking dirt onto paved streets from unpaved areas are oftentimes a significant source of dust in construction areas. Some means to alleviate this problem, such as tire washing or road cleaning, if appropriate, will be employed. Dust monitoring will be considered as a means to quantitatively evaluate the effectiveness of dust control measures.

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen

oxides emissions from diesel engines can be relatively high compared to gasoline powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Indirectly, slow-moving construction vehicles on roadways leading to and from the project site could obstruct the normal flow of traffic to such an extent that overall vehicular emissions are increased. This impact can be mitigated by moving heavy construction equipment during periods of low traffic volume. Likewise, the schedules of commuting construction workers can be adjusted to avoid peak hours in the project vicinity.

Air quality could be impacted additionally by fugitive dust from disturbance of dry exposed soil, and from increased vehicle emissions due to increases in traffic volume at the residential development.

Operational-Period Impacts. Potential operational period impacts of the Revised Proposed Action on the surrounding area include increased air pollution from vehicular emissions.

Any long-term impacts on air quality from traffic related to this project will likely be negligible. This impact is not expected to be significant, as there are no major sources of air pollutants associated with single-family residential or cemetery uses.

4.11.3 Mitigation

Standard construction and erosion control techniques will help to control any impacts to air quality from the proposed project. Appropriate dust control measures will be employed during construction activities to minimize the potential for fugitive dust emissions, including: frequent watering of exposed soil, covering all moving, open-bodied trucks transporting materials which may result in fugitive dust; applying mulching or wind screens to control wind erosion; establishing the landscaping early in the construction schedule.

Increased vehicular emissions due to traffic disruption by construction equipments and/or commuting construction workers will be minimized by moving equipment and workers to and from the Petition Area during off-peak traffic hours. Construction activities will comply with the provisions of HAR, Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33 Fugitive Dust.

Appropriate landscape screening will be constructed along the west perimeter of the Petition Area to minimize noise, odor, dust, and security lighting impacts from the nearby residential areas.

4.12 NOISE

A noise review was conducted for the project by D.L. Adams Associates, Ltd. The findings are summarized below and the review is included as Appendix I.

4.12.1 Affected Environment

Traffic flow along adjacent streets and internal cemetery roadways is the main source of noise in the vicinity of the Petition Area. Other contributions to ambient noise characteristics consist primarily of vegetation rustling in the wind, which is relatively low considering the surrounding open space and distance from adjacent urban uses.

4.12.2 Probable Impacts

Temporary short-term construction-period noise impacts are expected due to the operation of heavy equipment and trucks. During construction, contractors will be required to comply with the State DOH noise regulations to minimize such impacts. Potential noise impacts to nearby residences during construction will be minimized with appropriate measures, such as appropriate scheduling of construction activities ~~and/or~~ installing mufflers on construction equipment and vehicles with exhaust systems, use of properly tuned and balanced machines, temporary noise barriers, and/or time of day usage limits for certain kinds of construction activities. Construction activities that emit noise in excess of the maximum permissible sound levels established by DOH ~~will be scheduled appropriately~~ must obtain a permit from DOH. No blasting will occur during the development of the Petition Area.

Long term noise impacts associated with the operation of the cemetery will be negligible, as traffic will only increase marginally. The traffic noise along the primary roads of Kaneohe Bay Drive and Kamehameha Highway are likely to have a very minimal effect (approximately less than a one (1) decibel increase in noise level) due to the project. Existing and future vegetation and topographic features provide additional natural barriers to further absorb and screen possible noise emissions.