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CDD-BS 12-451007

February 3, 2012

Mr. Gary Hooser, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Hooser:

Subject: Rock Slide Potential Inspection and Mitigative Improvements
Along Round Top Drive in the Vicinity of Puu Ualakaa State Park
Draft Environmental Assessment for Round Top Drive Rockfall
Mitigation, Oahu, Hawaii

The Department of Design and Construction, City and County of Honolulu, has reviewed the Draft Environmental Assessment (EA) for the Round Top Drive Rockfall Mitigation project and anticipates a Finding of No Significant Impact. Please publish notice in the next available OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, one (1) copy of the document in pdf format on a CD, and one (1) hardcopy of the Draft EA. Please contact Randy Hamamoto at 808-529-7244 or via email at randy.hamamoto@aecom.com, or Michael Yamasaki at the Department of Design and Construction, City and County of Honolulu, at 808-768-8824, if you have any questions.

Your early attention on this matter will be appreciated.

Very truly yours,

Lori M. K. Kahikina, P.E.
Director

MY:MKHY:lal

✓ Enclosure

Project Name: Round Top Drive Rockfall Mitigation Project, Honolulu, O'ahu, Hawai'i

Applicable Law: HRS Chapter 343
Type of Document: Environmental Assessment
Island: Oahu
District: Honolulu

TMK: 2-5-019:003
Permits Required: Conservation District Use (HAR 13-5);
State Historic Preservation Review (HRS Chapter 6E-8; HAR 13-275)

Applicant or Proposing Agency: City & County of Honolulu, Department of Design & Construction
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Contact & Phone: Michael Yamasaki, 808-768-8824

Consultant: AECOM Technical Services, Inc.
Address: 1001 Bishop Street, Suite 1600
Honolulu, Hawai'i 96813-3920
Contact & Phone: Ardalan Nikou, 808-529-7223

Project Summary: Summary of the direct, indirect, secondary, and cumulative impacts of the proposed action (less than 200 words). Please keep the summary brief and on this one page.

The City and County of Honolulu proposes the Rockfall Mitigation project to reduce the potential for rockfall hazards on state lands adjacent to Round Top Drive by implementation of slope stabilization measures. The existing slope has a multitude of potentially hazardous rocks, creating a high potential for rockfalls and landslides to reach the roadway. Rockfall mitigation and slope stabilization measures are needed to reduce these identified risks to public health and safety for users of the road corridor.

To determine whether the Proposed Action would have a significant impact on the human, natural, or historic environments, the project, its anticipated direct and indirect effects, and the short-term, long-term, and cumulative impacts have been evaluated. Based on the discussion of impacts and mitigation measures contained in the EA and the evaluation of the significance criteria, it is anticipated that the proposed project would not have a significant adverse impact on the environment. Therefore, a Finding of No Significant Impact is anticipated.

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**DRAFT
ENVIRONMENTAL ASSESSMENT
ROUND TOP DRIVE ROCKFALL
MITIGATION, O'AHU, HAWAI'I**

Proponent:

City & County of Honolulu
Department of Design & Construction
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Prepared by:

AECOM Technical Services, Inc.
1001 Bishop Street, Suite 1600
Honolulu, HI 96813-3698

February 2012

SUMMARY

Applicant	City & County of Honolulu Department of Design & Construction 650 South King Street, 11th Floor Honolulu, Hawai'i 96813
Property Owner/Lessee	State of Hawai'i
TMK	2-5-019:003
Location	Round Top Drive, Honolulu, Island of O'ahu, Hawai'i
Consultant/Preparer	AECOM Technical Services 1001 Bishop Street, Suite 1600 Honolulu, Hawai'i 96813
Anticipated Determination	Finding of No Significant Impact (FONSI)
Agencies Consulted	Department of Land and Natural Resources City and County of Honolulu, Department of Planning and Permitting
Tax Map Key	2-5-019:003
State Land Use	Conservation
Zoning	P-1
Special Designations	None

CONTENTS

SUMMARY	i
ACRONYMS AND ABBREVIATIONS	vii
1.0 INTRODUCTION AND PROJECT DESCRIPTION	1-1
1.1 Introduction	1-1
1.2 Purpose and Need for the Proposed Action	1-1
1.3 Project Description	1-1
1.3.1 Project Location and Site Characteristics	1-1
1.3.2 Rockfall and Landslide Conditions	1-5
1.3.3 Proposed Construction Activities	1-7
1.3.4 Proposed Maintenance Activities	1-7
1.3.5 Project Schedule and Cost	1-7
1.4 Permits and Approvals That May Be Required	1-8
1.5 Anticipated Findings and Determinations	1-8
2.0 PROPOSED ACTION AND ALTERNATIVES TO THE PROPOSED ACTION	2-1
2.1 Proposed Action	2-1
2.2 No-Action Alternative	2-1
2.3 Alternatives Considered But Not Carried Forward	2-1
2.3.1 Alternative 1 – Anchored Wire Mesh System	2-1
2.3.2 Alternative 2 – Impact Fence System	2-1
2.3.3 Alternative 3 – Combined Impact Fence and Wire Mesh Drape System	2-5
2.3.4 Alternative 4 – Catchment Ditch	2-5
2.3.5 Alternative 5 – Retaining Wall	2-5
2.3.6 Alternative 6 – Scaling, Bolting, and Demolition	2-5
3.0 ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATION MEASURES	3-1
3.1 Climate and Air Quality	3-1
3.1.1 Climate	3-1
3.1.2 Air Quality	3-1
3.1.3 Potential Impacts and Mitigation	3-2
3.2 Noise	3-2
3.2.1 Existing Noise Environment	3-3
3.2.2 Potential Impacts and Mitigation	3-3
3.3 Geology and Soils	3-4
3.3.1 Geology	3-4
3.3.2 Soils	3-4
3.3.3 Potential Impacts and Mitigation	3-7
3.4 Water Resources	3-7
3.4.1 Surface Waters	3-7
3.4.2 Wetlands	3-7
3.4.3 Groundwater	3-7
3.4.4 Potential Impacts and Mitigation Measures	3-7
3.5 Biological Resources	3-8
3.5.1 Flora	3-8
3.5.2 Fauna	3-8
3.5.3 Special Status Species	3-8
3.5.4 Potential Impacts and Mitigation	3-11
3.6 Cultural Resources	3-11
3.6.1 Cultural Practices and Traditional Uses	3-11
3.6.2 Archaeological Resources	3-12
3.6.3 Registered Historic Places	3-12
3.6.4 Potential Impacts and Mitigation	3-12

3.7	Land Use and Ownership	3-12
3.7.1	Existing Land Use and Ownership	3-12
3.7.2	Potential Impacts and Mitigation	3-13
3.8	Visual Resources	3-13
3.8.1	Existing Scenic and Visual Environment	3-13
3.8.2	Potential Impacts and Mitigation	3-13
3.9	Natural Hazards	3-13
3.9.1	Floods	3-14
3.9.2	Tsunamis	3-14
3.9.3	Hurricanes	3-14
3.9.4	Earthquakes	3-14
3.9.5	Potential Impacts and Mitigation	3-17
3.10	Hazardous Materials and Hazardous Waste	3-17
3.10.1	Potential Impacts and Mitigation	3-17
3.11	Public Facilities and Services	3-18
3.11.1	Recreational Areas	3-18
3.11.2	Transportation and Traffic	3-21
3.11.3	Utilities and Infrastructure	3-21
3.11.4	Emergency Services	3-25
3.12	Socioeconomics	3-25
3.12.1	Potential Impacts and Mitigation	3-26
3.13	Cumulative Impacts	3-26
3.14	Irretrievable and Irreversible Commitment of Resources	3-26
4.0	RELATIONSHIP TO STATE AND CITY & COUNTY LAND USE PLANS AND POLICIES	4-1
4.1	Hawai'i State Plan and Functional Plans	4-1
4.1.1	Hawai'i State Plan	4-1
4.1.2	State Functional Plans	4-1
4.1.3	State Land Use Districts	4-1
4.2	City and County of Honolulu	4-2
4.2.1	General Plan	4-2
4.2.2	City and County of Honolulu Primary Urban Center Development Plan	4-2
4.2.3	City and County of Honolulu Zoning	4-3
4.2.4	City and County of Honolulu Special Management Area	4-3
5.0	FINDINGS AND CONCLUSION	5-1
5.1	Anticipated Determination	5-2
6.0	DISTRIBUTION LIST	6-1
7.0	LIST OF CONTRIBUTORS	7-1
8.0	REFERENCES	8-1
APPENDIXES		
A	Agency Correspondence	
B	Biological Resources Report	
C	Cultural Resources Reports	

FIGURES

- 1-1 Site Location Map
- 2-1 Typical Section and Plan View of Proposed Action
- 3-1 NRCS Soils
- 3-2 Biological Resources Survey Area
- 3-3 Flood Hazard Zones
- 3-4 State Parks and Reserves
- 3-5 Utilities and Infrastructure

TABLES

- | | | |
|-----|-----------------------------------------------------------------|------|
| 1-1 | Permits and Approvals for Implementation of the Proposed Action | 1-8 |
| 3-1 | Typical Noise Emission Levels for Construction Equipment | 3-3 |
| 3-2 | Population and Demographics | 3-26 |

ACRONYMS AND ABBREVIATIONS

§	Section
°F	degree Fahrenheit
BMP	best management practice
C&C Honolulu	City & County of Honolulu
CAA	Clean Air Act
CDUA	Conservation District Use Application
CFR	Code of Federal Regulations
CWB	Clean Water Branch, State of Hawai'i Department of Health
dB	decibel
dBA	decibel (A-weighted scale)
DLNR	Department of Land and Natural Resources, State of Hawai'i
DOH	Department of Health, State of Hawai'i
DOT	Department of Transportation, United States
EA	environmental assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GPS	global positioning system
HAR	Hawai'i Administrative Rules
HRHP	Hawai'i Register of Historic Places
HRS	Hawai'i Revised Statutes
IA	Implementing Actions
NAAQS	National Ambient Air Quality Standards
PUC DP	Primary Urban Center Development Plan
ROI	region of influence
SHPD	State Historic Preservation Division
SMA	Special Management Area
UIC	Underground Injection Control
U.S.	United States
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION AND PROJECT DESCRIPTION

1.1 INTRODUCTION

Chapter 343, Hawai'i Revised Statutes (HRS), as amended, requires that a government agency or a private developer proposing to undertake a project consider the environmental, social, and economic consequences of the Proposed Action by preparing an assessment. The Round Top Drive Rockfall Mitigation project would be constructed and operated with funds provided by the City & County of Honolulu (C&C Honolulu) on land owned by the State of Hawai'i.

This environmental assessment (EA) has been prepared to meet the requirements of Chapter 343, HRS, as amended, and Hawai'i Administrative Rules (HAR) Title 11, State of Hawai'i Department of Health, Chapter 200, Environmental Impact Statement Rules. This EA analyzes the potential environmental consequences of the Proposed Action and alternatives to determine whether there would be significant short-term, long-term, and/or cumulative impacts on the human, natural, or historic environments.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to reduce the potential for rockfall hazards on state lands adjacent to Round Top Drive by implementation of slope stabilization measures. The existing slope has a multitude of potentially hazardous rocks, creating a high potential for rockfalls and landslides to reach the roadway. Rockfall mitigation and slope stabilization measures are needed to reduce these identified risks to public health and safety for users of the road corridor.

1.3 PROJECT DESCRIPTION

1.3.1 Project Location and Site Characteristics

The entire project area is located on Round Top Drive along the boundary of the ahupua'a (traditional land division) of Makiki and Mānoa in the Honolulu (Kona) District (Figure 1-1). The proposed rockfall mitigation project is located along the northwest side (uphill slope) of Round Top Drive in proximity to the 7.5-mile marker of the 8.0 mile-long portion of Round Top Drive and encompasses approximately 0.8 acre. The slope at the northeast end of the project area transitions to an approximately four to five foot-high concrete wall. Approximately 70 feet southwest of the concrete wall is an approximately three foot-deep drain inlet.

The project area consists of cut slopes with gradients ranging from 0.5:1.0 to near vertical. The area above visible cut slopes is covered with moderate to heavy vegetation. The cut slopes extend to a maximum height of about 20 feet and transition to a gradient of approximately 1.5:1.0 as they extend upwards to Pu'u 'Ualaka'a State Wayside Park.

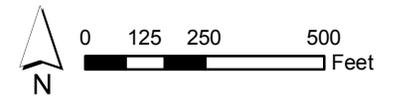
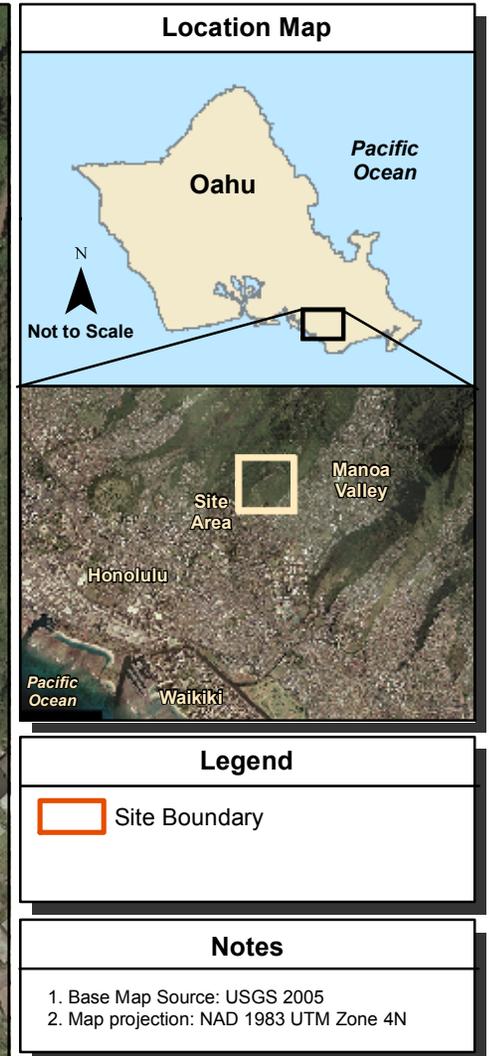


Figure 1-1
Site Location Map
Round Top Drive
Rockfall Mitigation
Honolulu, HI

1.3.2 Rockfall and Landslide Conditions

To assess potential rockfall hazards, the Federal Highway Administration and the United States (U.S.) Department of Transportation (DOT) have sponsored extensive research to develop a series of rockfall mitigation methods and a systematic procedure for rating rockfall conditions. Rockfall rating groups the hazard conditions into three classes, as described below:

- Class A — High estimated potential for rockfall on adjacent property(ies) with high historical rockfall activity. A Class A rating means that the chances of rock falling in a site is moderate to high, and that when the rockfall occurs, it will certainly reach adjacent property(ies). An example of a Class A condition is where rocks on the cut slope overhang the adjacent property(ies) and in areas, between the rockfall property and adjacent property(ies), where little or no rock catchment ditch is present.
- Class B — Moderate estimated potential for a rock to fall on adjacent property(ies) with moderate historical rockfall activity. As the rockfall risk is reduced, a Class B rating indicates that although a rockfall is probable, the chances of it reaching the adjacent properties are low to moderate. A possible scenario for Class B is a condition where a rockfall from the slope is clearly possible, and the catchment ditch is large enough to prevent most of the rocks from reaching the adjacent property(ies).
- Class C — Low estimated potential for rockfall on adjacent property(ies) with low historical rockfall activity. Class C rating pertains to a condition in which there is a low chance for a rockfall event, but should one occur, there is low to no chance for the rocks to reach other properties.

To evaluate a rockfall condition for a given property, certain criteria must be evaluated. These criteria are identified below:

- Slope height
- Ditch effectiveness
- Structural condition, Case One slopes (movement along discontinuities)
 - Rock friction
- Structural condition, Case Two slopes (differential erosion or oversteepening leads to rockfall)
 - Difference in erosion rates
- Volume of rockfall event
- Climate and the presence of water on slope
- Rockfall history
- Slope topography

1.3.2.1 SLOPE HEIGHT

Slope height evaluates the risk associated with the vertical height of a slope. Slope height represents the highest elevation from which a rock could roll down the slope. This value is reasonably estimated from existing topographic maps, through use of a global positioning system (GPS) unit, or from trigonometric relationships. High slopes are associated with high rockfall hazard because they have more materials available for rockfall and higher potential energy for rock acceleration. A larger rockfall potential energy is associated with an increased hazard.

The slope height at the project site is approximately 230 feet with an overall slope angle of about 30 degrees.

1.3.2.2 DITCH EFFECTIVENESS

Ditch effectiveness estimates the effectiveness of a catchment ditch in restricting falling rocks from reaching adjacent property(ies). The risk related to a rockfall situation varies based on how effectively a catchment ditch or zone can avert the rocks from reaching the adjacent property(ies). The risk of rocks reaching other property(ies) is lower where a good catchment is in place, regardless of the volume of rock that has fallen. Conversely, the risk heightens where there is limited or no catchment available to stop the falling rocks.

No catchment ditch exists at the project site.

1.3.2.3 STRUCTURAL CONDITION

For the purpose of the rockfall assessment, the geologic conditions of slopes are evaluated based on two distinct cases. Where both rockfall cases are present, the condition that is more severe should be considered.

- **Case 1.** Structural condition represents slopes for which discontinuities, bedding planes, and joints are the dominant features. Movement within the discontinuities of the slope is the major cause of rockfall for the Case 1 category. Movement occurs along the joints where the resistance to movement is significantly less than the intact strength of the rock itself. When the joints are oriented adversely to the slope, the potential for rockfall is greater. Adverse joints are those that singularly or in combination with other joints make planar, circular, block, wedge or topping failures kinematically possible” (Pierson and van Vickle 1993).

Rockfall movement along structural joints is controlled by the roughness of the jointed rocks. The degree of roughness ranges from rough and irregular to slickensided. “Friction along a joint, bedding plane, or other discontinuity is governed by the macro and micro roughness of surfaces. Macro roughness is the degree of undulation of the joint relative to the direction of possible movement. Micro roughness is the texture of the surface. On slopes where the joints contain hydrothermally altered or weathered material, movement has occurred causing slickensides or fault gouge to form, or the joints are open or filled with water, the rockfall potential is greater” (Pierson and van Vickle 1993).

- **Case 2.** This case represents slope conditions for which differential erosion and over-steepening are the dominant features that lead to rockfall. Over-steepening of slopes and unsupported rock overhangs increase the risk of rockfall. As described in the Rockfall Hazard Rating System manual, “Rockfall is commonly caused by erosion that leads to a loss of support either locally or throughout a slope. The types of slopes that may be susceptible to this condition are layered units containing more easily erodible units that undermine more durable rock; talus slopes; highly variable units, such as conglomerates, and mudflows, that weather differentially, allowing resistant rocks and blocks to fall; and rock/soil slopes that weather allowing rocks to fall as the soil matrix material is eroded” (Pierson and van Vickle 1993).

Where the slope is composed of different rock/soil materials, which exhibit significant differences in composition and characteristics, the rate of erosion may vary within different layers and zones. Progress of soil erosion under these conditions could result in loss of support of portions of the slope, increasing the risk for rockfall.

Due to the adverse bedding orientation (the tuff and ash layers dip out of the slopes), Case 1 governs at the project site.

1.3.2.4 BLOCK SIZE OR VOLUME OF ROCKFALL EVENT

“Larger blocks or volumes of falling rock produce more total kinetic energy and greater impact force than smaller events... the larger the blocks or volume the greater the hazard created...” (Pierson and van Vickle 1993).

Most rockfalls are of small sizes at the project site. Rockfalls from large blocks are possible due to the existence of thick cinder and ash layers and potential plane failures.

1.3.2.5 CLIMATE AND PRESENCE OF WATER ON SLOPE

This category evaluates the effects of climate including precipitation, and the presence of water on the slope surface. "Water ... contributes to the weathering and movement of rock materials and a reduction in overall slope stability. This category evaluates the amounts of precipitation ..." (Pierson and van Vickle 1993).

The average annual rainfall at the project site is about 82 inches.

1.3.2.6 ROCKFALL HISTORY

This category is a predictor of future rockfall activities. Sites with a history of frequent rockfall are more likely to experience future rockfall events. The magnitude of historical rockfalls is also an indicator of future rockfall behavior at a site.

Based on the presence of existing erosion and rockfall debris and a small recent rockfall at the time of the field investigation, rockfall activities are common at the project site. The majority of these rockfalls are generally small.

1.3.2.7 SLOPE TOPOGRAPHY

This category evaluates the existing site conditions and features.

Due to the high and steep slopes, the lack of catchment ditches or barriers, and the existing rockfall features, the project area along Round Top Drive is rated rockfall hazard Class A.

1.3.3 Proposed Construction Activities

Proposed construction activities would include the following activities:

- general rock scaling
- smoothing the slope surface
- clearing and trimming all vegetation, trees, and shrubs flush to the ground
- installation of the wire mesh drape system

Scaling, vegetation trimming, and installation of wire mesh would pose potential hazards to roadway travelers from falling materials and would require lane closure and the installation of a portable, temporary rockfall fence. Traffic control personnel would be present to regulate the flow of traffic through the area.

1.3.4 Proposed Maintenance Activities

The proposed wire mesh drape system would require periodic inspection and maintenance. The mesh would be inspected for corrosion and damage from falling debris, and steel components may need to be repaired or replaced periodically. Additionally, clearing of rockfall debris from behind the wire mesh and from the roadway shoulder would be required.

1.3.5 Project Schedule and Cost

Construction activities related to the Proposed Action are expected to take approximately 3.5 months to complete. Approval of engineering designs is expected to occur in March 2012, and construction work is anticipated to begin in September 2012 and would be completed in January 2013.

The Proposed Action has a preliminary construction cost estimate of \$500,000. This project would be funded by C&C Honolulu.

1.4 PERMITS AND APPROVALS THAT MAY BE REQUIRED

In addition to the environmental disclosure requirements of HRS Chapter 343, implementation of the Proposed Action would require coordination and consultation with state and county agencies for permits or approvals as presented in Table 1-1, below (see Appendix A for agency correspondence).

Table 1-1: Permits and Approvals for Implementation of the Proposed Action

Permit or Approval	Description	Regulation(s)	Administrative Authority
Conservation District Use	Projects located within the Conservation District as designated by the State Land Use Commission.	HAR 13-5	DLNR OCCL
State Historic Preservation Review	State projects that may affect a historic property must obtain a concurrence of "no affect" to historic properties from SHPD, prior to commencement.	HRS Chapter 6E-8; HAR 13-275	DLNR SHPD

DLNR Department of Land and Natural Resources

SHPD State Historic Preservation Division

OCCL Office of Conservation and Coastal Lands

1.5 ANTICIPATED FINDINGS AND DETERMINATIONS

Based on the findings and the assessment of potential impacts from the proposed project, a Finding of No Significant Impact (FONSI) is anticipated.

2.0 PROPOSED ACTION AND ALTERNATIVES TO THE PROPOSED ACTION

This section provides background information on the proposed project and a description of the Proposed Action, the No-Action Alternative, and alternatives considered but not carried forward.

2.1 PROPOSED ACTION

The Proposed Action includes the installation of a wire mesh drape system over the cut slope. The Proposed Action would consist of vegetation clearing, rock scaling, and the installation of the wire mesh drape system with an embedded anchor system. Figure 2-1 provides a cross-section view and a plan view of the Proposed Action.

The Proposed Action was determined based on several factors, including public safety, construction cost, and sound engineering principles. Other factors considered included rockfall protection characteristics, community needs, environmental issues, aesthetics, local politics, and land acquisitions required. Thus, a wire mesh drape system is the proposed mitigation method for this project. This method provides a permanent solution for rock protection and is advantageous in places where there is limited catchment area.

2.2 NO-ACTION ALTERNATIVE

In addition to the Proposed Action, the No-Action Alternative is analyzed in this EA. Under the No-Action Alternative, no slope stabilization measures would be installed and the existing conditions at the site would remain. The risk to public health and safety from rockfall and landslides would remain.

2.3 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

In addition to the No-Action Alternative, several other stabilization measures were considered but not carried forward for various reasons. Alternatives considered but not carried forward include the following.

2.3.1 Alternative 1 – Anchored Wire Mesh System

Alternative 1 provides for the installation of anchored wire mesh over the entire cut slope that could otherwise send falling rocks onto affected structures. After clearing, scaling, and leveling, the terrain surface is covered by a high strength steel wire mesh and tensioned with pre-installed anchors that are typically spaced 8 to 10 feet apart throughout the coverage area. The anchors pull the wire mesh tightly against the slope to prevent rockfalls by restraining the loose material in place.

This alternative has many benefits, including slope stabilization and improvement of soil retention and vegetation growth. The major drawbacks are high initial construction cost, the requirement of clearing most trees on the slope, and the area covered by the wire mesh becomes unusable for future development.

2.3.2 Alternative 2 – Impact Fence System

Alternative 2 provides for the installation of an impact fence system with relatively low height at the top of the cut slope to intercept falling rocks from upslope and the installation of a draped system on the cut slope below the impact fence system.

Large slopes can be mitigated with a single fence installed at the base. However, a catchment area is required; thus, areas with launching features or little shoulder room may require widening or realignment to accommodate the fence. Additional disadvantages include maintenance requirements and some visual impact.

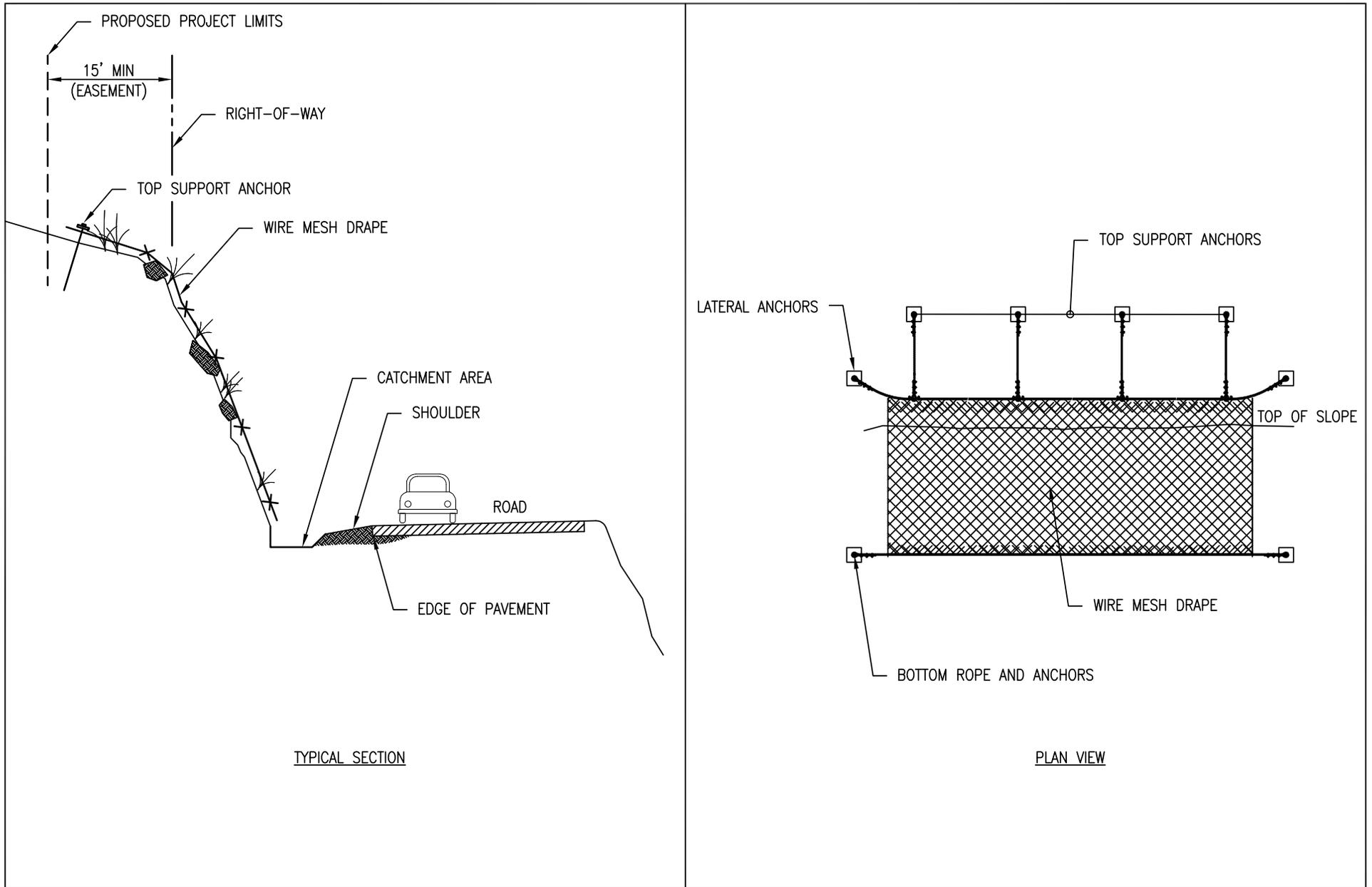


Figure 2-1
Typical Section and Plan View of Proposed Action
Wire Mesh Drape System
Round Top Drive Rockfall Mitigation
Honolulu, HI

2.3.3 Alternative 3 – Combined Impact Fence and Wire Mesh Drape System

Alternative 3 provides for the installation of an impact fence system with relatively low height at the top of the cut slope to intercept falling rocks from upslope and the installation of a draped system on the cut slope below the impact fence system.

This design alternative provides the most complete rockfall protection with the impact fence located at the most advantageous location: the top of the cut slope.

2.3.4 Alternative 4 – Catchment Ditch

Alternative 4 provides for the construction of a catchment ditch that would be designed based on site conditions to provide an adequate catchment zone.

Although minimal maintenance is required and benefits include improved drainage capacity, the disadvantage is the large catchment zone area and rock excavation that would be required.

2.3.5 Alternative 5 – Retaining Wall

Alternative 5 provides for the construction of a retaining wall. Little maintenance would be required with this alternative. Additionally, a faux rock texture could be applied to the wall surface for aesthetic purposes.

Disadvantages associated with Alternative 5 include increased construction costs and visual impacts, and this alternative is not suitable for high slopes. Additionally, this alternative is not suitable for high slopes. Existing utilities may require modification or relocation to install the retaining wall.

2.3.6 Alternative 6 – Scaling, Bolting, and Demolition

Alternative 6 includes scaling and demolition of rock outcrops that are ready to fall. After a thorough scaling and demolition, the rockfall hazard is generally maintained at a low level for a number of years because the geological processes associated with the natural production of rockfalls are generally slow requiring many years to generate a rock outcrop that is ready to fall.

This alternative is a temporary measure to reduce rockfall risk by dealing generally with the highly hazardous rocks.

3.0 ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This chapter describes the affected environment associated with the Proposed Action and the No-Action Alternative, the potential impacts to resources, and proposed mitigation measures. Cumulative effects and irretrievable and irreversible commitment of resources are also addressed in this chapter.

The affected environment describes the natural and man-made environments, which include climate and air quality, noise, geology and soils, water quality, biological resources, cultural resources, land use and ownership, visual resources, natural hazards, hazardous materials and hazardous waste, public facilities and services, and socioeconomics. Unless otherwise specified, the region of influence (ROI) for individual resources is the proposed project site.

3.1 CLIMATE AND AIR QUALITY

The ROI for air quality is the proposed project site and downwind areas. Downwind areas vary throughout the year. Although modeling of downwind areas was not completed as part of this assessment, typical downwind areas of the ROI would normally include places to the northeast. Air quality can also be affected by the climate.

3.1.1 Climate

The project site is located along the boundary of the ahupua'a (traditional land division) of Makiki and Mānoa in the Honolulu (Kona) District of O'ahu. Temperatures in this region are moderate and equable throughout most of the year. This reflects the small seasonal variation in the energy received from the sun and the tempering effect of the surrounding Pacific Ocean. Being situated in the tropics, Hawai'i has relatively uniform day length and temperature, and there are essentially only two seasons. The summer months, call Kau, extend from May through October with statewide daytime temperatures at sea level averaging 85 degrees Fahrenheit (°F). The winter months, Ho'oilō, are experienced from November through April with an average temperature of 78 °F. Nighttime temperatures are approximately 10 °F lower. Hawai'i's warmest months are August and September, and the coolest months are February and March. Median annual rainfall near the project site is approximately 70 inches (University of Hawai'i-Mānoa 2011).

3.1.2 Air Quality

Ambient air quality, which refers to the purity of the general outdoor atmosphere, is regulated under the Clean Air Act (CAA) and the U.S. Environmental Protection Agency National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] Part 50). The State of Hawai'i Department of Health (DOH) also regulates air quality and established ambient air quality standards (HAR Title 11, Chapter 59-4) that are as strict or, in some cases, stricter than the NAAQS. The State of Hawai'i has also established standards for fugitive dust emissions emanating from construction activities (HAR Title 11, Chapter 60.1-33). These standards prohibit any visible release of fugitive dust from construction sources without taking reasonable precautions.

The State of Hawai'i monitors ambient air quality for six regulated pollutants including:

- Particulate matter less than 10 microns
- Particulate matter less than 2.5 microns
- Carbon monoxide
- Ozone

- Sulfur dioxide
- Nitrogen dioxide

Areas where ambient levels of a criteria pollutant are below the NAAQS are designated as being in "attainment." Areas where levels of a criteria pollutant equal or exceed the NAAQS are designated as being in "nonattainment." In 2006, the State of Hawai'i was in attainment for all criteria pollutants (DOH 2006).

Emissions from motor vehicles are the primary source of air pollutants in the project vicinity. Vehicular traffic is generally light and concentrations of ambient pollutants are assumed to be well below the federal and state ambient air quality standards. No additional information on air quality was collected.

3.1.3 Potential Impacts and Mitigation

3.1.3.1 PROPOSED ACTION

The frequent rain and strong winds of the area can increase the risk of the felling of large, shallow-rooted trees onto the roadway. The first part of the project would involve the removal of large trees that are deemed hazardous to the scaling to remove loose debris from the existing natural slope. It is anticipated that project implementation would not be significantly impacted by regional climatic conditions.

Potential short-term adverse air quality impacts during the construction phase would include generation of fugitive dust from vehicle movement and soil excavation, and exhaust emissions from on-site construction equipment and from construction workers' vehicles travelling to and from the project site. Additionally, the project site is approximately 0.8 acre and there would be minimal ground disturbance.

Construction activities are expected to have little or no impact since the project would be of limited duration and where engine exhausts may be a source of potential air pollution, all internal combustion equipment would be governed in accordance with applicable State and County regulations. Construction activities would comply with provisions of Chapter 11-60.1, HAR (DOH), "Air Pollution Control".

The proposed project would not result in any changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to existing conditions. As such, this project would generate minimal air quality impacts for CAA criteria pollutants and would not be linked with any special concerns regarding mobile source air toxins.

3.1.3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no construction activities would occur at the project area. No additional emission sources would be added; therefore, there would be no impact to the existing air quality.

3.2 NOISE

Noise is defined as unwanted sound and is one of the most common environmental issues of concern to the public. A number of factors affect sound as it is perceived by the human ear. These include the actual level of the sound (or noise), the frequencies involved, the period of exposure to the noise, and changes or fluctuations in the noise levels during exposure. The accepted unit of measure for noise levels is the decibel (dB) because it reflects the way humans perceive changes in sound amplitude. Sound levels are easily measured, but human response and perception of the wide variability in sound amplitudes is subjective.

The State of Hawai'i regulates noise exposure in the following statutes and rules: HRS §342F – *Noise Pollution*, HAR §11-46 – *Community Noise Control*, and HAR §12-200.1 *Occupational Noise Exposure*. Maximum permissible sound levels for Class A zoning districts including all areas equivalent to lands zoned residential, conservation, preservation, open space, or similar type, is 55 (decibel [A-weighted scale]) dBA between the hours of 7:00 AM and 10:00 PM and 45 dBA between 10:00 PM and 7:00 AM (HAR §11-46-4). The ROI for noise is the project area and adjacent areas.

3.2.1 Existing Noise Environment

The project area is located on undeveloped conservation land. Existing sources of noise in the project area are limited to motor vehicles traveling along Round Top Drive, wind from trees, and avifauna and human associated activities in the area. Noise studies have not been performed at the project area for the purpose of this EA.

3.2.2 Potential Impacts and Mitigation

3.2.2.1 PROPOSED ACTION

Noise would be generated during construction and would be temporary. Typical noise emission levels for construction equipment are provided in Table 3-1.

Table 3-1: Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Air Compressor	81
Backhoe	80
Bulldozer	82
Chain Saw	85
Concrete/Grout Pumps	82
Crawler Service Crane (100-Ton)	83
Dump Truck	88
Drill Rigs	88
Excavator	85
Front End Loader	80
Generator	81
Jackhammer (Compressed Air)	85
Lift Booms	85
Pick-Up Trucks	55
Power-Actuated Hammers	88
Water Pump	76
Water Truck	55

Source: DOT 2006; HMMH 2006.

All internal combustion powered equipment would be muffled and work would be limited to daytime hours. Noise generated by construction activities would comply with noise provisions established by DOH. Upon completion of work, the area would return to preconstruction noise levels. Therefore, noise impacts would be less than significant.

3.2.2.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no construction activities would occur at the project area, and there would be no change to the existing noise environment. Therefore, no impacts from noise are anticipated under the No-Action Alternative.

3.3 GEOLOGY AND SOILS

3.3.1 Geology

The island of O'ahu demonstrates four major geomorphic provinces divided according to geological setting: Koolau Range, Waianae Range, Schofield Plateau, and Coastal Plain (Stearns 1985, MacDonald et al. 1983). The Waianae Range on the west and the younger Koolau Range on the east, both shield volcanoes, comprise the largest geomorphic formations of O'ahu. The Koolau Range only represents the southwest part of the Koolau volcano: the northeast part of the volcano slid into the ocean during a giant landslide. As a result, the Koolau Range only consists of lava flows that dip broadly to the southwest; the northeast dipping lava flows to the northeast side of the volcano caldera slid into the ocean. The gently sloping Schofield Plateau was formed when lava flows from the Koolau volcano banked against the older, already-eroded slope of the Waianae volcano.

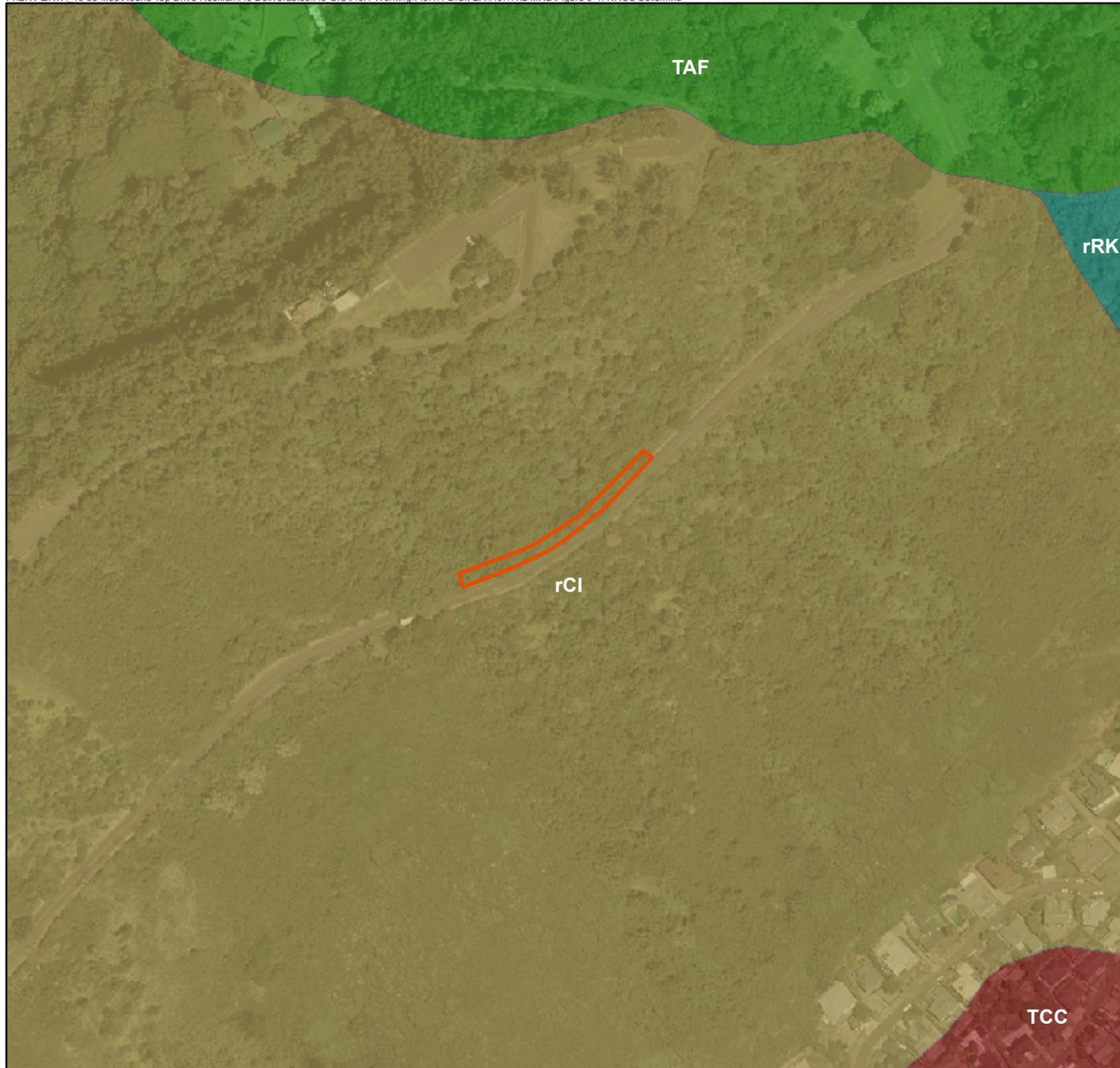
After a long period of volcanic quiet during which extensive weathering and erosion developed and large valleys were cut into the Koolau, volcanic activity returned, and a series of lava flows, cinder cones, and tuff cones, called Honolulu Volcanic Series, were formed. Many of the eruptions were accompanied by violent explosions, caused by hot lava contacting seawater (hydromagmatic eruption) that blasted through the coral reefs on the seaward slopes of Koolau Range.

The project site is located on Pu'u 'Ualaka'a, or Round Top, which is a prominent elongated outcrop on the ridgeline trending northeast-southwest between Mānoa Valley and Makiki Valley on the leeward side of the Koolau Mountains. Pu'u 'Ualaka'a, like other Hawai'ian landmark is including Punchbowl and Diamond Head, was created from volcanic ash and cinders during the geological recent post-erosional eruptions of the Honolulu volcanic series. The Honolulu volcanic overlies the older Koolau lava flows at Round Top. Slopes on Pu'u 'Ualaka'a are moderate to steep, with a summit elevation of approximately 1,075 feet mean sea level. Soils are mostly shallow, rocky, and well drained.

3.3.2 Soils

The *Soil Survey of the Islands of Kauai, O'ahu, Maui, Molokai, and Lanai, State of Hawai'i*, prepared by the U.S. Department of Agriculture Soil Conservation Service (1972) identifies the proposed project site as located on the Rock land-Stony steep land association, which consists of steep to precipitous, well-drained to excessively drained, rocky and stony land. Soils at the project site are cinder land (rCl) (Figure 3-1). Cinder land consists of areas of bedded magmatic ejecta associated with cinder cones. It is a mixture of cinders, pumice, and ash. This soil type occurs at elevations between 200 and 2,000 feet near Mount Tantalus. Cinder land supports some vegetation, but has no value for grazing because of its loose nature and poor trafficability. Rather, areas with this soil type are generally used for wildlife habitat and recreational areas. On O'ahu, Cinder land soils occur mainly at elevations between 200 and 2,000 feet near Mount Tantalus.

A geotechnical investigation was conducted for the project area in December 2010. This site visit revealed that the volcanic cinder appeared to be in a moderately to weakly cemented condition. Fragments of weakly cemented volcanic cinder were removed from the slope by hand. Additionally, tree roots were observed growing in fractures of the exposed cemented volcanic cinder face.



Location Map



Legend

-  Project Site
- Map Unit Symbol**
-  Tantalus silt loam (TAF)
-  Tantalus silty clay loam (TCC)
-  Cinder land (rCI)
-  Rock land (rRK)

Notes

1. Base Map Source: USGS 2005
2. Map projection: NAD 1983 UTM Zone 4N
3. NRCS Soils Data Source:
US Dept. of Agriculture 1972



Figure 3-1
NRCS Soils
Round Top Drive
Rockfall Mitigation
Honolulu, HI

3.3.3 Potential Impacts and Mitigation

3.3.3.1 PROPOSED ACTION

The Proposed Action involves mitigation of the present slope condition using a wire mesh drape system to contain the potential slope failure and/or rockfall events. The proposed project would involve scaling and vegetation clearing on the hillside. The wire mesh would blanket the hillside, thus containing soil and rocks. Vegetation would be allowed to grow through the mesh, which would provide erosion protection of the unconsolidated soil. Therefore, implementation of the Proposed Action is expected to have positive long-term effects on geology and soils.

3.3.3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no slope stabilization measures would be implemented at the project area. Structural deficiencies in the rock formations would not be addressed, and erosion would continue to undermine the stability of the rock formations. Therefore, the No-Action Alternative is anticipated to have long-term adverse impacts to geology and soils.

3.4 WATER RESOURCES

This section describes the availability and quality of water resources, including surface water and groundwater. Surface water includes lakes, perennial/intermittent streams, and drainage ways. Groundwater includes water present in aquifers (perched, unconfined, confined, or artesian).

3.4.1 Surface Waters

Generation of surface water typically begins in the mountains as rainfall. As surface water moves downgradient, it collects in streams and gulches. A portion infiltrates through the ground surface and streambeds, recharging the underlying aquifer.

There are no surface waters present within the project area.

3.4.2 Wetlands

According to the National Wetland Inventory maps provided by the U.S. Fish and Wildlife Service (USFWS), there are no wetlands within the project area (USFWS 2010).

3.4.3 Groundwater

Groundwater in the project area is within the southern O'ahu groundwater area, which is the largest groundwater area on O'ahu. The project area overlies the Koolau Basalt aquifer.

The State of Hawai'i Underground Injection Control (UIC) program was established by the DOH Safe Drinking Water Branch to protect the quality of underground sources of drinking water. As part of this program, a UIC line was delineated on U.S. Geological Survey maps for each island. Groundwater inland of this line is considered by the State to be a potential source of drinking water. Groundwater in areas seaward of this line are not considered potential drinking water sources. A review of the UIC map for the Island of O'ahu, which includes the area of the subject property, indicates the subject property is located above of the UIC line (DOH 1999).

3.4.4 Potential Impacts and Mitigation Measures

3.4.4.1 PROPOSED ACTION

There are no naturally occurring surface waters or wetlands within the project area. There would be no discharges from the project site directed to waters of the U.S. or waters of the State of Hawai'i. There is one drainage structure within the project area. Installation of the wire mesh drape system would not affect the quantity or quality of stormwater and would not change the location or course of the drainage structure. Construction plans and specifications for the Proposed Action would include best management practices (BMPs) to minimize erosion on the project site during and after

construction, as well as measures to contain runoff on-site during construction. Temporary erosion control measures would be used during construction to prevent soil loss and to minimize surface runoff into adjacent areas.

3.4.4.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no rockfall protection measures would be implemented and there would be no change to the water resources within the project area. Therefore, no impacts to water resources are anticipated with implementation of the No-Action Alternative.

3.5 BIOLOGICAL RESOURCES

A biological resources survey of the project area was conducted on October 19, 2011. The survey consisted of walking along the mauka edge of Round Top Drive in the project area and on the hillslope above the steep roadway cut to identify biological resources potentially impacted by the Proposed Action. Figure 3-2 identifies the survey area. A biological resources survey report is included in Appendix B.

3.5.1 Flora

For purposes of describing the vegetation at the project site, the proposed project area has been divided into two sections: (1) the road cut face and roadway verge, and (2) the hillslope. The road cut and roadway verge support mostly ruderal forbs and grasses with shrubs and small trees overhanging the upper part of the rock face. Above the road cut, the hillslope supports a mostly closed-canopy forest with a sparse understory of forbs and ferns.

A total of 48 plant species were recorded during the biological resources survey. Of these, only one "native" species was encountered: the yellow wood sorrel (*Oxalis corniculata*). The yellow wood sorrel is either an early Polynesian introduction or possibly an indigenous species that is very common on O'ahu and is often found as a lawn weed or a ruderal plant in disturbed areas.

3.5.2 Fauna

A total of 49 individual birds of 13 different species were recorded during the biological resources survey. All species detected are alien to the Hawai'ian Islands. Four mammalian species were detected during the survey.

3.5.3 Special Status Species

No plant species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs were recorded during the biological resources survey.

No animal species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs were recorded during the biological resources survey. It is possible that extremely small numbers of the threatened Newell's Shearwater (*Puffinus auricularis*) over-fly the project site between the months of May and early December.



Location Map

Legend

- Biological Resources Survey Area (dashed white line)
- Project Site (solid orange line)

Notes

1. Base Map Source: USGS 2005
2. Map projection: NAD 1983 UTM Zone 4N



Figure 3-2
Biological Resources Survey Area
Round Top Drive
Rockfall Mitigation
Honolulu, HI

3.5.4 Potential Impacts and Mitigation

3.5.4.1 PROPOSED ACTION

The project site contains no listed or candidate threatened or endangered species. Therefore, construction of the Proposed Action would not adversely impact special status species.

Construction of the Proposed Action would require removal of surface vegetation in the area where the wire mesh drape system would be installed. However, none of the vegetation to be removed is unique or rare. Additionally, vegetation would be allowed to grow through the wire mesh.

3.5.4.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no rockfall protection measures would be installed. There would be no impacts to biological resources under the No-Action Alternative.

3.6 CULTURAL RESOURCES

Per the *Guidelines for Assessing Cultural Impacts* (DOH 1997), the types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The cultural resources that support such cultural practices and beliefs are also subject to assessment. Cultural resources survey reports are included in Appendix C.

The Proposed Action would stabilize the slope adjacent to Round Top Drive. Construction activities would result in ground disturbance on the slope; however, implementation of the proposed slope stabilization measures would not alter the quality of Round Top Drive. Archival literature and historic documents revealed that a nearby portion of Round Top Drive/Tantalus Drive is on the Hawai'i Register of Historic Places (HRHP) (Wong and Shideler 2006); however, no part of Site 6915 would be affected by the Proposed Action. A review of previous archeological studies indicated that no archeological sites are known to exist within the project area, and no surface archeological remains were observed during the field survey.

Historic preservation review of the Proposed Action was initiated with the SHPD pursuant to HRS Chapter 6E-8 in a letter dated November 2, 2011; concurrence with our determination that "no historic properties will be affected" is expected. No further work (e.g., archeological monitoring) is recommended; however, in the event that historic properties or burials are found during construction, work would be stopped, the find would be protected, and SHPD would be notified immediately.

3.6.1 Cultural Practices and Traditional Uses

In pre-Contact times, Round Top (or Tantalus) was known as 'Ualaka'a, which means "rolling potato". 'Ualaka'a was known as the site of the finest sweet potatoes in the islands. There are multiple stories of potato fields so bountiful that the potatoes roll down hill. One such story tells of sweet potato fields planted by Kamehameha I that when dug from the ground, the potatoes rolled downhill. Another story tells of a famous archer who, while resting on Punchbowl, spotted and shot a mouse eating a potato on 'Ualaka'a; when the mouse died, the potato rolled downhill (Sterling and Summers 1978). There is little additional information about the locale. Apart from human burials that have also been found in various locations on the top and sides of Tantalus, there has been little evidence of other types of traditional land use in the area.

In the late 1800s, in conjunction with the growth of trade and commerce in Honolulu, the deforestation of Round Top/Tantalus began. As a result of the loss of native forests, Territory Forestry programs were implemented. During the 1900s, with the development of Round Top/Tantalus roads, recreational and residential land use grew (Wong and Shideler 2006).

Twentieth century historic land use information in the area is limited to private residential and State Park development. Round Top Drive was a favored residential area among Honolulu's early predominant families (Wong and Shideler 2006).

Pu'u 'Ualaka'a State Wayside was established before Hawai'i's statehood, in 1957, as part of the Territorial Parks System. The recreational area was initially 6.4 acres in size (DLNR 1965). By fiscal year 1992-1993, the last year for which there are departmental reports, Pu'u 'Ualaka'a State Wayside had expanded to 50.0 acres in size, of which 12 acres were developed for recreational use (DLNR 1994).

3.6.2 Archaeological Resources

A review of previous archaeological studies indicated that no archaeological sites are known to exist within the project area. Additionally, an archaeological reconnaissance survey conducted in the project area revealed no traditional or historical surface archaeological materials or features. The steepness of the hillside near the Proposed Action appears to have precluded traditional and historical residential or agricultural pursuits. The survey concluded that no surface archaeological sites or other historic properties were present within the project area.

3.6.3 Registered Historic Places

A review of archival literature and historic documents revealed that in 2007 a portion of Round Top Drive and Tantalus Drive was nominated to the HRHP as State Site No. 50-80-14-6915. The historic roadway was constructed in several phases: the construction of Tantalus Road (1891–1902); the construction of Round Top Road (1913–1917); Works Progress Administration paving (1937); and repaving and roadside improvements (1953–1954). The portion on the HRHP includes eight miles of the roadway as it winds around the summit of Round Top, beginning at the 1.5 Mile Marker and ending at Mile Marker 8. No part of Site No. 50-80-14-6915 would be affected by the Proposed Action.

3.6.4 Potential Impacts and Mitigation

3.6.4.1 PROPOSED ACTION

The potential for archaeological or historic properties within the proposed project area is considered minimal. In the event that historic properties or burials are found during construction, all construction activities would be stopped, the find protected, and the SHPD would be notified immediately.

3.6.4.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no work would be performed at the project site. No impacts to cultural resources would occur with implementation of the No-Action Alternative.

3.7 LAND USE AND OWNERSHIP

3.7.1 Existing Land Use and Ownership

The project site is in the Conservation District as designated by the State Land Use Commission (LUC 2008). A CDUA permit approved by the State Board of Land and Natural Resources will be required.

The project site is designated Preservation on the City's Primary Urban Center Development Plan (PUC DP) Land Use Map (June 2004). The project site is not located within the State's Special Management Area (SMA).

3.7.2 Potential Impacts and Mitigation

3.7.2.1 PROPOSED ACTION

Implementation of the Proposed Action would result in no change to land use or ownership within the project area.

3.7.2.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no work would be performed at the project site. Existing land use and ownership would remain; therefore, no impacts to land use and ownership would occur with the No-Action Alternative.

3.8 VISUAL RESOURCES

Visual resources are the aggregate of characteristic features imparting visually aesthetic qualities to a natural, rural, or urban environment.

3.8.1 Existing Scenic and Visual Environment

The proposed project site is rural in nature. The existing visual quality of the project area is that of a rural two-lane roadway corridor cut through steeply sloped and heavily vegetated undeveloped land. Steep, vegetation slopes are located above and below the project site. There are no residences or other buildings within the vicinity of the proposed project site. Unobstructed viewplanes extend from Round Top Drive to the ocean.

3.8.2 Potential Impacts and Mitigation

3.8.2.1 PROPOSED ACTION

During construction, workers, materials, and equipment would be visible on Round Top Drive.

Proposed slope stabilization measures include installation of a wire mesh drape system along the uphill slope of Round Top Drive. Removal of surface vegetation would be required to install the mesh, which would result in short-term adverse impacts to visual resources. While the anchored wire mesh would be visible from vehicles on Round Top Drive, adverse impacts to viewplanes are not expected to be significant. Overall, the view of the rockfall mitigation would be infrequent and temporary as motorists pass the site. This minor effect may be considered reasonable and practical because the project would improve public safety from future rockfall events. All exposed metal parts would be powder coated a flat black color to minimize visibility. Additionally, new vegetation would grow through the mesh openings rendering a natural view along the project site. Thus, no significant long-term adverse visual impacts are anticipated from installation of the proposed wire mesh drape system.

3.8.2.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no slope stabilization measures would be implemented and there would be no change to the visual quality of the project area. However, in the event of a significant rockfall event or large landslide, the visual integrity of the area could be compromised. These impacts would be temporary. No adverse impacts to visual resources would be anticipated with implementation of the No-Action Alternative.

3.9 NATURAL HAZARDS

Other natural hazards that may occur in and affect the proposed project area include floods, tsunamis, hurricanes, earthquakes, and other natural events. The ROI for natural hazards is the proposed project area.

3.9.1 Floods

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) flood zone designations are:

- A – Areas of 100-year flood, base flood elevations not determined
- AE – Areas of 100-year flood, base flood elevations determined
- XS – Areas of 500 year flood; areas of 100-year flood with average depths of less than one foot or within the drainage area less than one square mile, and areas protected by levees from 100-year flood
- X – Areas determined to be outside the 500-year flood plain
- D – Areas in which flood hazard is undetermined
- VE – Areas of 100-year coastal flood with velocity (wave action), base flood elevations determined (Coastal High Hazard District)

The FEMA FIRM Community Panel 15003C0360G, revised September 30, 2004, shows the project site is in Zone X (Figure 3-3), which means that it is outside of the 500-year floodplain.

3.9.2 Tsunamis

Tsunamis are a series of destructive ocean waves generated by seismic activity that could affect shorelines of Hawai'i. Tsunamis affecting Hawai'i are typically generated in the waters off South America, the west coast of the United States, Alaska, and Japan. Local tsunamis have also been generated by seismic activity on the Island of Hawai'i.

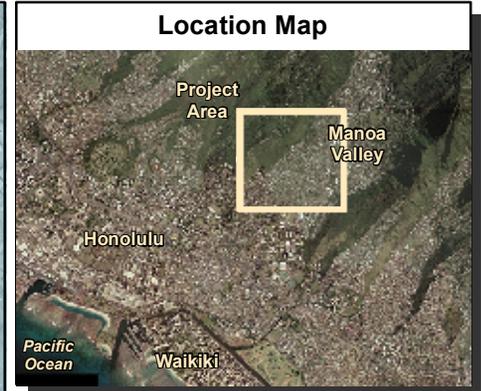
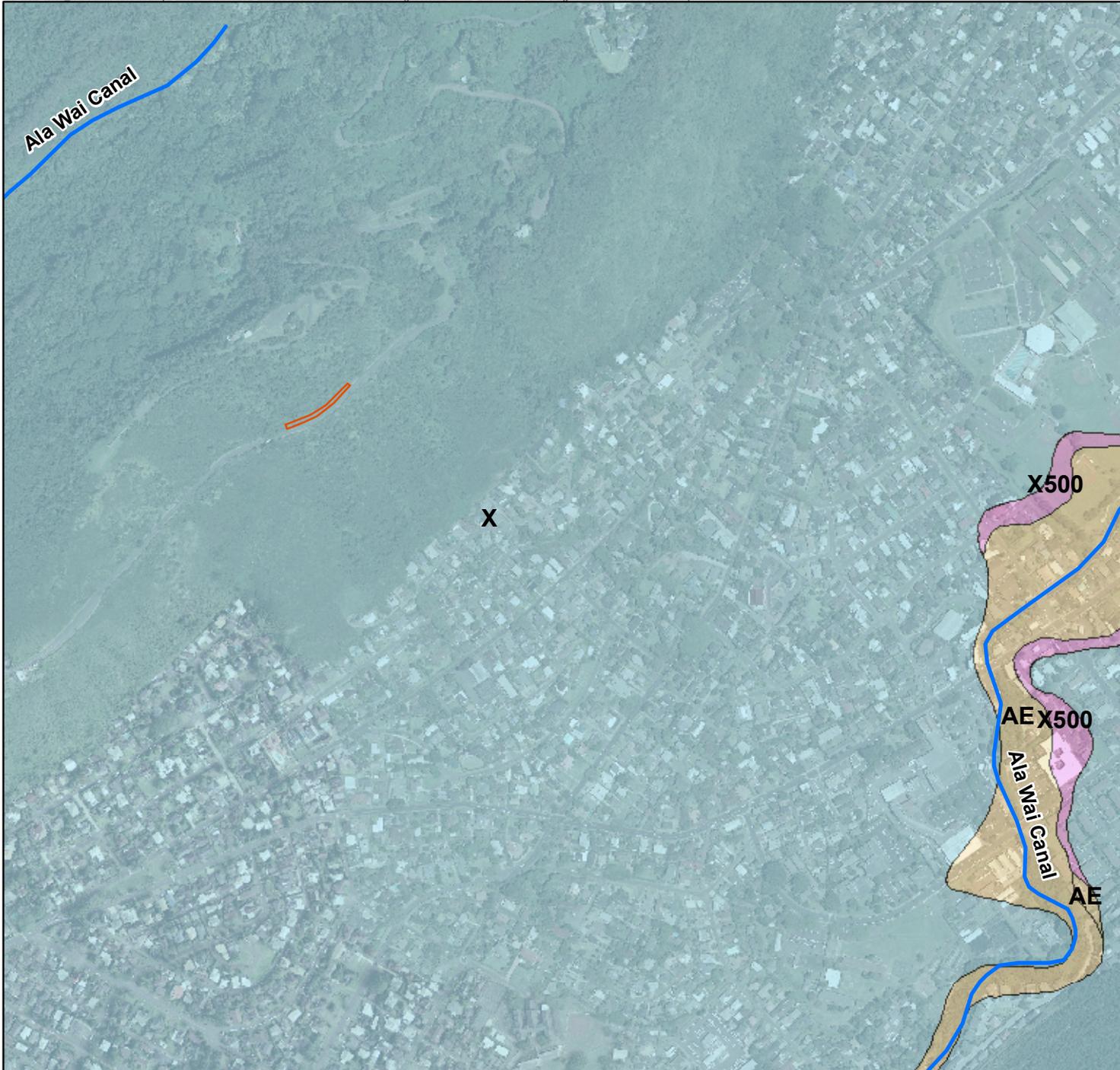
The County of Honolulu Civil Defense Agency establishes tsunami evacuation zones and maps for all coastal areas on O'ahu. The project area is not within a tsunami evacuation zone (C&C Honolulu 2010).

3.9.3 Hurricanes

The Hawai'ian Islands are seasonally affected by Pacific hurricanes from June to November. These storms generally travel toward the islands from a southerly or southeasterly direction and can deposit large amounts of rain with high winds on the Hawai'ian Islands. The storms generally contribute to localized flooding and coastal storm surges. Coastal storm surges would not impact the proposed project area.

3.9.4 Earthquakes

Seismic activity usually occurs on the Island of Hawai'i, and has been felt as far away as O'ahu. O'ahu is listed in Seismic Zone 2A under the Uniform Building Code (USGS 2001). Zone 2A indicates a location that has moderate potential for ground motion created by seismic activity.



Legend

- Streams
- Project Site
- Flood Hazard Zone**
 - AE
 - X
 - X500

Notes

1. Base Map Source: USGS 2005
2. Map projection: NAD 1983 UTM Zone 4N
3. Hazard Zone Data Source: FEMA 2004



Figure 3-3
Flood Hazard Zones
Round Top Drive
Rockfall Mitigation
Honolulu, HI

3.9.5 Potential Impacts and Mitigation

3.9.5.1 PROPOSED ACTION

Heavy rainfall associated with tropical storms has the potential to initiate rockfall in the project area. Attention would be paid to approaching weather systems and proper stormwater runoff mitigation measures. Silt fencing or other controls would be installed when necessary to prevent the commingling of cliff soils with runoff.

Tsunami and flooding in the project area are unlikely due to its location in the road right-of-way, which is equipped with a drainage control system and the presence of steep cliffs. Further diminishing the likelihood of a flood in the project area are factors such as elevation, site location along a mountain slope, and the well-drained soils in the project area. The project is not expected to be adversely effected by flooding, and no adverse impacts to the rockfall mitigation improvements are expected. No further mitigation measures are proposed.

Earthquakes can pose a threat to unstable slopes, but disruptive seismic events are relatively uncommon in this region. The contractor would exercise caution at the worksite should an advance warning from the State and County civil defense agencies be issued. No further mitigation measures are proposed.

The Proposed Action would secure the slope with a wire mesh drape system, thereby reducing the potential for rockfall and landslides to occur because of natural hazards. Therefore, the Proposed Action would have positive impacts relative to natural hazards.

3.9.5.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no slope stabilization measures would be implemented and the existing rockfall and landslide potential would remain. Structural deficiencies in the rock formations would not be addressed, and erosion would continue to undermine the stability of the slope. Rapid surface water runoff from storm events and/or tsunamis would accelerate this process of erosion. Therefore, the No-Action Alternative is anticipated to have adverse impacts at the project site relative to natural hazards.

3.10 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

For the purpose of the following analysis, the term hazardous materials or hazardous wastes will mean those substances defined by the Comprehensive Environmental Response, Compensation, and Liability Act.

The proposed project site is undeveloped. A visual survey of the project site shows no evidence of previous structures, buildings, facilities, or underground storage tanks that might contain hazardous materials.

3.10.1 Potential Impacts and Mitigation

3.10.1.1 PROPOSED ACTION

Construction equipment and vehicles contain hazardous materials such as gasoline, diesel, oil, and hydraulic and brake fluids. Accidental release of these materials into the environment is possible, but not anticipated. Site-specific BMPs, including procedures for hazardous material storage, handling, and staging; spill prevention, control, and response; waste disposal; and good housekeeping would be developed and implemented by the construction contractor. These BMPs would greatly reduce the likelihood of hazardous materials being released into the environment. The construction contractor would be responsible for compliance with all applicable federal, state, and local regulations governing the transportation, use, storage, and/or disposal of hazardous material and hazardous wastes during construction. No significant impacts related to hazardous materials or hazardous wastes are anticipated with implementation of the Proposed Action.

3.10.1.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, no construction activities would occur at the project site, and no hazardous materials would be brought to the project area. Therefore, no impacts from hazardous materials are anticipated with the No-Action Alternative.

3.11 PUBLIC FACILITIES AND SERVICES

3.11.1 Recreational Areas

The project site is immediately downslope of Pu'u 'Ualaka'a State Wayside and is surrounded by undeveloped forested state lands of the Round Top Forest Reserve (Figure 3-3). Pu'u 'Ualaka'a State Wayside is popular with residents and tourists primarily as a wayside rest or a quiet, peaceful place close to the densely developed areas of Honolulu. Pu'u 'Ualaka'a State Wayside also provides access to several hiking trails through the Round Top Forest Reserve.

3.11.1.1 POTENTIAL IMPACTS AND MITIGATION

Proposed Action

During construction, there would be periods when it would be necessary to temporarily restrict travel on Round Top Drive to one lane. This would result in temporary delays; however, this is a necessary precaution in order to maintain public safety.

The Proposed Action would reduce the potential for rockfall and landslide to reach the roadway, making the roadway safer for vehicular traffic. There would be no direct impacts to recreational facilities from implementation of the Proposed Action.

No-Action Alternative

Under the No-Action Alternative, no slope stabilization measures would be implemented and the existing rockfall and landslide potential would remain. In the event of a rockfall or landslide, the road could be closed to all traffic, which would impact access to Pu'u 'Ualaka'a State Wayside and trails through the Round Top Forest Reserve. However, recreationists would still be able to access these facilities via Tantalus Drive.



Location Map

Project Area

Manoa Valley

Honolulu

Waikiki

Pacific Ocean

Legend

Project Site

Notes

1. Base Map Source: USGS 2005
2. Map projection: NAD 1983 UTM Zone 4N



Figure 3-4
State Parks and Reserves
Round Top Drive
Rockfall Mitigation
Honolulu, HI

3.11.2 Transportation and Traffic

Access to the project site is by Round Top Drive, which is a two-lane, two-way City-maintained road. Round Top Drive provides vehicular access to Pu'u 'Ualaka'a State Wayside. Vehicle traffic tends to be relatively light, as the lands near the project site are not extensively developed with residential uses. City bus service is not provided on Round Top Drive.

3.11.2.1 POTENTIAL IMPACTS AND MITIGATION

Proposed Action

Traffic impacts related to construction activities would occur during the mobilization and demobilization of equipment and materials to the project site. This traffic would be short-term occurring during the 3.5-month construction period. This would not create an adverse effect to traffic on Round Top Drive, as it would represent a very small proportion of the total traffic volume on this roadway.

During construction, there would be periods when it is necessary to temporarily restrict travel on Round Top Drive to one lane. This would result in temporary delays; however, this is a necessary precaution in order to maintain public safety. As required, traffic controls including safety cones, signage, and/or flag personnel would be implemented to alert motorists and the public to the presence of construction workers and personnel. Additionally, residents would be given adequate notice of potential delays prior to construction. Once construction is complete, all personnel and equipment necessary to the project, including traffic controls, would be removed.

The Proposed Action would reduce the potential for rockfall and landslide to reach the roadway, making the roadway safer for vehicular traffic. Therefore, long-term impacts to transportation are expected to be positive.

No-Action Alternative

Under the No-Action Alternative, no slope stabilization measures would be implemented. The existing rockfall condition and associated risk to drivers on Round Top Drive would remain. Therefore, adverse impacts to transportation may result from implementation of the No-Action Alternative.

3.11.3 Utilities and Infrastructure

3.11.3.1 EXISTING UTILITIES

This section includes information on infrastructure related to electrical power, Telcommunications, drinking water distribution, sanitary sewer systems, storm water discharges, and solid waste disposal.

There is one Hawai'ian Telcom cable located on the makai side of the existing roadway. Additionally, there is an existing concrete rubble masonry drainage structure within the proposed project area that drains to the makai side of Round Top Drive. Both of these facilities are identified on Figure 3-5.

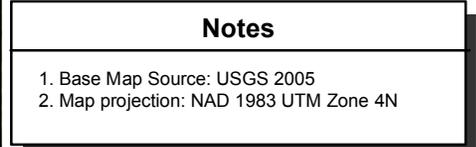
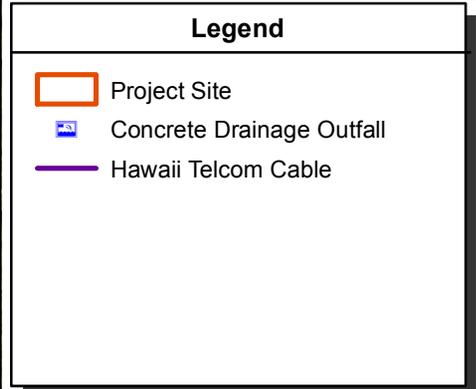
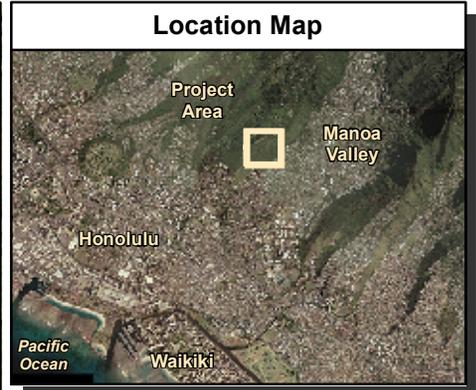


Figure 3-5
Utilities and Infrastructure
Round Top Drive
Rockfall Mitigation
Honolulu, HI

3.11.3.2 POTENTIAL IMPACTS AND MITIGATION

Proposed Action

There are no known utilities or infrastructure within the immediate project area, and the Proposed Action would not add any utilities or infrastructure to the project area. The existing Telcom cable and drainage structure are located outside of the proposed project area and would be protected from construction activities. Therefore, no impact to utilities or infrastructure is anticipated.

Any utilities encountered during construction activities would not be disturbed or damaged. Existing surface and subsurface utilities, and poles within and abutting the project site would be protected at all times. The City of Honolulu and the affected utility company shall be notified immediately of any damaged or disturbed utility.

No-Action Alternative

No impacts to utilities are anticipated with implementation of the No-Action Alternative.

3.11.4 Emergency Services

The project site is readily accessible for police, fire, and emergency medical service based on its location along Round Top Drive. Police services are provided for the area from the Honolulu Police Department's Alapai Police Headquarters. Fire protection is provided by the Honolulu Fire Department's Makiki Station. Ambulance service is provided by Division 2 of the Honolulu Emergency Medical Services Division.

3.11.4.1 POTENTIAL IMPACTS AND MITIGATION

Proposed Action

The Proposed Action would not generate any new demand for police, fire, or ambulance services. During construction, however, these services may be required because of an injury or construction accident. This potential use for such services is not expected to result in the requirement for new personnel or for construction of new police, fire, or ambulance facilities.

During construction, one travel lane would need to be closed, resulting in one-way, contra-flow traffic and temporary delays. Emergency services would be given adequate notice of potential delays prior to construction. Emergency vehicles would have continuous access through the project area during construction.

No-Action Alternative

Under the No-Action Alternative, no slope stabilization measures would be implemented and the existing rockfall and landslide potential would remain. In the event of a rockfall or landslide, the road could be closed to all traffic, including emergency services. For example, in 2006, a portion of Round Top Drive was closed for several months after a landslide compromised the underside of the road. Emergency services were forced to take Tantalus Drive to respond to emergency calls on Round Top Drive, thereby increasing the response time by up to 40 minutes round-trip (Vorsino 2006). Therefore, the No-Action Alternative could have significant adverse impacts on emergency services.

3.12 SOCIOECONOMICS

This section summarizes the demographic and income characteristics of residents near the proposed project area. Data summarized in Table 3-2 are taken from the 2010 U.S. Census (U.S. Census Bureau 2010). Census data are used to describe the existing social and economic characteristics of the ROI and to determine whether any minority or low-income population may experience disproportionately high adverse impact from the Proposed Action or alternatives. The socioeconomics for the County of Honolulu is presented for reference, in which the proposed project area is located.

Table 3-2: Population and Demographics

Characteristic	County of Honolulu		Census Tract 32	
	No.	Percent	No.	Percent
Population	953,207	100.0	833	100.0
Ethnicity				
White	198,732	20.8	352	42.3
Black or African American	19,256	2.0	4	0.5
American Indian or Alaska Native	2,438	0.3	3	0.4
Asian	418,410	43.9	255	30.6
Native Hawaiian and Other Pacific Islander	90,878	9.5	48	5.8
Some Other Race	10,457	1.1	12	1.4
Two or More Races	213,036	22.3	159	19.1
Median Household Income (1999)	\$51,914	—	\$101,167	—

Source: U.S. Census Bureau 2010.

3.12.1 Potential Impacts and Mitigation

3.12.1.1 PROPOSED ACTION

No socioeconomic impacts are expected with implementation of the Proposed Action because the Proposed Action would not impact employment, income, or demographics within the ROI.

3.12.1.2 NO-ACTION ALTERNATIVE

No socioeconomic impacts are expected with implementation of the No-Action Alternative because the No-Action Alternative would not impact employment, income, or demographics within the ROI.

3.13 CUMULATIVE IMPACTS

Cumulative impacts refer to impacts on the environment that result from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. Cumulative impacts can result from individually minor yet collectively significant actions taking place over a period of time. Land use in the proposed project vicinity is comprised of conservation land and undeveloped open space. No other past, present, or planned actions associated with these land uses have been identified that would contribute to cumulative impacts for any resources. Therefore, no significant cumulative impacts would be anticipated from implementation of the Proposed Action or the No-Action Alternative.

3.14 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Implementation of the Proposed Action would not result in an irreversible or irretrievable commitment of resource, except for financial resources, fuel, or other consumable materials required for construction.

4.0 RELATIONSHIP TO STATE AND CITY & COUNTY LAND USE PLANS AND POLICIES

4.1 HAWAII STATE PLAN AND FUNCTIONAL PLANS

4.1.1 Hawaii State Plan

The Hawaii State Plan, Chapter 226 of HRS, adopted in 1978 and revised in 1988, establishes the overall theme, goals, objectives, and priority guidelines to guide the future long-range development of the State (Department of Planning and Economic Development 1978).

The proposed project supports and is consistent with the following State Plan objectives and policies:

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

1. Planning for the State's physical environment with regards to land, air, and water quality shall be directed towards achievement of the following objectives:
 - a) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.
 2. To achieve the land, air, and water quality objectives, it shall be the policy of this State to:
 - a) Promote the proper management of Hawaii's land and water resources.
 - b) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.

The proposed project involves rockfall mitigation along Round Top Drive. This project would reduce rockfall hazards to Round Top Drive, thereby reducing the potential for rockfall and landslides impacts to occur because of natural hazards (i.e. earthquake, hurricane, or severe storm). The Proposed Action would mitigate for potential rockfalls, which would have long-term positive impacts on public safety and health and reduce threats to life and property from potential for rockfalls and landslides originating upslope of Round Top Drive to affect pedestrians and vehicles along Round Top Drive.

4.1.2 State Functional Plans

The State Functional Plans are designed to implement the broader goals, objectives, and policies of the State Plan through specific actions identified as Implementing Actions (IA). While the proposed project is not specifically identified as an IA, the project maintains consistency with the Transportation Functional Plans through the following:

1. State Transportation Functional Plan
 - a) Objective I.F: Improving and enhancing transportation safety

The proposed project involves rockfall mitigation along Round Top Drive, which would have long-term positive impacts by reducing rockfall threats to pedestrians and vehicles along Round Top Drive.

4.1.3 State Land Use Districts

The Hawaii Land Use Law of Chapter 205, HRS, classifies all land in the state into four land use districts: Urban, Agricultural, Conservation, and Rural. The proposed project is located in the Conservation District.

HAR Title 13, Chapter 5, regulates land use in the conservation district for the purpose of "conserving, protecting, and preserving the important natural resources of the State through

appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare” (2008). As per subchapter 2, the Conservation District has five subzones: Protective, Limited, Resource, General, and Special. Omitting the Special subzone, the remaining four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (Protective) to the least sensitive (General). The Special subzone is applied in special cases specifically to allow a unique land use on a specific site. The project site is located in the Resource subzone.

The proposed project involves rockfall mitigation along Round Top Drive, which would have long-term positive impacts by reducing rockfall threats to pedestrians and vehicles along Round Top Drive. As per HAR, Title 13, Chapter 5, Section 13-5-24, erosion control is a permissible land use within the Resource subzone. Erosion control is defined as “erosion control, flood control, and other hazard prevention devices or facilities.” Erosion control projects require a Conservation District Use Permit issued from the Board of Land and Natural Resources. The CDUA will be submitted to the DLNR in accordance with HAR, Title 13, Chapter 5, Section 13-5-31.

4.2 CITY AND COUNTY OF HONOLULU

4.2.1 General Plan

The *General Plan City for the City and County of Honolulu*, as amended October 3, 2002, sets forth basic objectives and policies pursuant to the City Charter, which mandates preparation of a General Plan and area development plans to guide “the development and improvement of the city” (C&C Honolulu 2002). The General Plan and development plans provide a policy context for the land use and budgetary actions of the City across eight geographic regions, including the Primary Urban Center, Central O’ahu, Ewa, Waianae, North Shore, Koolauloa, Koolaupoko, and East Honolulu.

1. Objective B: To protect the people of O’ahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.

The proposed project involves rockfall mitigation along Round Top Drive. This project would reduce rockfall hazards to Round Top Drive, thereby reducing the potential for rockfall and landslides impacts to occur because of natural hazards (i.e. earthquake, hurricane, or severe storm). The Proposed Action would mitigate for potential rockfalls, which would have long-term positive impacts on public safety and health and reduce threats to life and property from potential for rockfalls and landslides originating upslope of Round Top Drive to affect pedestrians and vehicles along Round Top Drive.

4.2.2 City and County of Honolulu Primary Urban Center Development Plan

The project site is located within the region covered by the 2004 *Primary Urban Center Development Plan* (PUC DP). The PUC DP provides policies and guidelines for development within the City of Honolulu’s urban center.

1. Land Use and Transportation Policies: Improve access to shoreline and mountain areas.

The proposed project involves rockfall mitigation along Round Top Drive. This project would reduce rockfall hazards to Round Top Drive, thereby improving access to mountain areas, including Pu’u ‘Ualaka’a State Wayside and other trails on Tantalus.

4.2.3 City and County of Honolulu Zoning

The City Land Use Ordinance regulates land use in accordance with land use policies including the O'ahu General Plan and Development Plans. The City's zoning designation for the project site is Restricted Preservation (P-1).

The project site is located within the State Conservation District, where land use and activities are regulated by the State Department of Land and Natural Resources. A CDUA will be submitted to the DLNR.

4.2.4 City and County of Honolulu Special Management Area

The Coastal Zone Management Act contains the general objectives and policies upon which all counties within the State have structured specific legislation which created SMAs. Any development within the City's designated SMA requires approval of an SMA Use Permit, which is administered by the City Department of Planning and Permitting pursuant to Section 205A, HRS, and Chapter 25 Revised Ordinances of Honolulu.

The project site is not located within the City's SMA.

5.0 FINDINGS AND CONCLUSION

The accepting authority anticipates a FONSI. A final declaration will be made after the authority has considered all agency and public comments on the Draft EA.

In accordance with HAR §11-200-12, the proposing agencies have considered every phase of the Proposed Action, the expected consequences, both primary (direct) and secondary (indirect), and the cumulative as well as the short-term and long-term effects of the action, in order to determine whether the Proposed Action may have a significant effect on the environment. In making this determination, the Proposed Action has been evaluated with respect to the significance criteria established in HAR §11-200-12.

- **Involves an irrevocable commitment to, loss or destruction of any natural or cultural resources.**

The Proposed Action would result in positive impacts for geology and soils. Only short-term construction related impacts are anticipated for ambient air quality and biological resources. The Proposed Action would clear approximately 0.8 acre of existing vegetation in areas to be covered with wire. No special status species have been identified within the project area. Once installed, the wire mesh would allow for the re-growth of vegetation cleared for construction. SHPD concurrence that “no historic properties will be affected” by the Proposed Action is expected. Therefore, implementation of the Proposed Action is not anticipated to result in the irrevocable commitment to, loss or destruction of any natural or cultural resource.

- **Curtails the range of beneficial uses of the environment.**

There would be no change to the current or potential land use within the project area because of the Proposed Action. Management and use of the land would remain consistent with a conservation district.

- **Conflicts with the State’s long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.**

The Proposed Action is consistent with the state environmental policies, goals, and guidelines established in Chapter 344, HRS. The DOT has integrated the review of environmental effects with existing planning processes, and has developed the design for the slope stabilization with consideration for avoiding, minimizing, and mitigating any adverse environmental effects. Other agencies identified as having expertise or jurisdiction by law, were also consulted during the planning and permitting processes. In accordance with HRS §344-5, this EA is made available for public review and comment for a period of 30 days. All comments received during the public comment period will be responded to in the Final EA.

- **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

No socioeconomic impacts to the community are anticipated with implementation of the Proposed Action.

- **Substantially affects public health.**

The Proposed Action would have long-term positive impacts on public safety and health by reducing the potential for rockfalls and landslides originating upslope of Round Top Drive.

- **Involves substantial secondary impacts, such as population changes or effects on public facilities.**

No adverse secondary impacts are anticipated with implementation of the Proposed Action.

- **Involves a substantial degradation of environmental quality.**

No long-term adverse impacts to any resource evaluated in this EA are anticipated with implementation of the Proposed Action.

- **Is individually limited, but cumulatively has considerable effect on the environment, or involves a commitment for larger actions.**

The Proposed Action does not involve a commitment for larger actions. Land use in the proposed project vicinity is comprised of conservation land and undeveloped open space. No other past, present, or planned actions associated with these land uses have been identified that would contribute to adverse cumulative impacts for any of the resources considered in this EA.

- **Substantially affects a rare, threatened, or endangered species or its habitat.**

No special status species have been identified within the project area. No adverse impacts to rare, threatened, or endangered species or its habitat are anticipated with implementation of the Proposed Action.

- **Detrimentially affects air or water quality or ambient noise levels.**

Short-term adverse construction impacts to air quality and ambient noise levels are possible during implementation of the Proposed Action. However, BMPs to be implemented during construction would reduce these impacts. The Proposed Action would have no long-term impacts on air quality noise, or surface water quality.

- **Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.**

The project area is not located in a flood plain, tsunami zone, or coastal area. The presence of steep slopes and rocky soils at the project area does make the area susceptible to erosion and presents geologic hazards such as rockfall and landslides. The purpose of the Proposed Action is to reduce the potential for rockfall and landslides originating from the project area.

- **Substantially affects scenic vistas and view planes identified in County or state plans or studies.**

The Proposed Action would have no long-term adverse impacts on the scenic quality of the roadway corridor.

- **Requires substantial energy consumption.**

Implementation of the Proposed Action is not anticipated to require substantial energy consumption beyond what is required to operate equipment and tools during construction.

5.1 ANTICIPATED DETERMINATION

To determine whether the Proposed Action would have a significant impact on the human, natural, or historic environments, this EA has evaluated the direct and indirect effects and short-term, long-term, and cumulative impacts. The Proposed Action has been evaluated with respect to the significance criteria, as discussed in Section 5.2. Based on this evaluation, it is anticipated that the Proposed Action would not have a significant adverse impact on the environment. Therefore, a FONSI is anticipated.

6.0 DISTRIBUTION LIST

Copies of the Draft EA are provided to the recipients listed below and are also available upon request.

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235 South Beretania Street, Suite 702
Honolulu, HI 96813

City & County of Honolulu
Department of Design and Construction
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U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard
Room 3-122, Box 50088
Honolulu, HI 96850

City & County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, HI 96813

Hawai'i Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Rm. 555
Kapolei, HI 96707

Office of Hawai'ian Affairs
711 Kapiolani Boulevard, Suite 1250
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8.0 REFERENCES

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Appendix A
Agency Correspondence

November 2, 2011

President Leatrice Maluhia Kauahi
Hawaiian Civic Club of Honolulu:
PO Box 1513, Honolulu HI 96806

SUBJECT: Consultation for a Cultural Impact Assessment Regarding the Rock Slide
Mitigative Improvements along Round Top Drive, Makiki Ahupua'a, Honolulu
District, O'ahu, State of Hawai'i
TMK: (1) 2-5-019:003

President Kauahi;

We are writing to inform you of an upcoming project to be carried out by the Department of Design and Construction (DDC) of the City and County of Honolulu (CCH) along Round Top Drive on Tantalus in Makiki. The rock slide mitigation project will consist of vegetation clearing, rock scaling, and the installation of a wire mesh drape system with an embedded anchor system (10 to 15 feet [ft] deep). We would also like to seek your views on this project, including any effects it might have on historic or cultural sites that you may know about in the area.

Description of the Project Area

The entire project area is located on Round Top Drive along the boundary of the *ahupua'a* (traditional land division) of Makiki and Manoa in the Honolulu (old Kona) District (Figure 1). The proposed rock slide mitigation project is located on the steep hillside along the northern side of Round Top Drive in close proximity to the 7.5 mile marker of the 8.0 mile-long portion of Round Top Drive that comprises State Site No. 50-80-14-6915 (Site 6915). Figure 2 shows the project area location in relationship to Round Top Drive on a tax map.

The National Register of Historic Places (NRHP) nomination form provides the following description about the site components east the proposed rockfall mitigation project area:

After Mile Marker 7.5, low concrete walls border the edge of the road and the sharp cliff overlooking Mānoa Valley...Mile Marker 8: The 'Honolulu Watershed Forest Reserve' sign marks the south-east end of the proposed historic district (Wong and Shideler 2006, Section 7 page 3).

The proposed project will not affect any of the contributing features of Site 6915 since all ground alteration will take place upslope of the existing roadway (see Figure 3).

Proposed Construction and Maintenance Activities

The proposed action includes the installation of a wire mesh drape system over the cut slope. The proposed action would consist of vegetation clearing, rock scaling, and the installation of the wire mesh drape system with an embedded anchor system. Proposed construction activities would include the following activities:

- general rock scaling,
- smoothing the slope surface, and
- clearing and trimming all vegetation, trees, and shrubs flush to the ground

These activities would occur within the designated wire mesh drape coverage area prior to the installation of the wire mesh drape system.

The proposed action was determined based on several factors, including public safety, construction cost, and sound engineering principles. Other factors considered included rockfall protection characteristics, community needs, environmental issues, aesthetics, local politics, and land acquisitions required. Thus, a wire mesh drape system is the proposed mitigation method for this project. This method would provide a permanent solution for rock protection and is advantageous in places where there is limited catchment area.

Information on Previously Documented Historic Sites and Cultural Places At and Near the Round Top Drive Project Area

In pre-Contact times, Tantalus was also known as 'Ualaka'a, which means "rolling potato" (Pukui *et al* 1976). 'Ualaka'a was known as the site of the finest sweet potatoes in the islands, and is said to have included fields planted by Kamehameha I. Apart from these agricultural associations, there is little evidence for other types of pre-Contact land use except for the human burials that have been found over the years, as discussed below. The current land use is primarily residential and recreational.

Although few comprehensive archaeological studies have been carried out in Makiki or along the western part of Mānoa, individual studies have been conducted in the general vicinity of Tantalus, particularly those dealing with various inadvertent burial discoveries made over the last 20 years. Of the archaeological studies conducted near the project area, only one (Yent and Ota 1980) provides a comprehensive view of archaeological sites in the Tantalus/Round Top area. The authors surveyed the Kanealole and Moleka stream systems in Makiki, on behalf of the Division of State Parks. There were two main categories of sites reported: historic sites and traditional Hawaiian sites. Historic sites in this region pertained to the Herring family settlement and coffee plantation, along Moleka Stream, in the late 19th century, and the old carriage road that led to their property. Traditional Hawaiian sites in the region were mostly agricultural in nature, and included free-standing walls, retaining walls, and terraces. The ages of most of these features could not be determined with any precision, but it is likely that at least some of them date to the historic period.

The carriage road underwent further study when the Division of Forestry and Wildlife proposed to use a portion of it as a hiking trail (Nagata 1999). The survey of this portion recorded the road itself, as well as associated features (probable bridge foundations and retaining walls). Hammatt *et al.* (2002) conducted an archaeological assessment of land in the vicinity of Kalaiohua Place, near the junction of Round Top Drive and Tantalus Drive. The only features reported appeared to be historic (20th century) or modern walls, curbing, and retaining walls, associated with the roadway.

In 2007 a portion of Round Top Drive and Tantalus Drive was nominated to the Hawai'i Register of Historic Places (HRHP) as State Site No. 50-80-14-6915. The historic roadway was constructed in several phases: the construction of Tantalus Road (1891 – 1902); the construction of Round Top Road (1913 – 1917); Works Progress Administration paving (1937); and repaving and roadside improvements (1953 – 1954). The portion on the HRHP includes eight miles of the roadway as it winds around the summit of Round Top, beginning at the 1.5 Mile Marker and ending at Mile Marker 8.

Previous Burial Finds

Most of the burials listed below were inadvertently discovered during house construction activities or other earth-moving projects. A slight majority date to the pre-contact period and are probably Native Hawaiian in ethnicity; all of these burials are those of adults. Of the remaining cases, at least three date to the historic period, while time period information for the others is not available.

- McCoy 1971: 1-2 burials in cave shelter
- Sinoto 1971: 2 disturbed, historic burials
- Bath & Smith 1988: 1 disturbed burial, pre-Contact in age
- Kawachi 1991: 1 burial, left in situ
- Kawachi & Douglas 1991: 2 burials
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November 2, 2011

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Request for Information on Historic and Cultural Sites, Cultural Practices, and Traditional History Pertaining to the Round Top Drive Project Area

As part of the preparation of an environmental assessment for this project, we would like to seek your views and comments about this project. We are especially interested in any information you may be willing to share about the presence of historic sites in or near this section of Round Top Drive that have not been previously recorded. We would also like to learn about any specific cultural traditions, legends, and practices that pertain to the area that you may know about and be willing to share.

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Thank you very much for your time, and we look forward to hearing from you.

Sincerely,

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Stephan D. Clark
Vice President
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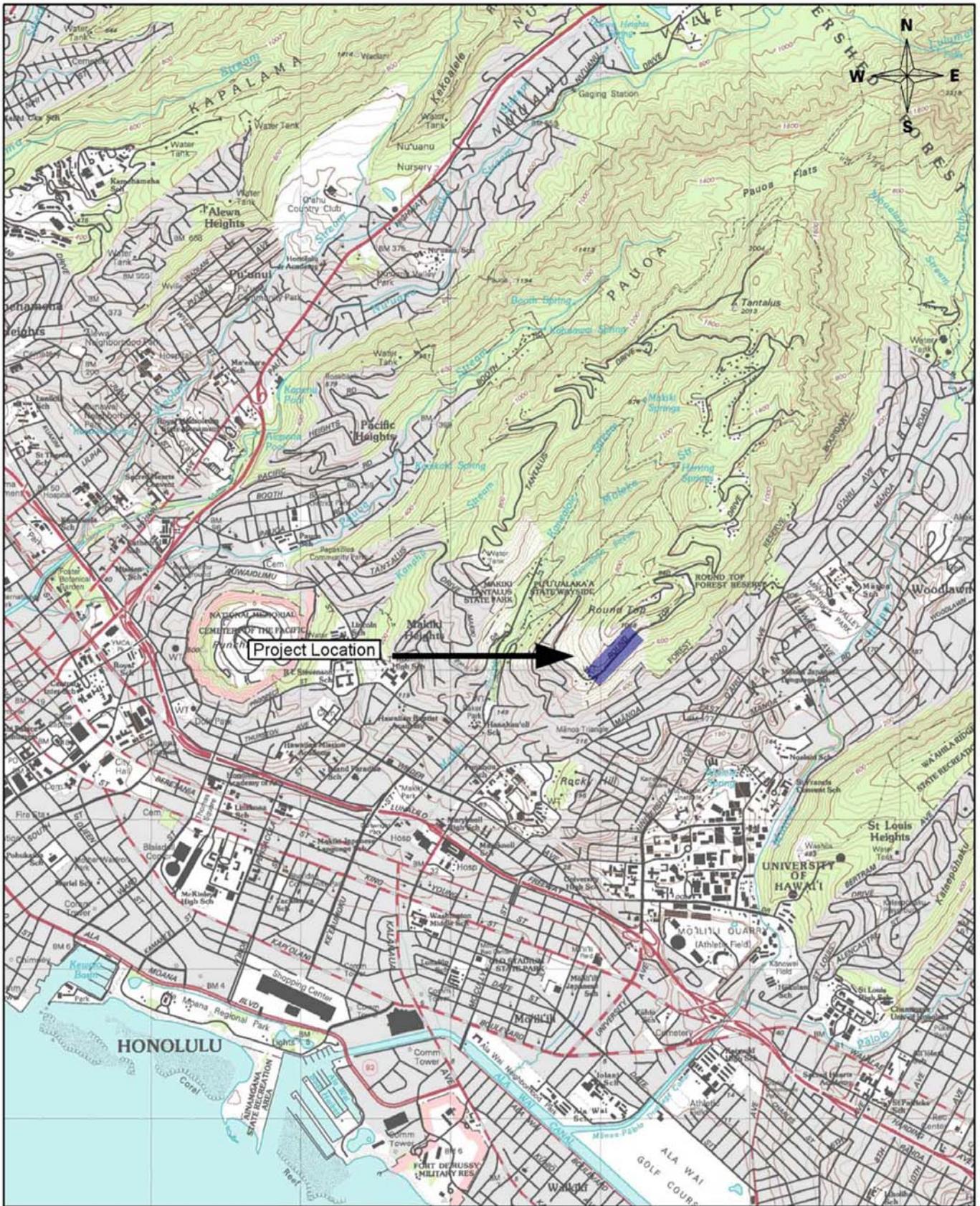


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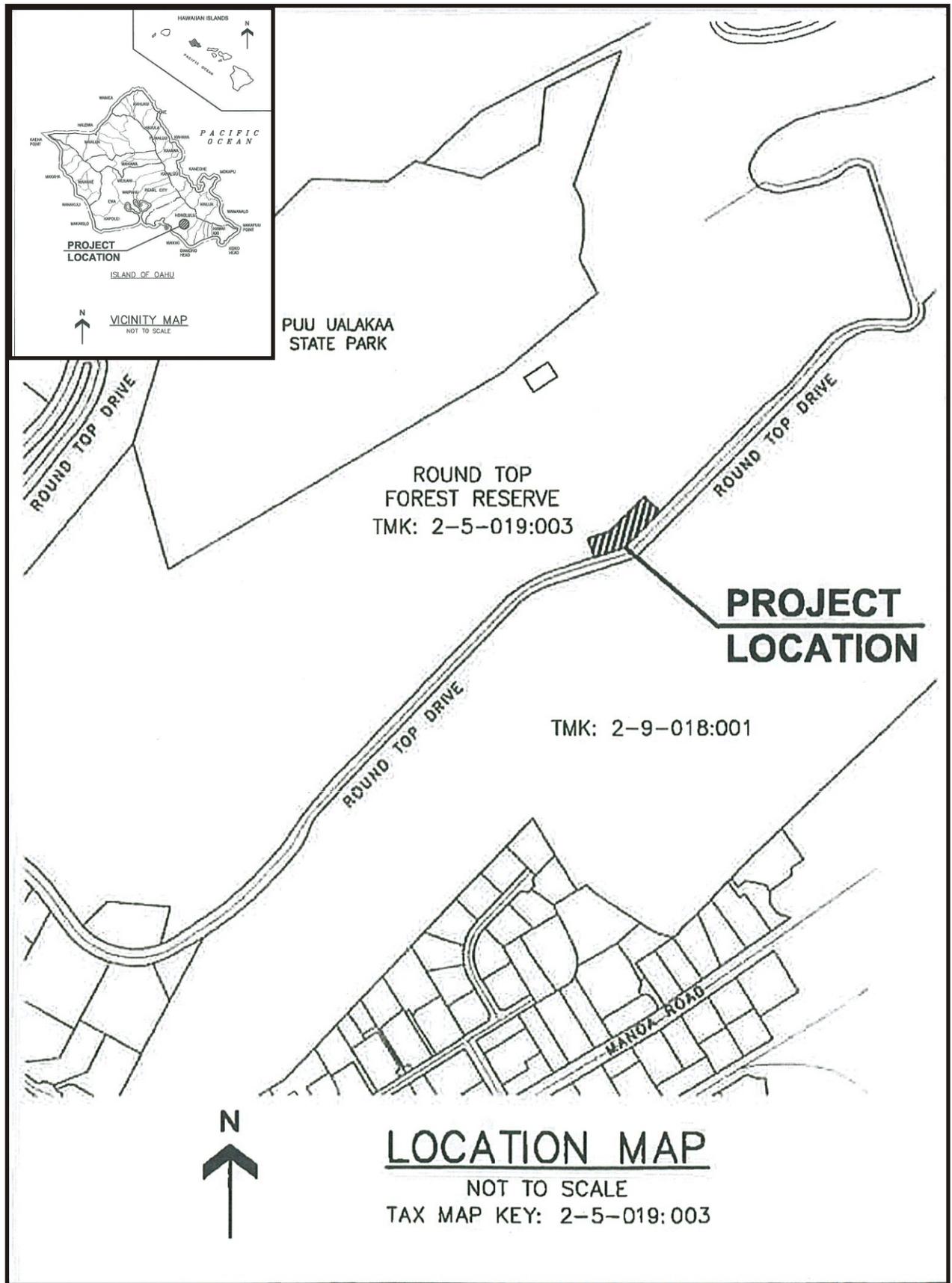


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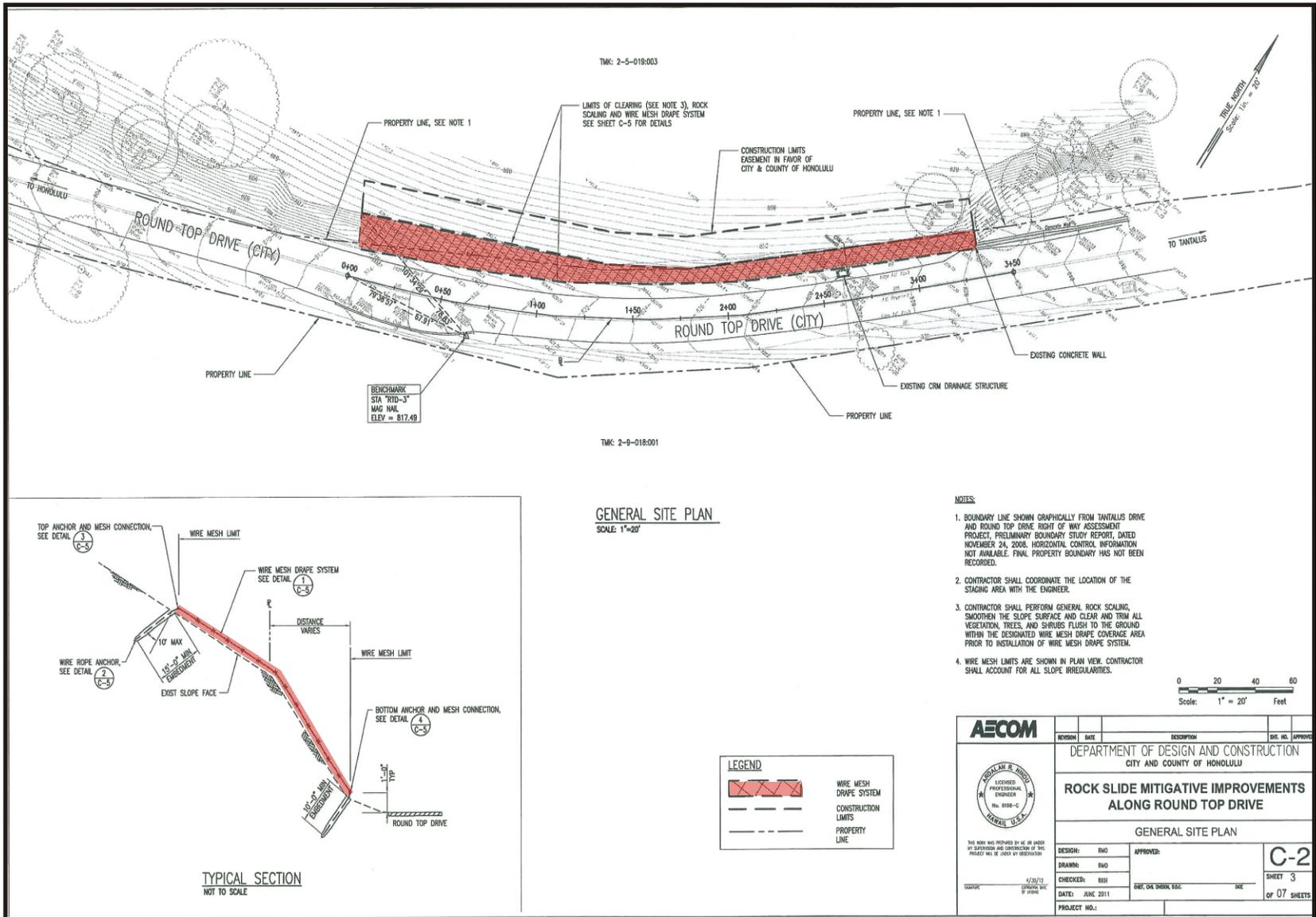


Figure 3. Site Plan Showing Location of Proposed Rockfall Mitigation Activities.

November 2, 2011

Mr. Edward Halealoha Ayau
Executive Director
Hui Malama I Na Kupuna `O Hawaii Nei
622 Wainaku Avenue
Hilo, HI 96720

SUBJECT: Consultation for a Cultural Impact Assessment Regarding the Rock Slide Mitigative Improvements along Round Top Drive, Makiki Ahupua'a, Honolulu District, O'ahu, State of Hawai'i
TMK: (1) 2-5-019:003

Aloha Mr. Ayau;

We are writing to inform you of an upcoming project to be carried out by the Department of Design and Construction (DDC) of the City and County of Honolulu (CCH) along Round Top Drive on Tantalus in Makiki. The rock slide mitigation project will consist of vegetation clearing, rock scaling, and the installation of a wire mesh drape system with an embedded anchor system (10 to 15 feet [ft] deep). We would also like to seek your views on this project, including any effects it might have on historic or cultural sites that you may know about in the area.

Description of the Project Area

The entire project area is located on Round Top Drive along the boundary of the *ahupua'a* (traditional land division) of Makiki and Manoa in the Honolulu (old Kona) District (Figure 1). The proposed rock slide mitigation project is located on the steep hillside along the northern side of Round Top Drive in close proximity to the 7.5 mile marker of the 8.0 mile-long portion of Round Top Drive that comprises State Site No. 50-80-14-6915 (Site 6915). Figure 2 shows the project area location in relationship to Round Top Drive on a tax map.

The National Register of Historic Places (NRHP) nomination form provides the following description about the site components east the proposed rockfall mitigation project area:

After Mile Marker 7.5, low concrete walls border the edge of the road and the sharp cliff overlooking Mānoa Valley...Mile Marker 8: The 'Honolulu Watershed Forest Reserve' sign marks the south-east end of the proposed historic district (Wong and Shideler 2006, Section 7 page 3).

The proposed project will not affect any of the contributing features of Site 6915 since all ground alteration will take place upslope of the existing roadway (see Figure 3).

Proposed Construction and Maintenance Activities

The proposed action includes the installation of a wire mesh drape system over the cut slope. The proposed action would consist of vegetation clearing, rock scaling, and the installation of the wire mesh drape system with an embedded anchor system. Proposed construction activities would include the following activities:

- general rock scaling,
- smoothing the slope surface, and
- clearing and trimming all vegetation, trees, and shrubs flush to the ground

These activities would occur within the designated wire mesh drape coverage area prior to the installation of the wire mesh drape system.

The proposed action was determined based on several factors, including public safety, construction cost, and sound engineering principles. Other factors considered included rockfall protection characteristics, community needs, environmental issues, aesthetics, local politics, and land acquisitions required. Thus, a wire mesh drape system is the proposed mitigation method for this project. This method would provide a permanent solution for rock protection and is advantageous in places where there is limited catchment area.

Information on Previously Documented Historic Sites and Cultural Places At and Near the Round Top Drive Project Area

In pre-Contact times, Tantalus was also known as 'Ualaka'a, which means "rolling potato" (Pukui *et al* 1976). 'Ualaka'a was known as the site of the finest sweet potatoes in the islands, and is said to have included fields planted by Kamehameha I. Apart from these agricultural associations, there is little evidence for other types of pre-Contact land use except for the human burials that have been found over the years, as discussed below. The current land use is primarily residential and recreational.

Although few comprehensive archaeological studies have been carried out in Makiki or along the western part of Mānoa, individual studies have been conducted in the general vicinity of Tantalus, particularly those dealing with various inadvertent burial discoveries made over the last 20 years. Of the archaeological studies conducted near the project area, only one (Yent and Ota 1980) provides a comprehensive view of archaeological sites in the Tantalus/Round Top area. The authors surveyed the Kanealole and Moleka stream systems in Makiki, on behalf of the Division of State Parks. There were two main categories of sites reported: historic sites and traditional Hawaiian sites. Historic sites in this region pertained to the Herring family settlement and coffee plantation, along Moleka Stream, in the late 19th century, and the old carriage road that led to their property. Traditional Hawaiian sites in the region were mostly agricultural in nature, and included free-standing walls, retaining walls, and terraces. The ages of most of these features could not be determined with any precision, but it is likely that at least some of them date to the historic period.

The carriage road underwent further study when the Division of Forestry and Wildlife proposed to use a portion of it as a hiking trail (Nagata 1999). The survey of this portion recorded the road itself, as well as associated features (probable bridge foundations and retaining walls). Hammatt *et al.* (2002) conducted an archaeological assessment of land in the vicinity of Kalaiohua Place, near the junction of Round Top Drive and Tantalus Drive. The only features reported appeared to be historic (20th century) or modern walls, curbing, and retaining walls, associated with the roadway.

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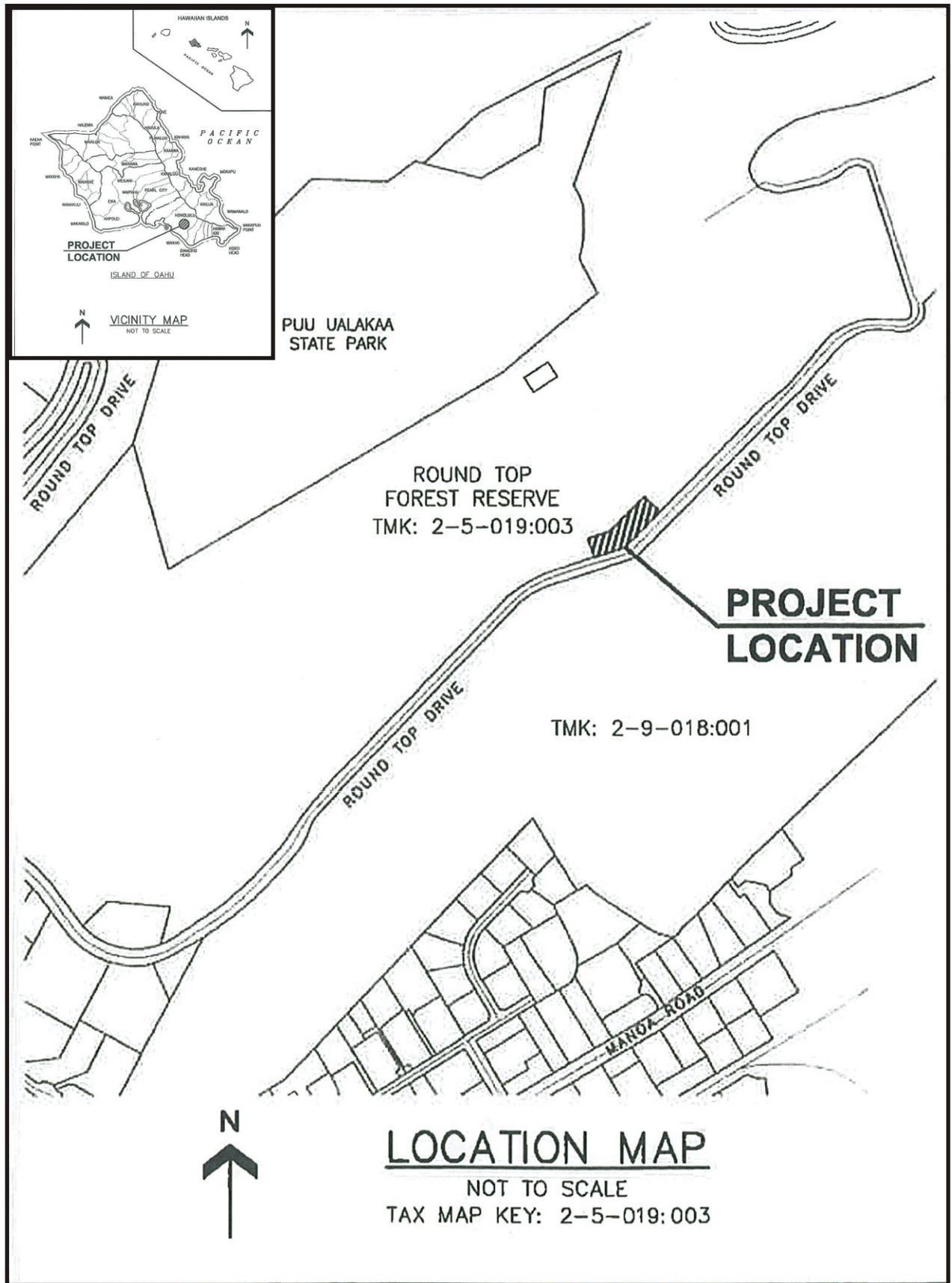


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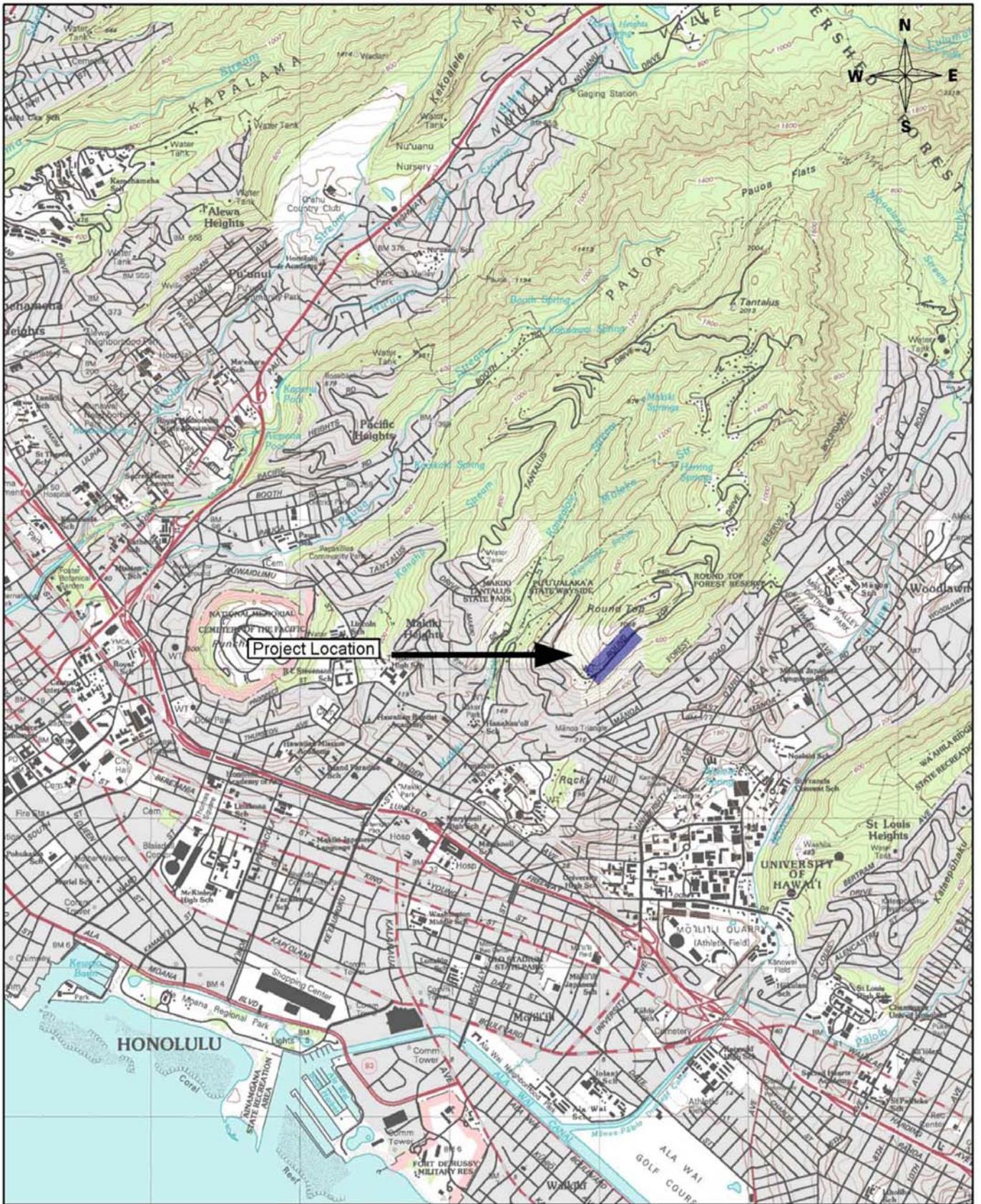


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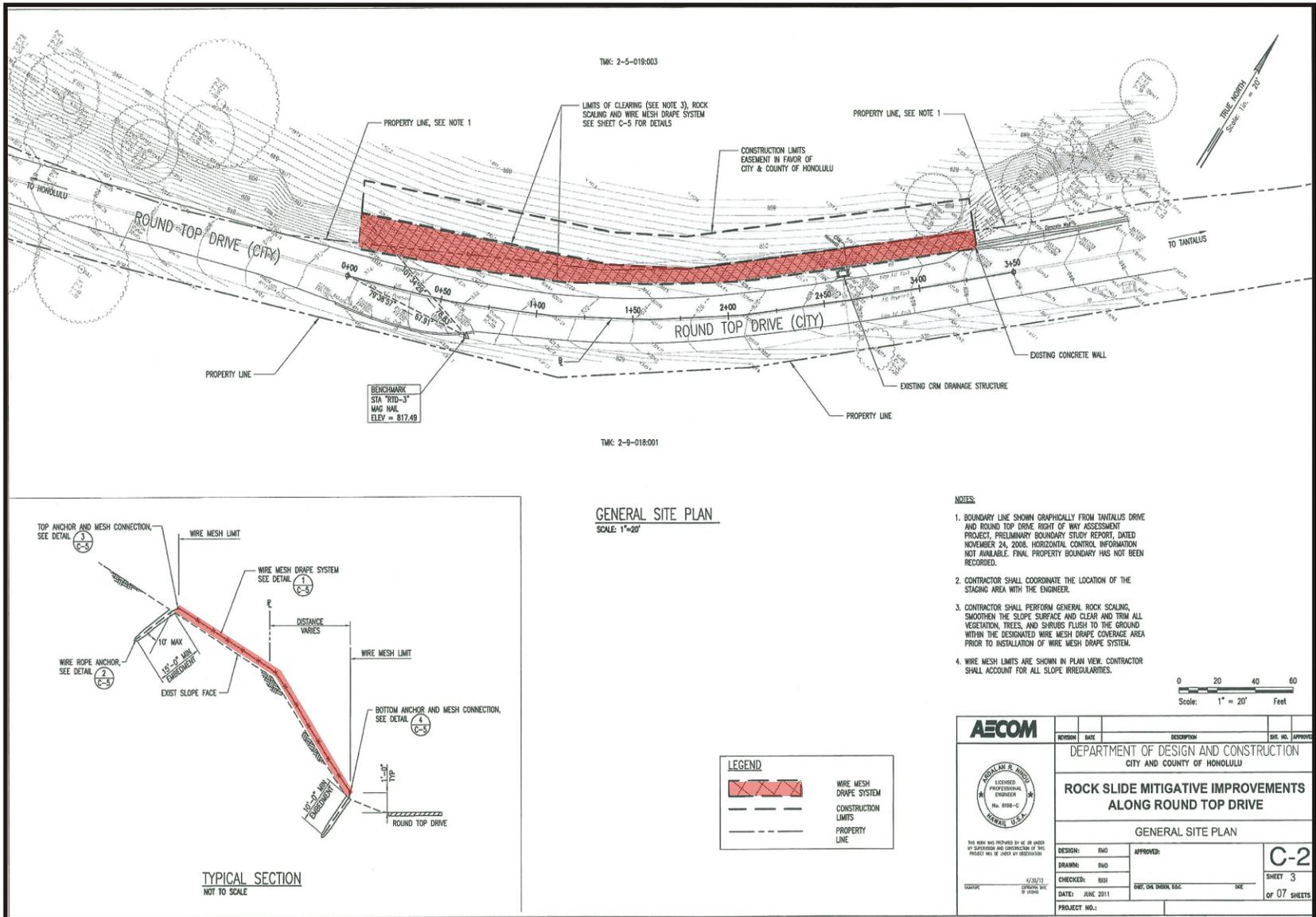


Figure 3. Site Plan Showing Location of Proposed Rockfall Mitigation Activities.

November 2, 2011

Mr. Clyde Nāmu`o
Office of Hawaiian Affairs
711 Kapiolani Blvd., Suite 500
Honolulu, HI 96813

SUBJECT: Consultation for a Cultural Impact Assessment Regarding the Rock Slide Mitigative Improvements along Round Top Drive, Makiki Ahupua`a, Honolulu District, O`ahu, State of Hawai`i
TMK: (1) 2-5-019:003

Aloha Mr. Nāmu`o;

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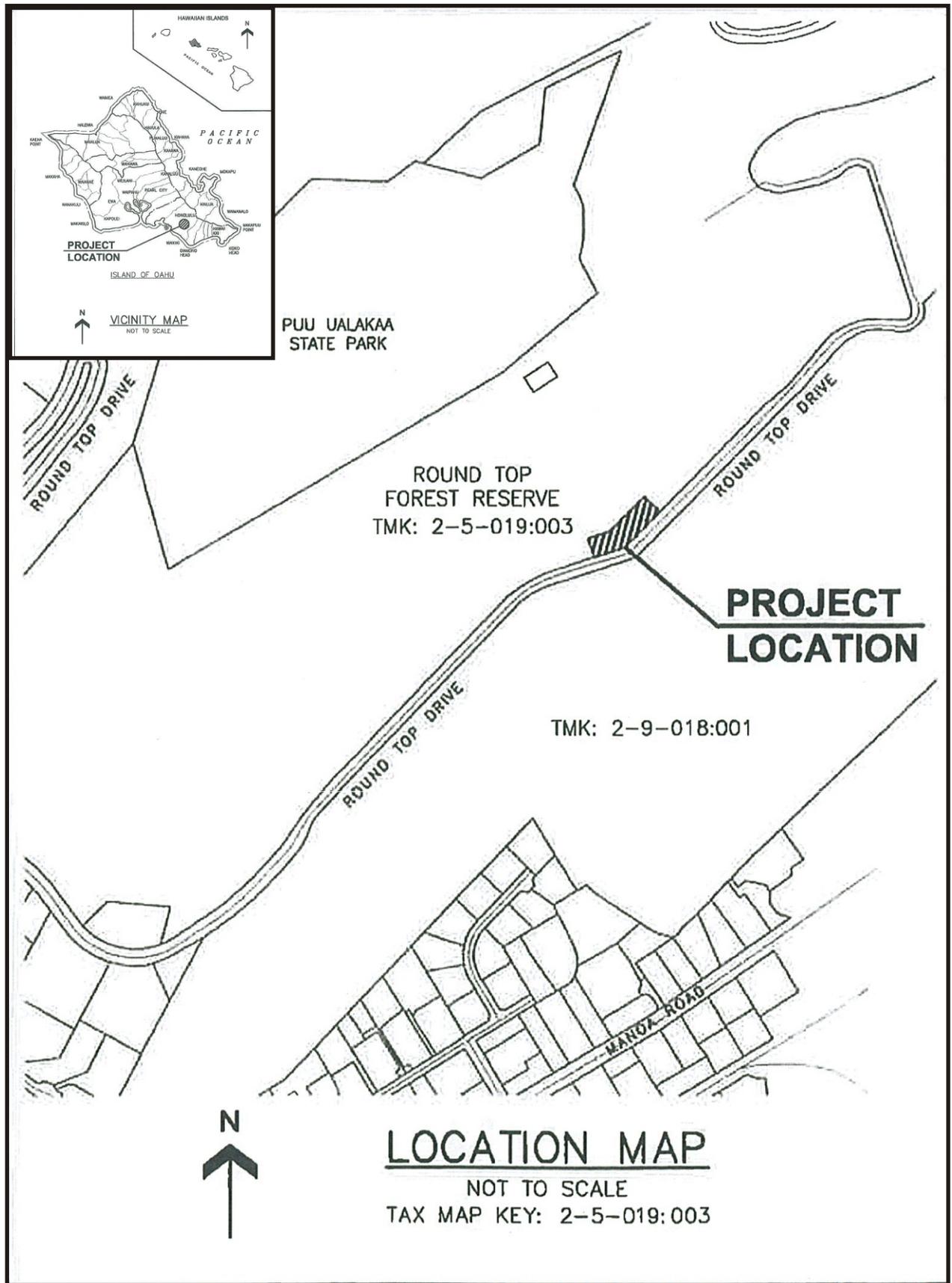


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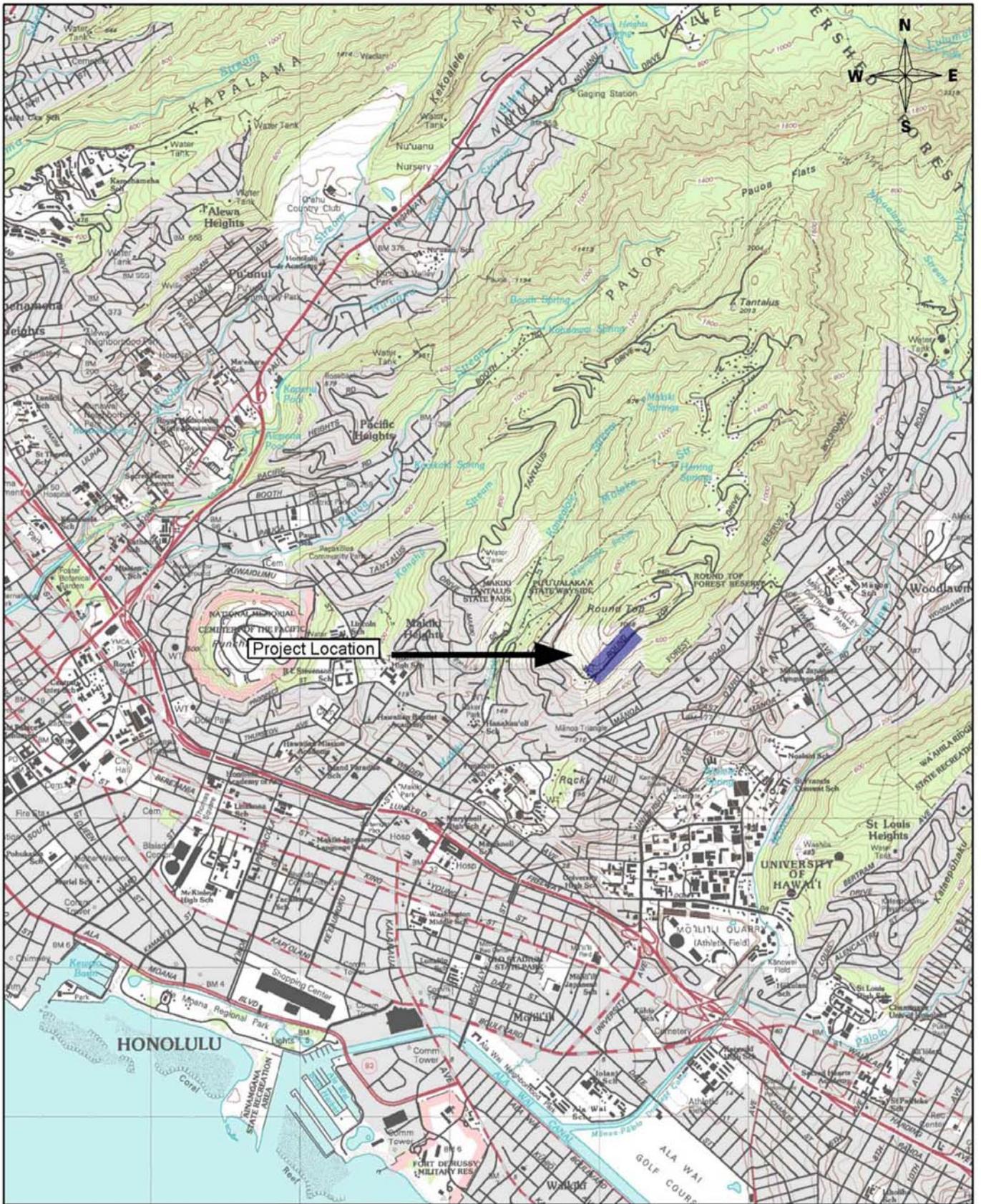


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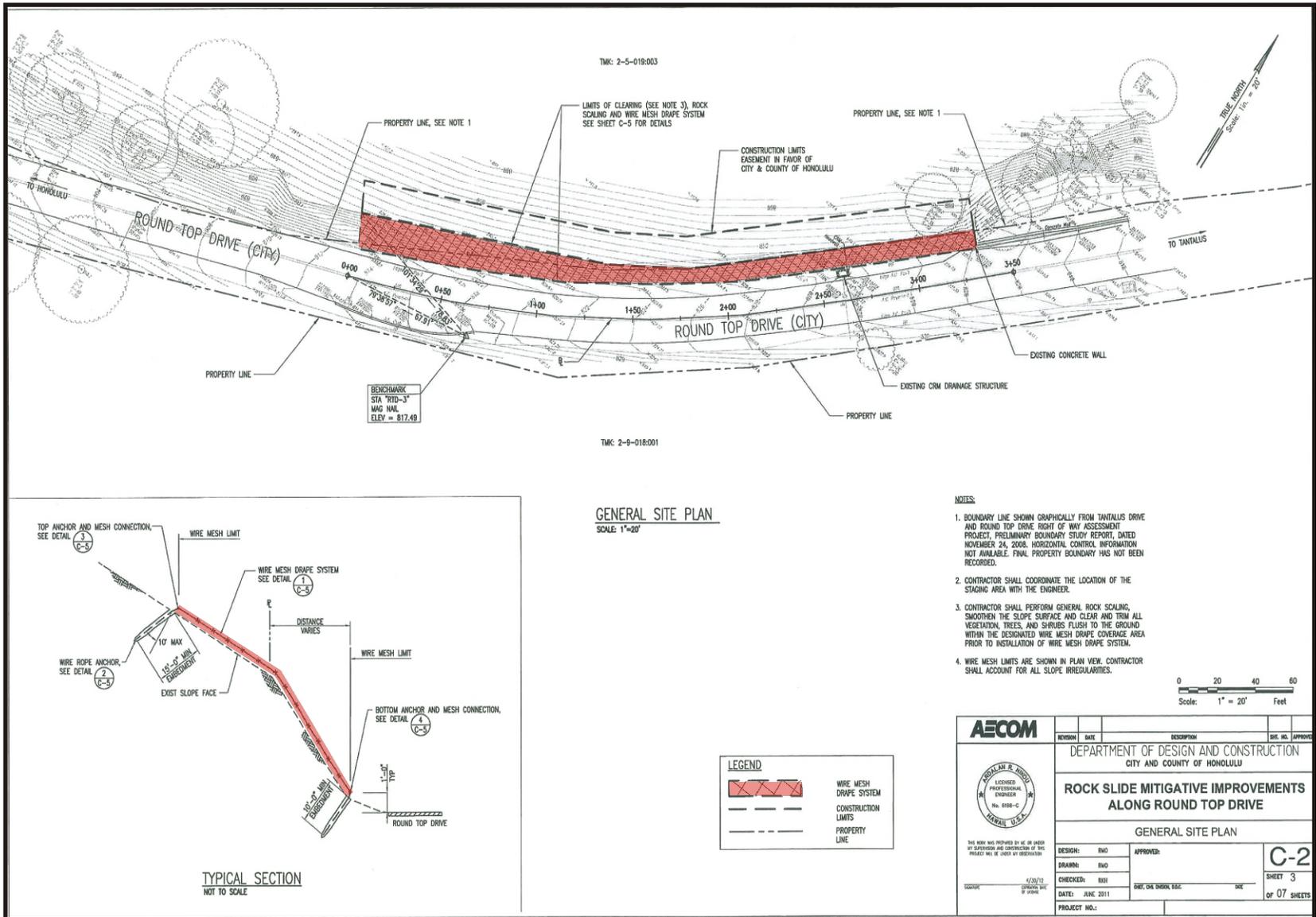


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November 2, 2011

Dr. Pua Aiu, Administrator
Attn: Ms. Phyllis Cayan and Ms. Nona Daboa
State Historic Preservation Division
601 Kamokila Boulevard, #555
Kapolei, Hawaii 96707

SUBJECT: Consultation for a Cultural Impact Assessment Regarding the Rock Slide
Mitigative Improvements along Round Top Drive, Makiki Ahupua'a, Honolulu
District, O'ahu, State of Hawai'i
TMK: (1) 2-5-019:003

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- Collins 2008b: 2 subadult burials, over 50 years old

Given the inadvertent discovery of all these burials, there is at best imprecise information on the depths at which the remains were found. Some burials occurred at approximately one meter below the surface (Kawachi 1992), while others were visible near the base of the cut bank of a slope 12 – 15 feet in height (Bath 1989). Seven burials were interred in the cinder, while at least two finds were in loam deposits above the cinder but near the boundary between the two soil types.

An archaeological reconnaissance survey of the Round Top Drive project area was undertaken by PCSI archaeologists on September 2, 2010 as part of an Archaeological Assessment (Walden et al 2011). The archaeological reconnaissance survey conducted in the project area revealed no traditional or historical surface archaeological materials or features. The steepness of the hillside in the parcel vicinity appears to have precluded traditional and historical residential or agricultural pursuits. The survey concluded that no surface archaeological sites or other historic properties were present within the project area.

In the Archaeological Assessment conducted for this project (Walden et al. 2011), a finding of no historic properties affected by the proposed project activities was recommended. No further work (e.g. archaeological monitoring) was recommended, however, in the event that

November 2, 2011

Page 4 of 4

historic properties or burials are found during construction, it was recommended that work be stopped, the find be protected, and SHPD be notified immediately.

Request for Information on Historic and Cultural Sites, Cultural Practices, and Traditional History Pertaining to the Round Top Drive Project Area

As part of the preparation of an environmental assessment for this project, we would like to seek your views and comments about this project. We are especially interested in any information you may be willing to share about the presence of historic sites in or near this section of Round Top Drive that have not been previously recorded. We would also like to learn about any specific cultural traditions, legends, and practices that pertain to the area that you may know about and be willing to share.

If you would like to provide us with such information, please feel free to use the addressed, stamped envelope included with this letter or to contact us by email at: steve.clark@pcsihawaii.com. Alternatively, if you would prefer to speak with me please feel free to contact me by telephone at (808) 546-5557 x 202. If we do not hear from your office within 30 days of receipt of this letter, we shall assume concurrence with our findings.

Thank you very much for your time, and we look forward to hearing from you.

Sincerely,

A handwritten signature in black ink that reads "Stephan D. Clark". The signature is written in a cursive style with a large, stylized "S" and "C".

Stephan D. Clark
Vice President
Pacific Consulting Services, Inc.

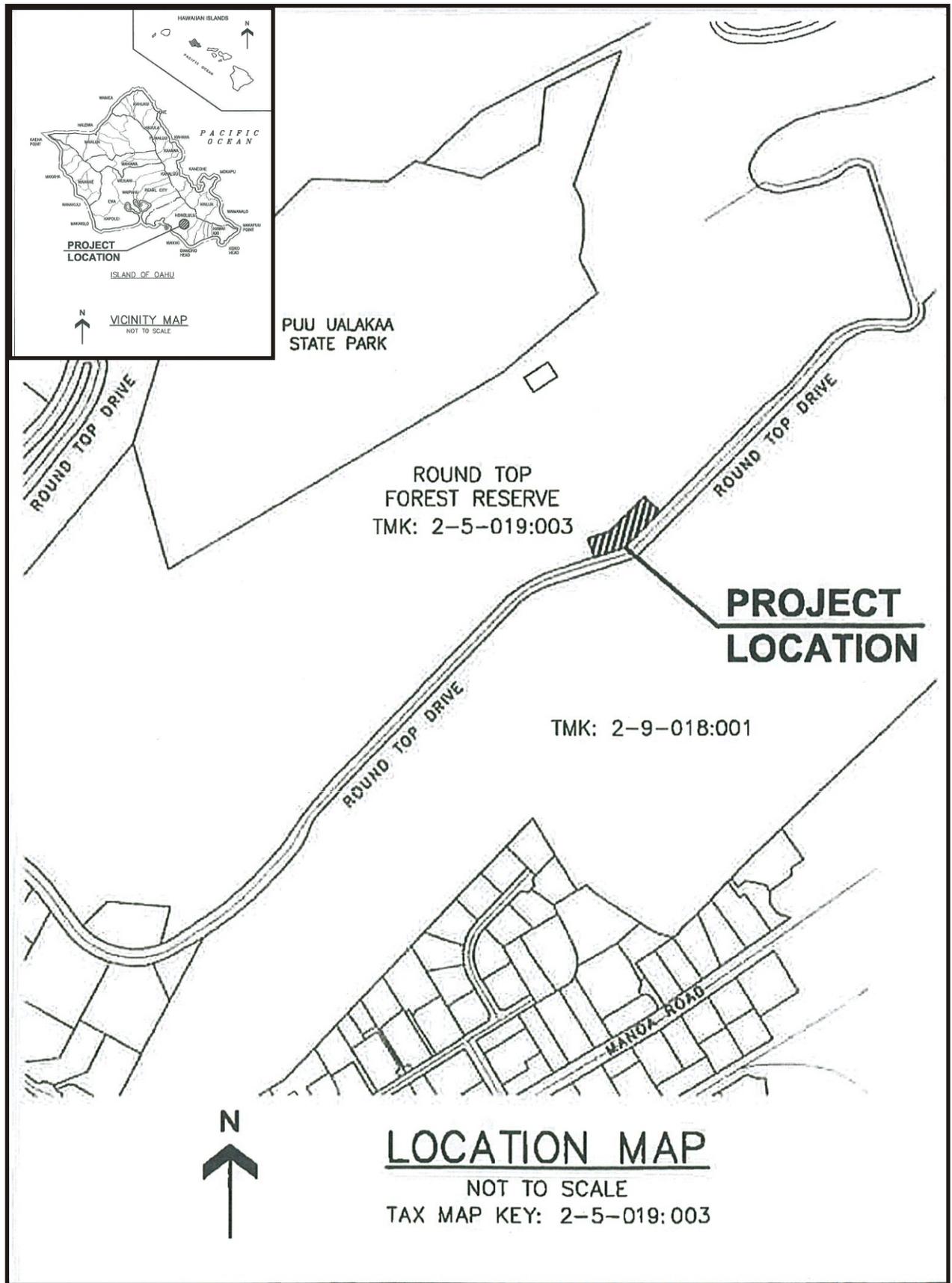


Figure 2. Project Area Location in Relationship to Round Top Drive.

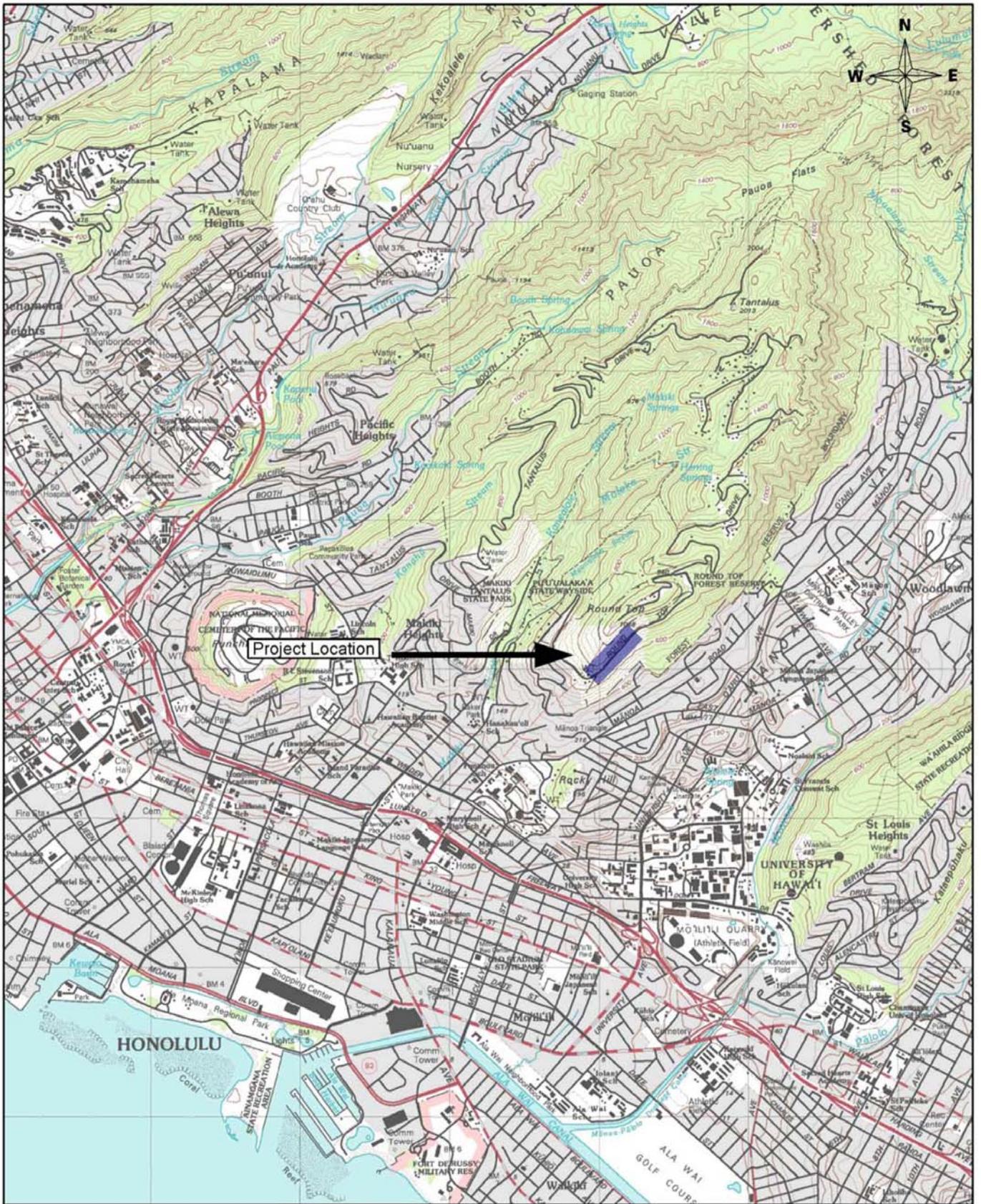


Figure 1. Portion of U.S.G.S. Honolulu Quad Map Showing Project Area Location.

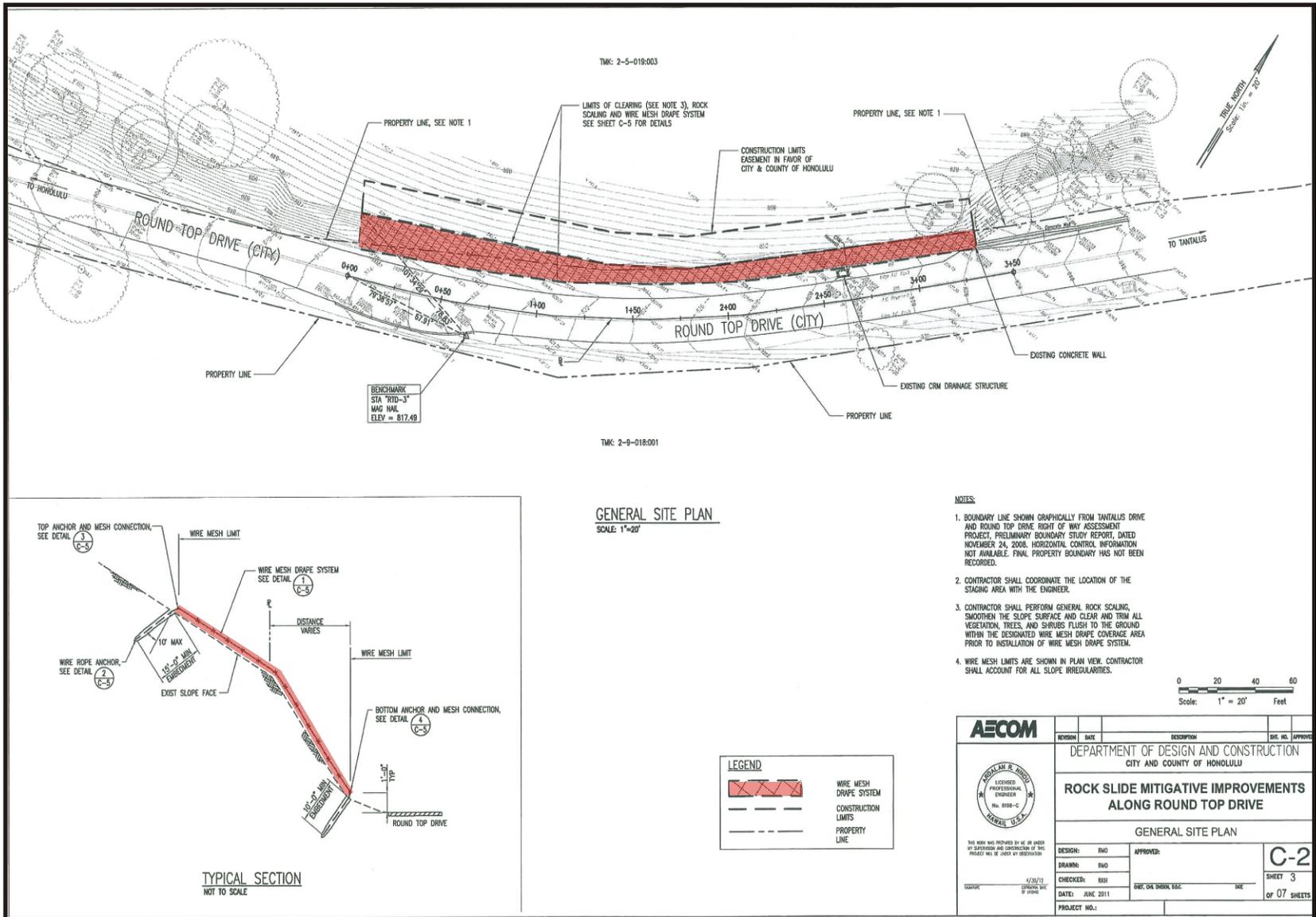


Figure 3. Site Plan Showing Location of Proposed Rockfall Mitigation Activities.

Appendix B
Biological Resources Report

A natural resources survey for rockslide mitigative improvements along Round Top Drive, Honolulu, O'ahu¹

October 26, 2011

AECOS No. 1285

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Introduction

The City and County of Honolulu is proposing to make specific improvements to the road cut on the north side of Round Top Drive to prevent rockslides onto the roadway. The project is located along Round Top Drive between about the 810 to 840-ft elevations. Round Top Drive ascends Round Top or Pu'u 'Ualaka'a, an ancient cinder cone (Macdonald, Abbott, and Peterson, 1983) and connects eventually to Tantalus or Pu'u 'Ōhi'a. Both heights are conspicuous features behind Honolulu on the west side of Mānoa Valley (Fig. 1). The project entails clearing vegetation and loose rocks from the steep, rocky slope adjacent to the roadway, and installing a wire mesh drape system to prevent further rocks from coming onto the right-of-way. Length of the impact area along the roadway is about 320 ft. Construction limits extend roughly 30 ft upslope from the road edge.

Methods

Flora

The botanical survey on October 19, 2011 consisted of walking both along the mauka edge of Round Top Drive in the project area and on the hillslope above the steep roadway cut to identify natural features (plants) potentially impacted

¹ This report was prepared for AECOM Inc. for use in preparing an Environmental Assessment for the subject C&C project and will become part of the public record.

² Rana Biological Consulting, Inc., Kailua-Kona, Hawai'i.

Field observations were made with the aid of Leica 10 X 42 binoculars and by listening for vocalizations. A running tally was kept of all bird species recorded during the time spent in the project area.



Figure 2. Aerial view of the southeast slope of Round Top (Pu'u 'Ualaka'a) with October 19 survey area outlined in white (based upon GPS record) and approximate project area outlined in red.

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ape'a as it is known locally, all terrestrial mammals currently found on the Island of O'ahu are alien species. Most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual

observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed, heard or detected by other means within the project area.

The avian phylogenetic order and nomenclature used in this report follows the *AOU Check-List of North American Birds* (American Ornithologists' Union, 1998), and the 42nd through the 52nd supplements to the Check-List (American Ornithologists' Union 2000; Banks et al., 2002, 2003, 2004, 2005, 2006, 2007, 2008; Chesser et al., 2009, 2010, 2011). Mammal names follow Tomich (1986).

Survey Results

Vegetation

Both the road cut face and the roadway verge support mostly ruderal forbs and grasses (Fig. 3); shrubs and small trees overhang the upper part of the rock face. Above the road cut, the hillslope supports a mostly closed-canopy forest with a sparse understory of forbs and ferns. To the south, this forest thins and is replaced by a scrub growth dominated by *koa haole* (*Leucaena leucocephala*) beyond the project area. Within the project vicinity bordering this scrub, occurs an open forest dominated by Guinea grass (*Panicum maximum*) understory. Immediately to the northeast of the project area, along Round Top Drive, the road cut moves back from the right-of-way and is replaced by landscaped area behind a low wall with mowed grasses, lawn weeds, plumeria (*Plumeria rubra*) trees, and other ornamentals.

Flora

A listing of all of the species of plants recorded during the October survey is presented as Table 1. One species of rare (at this location) non-native vine is pending identification. Presence and qualitative abundance of each identified plant species is given for survey area as indicated in Fig. 2. The number of species recorded (48) is small, but not unusual considering that the survey area was small. The only "native" species encountered—the yellow wood sorrel (*Oxalis corniculata*)—is either an early Polynesian introduction or possibly an indigenous species. The yellow wood sorrel is a very common plant on O'ahu, often found as a lawn weed or a ruderal plant in disturbed areas.

Table 1. Flora listing for a Round Top Rockslide Mitigation Project

Species	Common name	Status	Abundance	Notes
<i>FERNS and FERN ALLIES</i>				
POLYPODIACEAE				
<i>Phymatosorus grossus</i> (Langsd. & Fisch.) Brownlie	<i>lauae</i>	Nat	O2	
<i>FLOWERING PLANTS</i>				
DICOTYLEDONE				
AMARANTHACEAE				
<i>Amaranthus spinosus</i> L.	spiny amaranth	Nat	U	
ANACARDIACEAE				
<i>Schinus terebinthifolius</i> Raddi	Christmas berry	Nat	A	
ARALIACEAE				
<i>Schefflera actinophylla</i> (Endl.) Harms	octopus or umbrella tree	Nat	A	
ASTERACEAE (COMPOSITAE)				
<i>Bidens pilosa</i> L.	<i>ki</i>	Nat	C	<1>
<i>Pluchea carolinensis</i> (Jacq.) G. Don	sourbush	Nat	U	
<i>Synedrella nodiflora</i> (L.) Gaertn.	nodeweed	Nat	R	
BASELLACEAE				
<i>Anredera cordifolia</i> (Ten.) Steenis	Madeira vine	Nat	U	
BIGNONIACEAE				
<i>Spathodea campanulata</i> P. Beauv.	African-tulip tree	Nat	U	
CONVOLVULACEAE				
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	---	Nat	U	
EUPHORBIACEAE				
<i>Euphorbia hirta</i> L.	garden spurge	Nat	C	<1>
<i>Macaranga tanarius</i> (L.) Müll. Arg.	---	Nat	R	
<i>Phyllanthus debilis</i> Klein ex. Willd.	niuri	Nat	U	
FABACEAE				
<i>Acacia confusa</i> Merr.	Formosan <i>koa</i>	Nat	O	
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea	Nat	U	
<i>Crotalaria incana</i> L.	fuzzy rattlepod	Nat	U	
<i>Delonix regia</i> (Bojer ex Hook.) Raf.	royal poinciana	Nat	R	
<i>Desmodium incanum</i> DC	Spanish clover	Nat	C	
<i>Desmodium tortuosum</i> (Sw.) DC	Florida beggarweed	Nat	U	
<i>Indigofera hendecaphylla</i> Jacq.	prostrate indigo	Nat	C	<1>
<i>Leucaena leucocephala</i> (Lam.) deWit	<i>koa haole</i>	Nat	U1	
MALVACEAE				
<i>Hibiscus tiliaceus</i> L.	<i>hau</i>		U	

Table 1 (continued).

Species	Common name	Status	Abundance	Notes
MORACEAE				
<i>Ficus microcarpa</i> L. fil.	Chinese banyan	Nat	R	
MYRTACEAE				
<i>Eucalyptus</i> sp.	flaky, fibrous bark	Nat	R	
<i>Pimenta dioica</i> (L.) Merr.	allspice	Nat	R	<2>
<i>Psidium cattleianum</i> Sabine	strawberry guava	Nat	C2	
<i>Psidium guajava</i> L.	common guava	Nat	R	
<i>Syzygium cumini</i> (L.) Skeels.	Java plum	Nat	O	
OXALIDACEAE				
<i>Oxalis corniculata</i> L.	yellow wood sorrel	Pol	R	<1>
PASSIFLORACEAE				
<i>Passiflora suberosa</i> L.	---	Nat	R	
PHYTOLACCACEAE				
<i>Rivina humilis</i> L.	coralberry	Nat	C	
PORTULACACEAE				
<i>Portulaca oleracea</i> L.	pigweed	Nat	O	<1>
TILIACEAE				
<i>Heliocarpus popayanensis</i> Kunth	<i>moho</i>	Nat	U3	
ULMACEAE				
<i>Trema orientalis</i> (L.) Blume	gunpowder tree	Nat	R	
VERBENACEAE				
<i>Citharexylum caudatum</i> L.	fiddlewood	Nat	O	
MONOCOTYLEDONES				
COMMELINACEAE				
<i>Commelina</i> sp.	dayflower	Nat	U	<1>
CYPERACEAE				
<i>Kyllinga nemoralis</i> (J.R. Forster & G. Forster) Dandy ex Hutchinson & Dalziel	<i>kili'o'opu</i>	Nat	U	<1>
LILIACEAE				
<i>Asparagus densiflorus</i> (Kunth) Jessop	asparagus fern	Nat	A	
POACEAE (GRAMINEAE)				
<i>Axonopus fisifolius</i> (Sw.) P.Beauv.	nrv-lvd. carpetgrass	Nat	U	<1>
<i>Digitaria ciliaris</i> (Retz.) Koeler	Henry's crabgrass	Nat	C	<1>
<i>Eleusine indica</i> (L.) Gaertn.	wiregrass	Nat	C	<1>
<i>Eragrostis pectinacea</i> (Michx.) Nees	Carolina lovegrass	Nat	C	<1>
<i>Melinis repens</i> (Willd.) Zizka	Natal redtop	Nat	U	<1>
<i>Oplismenus hirtellus</i> (L.) P. Beauv.	basketgrass	Nat	U	
<i>Panicum maximum</i> Jacq.	Guinea grass	Nat	A3	
<i>Paspalum fimbriatum</i> Kunth	Panama grass	Nat	C	<1>

Table 1 (continued).

Species	Common name	Status	Abundance	Notes
POACEAE (continued))				
<i>Sporobolus cf. africanus</i> (Poir.) Robyns & Tournay	smutgrass	Nat	U	<1>

Legend to Table 1

Status = distributional status

- End.** = endemic; native to Hawai'i and found naturally nowhere else.
Ind. = indigenous; native to Hawai'i, but not unique to the Hawaiian Islands.
Nat. = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.
Orn. = exotic, ornamental or cultivated crop; plant not naturalized (not well-established outside of cultivation, at least at this location).
Pol. = Polynesian introduction; brought to the Hawaiian Islands before 1778.

Abundance = occurrence ratings for plants on property in March 2008

- R - Rare - only one or two plants seen.
 U - Uncommon - several to a dozen plants observed.
 O - Occasional - found regularly, but not abundant anywhere.
 C - Common - considered an important part of the vegetation and observed numerous times.
 A - Abundant - found in large numbers; may be locally dominant.
 AA - Abundant - very abundant and dominant; defining vegetation type.
 Numbers (as in R3) offset occurrence ratings (1 - several plants; 2 - many plants; 3 - abundant in a limited area) in cases where distribution across the survey area may be limited, but individuals seen are more than indicated by the occurrence rating alone.

Notes:

- <1> Ruderal plant associated with the roadway verge.
 <2> Plant lacking flowers or fruit; identification uncertain.

Fauna

Avian Survey — Forty-nine individual birds of 13 different species, representing 10 families were recorded during the point count (Table 2). All of the species detected are alien to the Hawaiian Islands. Avian diversity and densities were in keeping with the vegetation present on the site, and its location. The most commonly recorded species was Red-vented Bulbul (*Pycnonotus cafer*).

Mammalian Survey — Four mammalian species were detected during the course of this survey. We encountered tracks, scat, and sign of cat (*Felis catus*), dog (*Canis f. familiaris*), small Indian mongoose (*Herpestes a. auropunctatus*), and pig (*Sus s. scrofa*) at various locations within the survey area. We also saw one cat and one small Indian mongoose walking along the roadway.



Figure 3. Project site to right of road, starting at end of graffiti-on-concrete wall and extending around corner beyond.

Discussion

Botanical Resources

Clearly, there are no botanical resources in this area of concern or in need of protection/conservation in relation to the proposed project activities.

Avian Resources

Avian diversity and densities were in keeping with habitats present within and adjacent to the site. All 13 avian species recorded during this survey are alien to the Hawaiian Islands.

Table 2. Avian Species Detected at and near the Round Top Drive Rock Fall Mitigation Site, O'ahu, Hawai'i.

<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>No.</i>
PHASIANIDAE - Pheasants & Partridges			
Phasianinae - Pheasants & Allies			
Chicken	<i>Gallus gallus</i>	A	2
COLUMBIFORMES			
COLUMBIDAE - Pigeons & Doves			
Rock Pigeon	<i>Columba livia</i>	A	2
Zebra Dove	<i>Geopelia striata</i>	A	3
PSITTACIFORMES			
PSITTACIDAE - Lories Parakeets, Macaws & Parrots			
Psittacinae - Typical Parrots			
Rose-ringed Parakeet	<i>Psittacula krameri</i>	A	2
PASSERIFORMES			
PYCNONOTIDAE – Bulbuls			
Red-vented Bulbul	<i>Pycnonotus cafer</i>	A	12
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	A	3
ZOSTEROPIDAE – White-eyes			
Japanese White-eye	<i>Zosterops japonicus</i>	A	5
TURDIDAE – Thrushes			
White-rumped Shama	<i>Copsychus malabaricus</i>	A	2
EMBERIZIDAE – Emberizids			
Red-crested Cardinal	<i>Paroaria coronata</i>	A	1
CARDINALIDAE – Cardinals Saltators & Allies			
Northern Cardinal	<i>Cardinalis cardinalis</i>	A	2
FRINGILLIDAE – Fringilline and Carduline Finches & Allies			
Carduelinae – Carduline Finches			
House Finch	<i>Carpodacus mexicanus</i>	A	4
ESTRILDIDAE – Estrildid Finches			
Estrildinae – Estrildine Finches			
Common Waxbill	<i>Estrilda astrild</i>	A	6
Nutmeg Mannikin	<i>Lonchura punctulata</i>	A	5

Legend to Table 2.

<i>ST</i>	Status
<i>No.</i>	Number of birds counted during point count
A	Alien Species

Although not detected during this survey, it is possible that extremely small numbers of the threatened Newell's Shearwater or 'a'o (*Puffinus auricularis newelli*) over-fly the project site between the months of May and early December (Banko, 1980; Day et al., 2003; Harrison, 1990). Newell's Shearwaters have not been documented nesting on the Island of O'ahu, though over the years several downed birds have been found on the road in front of Wilson Tunnel. This pelagic seabird species nests high in the mountains in burrows excavated under thick vegetation, especially *uluhe* (*Dicranopteris linearis*) fern.

The primary cause of mortality for Newell's Shearwater is thought to be predation by alien mammalian species at the nesting colonies (USFWS, 1983; Simons and Hodges, 1998; Ainley et al., 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of this species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with man-made structures, and if not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley, 1961; Telfer, 1979; Sincock, 1981; Reed et al., 1985; Telfer et al., 1987; Podolsky et al., 1998; Ainley et al., 2001). No suitable nesting habitat occurs within or close to the project site for this species..

Mammalian Resources

The findings of the mammalian survey are in keeping with the environment and general nature of the project site. It is likely that several of the four Muridae species: European house mouse (*Mus musculus domesticus*), roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), and Polynesian rat (*Rattus exulans hawaiiensis*) known to be established on the Island of O'ahu occur in the project vicinity on a regular basis. The endangered Hawaiian hoary bat was not detected, though it is possible that this species uses resources within the general project area on a seasonal basis. However, given the paucity of historical records of this species from the greater Honolulu area, the likelihood that bats use resources within the project footprint are extremely low.

Protected Species

Flora — No plant species currently protected or proposed for protection under either the federal or State of Hawai'i endangered species programs (DLNR, 1998; USFWS, 2005, 2011) were recorded during the course of this survey.

Newell's Shearwater — The principal potential impact that the proposed action poses to Newell's Shearwaters is an increased threat that birds will be downed after becoming disoriented by exterior lighting set up in conjunction with night-time construction activities, and, or the servicing of construction equipment at night. To reduce the potential for interactions between nocturnally flying Newell's Shearwaters and man-made structures, it is recommended that any external lighting that may be used during construction be properly shielded (Reed et al., 1985; Telfer et al., 1987).

Hawaiian Hoary Bat — The principal potential impact that the project poses to bats is that from clearing and grubbing of trees. The removal of vegetation within the project site may temporarily displace individual bats that use the vegetation for roosting. As bats use multiple roosts within their home territories, the disturbance resulting from the removal of vegetation is likely to be minimal. However, during the pupping season, female bats carrying pups may be less able to rapidly vacate a roost; further, female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled. Potential adverse impacts from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 m (15 ft) during the pupping season between June 1 and September 15.

Critical Habitat

There is no federally delineated Critical Habitat present at or adjacent to the project site. Thus, the proposed project will not result in impacts to Critical Habitat. There is no equivalent statute under state law.

Jurisdictional Waters

No waters considered jurisdictional (streams, lakes, or wetlands) under state or federal statutes occur in or near the project area. The project will need to comply with Best Management Practices to control adverse impacts to the quality of storm water runoff generated during the construction phase.

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Appendix C
Cultural Resources Reports

DRAFT REPORT

**Cultural Impact Assessment
in Support of Rock Slide Mitigative
Improvements along Round Top Drive, Makiki
Ahupua'a, Honolulu District, O'ahu, State of
Hawai'i**

TMK: (1) 2-5-019:003

Prepared for:

AECOM Technical Services, Inc.
1001 Bishop Street, Suite 1600
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January 2012

PACIFIC CONSULTING SERVICES, INC.

720 Iwilei Road, Suite 424, Honolulu Hawaii 96817

DRAFT REPORT
Cultural Impact Assessment
in Support of Rock Slide Mitigative Improvements along
Round Top Drive, Makiki Ahupua'a, Honolulu District, O'ahu, State of Hawai'i
TMK: (1) 2-5-019:003

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January 2012

TABLE OF CONTENTS

LIST OF FIGURES	i
LIST OF TABLES.....	i
INTRODUCTION	1
PROJECT AREA LOCATION.....	1
ENVIRONMENTAL BACKGROUND	1
RAINFALL.....	1
SOILS	1
BACKGROUND LITERATURE REVIEW.....	4
TRADITIONAL AND HISTORIC LAND USE HISTORY.....	4
PREVIOUS ARCHAEOLOGY	4
PREVIOUS BURIAL FINDS.....	7
OTHER ARCHAEOLOGICAL STUDIES	8
CULTURAL IMPACT ASSESSMENT	12
PROJECT DESCRIPTION.....	12
METHODS FOR CONDUCTING THE CULTURAL IMPACT ASSESSMENT	12
RESULTS OF CONSULTATION	14
ASSESSMENT AND RECOMMENDATIONS	14
REFERENCES CITED.....	15
APPENDIX A: RESPONSE TO CONSULTATION LETTER FROM OFFICE OF HAWAIIAN AFFAIRS.....	18

LIST OF FIGURES

Figure 1. Location of the Project Area on a U.S.G.S. Quadrangle Map of Honolulu.	2
Figure 2. Project Area Location in Relationship to Round Top Drive.....	3
Figure 3. Locations of Previous Burial Finds and Archaeological Work in the Vicinity of the Project Area.	6
Figure 4. Photographs Showing the Southwest Portion of the Project Area.....	9
Figure 5. Photographs Showing the Upper Mid-Portion of the Project Area.....	10
Figure 6. Photographs Showing the Northeast Portion of the Project Area.....	11
Figure 7. Site Plan Showing Location of Proposed Rockfall Mitigation Measures.....	13

LIST OF TABLES

Table 1. Previous Archaeology and Burial Finds in the Vicinity of the Project Area.	5
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INTRODUCTION

At the request of AECOM Technical Services, Inc., Pacific Consulting Services, Inc. (PCSI) has prepared the following cultural impact assessment in support of the City and County of Honolulu (CCH) – Department of Design and Construction (DDC) proposed rock slide mitigative improvements along portions of the roadway on Round Top Drive in Makiki, Honolulu, O’ahu (Figure 1). The rock slide mitigation project will consist of vegetation clearing, rock scaling, and the installation of a wire mesh drape system with an embedded anchor system (10 to 15 feet [ft] deep) (Figure 3).

This CIA has been prepared in compliance with Hawaii Revised Statutes Chapter 343, Act 50 (HRS), Chapter 6E, and Title 13 of the Hawaii Administrative Rules (HAR), Subtitle 13 (State Historic Preservation Division Rules), Chapter 275 (Rules Governing Procedures for Historic Preservation Review for Governmental Projects Covered Under Sections 6E-8, HRS), and Chapter 276 (Rules Governing Standards for Archaeological Inventory Surveys and Reports).

PROJECT AREA LOCATION

The entire project area is located on Round Top Drive along the boundary of the *ahupua’a* (traditional land division) of Makiki and Mānoa in the Honolulu (old Kona) District. The proposed rock slide mitigation project is located on the steep hillside along the northern side of Round Top Drive in close proximity to the 7.5 mile marker of the 8.0 mile-long portion of Round Top Drive that comprises State Site No. 50-80-14-6915 (Site 6915). Figure 2 shows the project area location in relationship to Round Top Drive on a tax map.

The National Register of Historic Places (NRHP) nomination form provides the following description about the site components east of the proposed rockfall mitigation project area:

After Mile Marker 7.5, low concrete walls border the edge of the road and the sharp cliff overlooking Mānoa Valley...Mile Marker 8: The ‘Honolulu Watershed Forest Reserve’ sign marks the south-east end of the proposed historic district (Wong and Shideler 2006, Section 7 page 3).

The proposed project will not affect any of the contributing features of Site 6915 since all ground alteration will take place upslope of the existing roadway (see Figure 3).

ENVIRONMENTAL BACKGROUND

RAINFALL

According to Giambelluca et al. (1986), annual rainfall on Tantalus, at an elevation somewhat higher (ca 1,300 feet above mean sea level [FAMSL]) than that of the project area, averages about 254 cm (100 in) a year. Since the project area is located around 243 m AMSL (800 ft), the yearly rainfall average is probably somewhat lower.

SOILS

The entire project area is underlain by Cinder Land (rCI), which, according to Foote et al. (1972:29), is known for its “loose nature and poor trafficability.” This is because it is composed of loose volcanic cinders, pumice, and ash. These materials are black, red, yellow, brown, or variegated in color. They have jagged edges and a glassy appearance, and show little or no evidence of soil development.

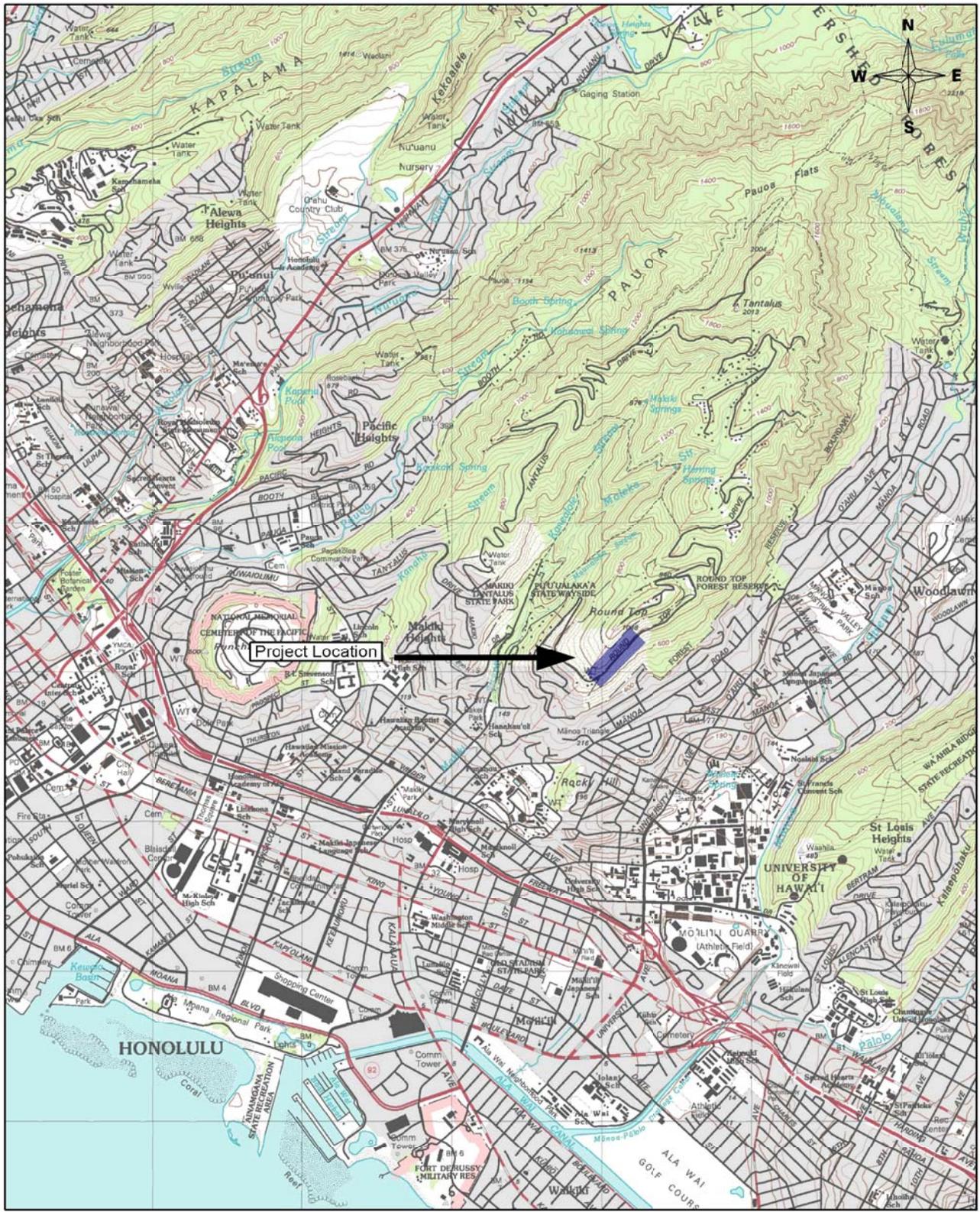


Figure 1. Portion of U.S.G.S. Honolulu Quad Map Showing Project Area Location.

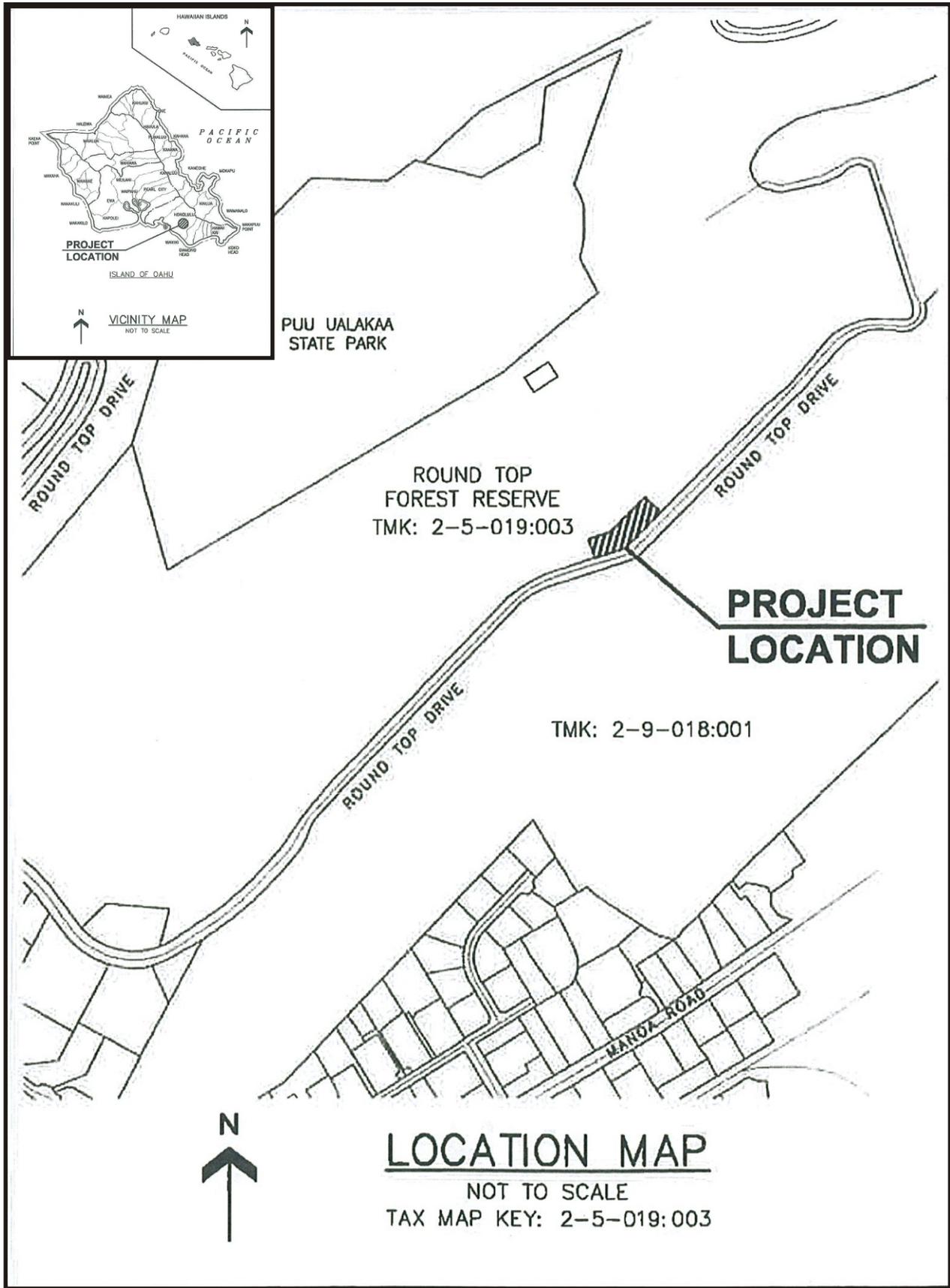


Figure 2. Project Area Location in Relationship to Round Top Drive.

Vegetation

Vegetation in the vicinity of the current project area includes, but is not limited to, java plum (cf. *Syzygium cumini*), umbrella trees (cf. *Schefflera actinophylla*), plumeria (*Plumeria* spp.), koa haole (*Leucaena leucocephala*), ficus trees (*Ficus* spp.), as well as a variety of vines, grasses, and shrubs (Wagner *et al.* 1990).

BACKGROUND LITERATURE REVIEW

TRADITIONAL AND HISTORIC LAND USE HISTORY

In pre-Contact times, Round Top (or Tantalus) was known as 'Ualaka'a, which means "rolling potato" (Pukui *et al.* 1976). 'Ualaka'a was known as the site of the finest sweet potatoes in the islands. There are multiple stories of potato fields so bountiful that the potatoes roll down hill. One such story tells of sweet potato fields planted by Kamehameha I that when dug from the ground, the potatoes rolled downhill. Another story tells of a famous archer who, while resting on Punchbowl, spotted and shot a mouse eating a potato on 'Ualaka'a; when the mouse died, the potato rolled downhill (Sterling and Summers 1978). There is little additional information about the locale. Apart from human burials that have also been found in various locations on the top and sides of Tantalus, there has been little evidence of other types of traditional land use in the area.

In the late 1800's in conjunction with the growth of trade and commerce in Honolulu the deforestation of Round Top/Tantalus began. As a result of the loss of native forests, Territory Forestry programs were implemented. During the 1900s with the development of Round Top/Tantalus roads recreational and residential land use grew (Wong and Shideler 2006).

20th Century historic land use information in the area is limited to private residential and State Park development. Round Top Drive was a favored residential area among Honolulu's early prominent families (Wong and Shideler 2006).

Pu'u 'Ualaka'a State Wayside was established before Hawai'i's statehood, in 1957, as part of the Territorial Parks System. The recreational area was initially 6.4 acres in size (DLNR 1965). By fiscal year 1992 - 1993, the last year for which there are departmental reports, Pu'u 'Ualaka'a State Wayside had expanded to 50.0 acres in size, of which 12 acres were developed for recreational use (DLNR 1994).

PREVIOUS ARCHAEOLOGY

Although few comprehensive archaeological studies have been carried out in Makiki or along the western part of Mānoa, individual studies have been conducted, particularly those dealing with various inadvertent burial discoveries made over the last 20 years. Table 1 contains a summary of known information, as obtained from reports on file at the State Historic Preservation Division (SHPD) library at the Department of Land and Natural Resources (DLNR). Figure 3 shows the location of the studies in Table 1.

Of the archaeological studies listed in Table 1, only one (Yent and Ota 1980) provides a comprehensive view of archaeological sites in the Tantalus/Round Top area. The authors surveyed the Kanealole and Moleka stream systems in Makiki, on behalf of the Division of State Parks (see Figure 3; see Table 1). There were two main categories of sites reported: historic sites and traditional Hawaiian sites. Historic sites in this region pertained to the Herring family settlement and coffee plantation, along Moleka Stream, in the late 19th century, and the old carriage road that led to their property. Traditional Hawaiian sites in the region were mostly

agricultural in nature, and included free-standing walls, retaining walls, and terraces. The ages of most of these features could not be determined with any precision, but it is likely that at least some of them date to the historic period.

Table 1. Previous Archaeology and Burial Finds in the Vicinity of the Project Area.

MAP KEY	AUTHOR(S) & YEAR	TMK(s)	SIHP SITE NUMBERS 50-80-14-	FINDINGS
1	McCoy 1971	2-5-019:008	2297	1-2 burials in cave shelter
2	Sinoto 1979	2-4-022:001	2298	2 disturbed, historic burials
3	Yent and Ota 1980	2-5-019,020	3985	Agricultural features & rockshelters; historic Herring residence & dump site
4	Yent 1982	2-5-020	3985	Historic wall & enclosure
5	Bath and Smith 1988	2-5-007:043	3743	1 disturbed burial, pre-Contact
6	Bath 1989	2-5-007:007	4134	2-3 burials, pre-Contact
7	Kawachi 1988	2-5-006:014	No sites	No sites
8	Kawachi 1991	2-5-007:039	1603	1 burial, left in situ
9	Kawachi and Douglas 1991	2-9-008:042	4273	2 burials
10	Kawachi 1992	2-5-004:044	4529	1 burial, pre-Contact
11	Pietrusewsky 1992a	2-5-005:008	4530	1 burial, pre-Contact
12	Pietrusewsky 1992b	2-2-024:024	4648	1 burial
13	Dagher 1993a	2-9-025:021	4658	Multiple burials in cave, left in situ
14	Dagher 1993b	2-5-003:014	4666	1 burial, pre-Contact
15	Jourdane 1994	2-9-019:035	0064	1 burial, left in situ at Kukao'o Heiau
16	Jourdane 1997	2-5-004:010	5497	1 burial, over 50 years old
17	Nagata 1999	2-5-019:008	5759	Historic carriage road
18	Hammatt <i>et al.</i> 2002	2-5-019	No sites	No sites
19	Wong and Shideler 2006		6915	Tantalus – Round Top Road HRHP Nomination
20	Collins <i>et al.</i> 2007	2-5-019:008	6864 & 6865	2 burials, over 50 years old
21	Collins 2008a	2-9-018:001	6917	1 burial, over 50 years old
22	Collins 2008b	2-5-020:002	6961	2 subadult burials, over 50 years old
23	Titchenal <i>et al.</i> 2011	2-9-18-001	No sites	No sites; historic artifacts (bottles, cans, etc.) present on surface

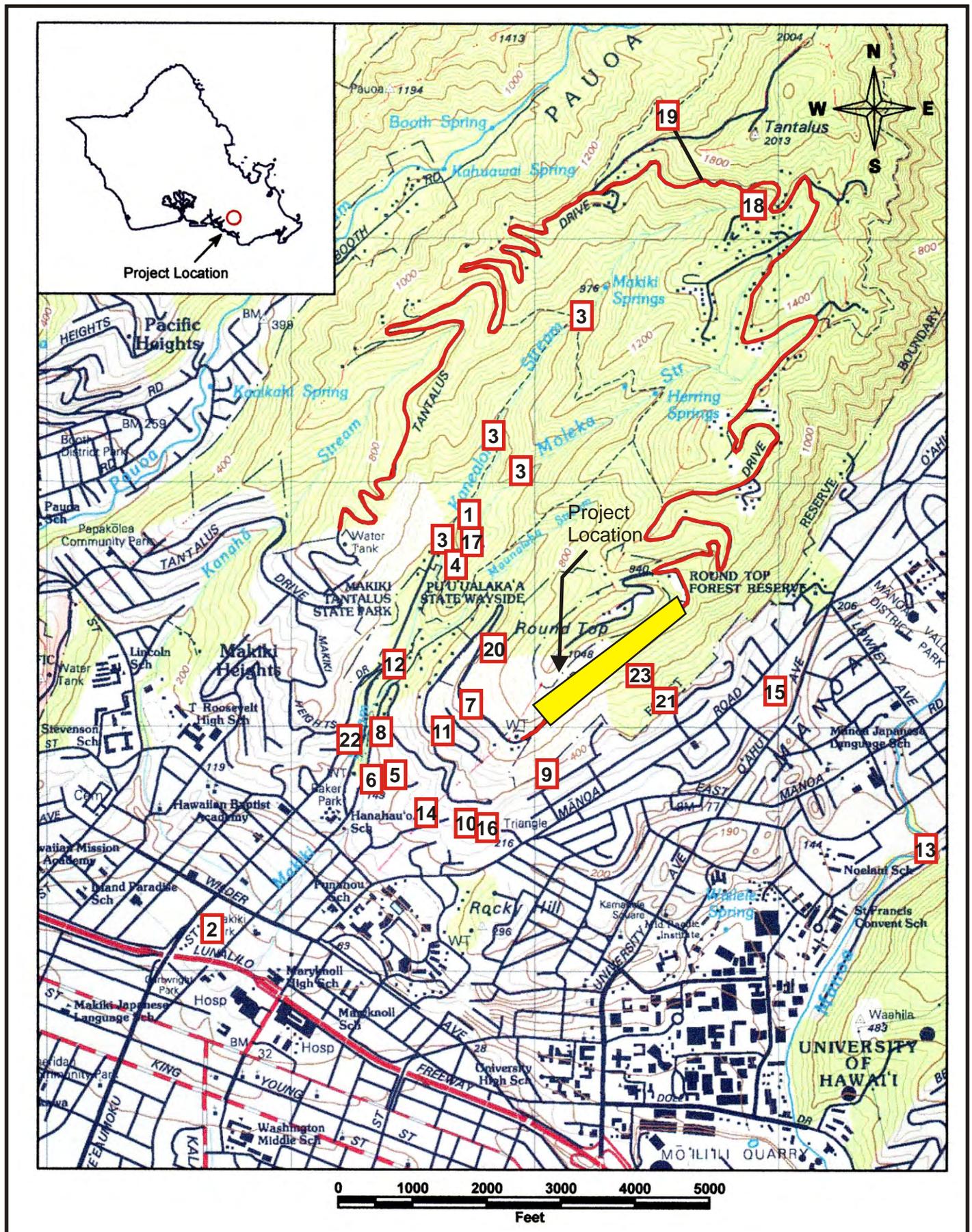


Figure 3. Locations of Previous Burial Finds and Archaeological Work in the Vicinity of Project Area (Numbers Correspond to Table 1).

The carriage road underwent further study when the Division of Forestry and Wildlife proposed to use a portion of it as a hiking trail (Nagata 1999). The survey of this portion recorded the road itself, as well as associated features (probable bridge foundations and retaining walls). Hammatt *et al.* (2002) conducted an archaeological assessment of land in the vicinity of Kalaiopua Place, near the junction of Round Top Drive and Tantalus Drive. The only features reported appeared to be historic (20th century) or modern walls, curbing, and retaining walls, associated with the roadway.

In 2007 a portion of Round Top Drive and Tantalus Drive was nominated to the Hawai'i Register of Historic Places (HRHP) as State Site No. 50-80-14-6915. The historic roadway was constructed in several phases: the construction of Tantalus Road (1891 – 1902); the construction of Round Top Road (1913 – 1917); Works Progress Administration paving (1937); and repaving and roadside improvements (1953 – 1954). The portion on the HRHP includes eight miles of the roadway as it winds around the summit of Round Top, beginning at the 1.5 Mile Marker and ending at Mile Marker 8.

PREVIOUS BURIAL FINDS

Most of the burials listed in Table 1 were inadvertently discovered during house construction activities or other earth-moving projects. A slight majority date to the pre-contact period and are probably Native Hawaiian in ethnicity; all of these burials are those of adults. Of the remaining cases, at least three date to the historic period, while time period information for the others is not available.

Taken in chronological order, the earliest burial site (Site 2297) recorded in SHPD's files was discovered by local hikers in a moderately-sized cave shelter (0.5 mi) away (McCoy 1971). The cave shelter contained at least one burial, with another possible *in situ* burial adjacent to the disturbed one. Both likely date to the historic period. No further skeletal information is available.

The next burial site to be recorded (Site 2298) was found during construction work at Makiki Park. Two burials were discovered at this site, both of which were extremely disturbed by trenching activities. They both date to the early historic period (Sinoto 1979). No further skeletal data is available.

Three burials were discovered mostly *in situ*, but with some minor disturbance. One burial (Site 1603) was left *in situ* at the time of discovery, pending landowner consultation (current status unknown). Therefore, further data about this burial is unavailable. The other two nearby burials were Hawaiian (or part-Hawaiian) males. One burial probably dates to the pre-contact period (Site 4530), while the time period of the other (Site 4648) is unknown. Skeletal analysis reports are the only accessible record of these two burials; general archaeological reports are not available.

Six (possibly seven) burials (Sites 3743, 4134, 4529, 4666, and 5497) were discovered during house construction projects south of the burial reported here, approximately 0.8 km (0.5 mi) distant. Nearly all were at least moderately disturbed. The remains were of Hawaiian adult females and males that likely dated to the pre-contact period. One burial (Site 5497) was simply reported to be "over 50 years old" (Jourdane 1997).

More recently, burials have been inadvertently discovered during public works projects. In 2006, two burials (Sites 6864 and 6865) were found inadvertently during emergency slope mitigation work along a section of Round Top Drive in Makiki near Maunaloa. SHPD recommended

relocation of both burials due to their precarious condition in loose cinder deposits on steep slopes (Collins *et al.* 2007).

In mid-2007, a single historic burial (Site 6917) interred in cinder was found while excavating holes for the support posts of a debris fence, on the Mānoa Valley side of Round Top. No grave goods were present, but the manner and context of the burial suggested Native Hawaiian ethnicity. The burial was left *in situ* (Collins 2008a). In the fall of 2007, two burials (Site 6961) were inadvertently discovered on a steep slope along Makiki Heights Drive, where the State was conducting emergency slope mitigation work. These burials also seemed to occur in the loose cinder deposits, although they may have been previously disturbed by earlier activities such as road construction or slope alterations related to residential development (Collins 2008b).

Given the inadvertent discovery of all these burials, there is at best imprecise information on the depths at which the remains were found. Some burials occurred at approximately one meter below the surface (Kawachi 1992), while others were visible near the base of the cut bank of a slope 12 – 15 feet in height (Bath 1989). Seven burials were interred in the cinder, while at least two finds were in loam deposits above the cinder but near the boundary between the two soil types.

OTHER ARCHAEOLOGICAL STUDIES

Between July, 2010 and March, 2011, PCSI conducted archaeological monitoring for construction of two dispersion channels and a retaining wall located along Round Top Drive (on the down-slope side) directly across the road from the current Round Top Drive rockfall mitigation project (Titchenal *et al.* 2011). The monitoring of the dispersion channel project was conducted for R.H.S. Lee, Inc. and the Department of Land and Natural Resources (DLNR). This monitoring focused on all ground-disturbing activities in conjunction with construction of the two dispersion channels and the retaining wall. Except for some historic artifacts found on the surface, no historic properties, including human burials, were encountered during the monitoring. No impacts to contributing properties of Site 6915 (Round Top Drive/Tantalus Drive) were impacted by the construction of the dispersion channels.

Related to the current project, in September 2011, PCSI conducted an archaeological assessment (AA) for the proposed rockslide mitigative improvements along Round Top Drive in compliance with the historic preservation review process as contained in HAR 13 and 13-276. The AA included archival background research, an archaeological reconnaissance survey, data analysis, and coordination and consultation with agency representatives (Walden and Titchenal 2011). The archaeological reconnaissance survey was conducted on September 2, 2011. The roughly rectangular project area measures approximately 325 ft west to east by approximately 25 ft north to south (including 15 ft of construction easement), and occupies a precipitous hillside along the upslope side (north) of Round Top Drive.

The archaeological reconnaissance survey revealed no traditional or historical surface archaeological materials or features. The steepness of the hillside in the parcel vicinity appears to have precluded traditional and historical residential or agricultural pursuits. The survey concluded that no surface archaeological sites or other historic properties were present within the project area. Figures 4 through 6 present photographic overviews of the project area.



View: Northwest



View: Northwest (Upslope)

Figure 4. Photographs Showing the Southwest Portion of the Project Area.



View: Northwest



View: Northeast

Figure 5. Photographs Showing the Upper Mid-Portion of the Project Area.



View: Southwest



View: Northwest (Upslope)

Figure 6. Photographs Showing the Northeast Portion of the Project Area.

CULTURAL IMPACT ASSESSMENT

This cultural impact assessment presents a description of the proposed Round Top Drive rockslide mitigation project, the methods used for consultation, the results of the consultation, and the results of the assessment. The scope of work (SOW) for this cultural impact assessment included the following tasks:

- Archival background research on the cultural history and previous land uses of the project area (see previous sections).
- Literature review of previous archaeological studies within the project area and in areas near the current project area (see previous sections).
- Written consultation with the following interested parties:
 - Office of Hawaiian Affairs (OHA)
 - State Historic Preservation Division (SHPD)
 - Honolulu Hawaiian Civic Club (HHCC)
 - Hui Malama I Na Kupuna `O Hawaii Nei

PROJECT DESCRIPTION

The Round Top Drive Rock Slide Mitigative Improvements project includes the installation of a wire mesh drape system over the cut slope. This proposed action would consist of vegetation clearing, rock scaling, and the installation of the wire mesh drape system with an embedded anchor system. Figure 7 presents a map of the project area showing where the wire mesh drape system will be applied. Proposed construction activities would include the following activities:

- general rock scaling,
- smoothing the slope surface, and
- clearing and trimming all vegetation, trees, and shrubs flush to the ground

These activities would occur within the designated wire mesh drape coverage area prior to the installation of the wire mesh drape system.

The proposed action was determined based on several factors, including public safety, construction cost, and sound engineering principles. Other factors considered included rockfall protection characteristics, community needs, environmental issues, aesthetics, local politics, and land acquisitions required. Thus, a wire mesh drape system is the proposed mitigation method for this project. This method would provide a permanent solution for rock protection and is advantageous in places where there is limited catchment area.

METHODS FOR CONDUCTING THE CULTURAL IMPACT ASSESSMENT

An archaeological reconnaissance survey of the project area was undertaken by PCSI archaeologists, Keola Nakamura, B.A. and Paul Titchenal, M.A. (Principal Investigator), on September 2, 2010. This survey consisted of a pedestrian transect inspection of the project area to determine the presence and/or absence of surface archaeological sites and cultural material scatters.

Prior to contacting the interested parties for the consultation, a literature review was conducted on the land use history and previous archaeological studies completed in this area. Based on this research, it was noted that there is a reasonable likelihood that subsurface archaeological features and/or human remains may be discovered during any excavations in this area. During

research efforts associated with this project, there were no indications that specific traditional and customary practices are being carried in the vicinity of the project area

Consultation letters were sent to the Office of Hawaiian Affairs (OHA), Hui Malama I Na Kupuna 'O Hawai'i Nei, the State Historic Preservation Division (SHPD), and Honolulu Hawaiian Civic Club (KHCC). Formal letters were sent out to these organizations/agencies on November 2, 2011, requesting information concerning their views on this project, including any effects it might have on historic or cultural sites that they might know about in the area. Likewise, they were asked to share any information about legends, cultural properties, or traditional practices associated with this area.

RESULTS OF CONSULTATION

The responses from the three agencies/organizations invited to participate were as follows:

- OHA: They suggested that the statement in the consultation letter (pages 3-4), referring to the Archaeological Assessment (Walden and Titchenal 2011) which recommended no further work, which read: *“however, in the event historic properties or burials are found during construction, it is recommended that all work be stopped, the find protected, and the SHPD be notified immediately”* be revised to read *“however, in the event historic properties or burials are found during construction, it is recommended that all work be immediately stopped, the find protected, and the SHPD and all other required agencies be notified immediately”* (see Appendix A).
- Hui Malama I Na Kupuna 'O Hawai'i Nei did not respond to the consultation letter.
- SHPD: Staff archaeologists did not respond to the CIA consultation letter.
- HHCC: Representatives of the Honolulu Hawaiian Civic Club have not responded to the consultation letter.

ASSESSMENT AND RECOMMENDATIONS

The potential for archaeological or historic properties within the current project area is considered to be minimal. Archival literature and historic documents revealed that a nearby portion of Round Top Drive / Tantalus Drive is on the HRHP (Wong and Shideler 2006); however, no part of Site 6915 will be affected. A review of previous archaeological studies indicated that no archaeological sites are known to exist within the project area, and no surface archaeological remains were observed during an archaeological reconnaissance survey conducted for the archaeological assessment (Walden and Titchenal 2011).

Therefore, a finding of no historic properties affected by the proposed project activities is recommended. No further work (e.g. archaeological monitoring) is recommended; however, in the event that historic properties or burials are found during construction, it is recommended that work be immediately stopped, the find be protected, and SHPD and all other required agencies be notified immediately.

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APPENDIX A: RESPONSE TO CONSULTATION LETTER FROM OFFICE OF HAWAIIAN AFFAIRS



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

HRD11/6002

November 21, 2011

Stephan D. Clark, Vice-President
Pacific Consulting Services, Inc.
720 Iwilei Road, Suite 424
Honolulu, Hawai'i 96817

**Re: Cultural Impact Assessment Consultation
Round Top Drive Rock Slide Mitigation Project
Island of O'ahu**

Aloha e Stephan D. Clark,

The Office of Hawaiian Affairs (OHA) is in receipt of your November 2, 2011 letter with enclosures seeking comments ahead of a cultural impact assessment (CIA) which will be prepared as a technical document to support a draft environmental assessment for a rock slide mitigation project (project) proposed by the City and County of Honolulu-Department of Design and Construction in the vicinity of the 7.5 mile marker on Round Top Drive. Project activities will consist of vegetation clearing, rock scaling and the installation of a wire mesh system.

OHA recognizes the need for this project in order to ensure public health and safety, especially for residents and commuters in the area and we look forward to seeing it completed. We are unaware of any historic properties of significance to or customary practices and beliefs of the Hawaiian people which may be adversely affected by this project at this time. We look forward to reviewing the completed CIA and the opportunity to provide comments at that time.

An archaeological reconnaissance survey/assessment of the project area has been conducted and no archaeological sites or historic properties have been identified. Archaeological monitoring is not recommended during project activities. OHA suggests that the statement in your letter (page 3-4) which proposes that in the event "*historic properties or burials are found during construction, it was recommended that all work be stopped, the find be protected, and the SHPD be notified immediately*" be revised to read that in the event "*historic properties or burials are found during construction, ~~it was recommended that~~ all work shall be immediately stopped, the find be protected, and the SHPD and all other required agencies be notified immediately*".

OHA notes that the last sentence of your letter suggests that "*if we do not hear from your office within 30 days of receipt of this letter, we shall assume concurrence with our findings*". We have no objections to your firm providing thirty (30) days to review and provide comments, as this is an appropriate and adequate amount of time. We are opposed to your firm asserting that no response to your letter translates to OHA's concurrence with your findings and we caution you in using this approach. In the future, your firm should describe no response as exactly that as claiming anything else would be incorrect.

Stephan D. Clark, Vice-President
Pacific Consulting Services, Inc.
November 21, 2011
Page 2 of 2

Thank you for initiating consultation and for the opportunity to provide comments at this early stage. Should you have any questions, please feel free to contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

A handwritten signature in black ink, appearing to read "Clyde W. Nāmu'o". The signature is fluid and cursive, with a long horizontal stroke at the end.

Clyde W. Nāmu'o
Chief Executive Officer

CWN:kl

DRAFT REPORT

**Archaeological Assessment in Support of
Rock Slide Potential Inspection and Mitigation
Improvements Along Round Top Drive, Makiki
Ahupua'a, Honolulu District, O'ahu, State of
Hawai'i**

TMK: (1) 2-9-019:003

Prepared for:

AECOM Technical Services, Inc.
1001 Bishop Street, Suite 1600
Honolulu, HI 96813

September 2011

PACIFIC CONSULTING SERVICES, INC.

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Along Round Top Drive, Makiki Ahupua'a, Honolulu District, O'ahu, State of Hawai'i
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TABLE OF CONTENTS

LIST OF FIGURES	ii
LIST OF TABLES.....	ii
INTRODUCTION	1
PROJECT AREA LOCATION.....	1
ENVIRONMENTAL BACKGROUND	1
RAINFALL.....	1
SOILS	1
VEGETATION.....	5
ARCHAEOLOGICAL ASSESSMENT	5
SCOPE OF WORK	5
BACKGROUND LITERATURE REVIEW.....	5
TRADITIONAL AND HISTORIC LAND USE HISTORY.....	5
PREVIOUS ARCHAEOLOGY.....	6
PREVIOUS BURIAL FINDS.....	6
ARCHAEOLOGICAL RECONNAISSANCE SURVEY	8
FIELD METHODS.....	8
ARCHAEOLOGICAL RECONNAISSANCE SURVEY RESULTS.....	12
ASSESSMENT AND RECOMMENDATIONS	12
REFERENCES CITED.....	13

LIST OF FIGURES

Figure 1. Location of the Project Area on a U.S.G.S. Quadrangle Map of Honolulu.2
Figure 2. Project Area Location in Relationship to Round Top Drive.....3
Figure 3. Site Plan Showing Location of Proposed Rockfall Mitigation Activities.4
Figure 4. Photographs Showing the Southwest Portion of the Project Area.....9
Figure 5. Photographs Showing the Upper Mid-Portion of the Project Area..... 10
Figure 6. Photographs Showing the Northeast Portion of the Project Area. 11

LIST OF TABLES

Table 1. Previous Archaeology and Burial Finds in the Vicinity of the Project Area.7

INTRODUCTION

At the request of AECOM Technical Services, Inc., Pacific Consulting Services, Inc. (PCSI) has prepared the following archaeological assessment (AA) in support of the City and County of Honolulu – Department of Design and Construction proposed rock slide mitigative improvements along portions of the roadway on Round Top Drive in Makiki, Honolulu, O‘ahu (Figure 1). This AA has been prepared in compliance with Hawaii Revised Statutes (HRS), Chapter 6E, and Title 13 of the Hawaii Administrative Rules (HAR), Subtitle 13 (State Historic Preservation Division Rules), Chapter 275 (Rules Governing Procedures for Historic Preservation Review for Governmental Projects Covered Under Sections 6E-8, HRS), and Chapter 276 (Rules Governing Standards for Archaeological Inventory Surveys and Reports).

PROJECT AREA LOCATION

The entire project area is located on Round Top Drive along the boundary of the *ahupua‘a* (traditional land division) of Makiki and Manoa in the Honolulu (old Kona) District. The proposed rock slide mitigation project is located on the steep hillside along the northern side of Round Top Drive in close proximity to the 7.5 mile marker of the 8.0 mile-long portion of Round Top Drive that comprises State Site No. 50-80-14-6915 (Site 6915). Figure 2 shows the project area location in relationship to Round Top Drive on a tax map.

The National Register of Historic Places (NRHP) nomination form provides the following description about the site components east the proposed rockfall mitigation project area:

After Mile Marker 7.5, low concrete walls border the edge of the road and the sharp cliff overlooking Mānoa Valley...Mile Marker 8: The ‘Honolulu Watershed Forest Reserve’ sign marks the south-east end of the proposed historic district (Wong and Shideler 2006, Section 7 page 3).

The rock slide mitigation project will consist of vegetation clearing, rock scaling, and the installation of a wire mesh drape system with an embedded anchor system (10 to 15 feet [ft] deep) (Figure 3). The proposed project will not affect any of the contributing features of Site 6915 since all ground alteration will take place upslope of the existing roadway (see Figure 3).

ENVIRONMENTAL BACKGROUND

RAINFALL

According to Giambelluca et al. (1986), annual rainfall on Tantalus, at an elevation somewhat higher (ca 1,300 feet above mean sea level [FAMSL]) than that of the project area, averages about 254 cm (100 in) a year. Since the project area is located around 243 m AMSL (800 ft), the yearly rainfall average is probably somewhat lower.

SOILS

The entire project area is underlain by Cinder Land (rCl), which, according to Foote et al. (1972:29), is known for its “loose nature and poor trafficability.” This is because it is composed of loose volcanic cinders, pumice, and ash. These materials are black, red, yellow, brown, or variegated in color. They have jagged edges and a glassy appearance, and show little or no evidence of soil development.

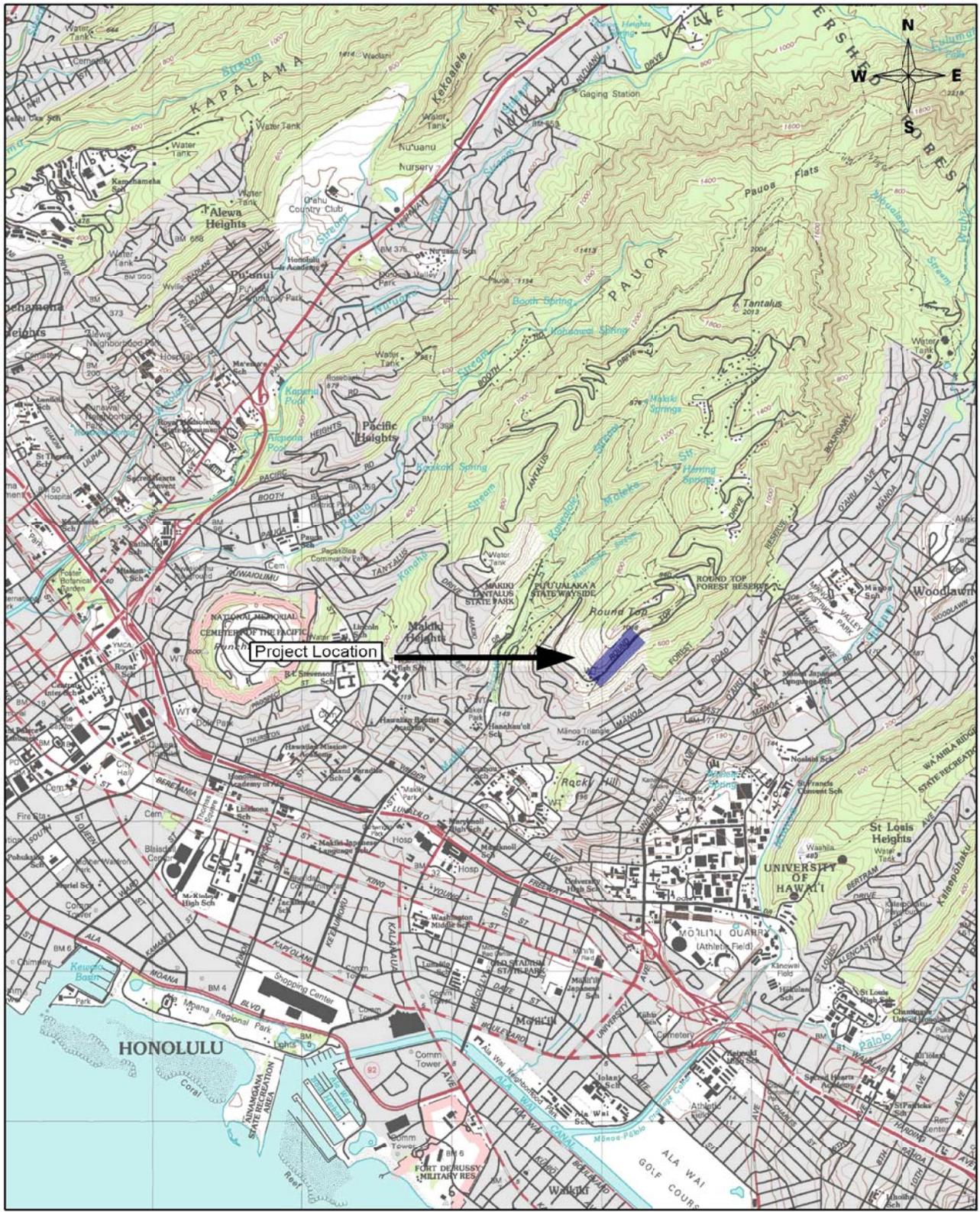


Figure 1. Portion of U.S.G.S. Honolulu Quad Map Showing Project Area Location.

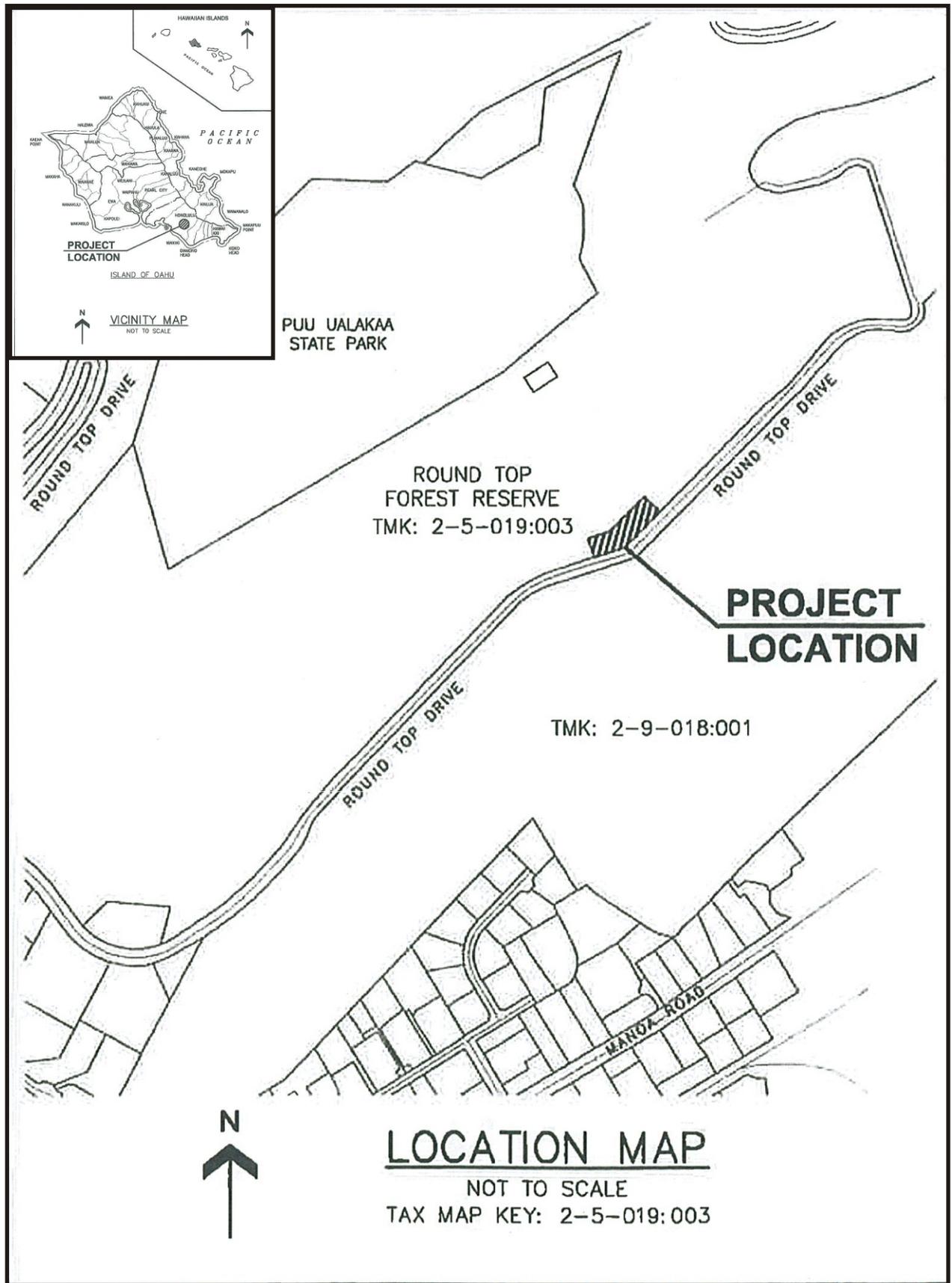


Figure 2. Project Area Location in Relationship to Round Top Drive.

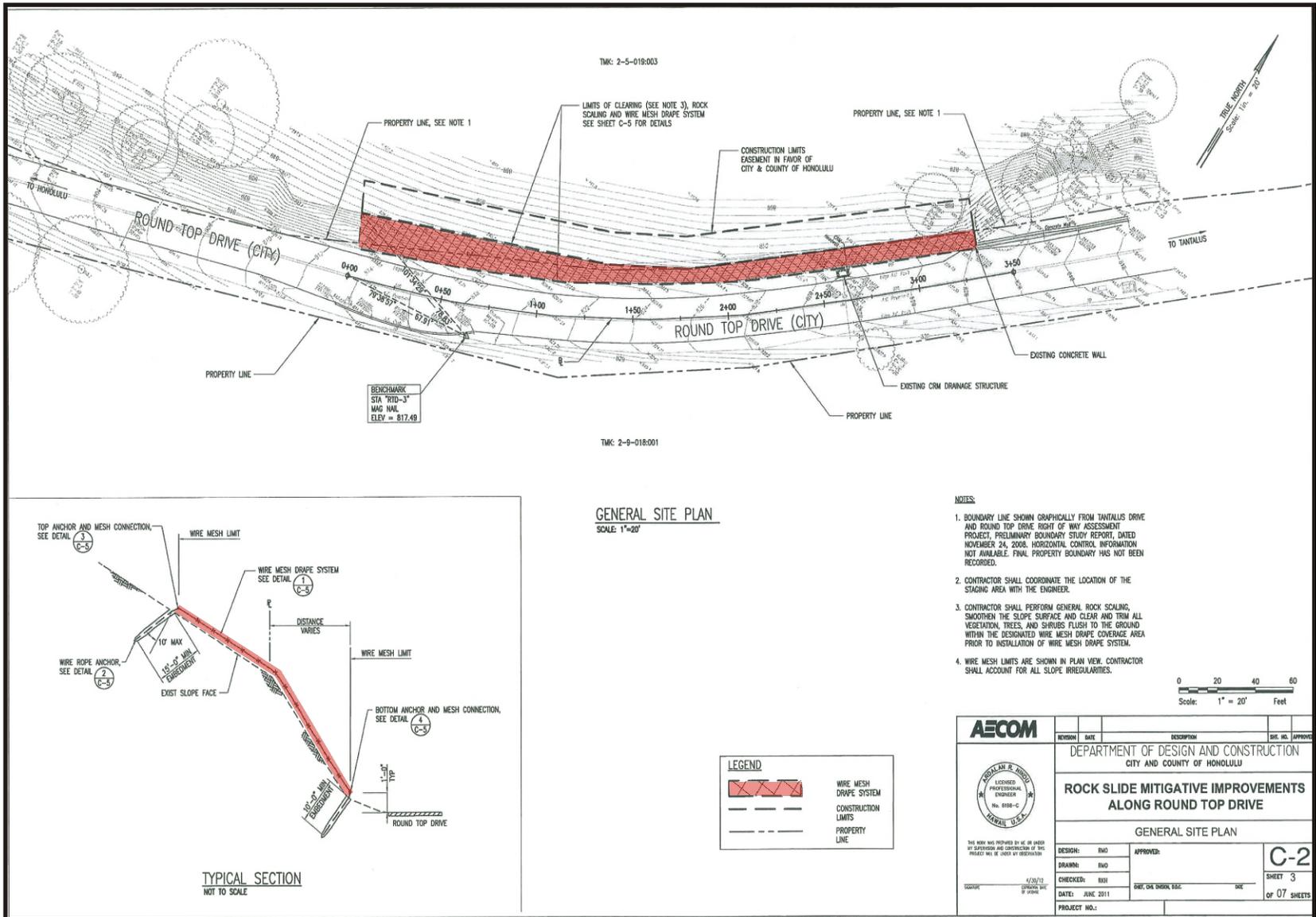


Figure 3. Site Plan Showing Location of Proposed Rockfall Mitigation Activities.

VEGETATION

Vegetation in the vicinity of the current project area includes, but is not limited to, java plum (cf. *Syzygium cumini*), umbrella trees (cf. *Schefflera actinophylla*), plumeria (*Plumeria* spp.), *koa haole* (*Leucaena leucocephala*), ficus trees (*Ficus* spp.), as well as a variety of vines, grasses, and shrubs (Wagner *et al.* 1990).

ARCHAEOLOGICAL ASSESSMENT

This archaeological assessment for the proposed slope stabilization measures along Round Top Drive has been prepared to achieve compliance with the historic preservation review process as contained in HAR 13 and 13-276.

SCOPE OF WORK

The primary objectives of this archaeological assessment were to determine the following:

1. The general nature, extent, and potential significance of any archaeological or historic remains present within the project area.
2. The historic preservation implications of such remains for the feasibility of the proposed development.
3. The general scope of work and level of effort for any subsequent archaeological and historic preservation work that might be appropriate and/or required.

Based on current regulatory review requirements of the State Historic Preservation Division (SHPD), the following tasks were determined to be appropriate scope of work for this archaeological assessment:

1. Background literature review;
2. Archaeological survey of the project area;
3. Data analysis and preparation of an appropriate report;
4. Coordination and consultation with client and agency representatives.

BACKGROUND LITERATURE REVIEW

TRADITIONAL AND HISTORIC LAND USE HISTORY

In pre-Contact times, Round Top (or Tantalus) was known as 'Ualaka'a, which means "rolling potato" (Pukui *et al* 1976). 'Ualaka'a was known as the site of the finest sweet potatoes in the islands. There are multiple stories of potato fields so bountiful that the potatoes roll down hill. One such story tells of sweet potato fields planted by Kamehameha I that when dug from the ground, the potatoes rolled downhill. Another story tells of a famous archer who, while resting on Punchbowl, spotted and shot a mouse eating a potato on 'Ualaka'a; when the mouse died, the potato rolled downhill (Sterling and Summers 1978). There is little additional information about the locale. Apart from human burials that have also been found in various locations on the top and sides of Tantalus, there has been little evidence of other types of traditional land use in the area.

In the late 1800's in conjunction with the growth of trade and commerce in Honolulu the deforestation of Round Top/Tantalus began. As a result of the loss of native forests, Territory Forestry programs were implemented. During the 1900s with the development of Round Top/Tantalus roads recreational and residential land use grew (Wong and Shideler 2006).

20th Century historic land use information in the area is limited to private residential and State Park development. Round Top Drive was a favored residential area among Honolulu's early predominant families (Wong and Shideler 2006).

Puu Ualakaa State Wayside was established before Hawai'i's statehood, in 1957, as part of the Territorial Parks System. The recreational area was initially 6.4 acres in size (DLNR 1965). By fiscal year 1992 - 1993, the last year for which there are departmental reports, Puu Ualakaa State Wayside had expanded to 50.0 acres in size, of which 12 acres were developed for recreational use (DLNR 1994).

PREVIOUS ARCHAEOLOGY

Although few comprehensive archaeological studies have been carried out in Makiki or along the western part of Manoa, individual studies have been conducted, particularly those dealing with various inadvertent burial discoveries made over the last 20 years. Table 1 contains a summary of known information, as obtained from reports on file at the State Historic Preservation Division (SHPD) library at the Department of Land and Natural Resources (DLNR).

Of the archaeological studies listed in Table 1, only one (Yent and Ota 1980) provides a comprehensive view of archaeological sites in the Tantalus/Round Top area. The authors surveyed the Kanealole and Moleka stream systems in Makiki, on behalf of the Division of State Parks. There were two main categories of sites reported: historic sites and traditional Hawaiian sites. Historic sites in this region pertained to the Herring family settlement and coffee plantation, along Moleka Stream, in the late 19th century, and the old carriage road that led to their property. Traditional Hawaiian sites in the region were mostly agricultural in nature, and included free-standing walls, retaining walls, and terraces. The ages of most of these features could not be determined with any precision, but it is likely that at least some of them date to the historic period.

The carriage road underwent further study when the Division of Forestry and Wildlife proposed to use a portion of it as a hiking trail (Nagata 1999). The survey of this portion recorded the road itself, as well as associated features (probable bridge foundations and retaining walls). Hammatt *et al.* (2002) conducted an archaeological assessment of land in the vicinity of Kalaiohua Place, near the junction of Round Top Drive and Tantalus Drive. The only features reported appeared to be historic (20th century) or modern walls, curbing, and retaining walls, associated with the roadway.

In 2007 a portion of Round Top Drive and Tantalus Drive was nominated to the Hawai'i Register of Historic Places (HRHP) as State Site No. 50-80-14-6915. The historic roadway was constructed in several phases: the construction of Tantalus Road (1891 – 1902); the construction of Round Top Road (1913 – 1917); Works Progress Administration paving (1937); and repaving and roadside improvements (1953 – 1954). The portion on the HRHP includes eight miles of the roadway as it winds around the summit of Round Top, beginning at the 1.5 Mile Marker and ending at Mile Marker 8.

PREVIOUS BURIAL FINDS

Most of the burials listed in Table 1 were inadvertently discovered during house construction activities or other earth-moving projects. A slight majority date to the pre-contact period and are probably Native Hawaiian in ethnicity; all of these burials are those of adults. Of the remaining cases, at least three date to the historic period, while time period information for the others is not available.

Taken in chronological order, the earliest burial site (Site 2297) recorded in SHPD's files was discovered by local hikers in a moderately-sized cave shelter (0.5 mi) away (McCoy 1971).

The cave shelter contained at least one burial, with another possible *in situ* burial adjacent to the disturbed one. Both likely date to the historic period. No further skeletal information is available.

The next burial site to be recorded (Site 2298) was found during construction work at Makiki Park. Two burials were discovered at this site, both of which were extremely disturbed by trenching activities. They both date to the early historic period (Sinoto 1979). No further skeletal data is available.

Table 1. Previous Archaeology and Burial Finds in the Vicinity of the Project Area.

MAP KEY	AUTHOR(S) & YEAR	TMK(s)	SIHP SITE NUMBERS 50-80-14-	FINDINGS
1	McCoy 1971	2-5-019:008	2297	1-2 burials in cave shelter
2	Sinoto 1979	2-4-022:001	2298	2 disturbed, historic burials
3	Yent and Ota 1980	2-5-019,020	3985	Agricultural features & rockshelters; historic Herring residence & dump site
4	Yent 1982	2-5-020	3985	Historic wall & enclosure
5	Bath and Smith 1988	2-5-007:043	3743	1 disturbed burial, pre-Contact
6	Bath 1989	2-5-007:007	4134	2-3 burials, pre-Contact
7	Kawachi 1988	2-5-006:014	No sites	No sites
8	Kawachi 1991	2-5-007:039	1603	1 burial, left in situ
9	Kawachi and Douglas 1991	2-9-008:042	4273	2 burials
10	Kawachi 1992	2-5-004:044	4529	1 burial, pre-Contact
11	Pietrusewsky 1992a	2-5-005:008	4530	1 burial, pre-Contact
12	Pietrusewsky 1992b	2-2-024:024	4648	1 burial
13	Dagher 1993a	2-9-025:021	4658	Multiple burials in cave, left in situ
14	Dagher 1993b	2-5-003:014	4666	1 burial, pre-Contact
15	Jourdane 1994	2-9-019:035	0064	1 burial, left in situ at Kukao'o Heiau
16	Jourdane 1997	2-5-004:010	5497	1 burial, over 50 years old
17	Nagata 1999	2-5-019:008	5759	Historic carriage road
18	Hammatt <i>et al.</i> 2002	2-5-019	No sites	No sites
19	Wong and Shideler 2006		6915	Tantalus – Round Top Road HRHP Nomination
20	Collins <i>et al.</i> 2007	2-5-019:008	6864 & 6865	2 burials, over 50 years old
21	Collins 2008a	2-9-018:001	6917	1 burial, over 50 years old
22	Collins 2008b	2-5-020:002	6961	2 subadult burials, over 50 years old

Three burials were discovered mostly *in situ*, but with some minor disturbance. One burial (Site 1603) was left *in situ* at the time of discovery, pending landowner consultation (current status unknown). Therefore, further data about this burial is unavailable. The other two nearby burials were Hawaiian (or part-Hawaiian) males. One burial probably dates to the pre-contact period (Site 4530), while the time period of the other (Site 4648) is unknown. Skeletal analysis reports are the only accessible record of these two burials; general archaeological reports are not available.

Six (possibly seven) burials (Sites 3743, 4134, 4529, 4666, and 5497) were discovered during house construction projects south of the burial reported here, approximately 0.8 km (0.5 mi) distant. Nearly all were at least moderately disturbed. The remains were of Hawaiian adult females and males that likely dated to the pre-contact period. One burial (Site 5497) was simply reported to be “over 50 years old” (Jourdane 1997).

More recently, burials have been inadvertently discovered during public works projects. In 2006, two burials (Sites 6864 and 6865) were found inadvertently during emergency slope mitigation work along a section of Round Top Drive in Makiki near Maunaloa. SHPD recommended relocation of both burials due to their precarious condition in loose cinder deposits on steep slopes (Collins *et al.* 2007).

In mid-2007, a single historic burial (Site 6917) interred in cinder was found while excavating holes for the support posts of a debris fence, on the Mānoa Valley side of Round Top. No grave goods were present, but the manner and context of the burial suggested Native Hawaiian ethnicity. The burial was left *in situ* (Collins 2008a). In the fall of 2007, two burials (Site 6961) were inadvertently discovered on a steep slope along Makiki Heights Drive, where the State was conducting emergency slope mitigation work. These burials also seemed to occur in the loose cinder deposits, although they may have been previously disturbed by earlier activities such as road construction or slope alterations related to residential development (Collins 2008b).

Given the inadvertent discovery of all these burials, there is at best imprecise information on the depths at which the remains were found. Some burials occurred at approximately one meter below the surface (Kawachi 1992), while others were visible near the base of the cut bank of a slope 12 – 15 feet in height (Bath 1989). Seven burials were interred in the cinder, while at least two finds were in loam deposits above the cinder but near the boundary between the two soil types.

ARCHAEOLOGICAL RECONNAISSANCE SURVEY

FIELD METHODS

An archaeological reconnaissance survey of the project area was undertaken by PCSI archaeologists, Keola Nakamura, B.A. and Paul Titchenal, M.A. (Principal Investigator), on September 2, 2010 under clear skies. The roughly rectangular project area measures approximately 325 ft west to east by approximately 25 ft north to south (including 15 ft of construction easement), and occupies a precipitous hillside along the upslope side (north) of Round Top Drive (see Figure 2).

This survey consisted of a pedestrian transect inspection of the area. Pedestrian transects were conducted in 5 meter intervals parallel to Round Top Drive (west to east). Figures 4 through 6 present photographic overviews of the project area.



View: Northwest



View: Northwest (Upslope)

Figure 4. Photographs Showing the Southwest Portion of the Project Area.



View: Northwest



View: Northeast

Figure 5. Photographs Showing the Upper Mid-Portion of the Project Area.



View: Southwest



View: Northwest (Upslope)

Figure 6. Photographs Showing the Northeast Portion of the Project Area.

ARCHAEOLOGICAL RECONNAISSANCE SURVEY RESULTS

The archaeological reconnaissance survey conducted in the project area revealed no traditional or historical surface archaeological materials or features. The steepness of the hillside in the parcel vicinity appears to have precluded traditional and historical residential or agricultural pursuits. The survey concluded that no surface archaeological sites or other historic properties were present within the project area.

ASSESSMENT AND RECOMMENDATIONS

The potential for archaeological or historic properties within the current project area is considered to be minimal. Archival literature and historic documents revealed that a nearby portion of Round Top Drive / Tantalus Drive is on the HRHP (Wong and Shideler 2006); however, no part of Site 6915 will be affected. A review of previous archaeological studies indicated that no archaeological sites are known to exist within the project area, and no surface archaeological remains were observed during the field survey.

Therefore, a finding of no historic properties affected by the proposed project activities is recommended. No further work (e.g. archaeological monitoring) is recommended; however, in the event that historic properties or burials are found during construction, it is recommended that work be stopped, the find be protected, and SHPD be notified immediately.

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