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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

JAN 23 2014
FILE COPY

File No. CDUA OA-3698

JAN 10 2014

MEMORANDUM

To: Herman Tuiolosega, Acting Director
Office of Environmental Quality Control

From: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

Subject: Draft Environmental Assessment (DEA) for Conservation District Use Application (CDUA) OA-3698 and Management Plan for the Waimalu Nature Center and Zipline

The Department of Land and Natural Resources has reviewed the draft EA for the subject project. Please publish notice of availability for this project in the January 23, 2014 issue of the *Environmental Notice*. We have enclosed one hard copy and one digital of the draft EA document, as well as the Conservation District Use Application, a Management Plan, and an Executive Summary. We will follow this with an electronic copy of the applicant's project summary and the OEQC Bulletin Publication Form.

Please contact Michael Cain of our Office of Conservation and Coastal Lands staff at 587-0048 should you have any questions.

RECEIVED
'14 JAN 10 P4:19
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Enclosures:
Notice of determination
Draft EA (hard copy)
OEQC Pub Form

On disc:
Project Summary (word)
Project Summary (pdf)
Draft EA (pdf)
CDUA
Management Plan

Disc: *Draft EA, CDUA, OEQC Pub Form, OCCL Determination Letter*

APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JULY 2012 REVISION)

Project Name WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR
Island: O'ahu
District: Ewa
TMK: 1-9-8-073-001
Permits: Conservation District Use Permit (CDUP) (State BLNR)
Grading Permit and Building Permit for the driveway, nature center & parking lot (City and County Department of Planning and Permitting);
National Pollutant Discharge Elimination System permit (State Department of Health);
Water Supply Approval (City and County Board of Water Supply)

Approving Agency:
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu HI 96813
Sam Lemmo, Administrator, OCCL 808-587-0377

Applicant:
Waimalu Holding Company LLC, by Towne Development of Hawaii, Inc., its manager
220 S. King Street, Suite 960
Honolulu, Hawaii 96813

Consultant:
Geometrician Associates
PO Box 396
Hilo HI 96721
Ron Terry 808-969-7090

Status (check one only):

_x_DEA-AFNSI — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.

__FEA-FONSI — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.

__Act 172-12 EISPN — Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination — The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin.

__Statutory hammer

Acceptance

The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.

__Section 11-200-27 Determination

The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):
Waimalu Holding Company LLC (WHC) proposes to develop the Waimalu Nature Park and Zipline Canopy Tour as a private nature park on a portion of its 447-acre property in Waimalu. The Property is undeveloped land within the State Land Use Conservation District, bordered on the makai side by residential developments off of Ka'ahele Street in Royal Summit, and elsewhere by undeveloped land. WHC intends to form a joint venture with Flyin Hawaiian Zipline LLC of Maui. The Project consists of several elements: a nature center of about 1,200 square feet located 700 feet from the terminus of Ka'ahele Street, and a zipline course as part of a guided forest canopy tour. The zipline would have 13 to 14 sending and receiving platforms for use on seven paired zipline runs, starting 1.2 miles mauka and ending 0.7 miles mauka of the end of Ka'ahele Street, in an area not visible or audible from residential neighborhoods. Participants will be picked up offsite, and no participants will be allowed to drive to the Property or park on Ka'ahele Street and walk to the site. At maximum, three vehicles will be making trips to and from the nature center per hourt. The zipline will have a small footprint requiring minimal grading and grubbing on existing access roads/trails and at the platform supports, which all together occupy less than 0.1 acres. No archaeological or cultural sites will be affected. No rare, threatened or endangered species would be affected; native ecosystems being overrun by invasives will benefit from the type of management Flyin Hawaiian Zipline provides in Maui.

NEIL ABERCROMBIE

WILLIAM J. AILA, JR.
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LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:MC

CDUA: OA-3698
Acceptance Date: January 9, 2014
180-Day Exp. Date: July 8, 2014

JAN 10 2014
2014 JAN 10 P4:20
RECEIVED

Ron Terry
Geometrician Associates
PO Box 396
Hilo, HI 96721

Dear Mr. Terry,

NOTICE OF ACCEPTANCE and
PRELIMINARY ENVIRONMENTAL DETERMINATION

Conservation District Use Application (CDUA) File No. OA-3698
(BOARD Permit)

This acknowledges the receipt and acceptance for the processing of your client's Conservation District Use Application (CDUA) for the proposed Waimalu Nature Center and Zipline Canopy Tour at Waimalu, Honolulu District, O`ahu, TMK (1) 9-8-073:001. The project area is in the Resource and General Subzones of the State Land Use Conservation District.

The 447-acre parcel lies above the residential Royal Summit and Newtown residential subdivisions. The uplands are part of the shield stage of the Ko`olau Volcano, and contain many steep areas and smaller valleys. The valley floors are dry, with no evidence of permanent or intermittent stream channels.

The vegetation is a mix of shrubland and non-native forest. The most common native trees are `ōhi`a lehua (*Metrosideros polymorpha)* and koa *(Acacia koa)*. There is a relatively high diversity of smaller native trees, shrubs, vines, and ferns. These include `aki`a, `uhaloa, pukiawe, a`ali`i, naupaka, sandalwood, kopiko, alahe`e, uluhe, and pala`a. No native birds were sited during biological surveys, although the O`ahu `amakihi (*Hemignathus flavus)* were heard, and `apapane (*Himatione sanguinea)* are believed to frequent the area in to the seasons. Critical habitat for the endangered `elepaio (*Chasiempis ibidis)* is found mauka of the project area.

Although no listed or threatened species were found in the proposed project area, the applicant lists a number of mitigation measures they will follow to minimize potential risk to seabirds, bats, and snails.

The only developed infrastructure on the parcel is a dirt access road and Hawaiian Electric Company's (HECO) 138kV towers and power lines. Unimproved and unofficial mountain bike and hiking trails also run along the ridgeline.

The landowner currently posts 'no trespassing' signs on the property; however, they have not enforced this in the past. The area is visited by an average of 35 people per day, most of who appear to come from the nearby area. These include hikers, mountain and motor-cross bikers, 4 wheelers, paint ball players, hunters, cultural practitioners, and commercial lei makers.

The applicant proposes to construct a nature center / way station and zipline course on a portion of the property. The 1200 square-foot nature center is proposed for a location 700 feet mauka of the terminus of

Ka`ahele Street. The seven-run zipline course is proposed along a stretch of land running from 0.7 to 1.2 miles mauka of the terminus.

An off-site intake center will gather participants to transport them to the park. Alternatively, vans might pick up visitors at their hotels or similar locations. The park will not allow direct pedestrian, bike, or private vehicle access, effectively closing the area to unauthorized users. The applicant estimates that the park will generate 23 round-trip van trips per day, and ten round-trips by security, management, and associated personnel.

Passengers will be dropped off at the proposed nature center / way station, and then transported further mauka using utility vehicles (UTVs). The way station will have 10 parking stalls, storage for the UTVs, composting toilets, a 24-hour security operations center, and a wash-up area for UTVs.

The zipline course will require between 13 and 14 sending and receiving platforms. Their construction will require grubbing and grading on approximately 0.1 acres in total. The course will be set along the slopes of the ridges, at elevations ranging from 885 feet to 1130 feet above sea level. The course will be non-mechanized, and each segment will start and end on a raised platform. A typical platform is supported by four poles, uses an area of approximately fifteen by fifteen feet, and is elevated between four and ten feet off the ground.

Grey water from the way station will be stored and used for landscaping. The use of photovoltaic systems will be explored. Electric and telephone CATV lines will be run along the access road on overhead poles, or buried.

Construction activities include paving 700 linear feet of the existing 4WD road; clearing and grading the area for the way station; constructing any needed stormwater or retention ponds at the station; and drilling holes for the zipline platform poles. The platforms proposed for the east side of the valley are accessible by the existing unpaved 4WD road. The road will be stabilized, but not widened. The platforms proposed for the west side are connected by an existing trail that follows a former unpaved road. The trail will by widened through hand clearing and limited grubbing to eight-feet in width. No grading or machine clearing will be required.

Additional permits will be required rom the Department of Planning and Permitting (grading and building permits), the State Department of Health (National Pollutant Discharge Elimination System permit), and possibly the Board of Water Supply (water supply approval).

The applicant has stated that they will provide access to the area for registered members of the Newtown Estates Community Association (NECA), and will reserve six parking stalls for their use. The landowner also intends to continue its arrangement with the O`ahu Pig Hunters Association to allow its members to traverse the property. Cultural practitioners who request to access the property for gathering purposes will be able to arrange to access the existing 4WD access road and park at the way station. The Nature Conservancy and the Division of Forestry and Wildlife will maintain their permission to traverse the property for conservation-related activities.

After reviewing the application, the Department finds that:

1. The proposed use is an identified land use in the Resource subzone of the Conservation District, pursuant to §13-5-24, Hawai`i Administrative Rules (HAR), R-8, BOTANICAL GARDENS, PRIVATE PARKS, AND NATURE CENTERS (D-1), *For a profit or non-profit establishment featuring plants or other natural resources and offering tours or other nature-based, outdoors educational and recreational activities, primarily during daylight hours. Facilities may include access road, restrooms, shelters, and not more than one structure for housing, administration, and maintenance not to exceed 1,200 square feet, under a management plan approved simultaneously with the permit, is also required.*.

   This use requires a permit from the Board of Land and Natural Resources, who have the final authority to grant, modify, or deny any permit. This use also requires a management plan, which will be presented to the Board along with the application.

2. Pursuant to §13-5-40 of the HAR, a Public Hearing will be required. OCCL will work with the applicant to arrange a time and place for the public hearing.

3. Pursuant to HAR §13-5-31 *Permit applications,* the permit requires that an environmental assessment be carried out. The draft environmental assessment (DEA) for the project will be submitted to the Office of Environmental Quality Control (OEQC) to be published in the January 23, 2014 edition of the *Environmental Notice.*

4. It is the applicant's responsibility to comply with the provisions of Hawaii's Coastal Zone Management law (HRS Chapter 205A) pertaining to the Special Management Area (SMA) requirements administered by the various counties.

Upon completion of the application review process, your client's CDUA will be placed on the agenda of the Board of Land and Natural Resources for their consideration. Should you have any questions regarding this application, please contact Michael Cain of our Office of Conservation and Coastal Lands Staff at 587-0048.

Sincerely,

William J. Aila, Chairperson
Department of Land and Natural Resources

c: *O`ahu Board Member*
Office of Hawaiian Affairs
OEQC / DOH
Board of Water Supply
DLNR – Land Division, Historic Preservation, DOFAW, DOCARE
O`ahu Pig Hunters Association
Hawai`i Trail and Mountain Club
Neighborhood Board No. 20 - `Aiea
Newtown Estates Community Association
Department of Planning and Permitting
Hawai`i State Library
The Honorable K. Mark Takai
The Honorable David Y. Ige
Byron Park, Jerry Matsuda, Roy Ishikawa, Steven Tanaka

DRAFT ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

January 2014

Applicant:

Waimalu Holding Company LLC

Prepared for:

State of Hawai‘i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

DRAFT ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPLICANT:

Waimalu Holding Company LLC
c/o Christopher L. Lau
Executive Vice President
Towne Development of Hawaii, Inc.
220 S. King Street, Suite 960
Honolulu, Hawaii 96813

APPROVING AGENCY:

State of Hawai‘i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

CONSULTANT:

Geometrician Associates LLC
P.O. Box 396
Hilo, Hawai‘i 96721

CLASS OF ACTION:

Action in the Conservation District

This document is prepared pursuant to:
The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR)

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SUMMARY

Waimalu Holding Company LLC proposes to obtain a Conservation District Use Permit (CDUP) to develop the Waimalu Nature Park and Zipline Canopy Tour as a private nature park on a portion of its 447-acre property in Waimalu, O‘ahu. The Property is undeveloped land within the State Land Use Conservation District, bordered on the *makai* side by residential developments, and on the *mauka*, Diamond Head and Ewa sides by undeveloped land. Access for the Project is at the terminus of Ka‘ahele Street in the Royal Summit residential subdivision. The Landowner intends to form a joint venture with Flyin Hawaiian Zipline LLC of Maui (the “Operator”).

The Project consists of a nature center having approximately 1,200 sf of area located 700 feet from the terminus of Ka’ahele Street, and a zipline course as part of a guided forest canopy tour, having 13 to 14 sending and receiving platforms for use on seven zipline runs, each with a pair of wire cables, starting 1.2 miles *mauka* and ending 0.7 miles *mauka* of the end of Ka‘ahele Street, in an area not visible or audible from residential neighborhoods. Participants will be picked up at an offsite intake center with appropriate zoning and parking in the Aiea or Pearl City area, and/or at hotels or similar pickup sites. No participants will be allowed to drive to the Property or park on the public street adjacent to the Property and walk onto the site.

Electricity/telephone CATV lines will be run along the access road driveway on overhead poles or buried. The use of photovoltaic solar will also be explored. The water necessary for washing UTVs will be collected via rainwater catchment. The limited quantities of used wash water that will be generated will be stored and utilized for landscaping. Potable water lines for fire protection and drinking will be installed in the driveway. Visitors will be on the property for only a short time, and no extensive restroom facilities are required. An individual wastewater system with a seepage pit will be built at the nature center to service the restroom.

The zipline will have a small footprint requiring minimal grading and grubbing on existing access roads/trails and at the platform supports, which all together occupy less than 0.1 acres. The valley bottom is dry, with deep soil derived from the adjacent slopes and no evidence of a stream channel. No water features, wetlands or other aquatic habitat are present. While the Property contains some valuable native flora, inspection by biologists has determined that no threatened or endangered plant species listed by the U.S. Fish and Wildlife Service are present. An expected condition of the CDUP is that construction activities will involve a botanist trained in identifying native plants to ensure that valuable native plants are avoided to the extent feasible

during the very limited construction at platform sites and the nature center, which can be utilized with minimal damage to native plants. Due to the low elevation, it is highly unlikely that the project area supports the nests of Oʻahu Elepaio or would have any impact on this endangered bird. No night lighting that would disturb seabirds will be present. To avoid impact to Hawaiian hoary bats, the project will not trim or remove woody plants taller than 15 feet during the bat pupping season, from June 1 to September 15 each year, and no barb-wire fencing will be used.

The Project also has intrinsic biological benefits. All tours will include a component of conservation education conducted by guides specifically trained in Hawaiian conservation biology. Some tours will have a service component involving implementation of a program of alien species removal and/or outplanting of native species, conducted by qualified personnel and open to review and inspection by DLNR. The Landowner will also evaluate proposals by agencies or other entities to conduct research or restoration activities on the Property, and will permit and support these actions to the extent they are consistent with the continuing use as a nature park. Finally, implementation of the Project also involves a reduction in unauthorized off-road biking and motorcycle use, which have tended over time to degrade the Property through extensive disturbance to native species and promotion of invasive species.

On average, two vehicles will be traveling from the pickup site(s) to the nature center and another two vehicles will be traveling from the nature center to the pickup site(s). At maximum, three vehicles will be making trips to and from the nature center. This equates to 1.5% of future PM peak hour traffic along Kaʻahele Street, 0.2% along Moanalua Road, and 0.7% along Komo Mai Drive. This represents a negligible increase in peak hour traffic along Kaʻahele Street, Moanalua Road, and Komo Mai Drive, and traffic Level of Service would not degrade. The total daily trips projected along Kaʻahele Street is estimated to be 66, the equivalent daily traffic generated by 6 to 8 typical residences.

Noise studies determined that owing to distances to sensitive uses (such as residences or schools) of 700 feet to a mile, noise levels from actions at the nature center and the zip lines would be imperceptible to barely audible and below the ambient noise of the suburban neighborhood. The additional traffic from 2 to 3 vans per hour would produce typical instantaneous noise each time a van passed, but when factored into existing background traffic, averaged hourly noise would increase only a fraction of a decibel, below the ability of a human ear to perceive change.

Each of the 13 to 14 zipline platforms will be located 4 to 10 feet above ground on slopes just below the crest of flanking ridges, supported by four “telephone” poles, using an area of approximately 15 by 15 feet. Guide wires will be used to anchor the poles and provide structural integrity for the cables that are strung across the valley. Ziplines themselves are slender and minimally visible from a distance. In the context of the existing forested slopes shielded by ridge lines, the platforms and ziplines generally are not visually intrusive even within the valley. The platforms would be located essentially at ridge level amid groves of trees. Ridges at the front of the valley to be used for the zipline block views to/from nearby subdivisions. The proposed nature center is situated behind a ridge and will be barely visible through the trees from offsite locations. Because of scale and intervening topography, it is unlikely that any part of the zipline

will be visible from the H-1 Freeway or Kamehameha Highway. From Pearl Harbor, a minimum of two miles away, high powered binoculars would be required to spot a platform or line.

There are no available studies on the relationship between property values and small-scale outdoor recreational facilities such as the proposed nature park and zipline. The highest value properties on the Hamakua Coast of Hawai‘i are currently being developed directly adjacent to the zipline complexes at/near World Gardens in Umauma. The Operator notes no reports of property value declines near his zipline at Waikapu. Ziplines do not appear to have a stigma that lowers property values.

Discussion with law enforcement officials familiar with attractions in other neighborhoods with private nature parks, including Manoa Falls/Paradise Park and the Kalihi Nature Center, does not support the concern raised at several neighborhood meetings that visitors will return to commit crimes to a neighborhood after being transported in a van to this paid visitor activity.

Unauthorized access to the Property has been a concern for neighbors. Although the property is private and signed for no trespassing, some members of the public walk or ride around the gate and engage in mountain biking, hunting, motorcycle and ATV riding, paintball/airsoft gun tournaments, and hiking. Some commercial lei makers indiscriminately harvest ferns and *liko* (buds) of *‘ōhi‘a* to an unsustainable degree that could harm the trees (there may also be some cultural practitioners gathering material for non-commercial purposes in a traditional manner, which is not a concern). The Landowner is thereby exposed to some degree of liability, but without hiring full-time security, it has not found it feasible completely to prevent these activities. Such intense use also affects Royal Summit residents, who now often lack on-street parking and have to deal with the inconveniences of trail users with dogs and unauthorized use of hoses for removing mud from bikes and motorcycles. Responding to requests at community meetings, the Landowner has applied for a CDUP to fence off the access and intends to install additional signs to prevent unauthorized access for the time being. The Project would permanently eliminate unauthorized trespassing and use of the Property.

In order to allow residents of the Newtown neighborhoods, past which the passenger vans for the Project will pass each day, to continue to enjoy some use of the Property, the project specifically provides that Newtown Estates Community Association (NECA) members will be able to hike on the property. A system will be implemented whereby users from NECA and their guests will sign a waiver of liability form and can then drive through the gate at the end of Ka‘ahele Street and up the access driveway. They will then park in a designated area containing approximately six visitor parking stalls at the nature center and will be able to hike. There will be no pedestrian access through the end of Ka‘ahele Street. Those engaged in cultural practices on the Property will also be provided access and their rights will not be affected.

In addition to the CDUP, City and County of Honolulu or State of Hawai‘i approvals required to implement the Project include a Grading Permit and Building Permit for the driveway, nature center and parking lot (Department of Planning and Permitting); a National Pollutant Discharge Elimination System permit (Department of Health); and Water Supply Approval (Board of Water Supply) (if necessary).

PART 1: PROJECT DESCRIPTION AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Project Description

Project Location

Waimalu Holding Company LLC (WHC, the "Landowner" and "Applicant") proposes to obtain a Conservation District User Permit (CDUP) to develop the Waimalu Nature Park and Zipline Canopy Tour (the "Project") as a private nature park on a portion of its 447-acre property in Waimalu, Oʻahu, Hawaiʻi identified as TMK 9-8-073-001 (the "Property"). The Property is undeveloped land within the State Land Use Conservation District, bordered on the *makai* side by residential developments, on the *mauka* and Ewa sides by undeveloped land belonging to the Austin Trust and Kamehameha Schools, and on the Diamond Head side by the steep Waimalu Gulch cliff and several other large private and Board of Water Supply parcels. The access for the Project is at the terminus of Kaʻahele Street in the Royal Summit residential subdivision (Figures 1a-1c).

Project Concept

The Waimalu Nature Park and Zipline Canopy Tour would be a private nature park offering recreational tours. The featured activity would be a zipline operation through the forest canopy, with a nature center for orientation of visitors and education in Oʻahu's natural environment. A 2012 study by the Auditor of the State of Hawaiʻi found that the first zipline course in Hawaiʻi opened in 2002, and there are now 22 ziplines and canopy tours throughout the State.

The portion of the Property to be used for the zipline is between 0.7 and 1.2 miles from the end of Kaʻahele Street, on two forested ridges that meet in a low saddle, separated from the residential areas below by a low rise that hides views of the areas proposed for use (Figure 2). One ridge, forested primarily with non-native trees, has an existing 4WD road that serves as a HECO utility corridor access. The other ridge supports a native *ʻōhiʻa-uluhe* forest that is just beginning to be invaded by non-native species, despite having a trail that was formerly cleared as a crude 4WD road. The Project involves seven paired zipline runs, varying in length from approximately 240 to 1,200 feet, that will criss-cross the valley between the ridges, providing an exciting and educational experience in a beautiful natural setting (Figure 2).

Although the property is private and no public access is authorized, some members of the public have for several years walked or ridden around the gate and engaged in a variety of uses including mountain biking, motorcycle and ATV riding, paintballing/airsoft gun tournaments, commercial harvest of forest material and hiking. This has created difficulties for the Landowner, who despite posting No-Trespassing Signs has been exposed to some degree of liability for the numerous participants in these unauthorized activities. It also tends to create problems for some residents of the adjacent Royal Summit neighborhood, who lose on-street parking. Responding to a request from neighbors at several recent community meetings, the Landowner has filed for permits to fence off the access and install additional signs and security to prevent unauthorized access for the time being.

The proposed Waimalu Nature Park and Zipline Canopy Tour can achieve a low-impact economic use of the unique property that controls unauthorized uses while allowing neighborhood residents the opportunity to continue to hike on the property. The Landowner has teamed on the project with Duane Ting, who operates Flyin Hawaiian Zipline (a 2-mile long course from Waikapu to Maʻalaea in Maui), the Maui Zipline Company at Maui Tropical Plantation, and Zipzone Columbus in Columbus, Ohio. Duane Ting was honored as the Maui Young Businessperson of the year in 2010 and was a finalist for the *Pacific Business News* Business Leadership Hawaiʻi Awards in 2013. These awards recognized his business model focused on keeping Maui natural while sharing it with visitors. He designed the business to leave the lightest footprint and to foster restoration of native habitat and endangered species, including planting of over 1,800 *Hibiscus breckenridgei*. The Waimalu Nature Park and Zipline and Canopy Tour is being planned to follow and extend this model.

Ziplines tend to have limited physical footprints, where land is disturbed only on access roads/trails (which already exist at the Waimalu property) and at the zipline platform supports, which each require only a few hundred square feet (see photo in Figure 3c of typical zipline platform). Duane Ting has learned that zipline visitors enjoy natural beauty along with information about native plants and their traditional uses. There is thus an incentive to maintain and restore native vegetation and train guides in biology and culture, an idea fit for Waimalu. Although known for their thrills, ziplines have one of the lowest injury rates of any "active" tours such as bicycling, ATV riding, horseback riding, etc. An official 2012 report by the Auditor of the State of Hawaiʻi determined that the industry has a good safety record with insufficient data of serious harm to the public to warrant any form of government regulation. The industry successfully self-regulates through insurance provisions that require annual inspection reports by insurer-accredited companies designated under industry standards as qualified challenge course professionals.

The following is a detailed description of the planned Waimalu Nature Park and Zipline facilities and operations, along with access plans:

FACILITIES:

- A zipline course as part of a guided forest canopy tour, having 13 to 14 sending and receiving platforms for use on seven zipline runs, each with a pair of zipline cables, starting 1.2 miles *mauka* and ending 0.7 miles *mauka* of the end of Kaʻahele Street, in an area not visible or audible from residential neighborhoods (See Figure 3a for Site Plan);
- An offsite intake center to gather participants for transport to the Waimalu Nature Park and Zipline Canopy Tour, with approximately 1,500 to 2,000 square feet (sf), to be leased from a third party, located in a yet-to-be identified property in the Aiea or Pearl City area with appropriate zoning and adequate parking. Alternatively, vans may pick up guests from hotels or similar locations.
- A nature center/way station, situated 700 feet *mauka* of the end of Kaʻahele Street, consisting of a structure having no more than 1,200 sf and 10 parking stalls that will serve as: 1) the drop-off point for the van transportation and the pick-up point for the utility vehicle (UTV transports; 2) storage for the UTVs; 3) parking; 4) a composting toilet; 5) a wash-up area for UTVs with the grey water stored and used for landscaping; and 6) the 24-hour security operations center.

Figure 1a. USGS Project Location Map

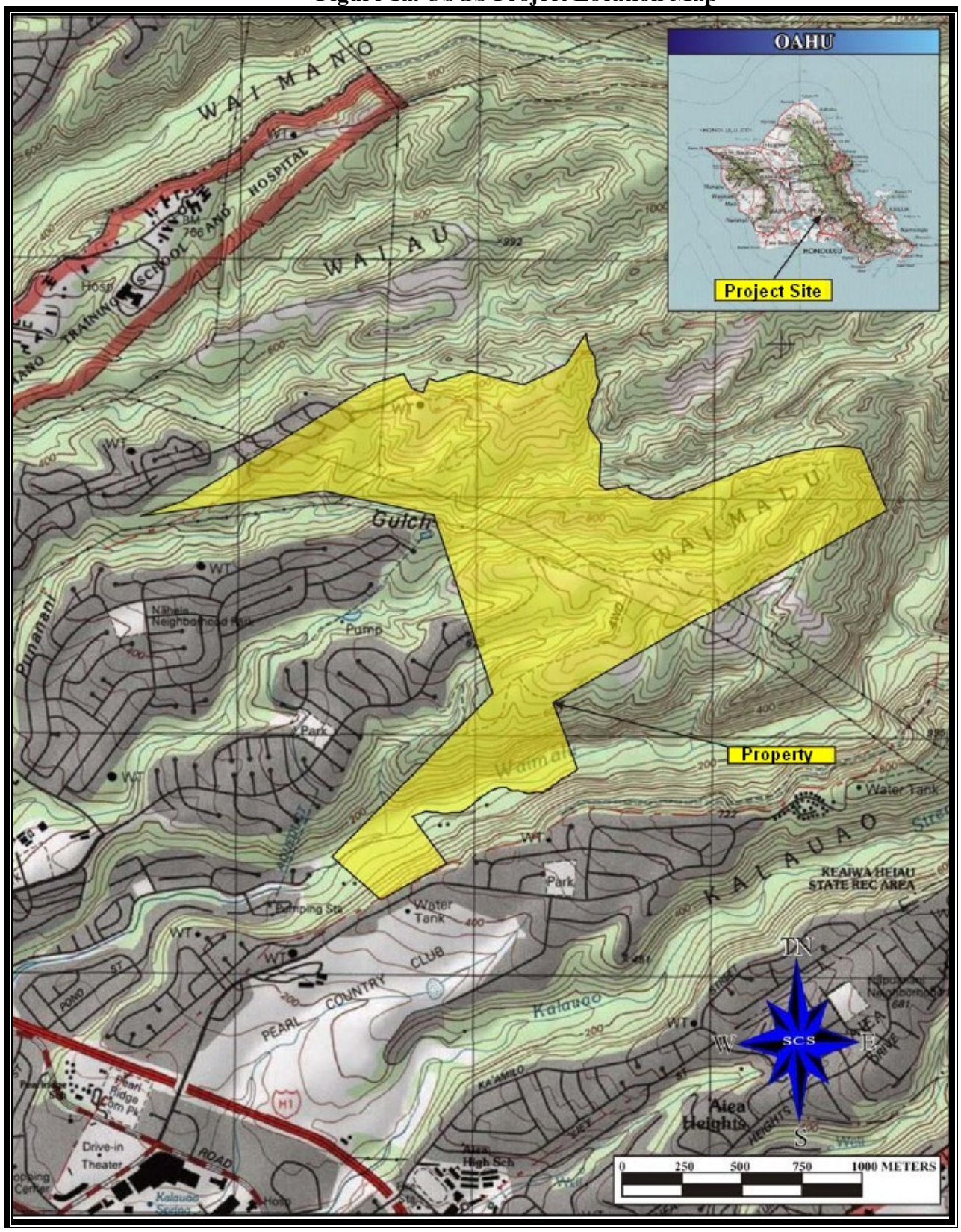


Figure 1b. TMK Map

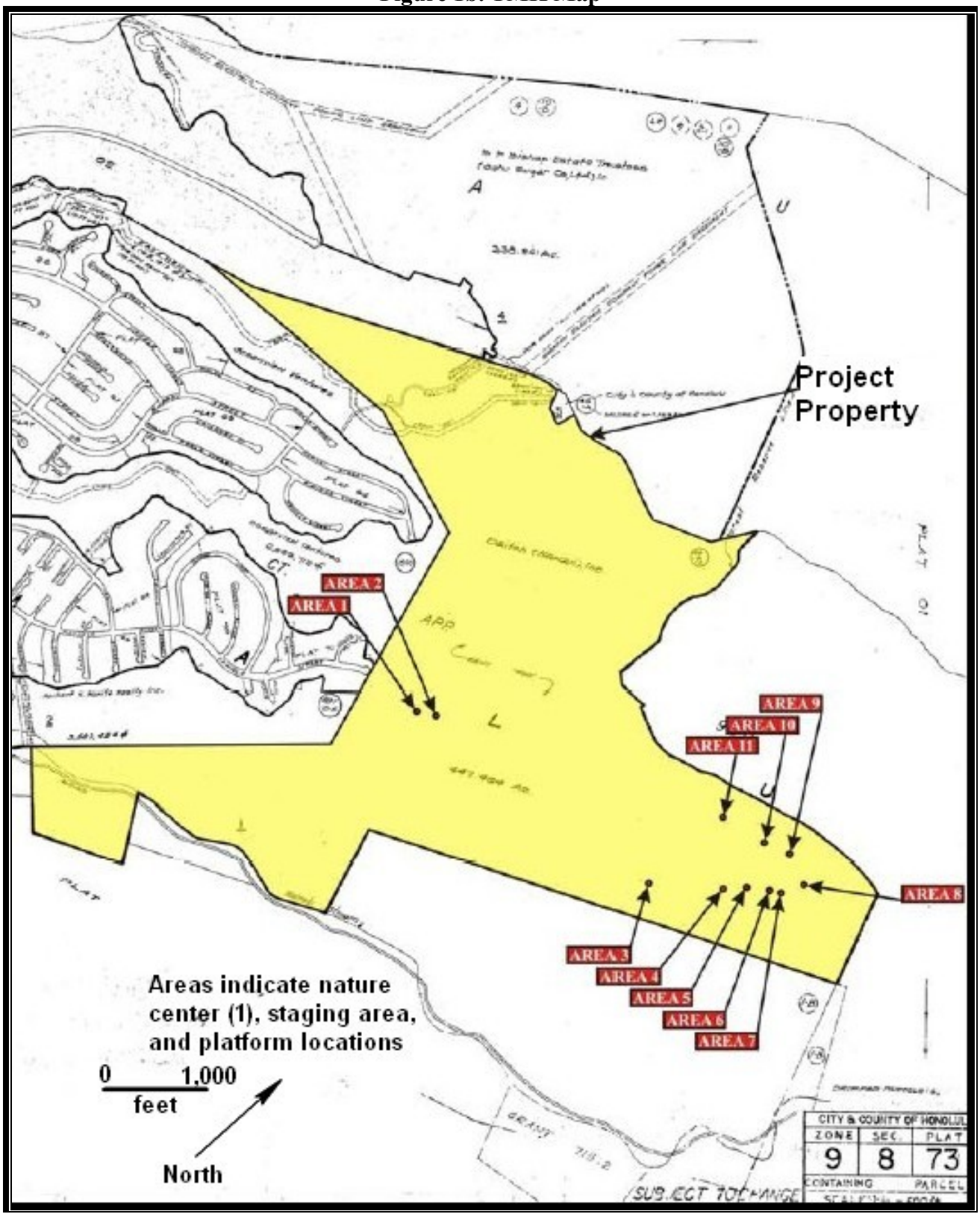
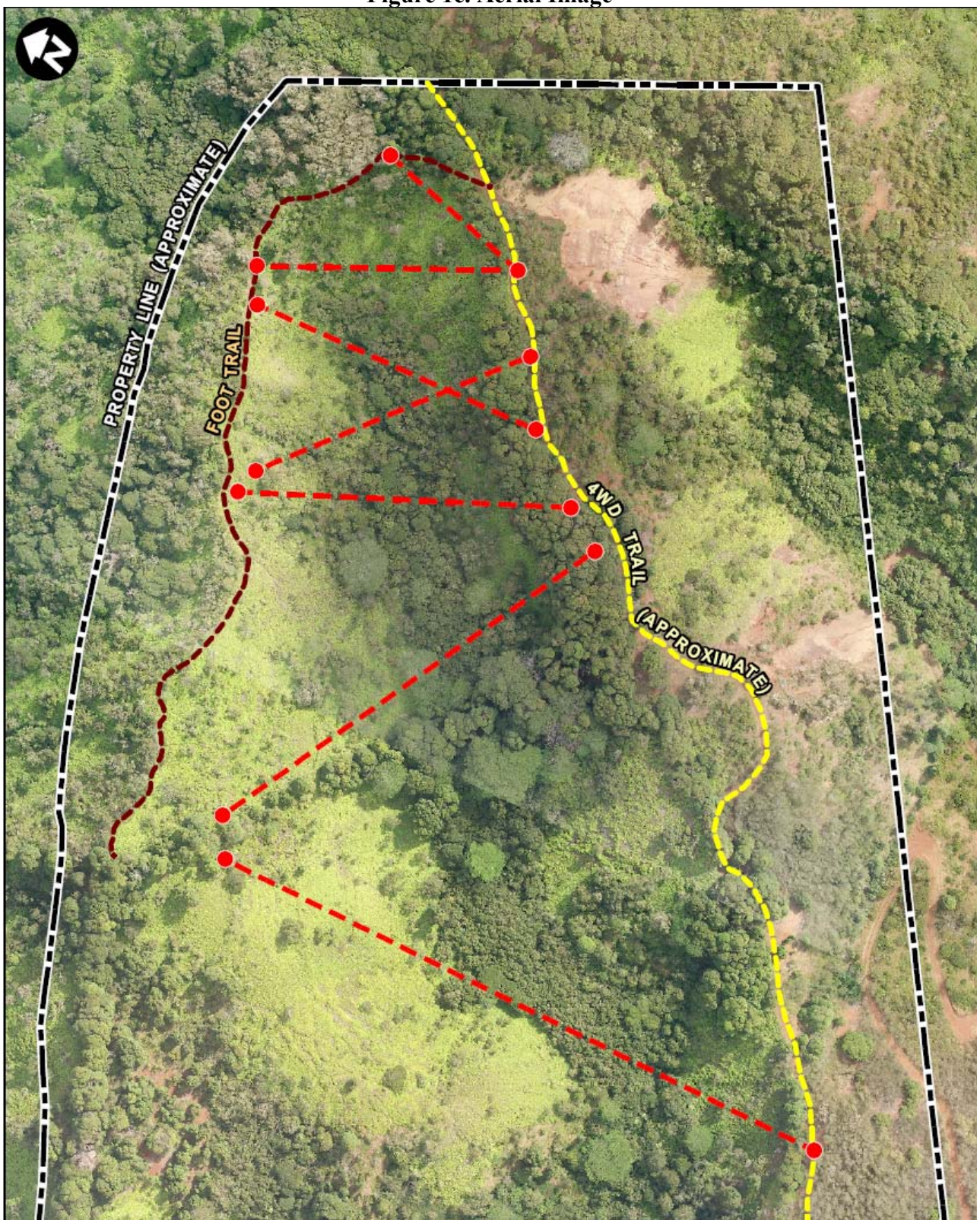


Figure 1c. Aerial Image



Note: Zipline locations and lengths approximate

Figure 2. Project Site Photos

Figure 2a Valley Proposed for Ziplines ▲ ▼ Figure 2b Native Forest on West of Valley

Figure 2. Project Site Photos

Figure 2c View towards Pearl Harbor ▲

▼ Figure 2d Terminus of Ka‘ahele Street

Figure 3. Typical Zipline Features and Site Plans

Figure 3a Typical Zipline Platform Structure ▲

▼ Figure 3b Typical Zipline in Operation

EARTHWORK SUMMARY

EXCAVATION= 3,670 CY
EMBANKMENT= 810 CY
AREA TO BE GRADED= 0.9 AC.
*FOR GRADING PERMIT ONLY

NATIONAL POLLUTANT DISCHARGE ELIMINATION NOTES
APPLICABLE BEST MANAGEMENT PRACTICES FOR THIS PROJECT ARE:

1. Perimeter Runoff Control – Temporary Silt Fence.
2. Sediment Traps – Temporary Sediment Control Filters at Catch Basins.
3. Stabilization Cotrol – Vegetative cover to be planted as soon as final grades are established.
4. #2 Crushed Rock Construction Road for Ingress/Egress.
5. At the end of the operations, all the catch basins surrounding the project site shall be inspected for any accumulation of sediment and debris. The accumulated sediment and debris shall be removed from the catch basins (flushing into the catch basins is prohibited).

DUST CONTROL NOTE:

The contractor shall be fully responsible for the measures it will take for the control of fugitive dust from the worksite. The measures may include but not limited to the installation of dust screens, watering of the site and fill material being placed, and delaying work in the week that prevailing wind direction should shift.

20 10 0 20 40
Scale in Feet

REV.	DATE	DESCRIPTION	BY	CEB	TRB	WWB	BWS

Bills Engineering Inc.
Civil/Environmental Engineering
1124 Fort Street Mall • Suite 200 • Honolulu, HI 96813

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE

WAIMALU
TAX MAP KEY : 9 – 8 – 73 : 01
WAIAU AND WAIMALU, EWA, OAHU, HAWAII

CONCEPTUAL SITE, GRADING PLAN, ACCESS ROAD AND NATURE CENTER

ENGINEER DB DRAWN BY RE CHECKED BY DB
APPROVED BY:

12073c01.dwg/1501.54/ggsw/082913
Tue, 03 Dec 2013 – 10:40am
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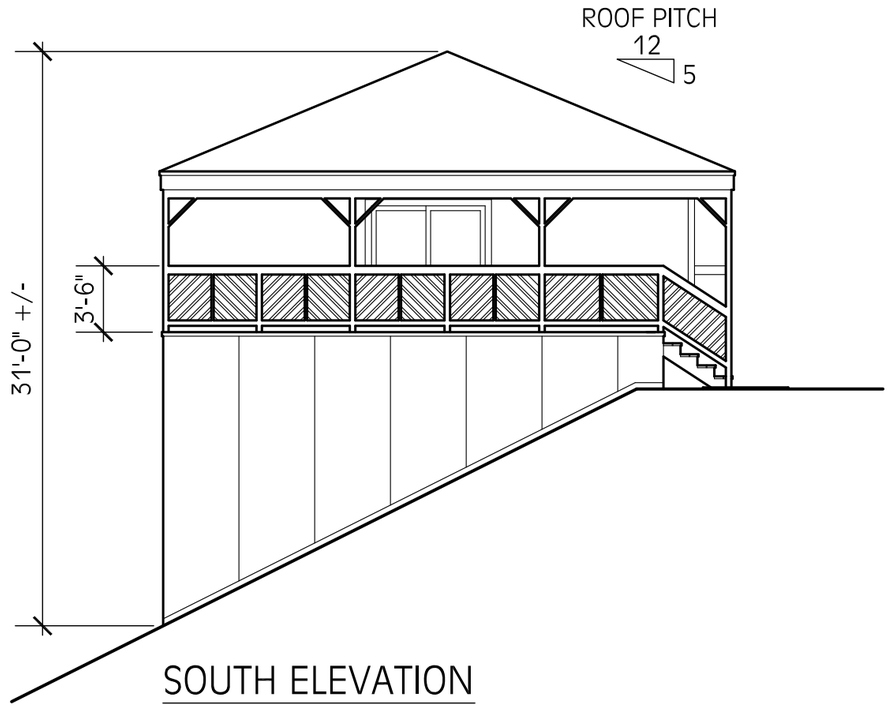
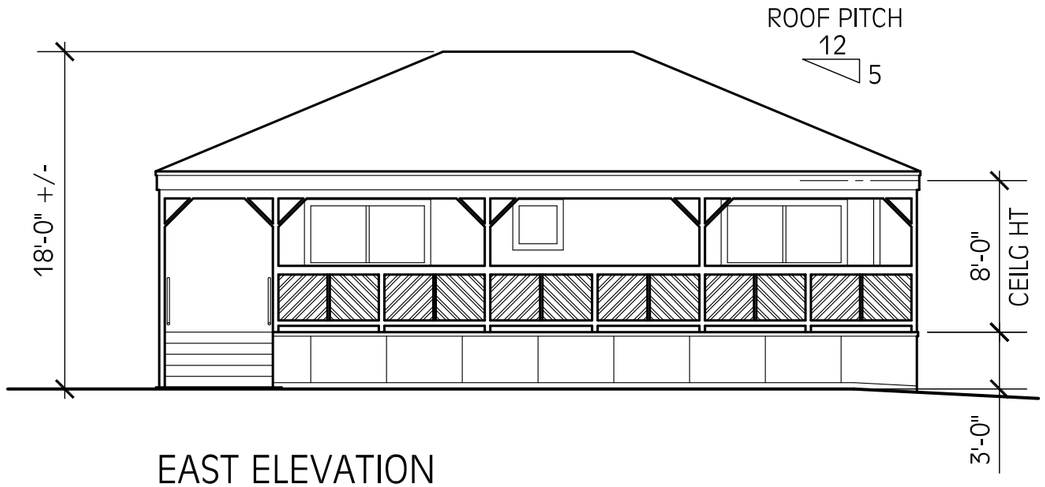
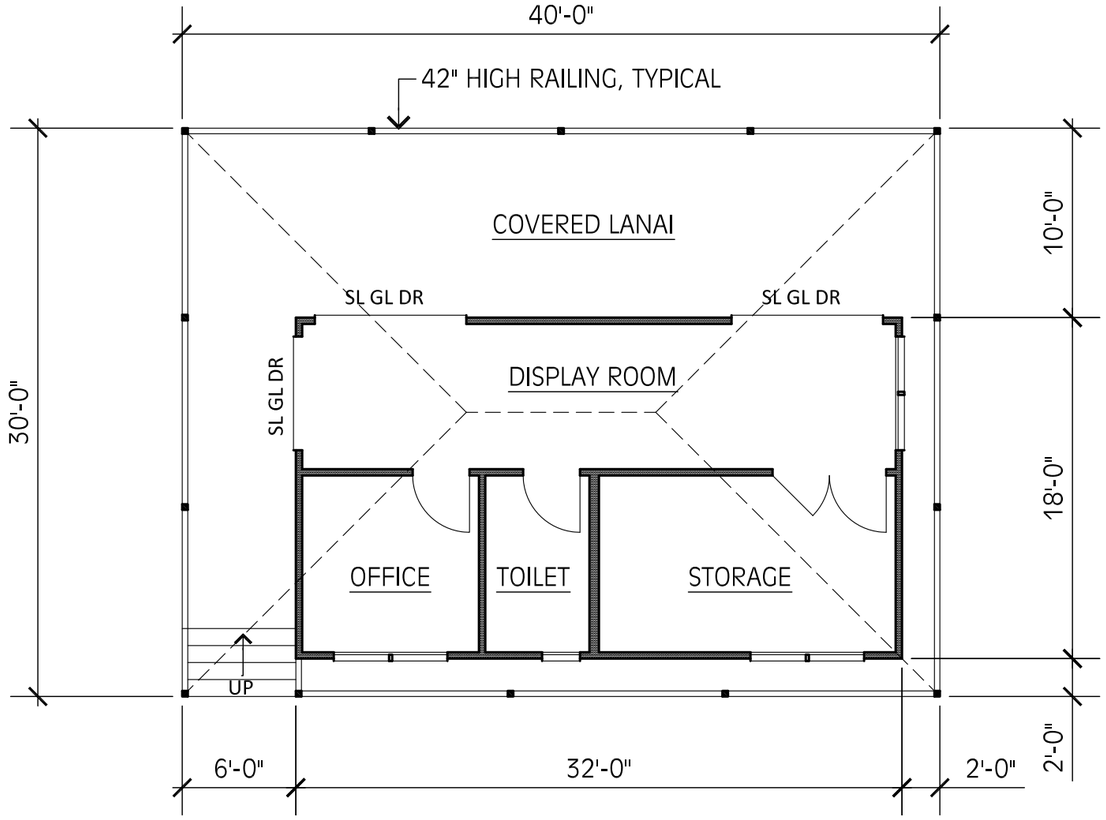


SOUTH ELEVATION
Sc: 1/8"=1'0"



EAST ELEVATION
Sc: 1/8"=1'0"



FLOOR PLAN
Sc: 1/8"=1'0"

NATURE CENTER
Waimalu Nature Park and Zipline Canopy Tour
at:
tmk: 9-8-073: 001
Fig. 3b

DATE	14NOV13
REVISION	
SHEET	1
OF	1 SHEETS

- On-site parking limited to employees, shuttle vans, service vehicles, and authorized non-zipline users, including neighborhood resident hikers;
- A booth near the security gate for use by a security guard; and
- Utilities serving the nature center, including electricity and a water line, will come from the terminus of Ka'ahele Street.

OPERATIONS:

- Operations will consist of an average of 15 tours per day with a maximum limit of 25 tours per day. Typically, about twice an hour, passengers will be transported in vans from the intake center or hotels/alternative visitor pickup sites over City & County roads through the entry of the Waimalu site to the nature center/way station;
- Zipline tour participants will be put into 10- to 12-person groups and accompanied at all times by two guides;
- Participants will be taken by UTVs from the nature center/way station to the start of the zipline course over an existing 4WD road that will be lightly improved;
- The tours will take about 2½ hours from the time that they leave the intake center/alternative pickup sites until their return; and
- Operations will be limited to 8:00 a.m. to dusk, 365 days a year.

ACCESS PLANS:

- Participants will NOT be allowed to drive to the site or park on Kaʻahele Street; all participants will access the site via pickup at the offsite intake center or hotels/alternative visitor pickup sites.
- Unauthorized access to the Property by various users off of Kaʻahele Street will no longer be permitted, and the Kaʻahele Street access will be fenced, gated, signed for no-trespassing, and patrolled by security personnel;
- Existing easement holders, including Hawaii Electric Company and the Austin Trust, will continue to be able to access the Property via Kaʻahele Street;
- Emergency operations such as fire response or search and rescue that require access to or through the Property will continue to be allowed;
- Conservation uses by the Hawaiʻi Division of Forestry and Wildlife and The Nature Conservancy, which currently has permission to traverse the Property, will be allowed;
- As long as there are no incidents, the Landowner intends to continue its longstanding arrangement allowing members of the Oʻahu Pig Hunters Association access *through* the Property to hunt with dogs and knives in other areas for which they have permission to access and hunt. No hunting or use of firearms will be permitted on the Property itself;
- Newtown Estates Community Association members will be able to arrange to access the existing 4WD access road at the end of Kaʻahele Street and park at the nature center and hike, as space is available; and
- Cultural practitioners who request access to the Property for gathering purposes will be able to arrange to access the existing 4WD access road at the end of Kaʻahele Street and park at the nature center and hike, as space is available.

Zipline Course Layout and Appearance

The guided forest canopy tours will be conducted on the zipline course, with seven paired lines of ½-inch steel cable. The course will be set along the slopes of the ridges at elevations of between 1,130 and 885 and feet above sea level, within an area of intermittent forest canopies and open areas. The course will be non-mechanized, and each segment will start and end on a raised zipline platform (see Figure 1c for aerial image with general conceptual layout, and Figure 3a for detailed site layout of the zipline courses).

Each platform will have a small footprint and be elevated the minimum practical height above the sloping ground near the crest of the ridge. Unlike ziplines in flatter terrain, which require very elevated platforms to help achieve the gradient needed for the zipline, the platforms on the ridges at Waimalu can be low to the ground. A typical platform is supported by four "telephone" poles, uses an area of no more than 15 by 15 feet, and is elevated 4 to 10 feet above the surface of the ground on the downslope side (and near level on the upslope side) (see Figure 3c). This varies depending on the exact surface topography at the platform site. Guide wires will be used to anchor the poles and provide structural integrity for the cables that are strung across the valley. No utilities will service the towers or platforms. Even within the valley, in the context of the existing forested slopes, the platforms would not be visually intrusive, and none of the courses will be visible from the H-1 Freeway or from Kamehameha Highway.

Facility Construction

In overview, construction of the facility will include improvement of trails and roadways, construction of the nature center, and emplacement of zipline infrastructure, involving full or partial disturbance of approximately 1.65 acres: 0.9 acres for the access road and nature center, about 0.5 acres for the zipline platforms and helical anchor pads, and about 0.25 acres for a 100-foot by 100-foot staging area in an existing cleared, flat area just off the access road near the high-tension electric line crossing. The following specific construction actions are involved:

- Driveway: Grading, excavation and/or other ground disturbance for improvements to a 700-foot length of the existing 4WD to convert it to a driveway. Excavated materials will be retained on-site, and some driveway base material such as gravel may be imported to the site.
- Nature Center: Clearing, grading, base course construction, drainage facilities installation, utility trenching and installation, paving for parking and turnaround, construction of any stormwater detention and retention ponds that may be required, and construction of the 1,200-sf nature center building itself.
- UTV Trail and Construction Trail: Grubbing and widening of the zipline platform construction access trails. The platforms located on the east side of the valley are all accessible by the existing unpaved 4WD road, which will be stabilized, with no widening necessary. The platforms on the west side are connected by an existing trail on the course of a former unpaved road that will be widened through hand-clearing and light grubbing to eight feet in width for construction purposes, after which they will be narrowed by allowing native *uluhe* fern to grow back in. No grading or machine clearing is necessary in these areas.
- Zipline Platforms and Supports: Digging/drilling of holes for the zipline platform poles and

guide wire stays. To enable the construction of some of the zipline platforms and their anchors, it may be necessary to conduct minor rock drilling, the debris from which would be utilized on-site. No blasting would be necessary. There will also be hand clearing of foot trails between platforms, avoiding native vegetation to the degree feasible, between some of the towers to facilitate maintenance.

Each of these activities involves some disturbance to vegetation and the ground surface. As discussed in appropriate sections below in this EA, grading permits and National Pollutant Discharge Elimination System permits will include plans to avoid or reduce erosion, sedimentation and water quality effects; biological survey has determined that no rare, threatened or endangered plants or important habitat for native fauna would be affected by this action; and archaeological survey has determined that no archaeological sites are present in any affected area.

In recognition of the special character of the Property and its location within the Conservation District, the Applicants have committed to a number of measures with potential to protect and restore conservation biology values in the area. These are expected to be incorporated in the Project's Conservation District Use Permit (CDUP) permit as enforceable conditions, and include the following:

- Project construction activities will involve a botanist trained in identifying native plants to ensure that valuable native plants are avoided to the extent feasible during construction.
- All tours will include a component of conservation education conducted by guides specifically trained in resources and issues related to Hawaiian conservation biology;
- Some tours will include a service component involving implementation of a program of alien species removal and/or outplanting of native species. These will be conducted by qualified personnel trained in recognizing and dealing with invasive species and outplanting appropriate natives. This program will be submitted to DLNR-OCCL and DLNR-DOFAW for review and comment, all actions will be documented, and the project site will be open for inspection from DLNR officials;
- The Landowner will evaluate proposals by agencies or other entities to conduct research or restoration activities on the Property, and will permit and support these actions to the extent they are consistent with the continuing use as a Nature Park; and
- Implementation of the Project also involves a reduction in the intensity of other recreational uses on the property, including off-road biking and motorcycling, which have tended over time to degrade the Property through extensive disturbance to native species and promotion of invasive species.

1.2 Environmental Assessment Process

The Project would be a permitted use within the State Land Use Conservation District, subject to issuance of a Conservation District Use Permit by the Board of Land and Natural Resources. To complete the proposed improvements, a Conservation District Use Application ("CDUA") permit with Land Board approval is required pursuant to Chapter 13-5, Hawai'i Administrative Rules ("HAR"), which governs land uses within the State Land Use Conservation District. An Environmental Assessment ("EA") is required due to the Property's location within the State Conservation District.

This EA process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact assessment process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur; Part 5 lists each criterion and presents the anticipated preliminary findings by the approving agency, the State of Hawai‘i Department of Natural Resources. If, after considering comments to the Draft EA, the approving agency concludes that, as anticipated, no significant impacts would be expected to occur, then it will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to occur. If the agency concludes that significant impacts are expected to occur, then an Environmental Impact Statement (EIS) will be prepared.

1.3 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of the Environmental Assessment.

Federal:
- U.S. Fish and Wildlife Service

State:
- Department of Health, Environmental Health Administration
- Department of Land and Natural Resources
- Office of Hawaiian Affairs
- Hawai‘i Tourism Authority
- Representative Mark Takai
- Senator David Ige

City and County:
- Department of Facility Maintenance
- Honolulu Fire Department
- Department of Facility Maintenance
- Department of Design and Construction
- Department of Planning and Permitting
- Department of Environmental Services
- Honolulu Police Department
- Councilmember Breene Harimoto

Private:
- Hawaiian Electric Company
- Newtown Estates Community Association
- The Nature Conservancy

Letters and other materials received in response to early consultation are included in Appendix 1a.

1.4 Cost and Schedule

The cost of developing the Project, including permitting, design, construction and initial mitigation, is estimated at approximately $1,000,000. The completion of various project elements is expected to involve an eighteen month process. The processing and approval of a CDUA is projected to be completed by late 2013. Final approvals for site design plans, architectural and engineering details for the nature center could be received by early 2014, with construction to begin in the middle part of 2014 and to be completed within six months from commencement.

PART 2: ALTERNATIVES

2.1 No Action

The "No Action" alternative would leave the Property as-is for the foreseeable future. The Property at present is vacant, although some members of the public utilize it without permission of the owners for hiking, mountain biking, paintball/airsoft gun tournaments, commercial (and perhaps traditional) gathering of forest materials and dirt biking. The No Action alternative would fail to generate economic benefits including jobs, income tax, general excise tax and increased property taxes. It would not provide additional commercial recreational opportunities for O'ahu residents and visitors. For liability reasons and to prevent erosion, invasive species proliferation and other adverse effects, the owner may choose at some point to limit or prevent altogether any public use of the property, which would deprive neighborhood residents of the ability to hike on the property.

2.2 Other Alternatives Evaluated and Dismissed from Further Consideration

There are a variety of uses possible within the existing State Land Use Conservation District, many of them a variant of a nature park/recreational facility. Such actions have been fully considered and the owners have refined them to the proposed action. Other identified private uses include a single-family home, which the owners do not wish to construct. A previous property owner considered the potential to reclassify the Property to State Land Use Urban, acquire a zoning change and other permit approvals, and then subdivide and create as many as 300 10,000-sq. ft. lots for a mixture of affordable and market rate housing. This is not consistent with the current Landowner's vision for this Conservation District property and they do not consider it a prudent alternative for consideration in this EA. It is possible that private parties, the State or the City/County could arrange to purchase this land for conservation or recreational purposes; however, the owners are unaware of any desire by such parties to initiate such a purpose and this seems unlikely at this point.

2.3 Alternatives Advanced for Consideration in the EA

The proposed Waimalu Nature Park and Zipline Canopy Tour is the only action alternative for the Property that is currently acceptable to or desired by the Landowner. This along with the No Action Alternative will be the only actions systematically considered in this Environmental Assessment.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The 447-acre property on which the project would take place, TMK 9-8-073-001, is referred to in this document as "the Property". The term "project area" is used variably to describe the general environs of the Aiea-Pearl City-Waimalu area. Supporting infrastructure including improved roadways and trails and the nature center will involve disturbance of scattered sites totally less than an acre, concentrated within 40 to 50 acres on two ridges in the center third of the Property that are already accessible by 4WD road and/or trail and has been used by hikers and cyclists. As other areas of the Property will remain completely undisturbed, this 40 to 50-acre area is called in this EA the "project site" (see Figure 1a).

3.1 Physical Environment

3.1.1 Geology, Soils and Geologic Hazards

Environmental Setting

The uplands of Aiea are geologically part of the shield stage of Koʻolau Volcano, which has been eroded by the stream valleys such as nearby Waimalu that have become filled with sedimentary deposits (MacDonald et al 1983). According to U.S. Natural Resources Conservation Service soil maps (U.S. Soil Conservation Service 1972), the Property consists of five soil series, primarily Helemano silty clay and Manana silty clay loam. These soils are well-drained except where severely eroded or where a pan-like sheet occurs at shallow depths in the soil profile. Much of the remaining land is classified as other than soil – rock land or rough mountainous land.

Seismic activity in the southern half of Oʻahu is moderately high because it is within the Molokai Seismic Zone (Fletcher et al 2002), and the project site may be subject to earthquakes. This is particularly relevant because the Property contains many steep areas that are naturally subject to landslides, rockfalls and other forms of mass wasting (see photos in Figure 2).

Impacts

A number of construction activities will involve at least some level of surface disturbance, as discussed in Section 1.1, above. Most of this activity would occur in association with the existing driveway and the nature center, on existing roads or in flat or low-slope areas that are currently cleared or were previously cleared for former uses. Construction and use of areas related to the zipline platforms, however, will occur in areas of steep slopes. As discussed in Section 1.1, each platform will be supported by four "telephone" poles, use an area of approximately 15 by 15 feet that is currently undisturbed, and be elevated 4 to 10 feet above the surface of the ground on the downslope side (and near level on the upslope side) (see Figure 3c). This will vary depending on the exact surface topography at the platform site. Guide wires will be used to anchor the poles and provide structural integrity for the cables that are strung across the valley.

The No Action Alternative would avoid all geologic hazards and risks and potential loss or damage to the land or equipment.

Mitigation Measures

As discussed above, advanced zipline construction techniques in conformance with ASTM (American Society for Testing and Materials) standards referenced in Designation F2959-12, "Standard Practice for Aerial Adventures Course." These incorporate measures that act to mitigate for slope stability issues in the steep areas they are often built on. Prior to construction of the platforms and ziplines, a geotechnical engineer will evaluate the areas proposed for the location of the platform poles and anchors for guide wires, and will assist in determining the specifications, including size, material and depth, for the poles and anchors. In particular, the geotechnical engineer will:

- Conduct a visual geologic reconnaissance of the proposed area;
- Research available geologic documentation relevant to the area;
- Drill nine test borings extending to an estimated maximum depth of 25 feet. The borings would be six inches in diameter, with drilling and sampling undertaken with a truck-mounted drill rig. The samples would be obtained with a 3.0-inch O.D. (2.50-inch I.D.) split spoon sampler advanced with 140 foot-pound drop hammer blows. The borings would be backfilled with tamped soil upon completion;
- Conduct laboratory testing on selected samples recovered from the test borings;
- Prepare engineering analyses based on the results of the field exploration and laboratory testing program;
- Make findings regarding site soil, ground water and other geologic conditions; conclusions pertaining to expansive soils, bearing capacity, settlement, slope stability and foundation conditions; and. recommendations for site preparation and grading, and foundations.

As stated in Chapter 1, construction of the facility will include improvement of trails and roadways, construction of the nature center, and emplacement of zipline infrastructure, involving full or partial disturbance of approximately 1.65 acres: 0.9 acres for the access road and nature center, about 0.5 acres for the zipline platforms and helical anchor pads, and about 0.25 acres for a 100 by 100-foot staging area in an existing cleared, flat area just off the access road near the high-tension electric line crossing. A preliminary engineering plan for the access road and nature center area is shown in Figure 3c. During final design of the project, topographic survey and grading plans will be developed. A grading permit application in conformance with Chapter 14, ROH (Revised Ordinances of O‘ahu) 1990, as amended, will be prepared as appropriate. If soil type, cut/fill dimensions or the steepness of the slopes warrant, a soils report and/or an engineering report will be prepared. These plans will provide measures including structural controls, maximum slopes, fill characteristics, etc., to stabilize the slopes and eliminate or reduce the possibility of slope failure.

Final design will also involve a drainage plan and erosion control plan. Ground disturbance is expected to exceed an acre, and therefore a National Pollutant Discharge Elimination System (NPDES) Permit from the Hawai‘i Department of Health will be required. This will involve preparation of a Storm Water Pollution Prevention Plan (SWPPP) that would describe the best management practices (BMPs)

for any aspect of land preparation that has the potential to lead to erosion or sedimentation. The specific design and BMP elements of the drainage and erosion control plan (will be determined as part of the design and permit process, but will likely include these measures:

- Limitation of surface disturbance only to the minimum area required for construction;
- Selection of platform areas to minimize the need to disturb the surface;
- Limiting disturbance of soil during periods of heavy rain;
- Phasing of the project to disturb the minimum area of soil at a particular time;
- Perimeter runoff control utilizing a temporary silt fence;
- Sediment traps utilizing temporary sediments control filters at catch basins;
- Vegetative cover planted as soon as feasible after grading for stabilization control;
- Emplacement of #2 crushed rock at construction road ingress/egress to prevent offsite sedimentation;
- At end of construction, catch basins will be inspected and all sediment and debris removed.
- The increase in permanent stormwater runoff from the construction of the driveway, nature center and parking lot will be controlled through the use of drywells that will be placed in as yet undetermined locations adjacent to the driveway.
- Construction of access driveway on the existing unpaved 4WD access road with minimal grading;
- Application of protective covers to soil and material stockpiles;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;
- Routine maintenance of BMPs by adequately trained personnel; and
- Clean-up and disposal at an approved site of significant leaks or spills, if they occur.

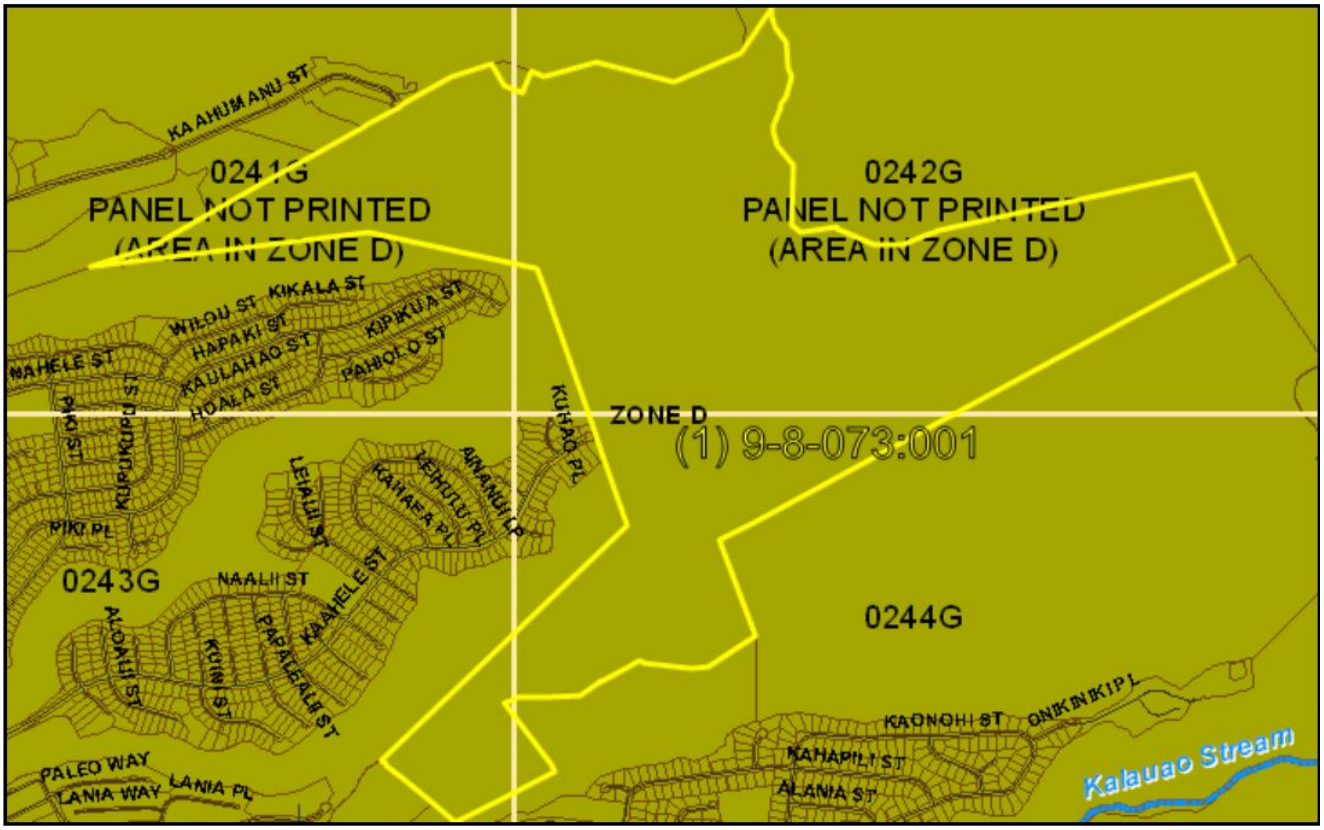
3.1.2 Climate, Drainage and Water Resources

Existing Environment

Average annual rainfall varies sharply on the Property from about 45 to 65 inches per year (Giambelluca et al 2013). Heavy showers can occur during winter storms such as cold fronts or upper level low pressure systems. Due to its lowland, leeward location at an elevation of no more than about 1,130 feet above sea level, temperatures are warm on daily and yearly levels, never exceeding 90 degrees nor dropping below 50 degrees F.

The Flood Insurance Rate Maps (FIRM) classify the entire Property in Flood Zone D, a designation used for areas where there are possible but undetermined flood hazards (Figure 4). In areas designated as Zone D, no analysis of flood hazards has been conducted. Mandatory flood insurance purchase requirements do not apply, but coverage is available.

Figure 4 Flood Zone Map



Source DLNR http://www.hidlnr.org/eng/nfip/NfipHome.aspx#

Impacts and Mitigation Measures

Aside from the issue of erosion and sedimentation impacts, which can be avoided or fully mitigated as discussed in the previous section, there will be no impacts to water bodies, drainage or flooding. Drainage from the Nature Center and driveway will be dealt with in conformance with drainage plans that will be reviewed and approved by both the City and County of Honolulu and the State DLNR Engineering Division.

3.1.3 Flora, Fauna and Ecosystems

A biological report is included as Appendix 6 and is summarized below. Biological assessment of the area began with early written consultation of the Hawai‘i Department of Land and Natural Resources and the U.S. Fish and Wildlife Service (see Appendix 1a for responses), along with review of literature concerning species of interest. This was followed by systematic field surveys for vascular plants and birds and field research on O‘ahu tree snails. All areas of the project site proposed for use were surveyed, including the access road, trails, the nature center and the platform areas. All sites were “over-surveyed” in order to ensure coverage in case of inadvertent use of adjacent areas during construction. Although not proposed for use except for a “flyover” as part of the canopy tour, portions of the valley floor were also surveyed.

Existing Environment: Vegetation and Flora

Vegetation on the Property consists of a mosaic of forest and shrubland, primarily dominated by non-native species but with a substantial component of native trees, shrubs, herbs, grasses, sedges and ferns as well. This reflects a long history of disturbance from agriculture, forestry plantings and most importantly invasion by non-native species. In general, the vegetation has a more native component in the upper elevations and on the western ridge. Overall, vegetation cover is mainly non-native, involving the trees Formosan koa (*Acacia confusa),* eucalyptus (*Eucalyptus* sp.), vinegar tree (*Lophostemon confertus*), paperbark (*Melaleuca quinquenervia*)*,* ironwood (*Casuarina equisetifolia*), strawberry guava (*Psidium cattleianum*) and *Ardisia elliptica*. Many of these trees are highly invasive and are rapidly overwhelming the native vegetation, accompanied by shrubby or herbaceous invaders such as Koster's curse (*Clidemia hirta*) as well.

The most common native trees in the forested areas are *ʻōhiʻa lehua* (*Metrosideros polymorpha*) and *koa* (*Acacia koa*). There is a relatively high diversity of small native trees, shrubs, vines and ferns as well, including *ʻakiʻa* (*Wikstroemia oahuensis*), *ʻuhaloa* (*Waltheria indica*), *pukiawe* (*Leptecophylla tameiameiae*), *aʻaliʻi* (*Dodonea viscosa*), *naupaka kuahiwi* (*Scaevola gaudichaudiana*), sandalwood (*Santalum freycinetianum*), *kopiko* (*Psychotria sp.*), *alaheʻe* (*Psydrax odorata*), *huehue* (*Cocculus orbiculatus*), *uluhe* (*Dicranopteris linearis*) and *palaʻa* (*Odontosoria chinensis*). A full list of plant species detected on the project site is contained in Table 1 of Appendix 6.

Existing Environment: Birds

The biological survey conducted for this EA involved review of literature concerning the presence of native birds in the area, and an onsite survey of native birds and assessment of bird habitat in the project area. During the survey, the site was dominated by non-native birds, in particular, the Japanese White-eye (*Zosterops japonicus*), the Red-billed Leiothrix (*Leiothrix lutea*), and the Red-whiskered Bulbul (*Pycnonotus jocous*). The Oʻahu ʻAmakihi (*Hemignathus flavus*), a native honeycreeper, was heard singing throughout the day on both survey days. No other native birds were seen or heard, although the native ʻApapane (*Himatione sanguinea*) may also occur in the area at certain times of the year. No other native birds would be expected in this lowland area. A full list of birds detected on the project site is contained in Table 2 of Appendix 6.

In addition to birds that would be detectable during standard surveys, several Hawaiian seabirds, including the federally threatened Newell's Shearwater (*Puffinus auricularis newelii*) and Wedge-tailed Shearwater (*Puffinus pacificus chlorhynchus*), protected under the Migratory Bird Treaty Act [16 USC. 703-712], overfly many areas of Oʻahu.

In its April 29, 2013 letter in response to early consultation (see Appendix 1a), the USFWS stated concern about the possible presence of Oʻahu Elepaio (*Chasiempis ibidis*), stating that the area should be surveyed for this endangered native bird, and if present, to take steps to ensure that ensure that any trees occupied by the birds or their nest are not cleared or removed. This endangered flycatcher is found within a small, fragmented range of about 18 square miles in the Koʻolau and Waiʻanae ranges, where there may be 1,200 to 1,400 birds (VanderWerf 1998; VanderWerf et al 2001, 2006). Survey records from 1976 to 2003 were mapped by the U.S. Fish and Wildlife Service in its recovery plan for

the O‘ahu ‘Elepaio and are published by DLNR alongside designated critical habitat (see Figure 1 of Appendix 6). Although the project site is directly *makai* of and adjacent to the critical habitat, no sightings are recorded in the general area, which may lack some requisite habitat characteristics or may simply be currently unoccupied habitat. Mosquito-transmitted diseases and predation by alien mammals (particularly rats) are severe threats to this bird’s existence, and the project site has both rats and mosquitos. The two-day survey of the Property by professional ornithologist Dr. Patrick J. Hart failed to detect any O‘ahu ‘Elepaio, although the bird may occasionally foray into this and other lower slopes in the Leeward Ko‘olau area. It would appear highly unlikely that the bird nests on the Property.

Existing Environment: Native Mammals (Hawaiian Hoary Bat)

Relatively little is known about the behavior on the island of O‘ahu of the endangered Hawaiian Hoary Bats (*Lasiurus cinereus semotus*), the only land mammal native to Hawai‘i. According to information from the Hawai‘i DLNR (Mitchell et al 2005), although there are many historical and ongoing bat sightings on O‘ahu, evidence of breeding populations (e.g., pregnant or lactating individuals) is limited to Kaua‘i and the island of Hawai‘i. Systematic detection efforts on the North Shore found high activity in summer and low activity in winter (Ong et al 2012). Bats on the Big Island tend to retreat during winter to elevations above 4,000 feet, which are lacking in O‘ahu, and it is possible that the bats travel inter-island to access these preferred areas. The North Shore research also indicated a preference for edge habitats involving ponds and forests. Much more research is needed to gain a clear understanding of bat ecology.

Although bats are not known to have been observed on the Property, there are historic observations from the Leeward area. Bats tend to be observed wherever there are systematic detection efforts (Ong et al 2012), and it is entirely possible that the Property is used at least occasionally by bats.

Existing Environment: Endangered Invertebrates

In its April 29, 2013 letter in response to early consultation, USFWS stated:

> “We recommend a qualified biologist conduct surveys for the endangered Oahu tree snails (*Achatinella* spp.) prior to all vegetation clearing. Achatinella have been observed on both native and non-native plant species. In areas of proposed site clearing and fencing, we recommend a qualified biologist survey to ensure any trees occupied by Achatinella are not cleared or removed.”

Achatinella is endemic to O‘ahu and includes 41 species of small tree snails with smooth shells patterned decorated with various colors. Their frequent occurrence in Native Hawaiian stories and their use in leis indicates that O‘ahu tree snails were abundant when Polynesians arrived in Hawai‘i, but today, 22 of these species are believed to be extinct and 18 are near extinction. They are all nocturnal and arboreal, feeding on fungus that grows on the leaves of native (and perhaps certain non-native) plants. Historically, the snails were found from near sea level along the windward coast to the central plains and throughout the Ko‘olau and Wai‘anae Mountains. Today, they appear restricted to remnant native forest on the highest ridges of the Ko‘olau and Wai‘anae ranges on the island of O‘ahu (Mitchell et al 2005; USFWS 1992).

A review of the maps contained in the USFWS O‘ahu tree snail recovery plan of the known distribution of the snails and the area of the Ko‘olau Mountains considered essential habitat (see Figures 2 and 3 of Appendix 6) indicate that the low-elevation, heavily invaded Property is unlikely to contain snails or have the essential characteristics of the habitat they require. The biological survey included examination of *‘ōhi‘a* and other trees for evidence of the presence of *Achatinella* snails, and none were detected. These findings indicate that O‘ahu tree snails are not likely to be present on the Property.

Existing Environment: Aquatic Ecosystems

U.S. Geological Survey topographic maps depict a perennial or intermittent stream in the steep, V-shaped valley bottom crossed by the zipline. Fieldwork in this valley, however, definitively demonstrated that no such stream exists. The valley bottom is dry, with deep soil derived from colluvium from the adjacent slopes, with no evidence of a stream channel. No water features, wetlands or other aquatic habitat is present. The soil is heavily rooted by pigs, and the vegetation is dominated by albizia, Christmas berry, silk oak, ironwood and *kukui*. During heavy rains, there are likely brief flows, but they are apparently of a low enough frequency and magnitude that they have not carved a distinct channel.

Impacts and Mitigation Measures

While the Property contains some valuable native flora, no threatened or endangered plant species listed by the U.S. Fish and Wildlife Service were present (USFWS 2013). An expected condition of the Project is that construction activities will involve a botanist trained in identifying native plants to ensure that valuable native plants are avoided to the extent feasible during construction. The sites chosen for the nature center, platforms and trails can be utilized with minimal damage to native plants, given this precaution. In addition, the project includes invasive species removal and outplanting of native species. In the absence of some managed program, the status of native plants on the property will inevitably degrade, and the Project could thus lead to a substantial overall net benefit for native flora.

The USFWS letter of May 17, 2013 made the following statement concerning impact to the O‘ahu ‘Elepaio:

> “In addition, we recommend that you avoid conducting potentially disturbing activity, such as the use of chain saws or other machinery, in the vicinity of known Oahu elepaio nests during the breeding season. Oahu elepaio breeding season is usually mid February through May; but active nests have been found January through July.”

As discussed above, it is highly unlikely that the project area supports the nests of O‘ahu Elepaio, and the project would not appear to have any impact on this endangered bird or its nests.

Concerning Hawaiian seabirds, according to the USFWS letter of May 17, 2013:

> "Outdoor lighting, used for night time work and street lights, can adversely impact listed and migratory seabird species protected under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), as amended, and the Migratory Bird Treaty Act. Night lighting poses a significant threat to protected fledgling seabirds. Seabirds fly at night and are attracted to artificially-lighted areas which can result in disorientation and subsequent fallout due to exhaustion or collision with objects such as utility lines, guy wires, and towers that protrude above the vegetation layer. Any increase in the use of night-time lighting, particularly during each year's peak fallout period (September 15 through December 15), could result in seabird injury or mortality. Once grounded, they are vulnerable to predators or often struck by vehicles along roadways. We recommend avoiding night-time work, and providing all project staff with information about seabird fallout. If lights cannot be eliminated due to safety or security concerns, then they should be positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below."

Accordingly, the project will avoid any night-time construction work or operation of ziplines. There will be no project lighting other than minimal security lighting at the gate and nature center, which will conform to the USFWS specifications.

For Hawaiian hoary bats, the USFWS stated in their April 29, 2013 letter in response to early consultation:

> "To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). If site clearing is proposed as part of your action, it should be timed to avoid disturbance to Hawaiian hoary bats in the project area. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground. When barbed wire is used in fencing, Hawaiian hoary bats can become entangled. If fencing is a part of your proposed action, we recommend barbed wire not be used."

Accordingly, the project will avoid any disturbance to woody plants taller than 15 feet during the bat pupping season, from June 1 to September 15 each year, and no barb-wire fencing will be used.

A number of other mitigation measures have been adopted as part of the construction and operation of the zipline, as discussed in Section 1.1. These are expected to be incorporated in the Project's Conservation District Use Permit (CDUP) permit as enforceable conditions, and include the following:

- Project construction activities will involve a botanist trained in identifying native plants to ensure that valuable native plants are avoided to the extent feasible during construction;
- All tours will include a component of conservation education conducted by guides specifically trained in resources and issues related to Hawaiian conservation biology;
- Some tours will include a service component involving implementation of a program of alien species removal and/or outplanting of native species. These will be conducted by qualified personnel trained in recognizing and dealing with invasive species and outplanting appropriate

natives. This program will be submitted to the Department of Land and Natural Resources (DLNR) for review and comment, all actions will be documented, and the project site will be open for inspection from DLNR officials;
- The Landowner will evaluate proposals by agencies or other entities to conduct research or restoration activities on the Property, and will permit and support these actions to the extent they are consistent with the continuing use as a nature park; and
- Implementation of the Project also involves a reduction in the intensity of other recreational uses on the property, including off-road biking and motorcycle use, which have tended over time to degrade the Property through extensive disturbance to native species and promotion of invasive species.

3.1.4 Air Quality and Noise

Environmental Setting,

Air quality in the project area, which is removed from industrial land uses or major highways, is generally good.

A noise study considering both construction and operational noise for the proposed zip line canopy tour was conducted by Cardno TEC of Honolulu. The report is attached as Appendix 8 and summarized in this section. Noise in the project area is very low, derived mainly from natural sources such as birds and wind, along with passing airplanes.

Impacts

For any substantial grading on the access road and the nature center, the Applicant will develop dust and implement control plans compliant with provisions of Hawai‘i Administrative Rules, Chapter 11-60.1, “Air Pollution Control,” Section 11-60.1-33, “Fugitive Dust.” No operational aspect of the project, including the addition of a maximum of 144 van trips per day from the offsite facility to Waimalu Nature Park, nor the use of Utility Vehicles (UTVs) to transport visitors within the Property, will contribute appreciably to air pollution.

The project is expected to have some impact on noise levels during both construction and operation of the zip line canopy tour. Construction noise would involve the installation of the zip line and the paving of the dirt road at the top of Ka‘ahele Street. Operational noise would result from the transport of visitors via 10 to 15-passenger van on Ka‘ahele Street to and from the nature center, transport of visitors via UTV between the proposed nature center and the start and end of the zip line, and riders on the zip
line.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. The perception and evaluation of sound involves three basic physical characteristics:

- Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels

- (dB)
- Frequency – the number of cycles per second the air vibrates, in Hertz (Hz)
- Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. The logarithmic unit of the decibel (dB) is used to represent the intensity of a sound, also referred to as the sound level. A change of 3dB is barely perceptible, but an increase of 10dB seems about twice as loud. Normal quiet conditions in a residential area have sound levels averaging 30 to 50 dB, although individual events such as car engines, lawnmowers, passing planes, and loud voices can raise dB levels to 100 dB or higher. Constant levels above 70 dB seem noisy to most individuals, hearing protection is required by the Occupational Safety and Health Administration (OSHA) when workplace noise exposure exceeds an action level of 85 dB.

A cumulative noise metric useful in describing noise is the equivalent sound level (L_{eq}). L_{eq} is the continuous sound level that would be present if all of the variations in sound level occurring over a specified time period were smoothed out as to contain the same total sound energy. Typical time periods for L_{eq} are 1 hour, 8 hours, and 24 hours. The highest A-weighted (i.e., factoring in human hearing characteristics) sound level measured during a single event where the sound level changes value with time (e.g., a passing automobile or van) is called the maximum A-weighted sound level or L_{max}. During a noise event, the noise level starts at the ambient or background noise level, rises to the maximum level as the noise source gets closest to the observer, and returns to the background level as the source recedes into the distance. L_{max} defines the maximum sound level occurring for during the event and L_{max} occurs instantaneously.

Using models discussed in detail in Appendix 8, the noise study first assessed noise associated with construction, which would affect residences along Kaʻahele Street for a short period of time when the 700 feet of access road was paved. The nearest receptors would be the residences at the end of the cul-de-sac on Kaʻahele Street, which would be within 60 feet of the site. Construction equipment would likely include a grader, paver, roller, and dump truck, which would likely be used simultaneously to finish construction quicker, leading to noise levels as high as 81.2 dBA L_{eq}. The elevated noise levels would be extremely short-term. Some processes could occur consecutively rather simultaneously, lowering sound levels somewhat but extending the duration. There would also be slight construction noise associated with the nature center and zipline, involving transport of equipment, including small loaders and UTVs up the access road, along with minor road grading, paving, drilling holes for platform supports, and construction of the 1,200-sf nature center and zipline platforms. However, most of this temporary activity would occur up to a mile distant from the end of Kaʻahele Street and is unlikely to be highly audible.

Operationally, noise would come from the 10 to 15-passenger vans and the zipline operation. The speed limit on Kaʻahele Street is 25 miles per hour. The Royal Summit development has 560 home

sites, and each household generates about ten trips per day, including trips by residents, visitors, deliveries, buses, etc. (see Section 3.3.2 for basis of the number of trips generated by households). About 90 percent of these occur between 7 a.m. to 10 p.m. This would lead to about 27 background trips per hour during the zipline operational period on upper Ka‘ahele Street (above Ainanui Loop), and 336 background trips per hour at the entrance of Royal Summit. Baseline equivalent noise levels would be 45.1 dBA L_{eq} at the top of Ka‘ahele Street and 56.1 dBA L_{eq} at the bottom. Adding two round trips for a 10-15-passenger van (4 one-way trips per hour) the noise levels would increase by 0.6 dB to 45.7 dBA L_{eq} at the top, and noise levels would not show a measureable increase at the bottom. The residents at the top of Ka‘ahele Street would experience lower total noise, because of dwindling of normal vehicle traffic and resultant background noise near the top of the cul-de-sac, but a higher proportional increase of noise, for the same reason. The average noise increase would either be barely measureable or very slight, and either case, imperceptible. A single van trip would generate a maximum instantaneous noise level of about 68 dBA at a residence located 40 feet from the van, but the duration from ambient noise level to peak back down to ambient would only last about 20 seconds.

Most studies involving Utility Vehicles (UTVs) and All-Terrain Vehicles (ATVs) have been done to certify a particular model of an ATV for public sale to satisfy US Environmental Protection Agency and Society of Automotive Engineers requirements. These studies determine maximum noise levels at very high revolutions per minute (RPM) simulating high speed, and thusly the most noisy conditions. Results of the study included measurements for eight ATVs, mostly small or medium sized ATVs. One of the ATVs included in this study was the Kawasaki KFX700, a very large and powerful ATV but not likely to be used for transporting zip line riders to the top of the proposed zip line tours. Using the USEPA method, the average noise level for the small and medium-sized ATVs was 78 dBA at a distance of 50 feet. The nature center would be 900 feet from the gate at the top of Ka‘ahele Street and ATV use would start at the nature center and travel away from the residences. Noise decreases by about 6 dBA for every doubling of the distance between the noise source and the recipient, so noise levels at the residences would fade from 78 dBA to 55 dBA L_{max}. This level would be just below the ambient noise level for a suburban neighborhood of 55 dBA, meaning it would be audible but not intrusive. These levels would only last a short time and would occur twice per hour. If the nature center is constructed as planned, behind a topographic hill, this would provide further noise shielding.

There are no known noise studies for zip lines, probably because noise has never been identified as an issue in siting the facilities. The operation of the zip line itself is extremely quiet, but participants occasionally may shout or scream. Unlike roller coasters, this is not a normal reaction for most riders. Modeling based on worst-case conditions – numerous roller coaster passengers – and accounting for the nearly mile distance between the zip line and the end of Ka‘ahele Street, yields a sound level of 48 dBA at the gate. It is important to note that this is below the ambient level of 55 dBA. In reality, there would be far fewer riders on a zipline than a roller coaster (9 as compared to 24 in the study used in the model), and normalized to more realistic conditions, levels would be about 42 dBA at the residences at the top of Ka‘ahele Street. During daytime, the only time when the zip line would be in operation, it is doubtful if this would be audible. Furthermore, as there is no direct “line of sight” between the top of further reduced by as much as 5 or 10 dB, although modeling of the precise amount is not feasible.

Mitigation Measures

Construction will elevate noise levels during short periods. These temporary activities, which will occur only during the daytime, could briefly to generate noise exceeding 55 decibels at the property boundary for the road paving, and thus could exceed the Department of Health (DOH) "maximum permissible" property-line noise levels. Therefore, the contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would then review the proposed activity, location, equipment, project purpose and timetable in order to decide whether a permit is necessary and what conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers, will be necessary. The contractor would consult with DOH to determine whether permit restrictions would consist of construction being limited to daylight hours.

Operationally, the daily volume of four passenger van trips per hour will generate very minor vehicle noise as they pass along Ka'ahele Street and into the property. Once on the property, project activities, including UTVs transporting zipline passengers from the nature center uphill to the start of the zipline course, as well as participants using the zip line, will be barely if at all audible. Such levels of noise would be below the general ambient noise and do not have characteristics such as frequency or pulsing that would cause them to be annoying or unpleasant. The Project has considered noise in its decision to site the nature center 700 feet, and the zipline between 0.7 and 1.2 miles, from the end of Ka'ahele Street, and no additional noise mitigation is warranted.

3.1.5 Scenic Resources

Environmental Setting,

The forested ridges and steep valley make the area highly scenic (see photos in Figure 2). The portion of the Property in which the Project would occur consists of two forested ridges that meet in a low saddle, separated from the residential areas below by a low rise that hides views of the areas proposed for use (see Figure 1c). Because of topography and the heavily forested ridges, the vantages from trails and platforms areas are generally only of the dry valley crossed by the zipline. A few spots have partial views of Pearl Harbor in the distance (see photos in Figure 2). Topography blocks views of the adjacent subdivisions for most of the area. Views towards the project site, of course, are shielded by the same topography, further blocked by trees.

Impacts and Mitigation Measures

Each of the 13 to 14 zipline platforms will be located 4 to 10 feet above ground on slopes just below the crest of flanking ridges, supported by four "telephone" poles, using an area of approximately 15 by 15 feet (see Figure 3c). Guide wires will be used to anchor the poles and provide structural integrity for the cables that are strung across the valley. Ziplines themselves are slender and minimally visible from a distance. Figure 3d illustrates the view of a zipline in a similar environment.

Appendix 5 shows the sightline profile from Pearl Harbor to the *mauka* terminus of the zipline, illustrating the blocking effect of the ridge on the *makai* portion of the property for nearby

subdivisions. Views from adjacent subdivisions are fully or mostly blocked by topography, with tall trees on one or more ridges blocking all views of zipline platforms. The proposed nature center is situated behind a ridge and will have intermittent distant views through the trees but will not be visible from adjacent subdivisions.

In the context of the existing forested slopes shielded by ridge lines, the platforms and ziplines generally are not visually intrusive. The platforms would be located essentially at ridge level amid groves of trees and ziplines themselves are slender and minimally visible. In this case, within a valley that is essentially hidden from residential areas below and most ridges above, there will be virtually no visual impact. Because of scale and intervening topography, vegetation and structures, it is unlikely that any of the courses will be visible from any portions of the H-1 Freeway or Kamehameha Highway. From any point in Pearl Harbor, a minimum of two miles away, high powered binoculars or a telescope would be required to spot a platform or line.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Environmental Setting, Impacts and Mitigation Measures

Towne Development of Hawaii, Inc., retained Clayton Group Services, Inc. (Clayton) to conduct an updated Phase I Environmental Site Assessment the entire 447-acre undeveloped property in 2005. The objective of the assessment was to provide an independent, professional opinion regarding recognized environmental conditions, as defined by American Society for Testing and Materials (ASTM), associated with the subject property. Clayton's original Phase I ESA of the subject property was conducted in 1995.

Historical research established the use of the subject property since 1913, through aerial photographs (1952 through 1993) and topographic maps (1913 through 1998), which showed that the subject property has consisted of undeveloped land. Based on tax assessment records, none of the past or present owners appeared to have conducted activities of environmental concern on the subject property. A site walkthrough inspection of the property for visual evidence of potential environmental concerns including existing or potential soil and groundwater contamination, as evidenced by soil or pavement staining or discoloration, stressed vegetation; indications of waste dumping or burial, pits, ponds, or lagoons; containers of hazardous substances or petroleum products; electrical and hydraulic equipment that may contain polychlorinated biphenyls (PCBs), such as electrical transformers and hydraulic hoists; and underground and aboveground storage tanks. The revealed no evidence of recognized environmental conditions, as defined by ASTM, in connection with the subject property.

Since that time, the Landowner is unaware of any activities that would introduce hazardous materials to the site, or of any other recognized environmental conditions that might have developed. Access to the site is generally restricted from the general public, which precludes such concerns as severe and chronic dumping of hazardous solid waste or other materials.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

Existing Environment

Table 1 provides 2010 U.S. Census of Population socioeconomic data from the U.S. Census Bureau for the Pearl City Census Designated Place (CDP), which includes the neighborhoods near the Property, along with the State of Hawai‘i as a whole for comparison.

Table 1. Selected Socioeconomic Characteristics

U.S. CENSUS OF POPULATION, 2010		
	Pearl City CDP	**State of Hawai‘i**
CHARACTERISTIC	Percent OR Value	Percent OR Value
POPULATION		
Total population	47,698	1,360,313
Under 20 years old	19.3%	22.3%
65 years and older	19.4%	14.3%
Median Age		
RACE		
White	16.0%	24.7%
Asian	53.2%	38.6%
Native Hawaiian and Other Pacific Islander	5.5%	10.0%
Two or More Races	21.0%	23.6%
HOUSEHOLDS AND HOUSING		
Average household size (persons)	3.12	2.93
AMERICAN COMMUNITY SURVEY 2011 ESTIMATES		
	Pearl City CDP	**State of Hawai‘i**
CHARACTERISTIC	Percent OR Value	Percent OR Value
Median household income (in 2011 inflation-adjusted dollars)	$84,029	$67,116
Individuals below poverty level	6.5%	10.2%
Living in same house 1 year & over	89.6%	84.9%
Homeownership rate	71.2%	58.7%
Mean travel time to work (minutes), workers age 16+	26.5	25.9
Foreign born	13.1%	17.8%
Speak language other than English in home	21.3%	25.6%
Persons 25 or older, high school graduate or higher	93.3%	90.1%
Population 16 years or older in labor force	65.7%	66.6%
OCCUPATION		
Management, business, science, and arts occupations	33.2%	33.0%
Service occupations	17.9%	22.4%
Sales and office occupations	26.7%	26.3%
Natural resources, construction, and maintenance occupations	13.7%	10.2%
Production, transportation, and material moving occupations	8.5%	8.1%

Source: U.S. Census Bureau, 2010 Census. 2010 Census Redistricting Data (Public Law 94-171) Summary File, Tables P1, P2 P3, P4, H1; and American Community Survey (U.S. Census Bureau American Factfinder Webpage. (X) data not available or applicable. Note: for small populations, error estimates are often large.

Demographic characteristics in the Pearl City CDP are relatively similar to the State of Hawai‘i as a whole, but with fewer Whites and Native Hawaiians/Pacific Islanders, and more Asians, who make up over half the population. The population is slightly older than the State as a whole, but, interestingly, the average household size is also larger. The percent of foreign born is similar. Although the breakdown of occupation types is similar to the Statewide averages, and the percent of adults in the labor force is almost identical, the median income in Pearl City is significantly higher and the poverty rate is lower, which is perhaps influenced by the higher rate of high school graduates and relatively lower percent of service occupations. The neighborhoods are stable, with a low rate of household moves and high homeownership rates.

The specific areas potentially most affected by the action include the Newtown Estates and Royal Summit neighborhoods centered on Ka‘ahele Street, and particularly those residents near the terminus of the street.

As discussed previously, although the property is private, signed for no trespassing, and no public access is authorized, some members of the public have been walking or riding around the gate and engaging in a variety of uses including mountain biking, hunting, motorcycle and ATV riding, paintballing and hiking. During research for this EA, which took place near Mothers' Day and high school/college graduation, teams of commercial lei makers were observed harvesting ferns, as well as the *liko* (buds) of *‘ōhi‘a* to an unsustainable degree that could harm the trees (there may also be some cultural practitioners gathering material for non-commercial purposes in a traditional manner, which is not a concern).

A Usage Study commissioned by the Applicant was conducted during eight days in June of 2013, including four weekends and a holiday (see Appendix 7). The purpose was to quantify the people who access the Property and the vehicles they arrive in, and to ascertain where they live, how they learned about the area, what activities they will engage in while on the Property, how many times have they come in the past, as well as other details.

The Usage Study determined that, during the number of visitors entering the Property during the sample period averaged 35 per day. More people visited the property on weekends than on weekdays, with an average of 27 people on weekdays and 42 on weekend days. The Property was visited almost equally throughout the day, although there are noticeable differences on weekdays versus the weekend. There is an average of 17 vehicles that bring visitors to the property on a daily basis, with the vehicle counts slightly higher on weekends. A majority of the vehicles park close to the property entrance (88%) compared to further away (12%). Close to the property parking is identified as those who park within the 10 housing units closest to the property entrance.

One out of four visitors to the property had been there more than once during the two week period. Visitors spent approximately two hours and fifteen minutes on the property. A majority of the people utilized the Property for bike riding or hiking, although there were also hunters and airsoft players (similar to paintball). When asked how they learned about the Property, almost 3 out of 4 people stated the source as friends or family members. Only 10 percent of the visitors to the area are from Newtown.

The three primary geographical locations where visitors travel from are Aiea, Maunalani Heights, and Mililani Town.

The level and nature of these unauthorized activities has created difficulties for the Landowner, who despite posting No-Trespassing Signs is exposed to some degree of liability for the numerous participants, particularly those engaged in mountain biking, paintball/airsoft gun tournaments, hunting and motorcycle riding. Without hiring full-time security, the Landowner has not heretofore found it feasible to prevent these activities. The intense use also tends to create problems for some residents of the adjacent Royal Summit neighborhood, who now often lack on-street parking, occasionally lose property to thefts and vandalism, and have to deal with the inconveniences of trail users with dogs and unauthorized use of hoses for removing mud from bikes and motorcycles.

Impacts and Mitigation Measures: Neighborhood Impacts

Responding to a request from neighbors at several recent community meetings, the Landowner has applied for a CDUP to fence off the access and intends to install additional signs to prevent unauthorized access for the time being. The Project would permanently eliminate unauthorized trespassing and use of the Property. Such action would, of course, affect those who have heretofore enjoyed these unauthorized activities, but it is the right of a landowner to exclude others from a Property, and it is important to do so in this case where there are problems with liability and neighbor impacts. There will no longer be pedestrian or bicycle access into Ka‘ahele Street, and nearby neighbors will not experience the impact of dozens of people and an average of 17 vehicles a day parking in front of their properties and preparing for/finishing their hiking, bicycling, motorcycling, hunting, or gun sport activities.

In order to allow residents of the Newtown neighborhoods, past which the passenger vans for the Project will pass each day, to continue to enjoy some use of the Property, the project specifically provides that Newtown Estates Community Association (NECA) members will be able to hike on the property. A system will be implemented whereby users from NECA and their guests will sign a waiver of liability form and can then drive through the gate at the end of Ka‘ahele Street and up the access driveway. They will then park in a designated area containing approximately six visitor parking stalls at the nature center and will be able to hike. There will be no pedestrian access through the end of Ka‘ahele Street.

Another issue raised in community meetings was whether having the entrance to a zipline facility at the top of Ka‘ahele Street would lower property values. There are no available studies on the relationship between property values and low-key, small-scale outdoor recreational facilities such as the proposed nature park and zipline. The highest value properties on the Hamakua Coast of Hawai‘i are currently being developed directly adjacent to the zipline complexes at/near World Gardens in Umauma. The Operator notes no reports of property value declines near his ziplines at Waikapu. Ziplines do not appear to have a stigma that lowers property values.

An issue raised frequently in community meetings was fear of crime, in particular, that tourists would view the Royal Summit neighborhood homes out the windows of the vans as they were transported to their zipline experience and use that as an opportunity to "case" the neighborhood for future burglaries. As in any city, crime in Honolulu remains a problem. However, Honolulu ranks as the fourth lowest city in the country for violent crime, and *Forbes Magazine* listed Honolulu as the third safest city in the US (January 2012). The Hawai'i Crime Report, which documents crime in every district for 2012, showed that the Hawai'i Index Crime Rate decreased in 2011. Violent crime decreased in Honolulu by 8.3%, and property crime decreased by 4.7%.

Discussions by the applicant with Honolulu Police Department (HPD) and the Attorney General's indicate that visitors commit very few crimes when they come to vacation. There is no data to show that visitors are actively committing crimes in neighborhoods where they visit attractions. Nearly all criminal activity committed by visitors takes place in resort areas or and consists mainly of misdemeanor offenses against other people rather than property crime. Nevertheless, the applicant contacted HPD and consulted the Hawai'i Crime Report for three neighborhoods with existing visitor attractions in order to provide a comparison.

Community Policing Team District D-5 was asked about crime by visitors to Kalihi Nature Park, in an email dated September 27, 2013, they responded that they "have not heard or witnessed nor are aware of any negative affiliation between the park and the community."

Manoa Falls is a well-known natural attraction that brings both *kama'aina* and visitors to the area near Paradise Park. It is a free attraction but one must either park on Manoa Road and hike an additional 0.2 miles, or pay and park at Paradise Park. Paradise Park does daily counts that indicate 400 visitors a day (more than 100,000 a year) utilizing their parking lot. At least another 100 a day plus walk from Manoa Road.

Law enforcement personnel were asked about visitors and crime. HPD responded, "In the past there was a nuisance problem regarding parked cars on Manoa Road. The residents felt that the hikers were rude and inconsiderate and disrespectful, but not criminal." The Community Policing Team subsequently met with the residents and the hikers, and they said that "…today most of the problems have been resolved."

As O'ahu lacks ziplines currently, the applicant contacted law enforcement officials on the Neighbor Islands where ziplines have long been established. The County of Hawai'i Prosecutor's Office responded in an email:

> "I have looked into whether there has been any impact on criminal activity in Hawaii County in areas where zip lines have been built. After discussing this with various people in my office and police officers, I have not been able to find any impact on criminal activity where Ziplines have been built in Hawaii County or any other county as far as I can tell." (Mitchell Roth, Prosecuting Attorney, September 24, 2013)

The Maui Office of the Mayor's was also contacted, and they responded that there were no significant crime statistics in the neighborhoods surrounding the zipline operations.

There appears to be is no evidence to support the idea that visitors will return to commit crimes to a neighborhood after being transported in a van to paid visitor activity. Even were they so inclined, it is impractical for hotel visitors to burglarize properties when they have little means to store or fence stolen items.

The following mitigation measures will be implemented for potential neighborhood impacts:

- The supervised vans will be driven by trained and bonded employees who will drive directly from an off-site pick up point to the zipline site. Drivers will be trained to call 911 if they see anything suspicious.
- Security personnel for the nature park and zipline will also drive the neighborhood and Ka‘ahele Street on a scheduled but unannounced basis and will report suspicious activity immediately to the police.

Impacts and Mitigation Measures: Hiking Access for General Public

Several government officials and O‘ahu residents have verbally expressed concern to project personnel that although Newtown residents would be allowed to register for hikes and park inside the gates, essentially as compensation for the fact that the zipline vans will travel through this neighborhood to the adjacent operation, the trail would be closed for hiking to the general public.

Hiking is a popular activity for both residents and visitors on O‘ahu, and there are dozens of trails open to the public (see, e.g.: http://hawaiitrails.ehawaii.gov/island.php?island=Oahu, a website of the Na Ala Hele Program of the Hawai‘i DLNR). Nearby, these include the popular Manana Trail and Waimano Trail, located off Waimano Home Road in Pearl City, and the Aiea Loop Trail within Keaiwa Heiau State Recreation Area, accessed from Aiea Heights Drive. Some have stated that although the 4WD access road on the Property may be private and current access is unauthorized, the trail can be used to access properties *mauka* and beyond that of the Landowner. However, it is important to note that the two bordering properties – especially the large ones that extend *mauka* into potential hiking areas, TMKs 9-8-001:007 and 008 – are private, belonging to the Austin Trust and Kamehameha Schools, respectively. There are no public trails on these properties and no indication from their owners that they wish to promote public access through the Property. Given this, and the risk to zipline security posed by unlimited access, the Landowner does not wish to open the 4WD access road as a trail to the general public for hiking.

The proposed use for the canopy tours does not preclude future hiking opportunities on other parts of the Property, a use that the Landowner explored while developing the zipline concept. Hiking on the Property would not generate the scale of revenue that would make it economically viable to privately construct and maintain trails. However, the Landowner has expressed willingness to partner with government agencies who could undertake the trail construction and maintenance, provided it was in a portion of the Property that would not interfere with the canopy tour operation, and also that neighborhood concerns about access and parking could be met. For this concept to be viable, it would probably be necessary for the government to make arrangements with the owners of adjacent properties in the Conservation District to create a system of trails with meaningful length.

It should be noted that those engaged in cultural practices on the Property will also be provided access; measures to ensure that their rights are not affected are discussed in Section 3.2.2., below. The issue of traffic is discussed below in Section 3.3.2, below.

Impacts and Mitigation Measures: Economic

According to operator Duane Ting, the canopy tour operation is expected to involve up to a dozen construction jobs initially and then 40 to 50 jobs, in sales, administration, skilled maintenance, transportation, and guiding. Employees consider zipline jobs high quality and enjoyable, with low turnover and high satisfaction. There are no other permitted, commercial ziplines on O‘ahu, and the Project’s proponents are highly optimistic about it being a sustainable, long-term operation that can contribute to diversification of the State’s economic base. The Project will contribute jobs, tax revenues and secondary economic benefits to the residents and governments of Honolulu and the State of Hawai‘i. The income generated from the proposed development should raise the standard of living for some area residents, as well as contribute to business revenues in the area. The level of property taxes generated by the parcel would likely double from the current level of $3,825.84.

If the proposed Waimalu Nature Park and Zipline Canopy Tour project is implemented, residents on Ka‘ahele Street would also experience traffic from the proposed zipline operation, which is discussed in Section 3.3.3, below.

3.2.2 Cultural and Historic Resources

An archaeological assessment survey and cultural impact assessment were conducted by Scientific Consultant Services. These assessments are contained in Appendices 2 and 3 and are briefly summarized in the section below, in which most scholarly references have been removed; interested readers may consult the appendices.

Cultural and Historic Background

Traditionally, the division of O‘ahu’s land into districts (*moku*) and sub-districts (‘*ili*) was said to be performed by Mā‘ilikukahi, a ruling chief of O‘ahu, who was chosen by the chiefs to be the *mō‘īho‘oponopono o ke aupuni* (administrator of the government). It was Mā‘ilikukahi who at the beginning of the 16th Century had the Island of O‘ahu thoroughly surveyed, permanently defining the boundaries between the different divisions and lands. Mā‘ilikukahi created six districts and six district chiefs (*ali‘i `ai moku*). Land was considered the property of the king or *ali‘i ‘ai moku* (chief who rules a *moku*), which he held in trust for the gods. The title of *ali‘i ‘ai moku* ensured rights and responsibilities to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka‘āinana* (commoners) worked the individual plots of land.

Land divisions consisted of districts (*moku*), which contained smaller land divisions (*ahupua‘a*) that customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua‘a* were therefore able to harvest from both the land and the sea.

Ideally, this situation allowed each *ahupua'a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *'ili 'āina* or *'ili* were smaller land divisions administered by the chief who controlled the *ahupua'a* in which it was located . The *mo'o 'āina* were narrow strips of land within an *'ili*. The land holding of a tenant or *hoa 'āina* residing in an *ahupua'a* was called a *kuleana* .The present project area was located in the *ahupua'a* of Kalauao, which literally means "the multitude [of] clouds" (Pukui *et al.*1974:75).

Settlement pattern deduced from archaeological data suggest an initial colonization and occupation of the Hawaiian Islands first occurring on the windward shoreline areas of the main islands between A. D. 850 and 1100, with populations eventually settling in drier leeward areas during later periods (Kirch 2010). Although coastal settlement was dominant, Native Hawaiians began cultivating and living in the upland *kula* (plains) zones. Greater population expansion to inland areas began around the 14th Century and continued through the 16th Century. Large scale or intensive agriculture was implemented in association with habitation, religious, and ceremonial activities.

The Hawaiian economy was based on agricultural production and marine exploitation, as well as animal husbandry and collecting wild plants and birds. Extended household groups settled in various *ahupua'a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry-land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugarcane, *Saccharum officinarum*) and *mai'a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *'uala* (sweet potato, *Ipomoea batatas*) were cultivated.

The district of 'Ewa was an *ali'i* stronghold undoubtedly made attractive because of the natural springs and numerous fishponds that were constructed at different points around Pearl Harbor (named *Ka-awa-lau-o-Pu'uloa* by the Hawaiians). There was a great variety of shellfish, the most important being the *pipi*, or Hawaiian pearl oyster, known as *i'a hamau leo o 'Ewa* ('Ewa's silent sea creature). The *pipi* was eaten raw and the shell furnished shiny shanks used in bonito (*Sarda sarda*) hooks. It was believed that this valuable oyster had been brought from Kahiki by a *mo'o* (lizard demi-god/goddess) named Kane-kua'ana. Other bivalves gathered and eaten raw, or cooked with young taro leaves included *papaua*, *'owa'owaka*, *nahawele*, *kupekala*, and *mahamoe*.

Originally called *Ke Apana o 'Ewa*, the District of 'Ewa not only provided ideal circumstances for fishponds, but also included high interior plains and several deep valleys of the Ko'olau mountains, as well as, traditionally, the Wai'anae Range. Bananas and yams were cultivated in the lower parts of the valleys and *'awa* (kava) could be found higher inland. Perennial streams spilled from the valleys on to the lowlands creating ideal conditions for taro pond-fields (*lo'i*) and fresh water springs were abundant. Terraces extended up the river valleys, some as far as a mile (e.g., Waikele Stream) and lower terraces were watered from springs, such as those in Waipahu and Kalauao. The forests, or upland jungles (*wao*) contained gardens of *wauke* and *mamaki* grew freely on the slopes. Birds and *olonā* could be found in the *wao* along with mountain apples and other necessary resources

The settlement pattern, and timing of land utilization, may be conveniently (and arbitrarily) divided into several general periods: pre-Contact settlement/traditional period, the early Historic period/early

post-Contact, the recent Historic, and present land use. The potential remains of land use over these periods provide a basis on which archaeological researchers explored succinct research questions during survey.

The traditional *moku* of **ʻ**Ewa was and continues to be one of the largest districts in Oʻahu. The place-name of Ewa can be translated to mean "unequal" or "crooked." The meaning of Ewa as "unequal," alludes to the district being a favored residence of Oʻahu kings in olden times, making the area a seat of power for the Hawaiian *aliʻi*. ʻEwa translated to mean "crooked" may be a reference to the myth of the gods Kāne and Kanaloa throwing stones to determine district boundaries, in which the stone for determining the ʻEwa district boundary was lost but was later found at Pili-o-Kahe. Another story reports that the boundaries of `Ewa District were established by the traveling gods, Kāne and Kanaloa. At the western end, the boundary of Waikele and Hoeʻaeʻae was marked by a stone named Pohaku-pili (border stone). Set on the edge of a sheer precipice, this stone stands firm, as it was placed by the gods. Kāne and Kanaloa blessed the lands of ʻEwa with coconut groves, fishponds and taro plantations.

The *ahupuaʻa* of Waimalu is one of several located within the *moku* of ʻEwa. Waimalu means "sheltered water" (Pukui 1974:225), referring to the *makai* portion of the *ahupuaʻa*, which extends into the natural, sheltered harbor of Puʻuloa or Pearl Harbor. Additionally, the *makai* portion of the Waimalu *Ahupuaʻa* was known for both the large number of fishponds as well as extensive taro terraces irrigated by the Waimalu Stream and Waipi spring. While the *ahupuaʻa* of Waimalu itself is not associated with any known local mythology, the lands in the *makai* portion surrounding Puʻuloa were associated with an assortment of legends. For example, Puʻuloa is said to be the first site where breadfruit, brought from Samoa, was first planted in Hawaiʻi, and there are various myths connected to the Kapakule and Pakule fish ponds.

The pre-contact period in Oʻahu consisted of power shifts between different chiefs who ruled various districts including Ewa district which was tied to the Māweke-Kumuhonua royal line. In the early 1700s, Oʻahu was united by chief Kūaliʻi who was succeeded by his heir, Peleiholani. With Peleiholani's death circa 1778, the royal line shifted to the Ewa line of chiefs with the selection of Kahahana as ruler. Early post-contact accounts describe Waimalu as the residence of important figures such as chief Kīnaʻu, one of Kamehameha I sons, and Paul Marin. The earliest census of native populations was conducted by Protestant missionaries in 1831 and recorded a population of 4,015 living within the ʻEwa district

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on Western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy. The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available and private ownership was instituted, the *makaʻāinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *ʻokipū* (on Oʻahu), stream fisheries, or many other resources necessary for traditional survival. If occupation could be established through the testimony of two witnesses, the

petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property.

While many Hawaiians were unfamiliar with the concept of private ownership and thus failed to submit land claims, the LCAs that were filed provide insight into the presence and land use of native Hawaiians in a particular area. In the case of Waimalu, the LCA records indicate that the lowlands around Pearl Harbor and the surrounding streams were primarily used by the native Hawaiians while the plateau lands were not intensively utilized. The Indices of the Land Commission list 30 awards for Waimalu including the first LCA, LCA 1, which was granted in the *Waimalu Ahupua'a* to Kamanoualani for the 42.65-acre *ili* called Paepae.

In the latter half of the 19th century, traditional agriculture was displaced by commercial cultivation of rice, sugar, and pineapple in the 'Ewa district. From the 1860s, the Waimalu taro terraces were replaced by rice. Incorporated as part of the Honolulu Plantation Company lands in 1899 and later incorporated into the O'ahu Sugar company in 1947, Waimalu became covered with sugarcane fields. With the introduction of commercial cultivation, worker camps were established throughout Honolulu Plantation; this included the Waimalu Stable Camp located within the Waimalu *Ahupua'a*.

In 1887, the Navy leased Pearl Harbor from the Hawaiian Kingdom, and in 1908, the Naval Shipyard was established in what had become a U.S. Territory. Realizing the military value of the harbor, the U.S. government began acquiring more and more parcels of land from the Honolulu Plantation Company's agricultural fields. From the early 1900s onwards, large portions of Honolulu Plantation land were turned over to the government for military use, particularly for the expansion of the U.S. Naval Facilities at Pearl Harbor and for the construction of Hickam Air Field. The land containing the Pu'uloa Plantation Camp and Watertown, which had been leased by the Honolulu Sugar Company and consisted of one-sixth of the Pu'uloa plantation land, was purchased in 1935 by the U.S. Army and became Hickam Air Force Base. Additional land was given up in WW II. Handy (1940: 81) records much of the old terracing gone: "The small area of low flatland covered by plantation camp, railroad, etc. below the old highway, was formerly in terraces. . . .."

After WWII, the pressing needs of urban growth ended sugarcane cultivation for the Honolulu Plantation Company. In January 1947 the Honolulu Plantation Company shut down, the 'Aiea Mill closed its doors, was dismantled, and shipped off to the Philippines. The refinery continued to operate until 1996 and became the home to the Hawai'i Agricultural Research Center. Currently, the *makai* portion of the Waimalu *Ahupua'a* consists primarily of military facilities, the Honolulu International Airport, and subdivisions.

Consultation

Consultation was sought from individuals and organizations that might have knowledge or information pertaining to the collection of cultural resources and/or practices currently, or previously conducted in close proximity to the Property, including the relatively small portion of it proposed for use in the Waimalu Nature Park and Zip Line Canopy Tour operation. These individuals and organizations included George Kaeliwai, Jr., of the Hawaiian Civic Club of 'Ewa; Dr. Kamana`opono M. Crabbe, Chief Executive Officer Office of Hawaiian Affairs; William Ho'ohuli, community member;

Hinaleimoana K.K. Wong-Kalu, Chair, O‘ahu Island Burial Council; Kawika McKeague, community member and former ‘Ewa O‘ahu Island Burial Council Representative; Kawika Farm, State Historic Preservation Division, Burial Sites Program; Leimaile Quitevis, O‘ahu Island Burial Council, ‘Ewa Representative; Robert Oliveira, a community member; Mrs. Coochie Cayan, of DLNR-SHPD; Mr. Shad Kane, of the Hawaiian Burial Council; Mr. Blaine Fergerstrom, Department of Hawaiian Homelands in Kapolei; Mr. and Mrs. Miles Fukushima, of the O‘ahu Pig Hunters Association; Mr. Tin Hu Young, a member of the Royal Order of Kamehameha.

During the course of interviewing ethnographic consultants, information regarding areas of cultural and traditional importance in the vicinity of the project area and in Waimalu Ahupua‘a was obtained from five individuals, three of whom were of Hawaiian ancestry. Three of the individuals had been raised in the Waimalu/‘Aiea area. All informants are active members in the community and knowledgeable of the Waimalu area, serving in the Hawaiian Burial Council, the Department of Hawaiian Homelands, the O‘ahu Pig Hunters Association, and Kawaiaha‘o Church, respectively.

Mr. Shad Kane’s discourse related primarily to the mythological and prehistoric accounts of Waimalu, as well as the presence of burials. When asked about his knowledge of the remains existing in the Waimalu burial cave, Mr. Kane answered that most, if not all have been destroyed or removed. the only known map of the Waimalu burial cave, a hand-drawn map from Sterling and Summers’ 1978 Bishop Museum book *Sites of O‘ahu* showed the cave near Waimalu Stream. Cartographic work that overlaid this map on the areas utilized by the proposed action indicates that this cave is (or was) not in the vicinity of any aspect of the Waimalu Nature Park and Zipline (see Figure 4 of Appendix 3). Archaeological survey conducted for the project did not detect caves of any type or burials in or near the affected area.

Blaine Fergerstrom offered information relating to his geographical association to Waimalu, mostly discussing his childhood stories of exploring the upper areas of Waimalu, and iterating the general lack of “archaeological features.” When asked about seeing anything of cultural or archaeological note while exploring as a youth, he commented he had never seen anything in that area, likening it to the Aiea Loop hiking trail.

Mr. and Mrs. Miles Fukushima offered valuable information concerning the Property, as well as the Waimalu Mauka area. Pig hunting in Hawai‘i, specifically the legitimate Pig Hunters Association, very much serves the community, and can be considered, for all intents and purposes, a culture within the Hawaiian Islands. Mr. Fukushima is among the few individuals who still venture into O‘ahu's inaccessible areas, gathering knowledge in regards to the existence of possible sites of cultural importance. It should be noted that the Landowner intends to continue its longstanding arrangement allowing Mr. Fukushima and other members of the O‘ahu Pig Hunters Association access through the Property to hunt with dogs and knives in other areas for which they have permission to access and hunt. No hunting or use of firearms will be permitted on the Property itself. During the interview, Mr. Fukushima also iterated that during his hunting trips, he has never come across any ancient Hawaiian structures or burials. He mentioned that the development of residential areas in Waimalu had most likely destroyed any burials that may have existed.

Mr. Tin Hu Young's discourse related primarily to his historical and familial connection to the Waimalu area. He mentioned his association to the area, through his wife, the last living descendent of Don Francisco Marìn, who was given the lands of Waimalu from Kamehameha the Great. Mr. Young stated he had not conducted much research for specifically Waimalu Mauka, however, he did recall a burial cave, and suspected that rather than being a pre-Contact site, it in fact belonged to Don Francisco Marìn, and was utilized by him for his family's private burial use.

Existing Cultural Resources and Practices

The information acquired from consultees and historical research indicates that although much of the Property remains wild forested lands aside from the 4WD road and power line infrastructure, any cultural sites that may have existed were likely destroyed by natural degradation or looting long ago. The Waimalu burial cave was the principal cultural property of concern to several of the consulted parties. As discussed above, archaeologists determined that this cave is (or was) not in the vicinity of any aspect of the Waimalu Nature Park and Zipline, and archaeological survey did not detect this or any other caves or burials. Another cultural activity mentioned by the consultees was access for pig hunting, which continues to be allowed. Although not mentioned by consultees, it is possible that in addition to the commercial gathering observed during EA research, traditional cultural gathering may occur at some times and locations on the Property. Those engaged in cultural gathering practices on the Property will continue to be allowed access to the Property and their rights will not be affected.

Cultural Resources: Impacts and Mitigation Measures

Based on the above, it is reasonable to conclude that based upon the limited range of resources, and the ongoing provision of access for cultural activities, the exercise of native Hawaiian rights related to gathering, access or other customary activities will not be affected by the proposed action. The Draft EA was distributed to agencies and groups who might have knowledge in order to confirm this finding, including the Office of Hawaiian Affairs and the State Historic Preservation Division.

Historic Sites, Impacts and Mitigation Measures

The project site is located within a portion of a mostly undeveloped, forested parcel of land consisting of deep V-shaped valleys, high ridges, and steep slopes prone to erosion. While there have been agricultural and recreational activities conducted on some portions of the project parcel, the project site itself has not been significantly altered except through construction of access roads for utilities and informal mountain biking trails and jumps. Previous cultural and archaeological work conducted at the site indicates that most if not all cultural or archaeological sites that may have been present have likely been destroyed. Thus, relatively few cultural materials and archaeological sites were expected.

A general pedestrian survey was conducted in order to identify archaeological sites and assess the project site's geographical features. The survey covered eleven separate survey areas with an estimated total acreage of 2.701 acres, and includes the road and trail that links the various survey areas. No definitive cultural or archaeological features were recorded and no archaeological materials were collected during the surface survey.

An archaeological assessment survey documenting the research and requesting concurrence with the determination of no historic properties affected was submitted to the State Historic Preservation Division (SHPD) in August 2013. The Final EA will report on the outcome of SHPD review.

3.3 Infrastructure

3.3.1 Utilities and Public Services

Existing Facilities and Services

Utilities potentially required to serve the nature center, including water and electricity/telephone/ CATV, are all available from the terminus of Ka'ahele Street, approximately 700 feet away.

Impacts and Mitigation Measures

Electricity/telephone CATV lines will be run along the access road driveway on overhead poles or buried. The use of photovoltaic solar will also be explored. The water necessary for washing UTVs will be collected via rainwater catchment. The limited quantities of used wash water that will be generated will be stored and utilized for landscaping. Potable water lines for fire protection and drinking will be installed in the driveway. Visitors will be on the property for only a short time, and no extensive restroom facilities are required. An individual wastewater system with a seepage pit will be built at the nature center for the restroom.

3.3.2 Roadways and Traffic

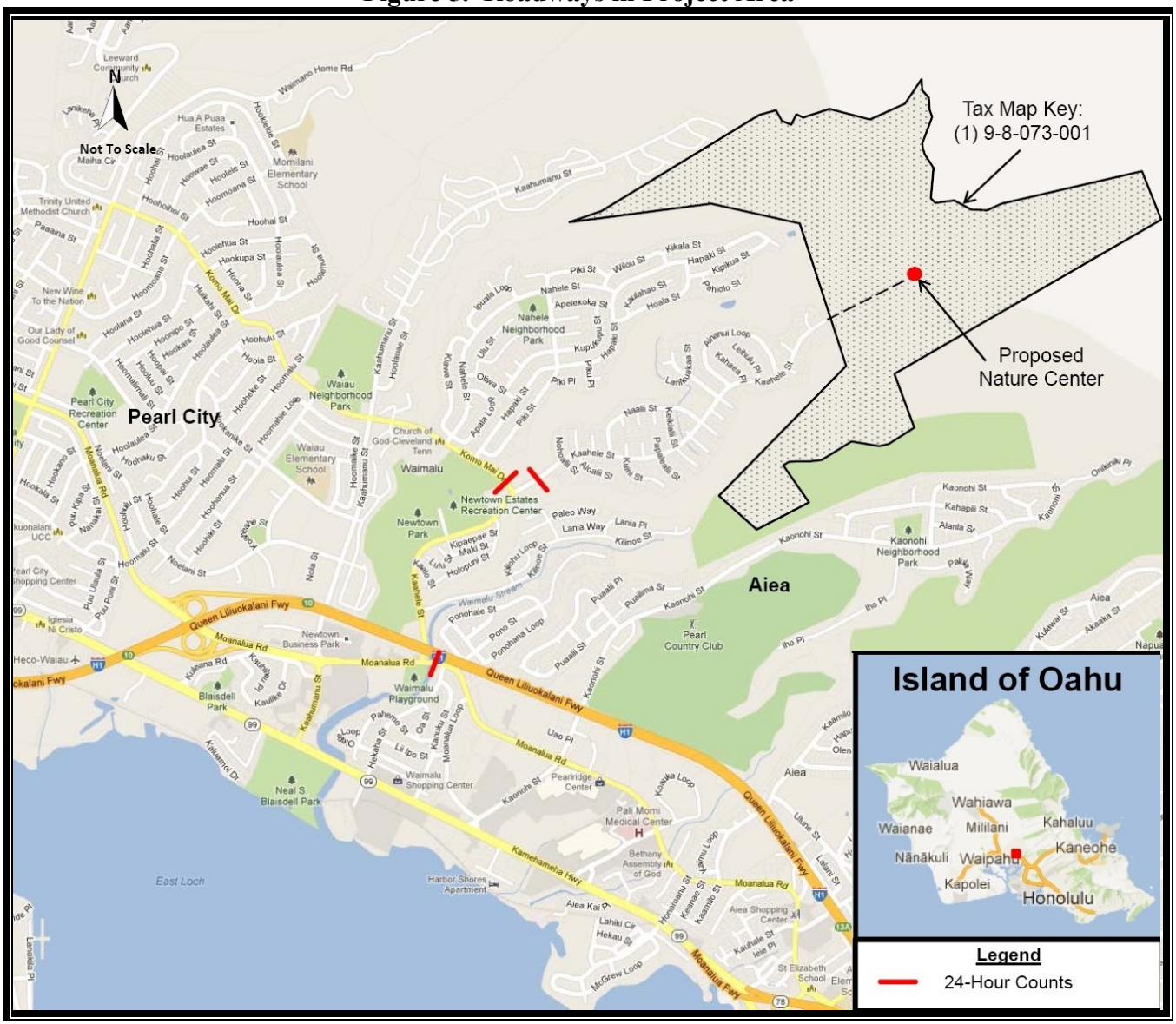
A Traffic Impact Assessment Report (TIAR) was prepared by SSFM International. This report is attached as Appendix 4 and summarized below. Readers interested in detailed descriptions, maps, tables and references are referred to Appendix 4.

Existing Facilities

Access to the Waimalu Nature Park and Zipline Canopy Tour will come off of Ka'ahele Street, through the Royal Summit subdivision. Ka'ahele Street is an approximately two mile long, *mauka-makai* City and County of Honolulu owned collector road, with a posted speed limit of 25 mph. Ka'ahele Street is four lanes and undivided between Moanalua Road and Komo Mai Drive, with parking restrictions. *Mauka* of Komo Mai Drive, Ka'ahele Street becomes a two-lane undivided road with permitted on-street parking.

Parking is prohibited at the cul-de-sac at *mauka* terminus of Ka'ahele Street. A driveway curb cut exists at the center of the cul-de-sac, which leads to a dirt/gravel path that is controlled by a locked gate and notice of private property. Sidewalks exist along both sides of the street along Ka'ahele Street, Moanalua Road, and Komo Mai Drive, although no bike lanes or designated routes exist in the area. The latest available traffic counts (from 2011) showed average daily traffic (ADT) of 4,810 vehicles on Ka'ahele Street between Komo Mai Drive and Nohoalii Street, i.e., at the *mauka*-most intersection on Ka'ahele Street with connections to other neighborhoods (see Figure 5). There are

Figure 5. Roadways in Project Area



distinct peak periods, with the PM peak period lasting several hours while the AM peak period is much shorter.

Level of service (LOS) is an operational analysis rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines *from A Policy on Geometric Design of Highways and Streets* (AASHTO 2011) state that an appropriate LOS for both a suburban rolling local or collector functional class road, the classifications of Kaʻahele Street, Moanalua Road, and Komo Mai Drive, is LOS D or better. The TIAR determined that the existing LOS on Kaʻahele Street, which would be most affected by the project, is C at both the AM and PM. Komo Mai Drive has an LOS of D at both peaks, and Moanalua Road has LOS F.

Impacts and Mitigation Measures

Of foremost important for the TIAR are the following characteristics of the Project:

- The nature center will be located approximately 700 feet from the end of Ka‘ahele Street, in the Royal Summit subdivision.
- Participants will initially travel from various locations on O‘ahu to an intake center located in an existing commercially zoned location. The exact location of the intake center is yet to be identified, but will likely be in Aiea, Pearl City, or Newtown. Alternatively, visitors may be picked up from hotels or similar sites.

- Participants will be transported from the intake center/alternative pickup sites to the nature center in shuttle vans.
- Hours of operations are being proposed between 8:00 AM and dusk (6:00-8:00 PM) depending on the time of year), 365 days a year.
- Vehicular access between the intake center/alternative pickup sites and nature center would be along a fixed route, primarily along City and County of Honolulu roads. Access will be established following identification of the intake center/alternative site location.
- It is anticipated that about two six vehicular roundtrips will be completed per hour transporting participants and employees between the intake center/alternative pickup site and nature center. Zipline tour participants will be grouped into 10 to 12-person groups and accompanied at all times by two guides.
- The nature center will have ten parking stalls. After being transported to the nature center, participants will travel to the ziplines on utility vehicles (UTV).
- On-site parking will be limited to employees, shuttle vans, and service vehicles.
- Newtown Estates Community Association members, and limited other users as authorized by the Applicant, will be able to access the existing 4WD access road using designated parking spots at the nature center.
- There will be 24-hour/day security for the zipline tour operation will prevent access to other unauthorized personnel.

The Project is expected to be in operation by summer 2014. Research for the TIAR in the databases of the State of Hawai‘i Office of Environmental Quality Control library and the Statewide Transportation Improvements Program (STIP) indicate no significant planned developments or construction in the area that would affect the roadway geometrics or traffic volumes in the near future. Based on data from historical trends, future traffic volumes were projected to remain similar to existing traffic volumes.

On average, two vehicles will be traveling from the intake center/alternative pickup sites to the nature center and another two vehicles will be traveling from the nature center to the pickup sites. At the maximum, three vehicles will be making trips to and from the nature center. This equates to 1.5% of future PM peak hour traffic along Ka‘ahele Street, 0.2% along Moanalua Road, and 0.7% along Komo Mai Drive. Even though Komo Mai Drive is not actually along the anticipated travel route between the nature center and intake center/alternative pickup sites, it was included to represent a potential alternate route and volumes from the only other significant intersecting road. This represents a negligible

increase in peak hour traffic along Kaʻahele Street, Moanalua Road, and Komo Mai Drive, and therefore there is no anticipated change in LOS.

Another traffic impact related question that was of interest to the project proponents and neighbors during discussion at meetings was the "Equivalent Vehicular Impact" – i.e., how many homes would it take to generate an equivalent amount of traffic over the course of a day. Assuming an average 11-hour day, 8:00 AM –7:00 PM, the total daily trips projected along Kaʻahele Street is estimated to be 66. The TIAR used standard trip generation models for single-family homes for weekdays, Saturdays and Sundays, as detailed in Table 3 of Appendix 4. It is estimated that the zipline project would generate the same number of trips as six to eight residences, depending on the day of the week under consideration.

In summary, the projected project-related number of vehicular trips is considered minimal and is not anticipated to change the roadway LOS or have a significant impact on the surrounding roadways. Therefore, no mitigation is proposed as a result of this project. It is recommended that with the noted community concerns for pedestrian safety and vehicle speeding, the zipline tour operation vehicles be mindful of and adhere to existing traffic regulations.

3.4 Secondary and Cumulative Impacts

Due to the modest scale, the project will not involve any secondary such as population changes or effects on public facilities.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. Research for the TIAR in the databases of the State of Hawaiʻi Office of Environmental Quality Control library and the Statewide Transportation Improvements Program (STIP) indicate no significant planned developments or construction in the area. The Royal Summit neighborhood is essentially built out, and no major home construction in the area is planned. The adverse effects of the Project are very limited in severity, nature and geographic scale, and do not appear to have the potential to accumulate with impacts from other projects.

3.5 Required Permits and Approvals

As the project is within the State Land Use Conservation District, it will require approval of a Conservation District Use Permit (CDUP) by the Board of Land and Natural Resources (BLNR).

City and County of Honolulu or State Department of Health approvals required to implement the Project include:

- Grading Permit and Building Permit for the driveway, nature center and parking lot (Department of Planning and Permitting);
- National Pollutant Discharge Elimination System permit (Department of Health)
- Water Supply Approval (Board of Water Supply) (if necessary);

3.6 Consistency with Government Plans and Policies

3.6.1 Hawai‘i State Plan

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. In general, the Project would promote these goals by providing a beneficial economic activity that diversifies O‘ahu's recreational offerings in a manner that provides jobs and revenues, minimizes impacts to neighbors, and promotes environmental education and restoration of native vegetation.

Many goals, objectives and policies of the Hawai‘i State Plan, Chapter 226 HRS, and adopted Functional Plans have some relevance to the Waimalu Nature Park. Those which are relevant are discussed below.

Hawai‘i State Plan Objectives

Section 226-6(a): Objectives for the economy - general:
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.
Section 226-6(b): Applicable policies:
(2) Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.
(10) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.
(15) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.

Discussion: Because of Hawaii's distinct geography, tropical climate and central Pacific location, it is an attractive market for visitors. The use of the Property for a nature park is environmentally and socially sound, and will benefit Hawai‘i's people. The aloha spirit indigenous to the area and the site's scenic beauty can be seen both as a resource and an asset of the project, to be protected and promoted by the Applicant.

According to operator Duane Ting, the canopy tour operation is expected to involve up to a dozen construction jobs initially and then 40 to 50 jobs, in sales, administration, skilled maintenance, transportation, and guiding. Employees consider zipline jobs high quality and enjoyable, with low turnover and high satisfaction. There are no other permitted, commercial ziplines on O‘ahu, and the Project's proponents are highly optimistic about it being a sustainable, long-term operation that can contribute to diversification of the State's economic base. The Project will contribute jobs, tax revenues and secondary economic benefits to the residents and governments of Honolulu and the State of Hawai‘i. The income generated from the proposed development should raise the standard of living for some area residents, as well as contribute to business revenues in the area.

Section 226-11(a): Objectives for the physical environment - land-based, shoreline, and marine resources:
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.
(2) Effective protection of Hawaii's unique and fragile environmental resources.
Section 226-11(b): Applicable policies:
(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.
(3) Take into account the physical attributes of areas when planning and designing activities.
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.
(8) Pursue compatible relationships among activities, facilities, and natural resources.
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

Discussion: The project site has a unique physical environment including topography and natural resources. The zipline guided forest canopy tour is a very low intensity development and will be designed with consideration for preservation and restoration of the native vegetation. Over 95 percent of the Property will be left in open space and untouched, with substantial preservation of the natural environment. The Project has been designed to work with the steep slope areas of the site and will minimize overall grading. No rare or endangered plant or animal species are found on the project site. The Project promotes not only recreation but also enjoyment of the natural environment of the site and views of the surrounding lands, mountains and ocean by patrons of the nature park. Additionally, NECA member neighbors will continue to have the use of the Property for hiking on an as-available basis.

Section 226-12(a): Objective for the physical environment - scenic, natural beauty, and historic resources:
Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historic resources.
Section 226-12(b): Applicable policies:
(1) Promote the preservation and restoration of significant natural and historic resources.
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.

Discussion: The enhancement of the subject area's natural beauty and the preservation of the natural resources have been central to the design of the Waimalu Nature Park and Zipline Canopy Tour. It will complement the natural beauty of the open area and provide the users the pleasure of the distant ocean

and mountain vistas. The development will avoid and protect historic and cultural resources. Scenic views and open space will be maintained and enhanced. The proposed guided zipline forest canopy tours would complement the open-area character of the site.

Section 226-13(a): Objectives for the physical environment - land, air, water quality:
(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.
(2) Greater public awareness and appreciation of Hawaii's environmental resources.
Section 226-13(b): Applicable policies:
(1) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.
(2) Promote the proper management of Hawaii's land and water resources.
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.

Discussion: The land and water resources of the project site will be properly managed. Nearly all of the land will be reserved in undisturbed and recreational open space. The project will not use the Pearl Harbor aquifer for irrigation water. The increase in permanent stormwater runoff from the construction of the driveway, nature center and parking lot will be controlled through the use of drywells that will be placed in as yet undetermined locations adjacent to the driveway. The total runoff of the project will not exceed existing conditions. Soil erosion will be less than under existing conditions. Minimal fertilizer and pesticide application at the landscaped entry area adjacent to Ka'ahele Street will be managed to ensure that there are no adverse impacts on groundwater. Noise and air quality levels at the project will be within government standards. Scenic views will be preserved, and the Project will lead to an overall net conservation biology benefit.

Section 226-16: Objective and policies for facility systems - water:
(b)(1) Coordinate development of land use activities with existing and potential water supply.
(b)(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.
Discussion: The project proposes to use only a small amount of potable water from the Pearl Harbor aquifer at the nature center. Surface water from Waimalu Stream will not be used.
Section 226-23: Objectives for socio-cultural advancement – leisure:
(a) Planning for the State's socio-cultural advancement with regard to leisure shall be directed toward the achievement of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.
Section 226-23(b): Applicable Policies
(1) Foster and preserve Hawaii's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.

(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.
(5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.

Discussion: The Project will offer a quality recreational opportunity to visitors and residents. The location of the project provides the opportunity to preserve the scenic and open space of the area. The provisions for public access to the hiking trail would allow NECA member neighbors to continue to have the use of the Property for hiking on an as-available basis.

Functional Plans

The State Functional Plans translate the broad goals and objectives of the Hawai'i State Plan into detailed courses of action. Like the State Plan they are intended to serve as a guide to public and private decision-makers. Some plans have only an indirect relationship to this project, while others have a more direct relationship. These relationships are described below.

State Conservation Lands Functional Plan:

Except for approximately 15 acres in the Waimalu Stream area, the remainder of the approximately 443 acres of the Property are designated Conservation. As such, there would be a direct relationship to the State Conservation Plan. The nature park use of virtually all of the Property will provide opportunities and facilities to meet needs for a wide range of recreational activities.
C(4) Policy: Provide opportunities and facilities to meet public needs for a wide range of recreational and educational activities within Conservation lands.
C(4)(b) Implementing Action: Provide opportunities and access to use forest lands for outdoor recreation and education by constructing and maintaining facilities for hiking, hunting, camping, nature walks, viewing scenery, and horseback and trail bike riding.

Discussion: The proposed project will provide outdoor recreation and will offer the public the opportunity to enjoy the scenic views of the site through the use of the guided forest canopy tours. NECA member neighbors will continue to have the use of the Property for hiking on an as-available basis.

State Agriculture Functional Plan:

Lands within the site are of negligible agricultural importance. The Soil Conservation Service and Land Study Bureau soil classification systems rate the agricultural capability of almost all (94 percent) soils on the project site as poor. Viable agriculture at the site is therefore, not a potential economic activity. As such, there is no conflict between the proposed project and the concerns of the State Agriculture Functional Plan.
State Transportation Functional Plan:

The overall objective of the State Transportation Plan is to provide for the efficient, safe, and convenient movement of people and goods. No new roadways are proposed; access to the Property will continue from the *mauka* terminus of Ka‘ahele Street. The impacts of the Project on existing transportation facilities are addressed in Section 3.3.2.

State Recreational Functional Plan:

The purpose of the Project is to provide recreational facilities—guided forest canopy and hiking tours—for residents and visitors. Neighborhood access to hiking trails will also be provided. The project is consistent with several of the objectives and policies of this functional plan, but is not directly relevant to any of its specific implementing actions.

State Tourism Functional Plan:

The policies and implementing actions of this functional plan deal with tourism promotion, the development of visitor promotion, the development of visitor accommodations, employment and career development, and community relations. No references to the independent provision of recreational facilities are included.

The Project is intended to provide recreational opportunities for both residents and visitors, without emphasizing services to any particular group. To the extent that its facilities help to attract visitors to the area, the Project will contribute to the health and viability of the State’s visitor industry.

State Health Functional Plan:

The State Health Functional Plan focuses on public health programs under the jurisdiction of the State Department of Health. Several of the implementing actions relate to operating Department of Health permit programs to which the proposed project is subject. The Project would comply with all necessary permit requirements of the Department of Health and will not have any impact to groundwater reserves.

State Water Resources Development Functional Plan:

The development of the nature park and its very limited use of potable water will have no effect on groundwater.

State Historic Preservation Functional Plan:

The Project would be consistent with the State Historic Preservation Functional Plan in that no historic properties would be affected.

The remaining functional plans – State Education Functional Plan, State Higher Education Functional Plan, and State Energy Functional Plan – are not directly relevant to the proposed project.

3.6.2 City and County of Honolulu Zoning, General Plan and Other Plans

Approximately 428 acres of the Property, including all of the area proposed for use as part of the Project, are within the State Conservation District and are concurrently zoned P-1, Restricted Preservation District by the City and County of Honolulu. Conservation lands are under the sole jurisdiction of the State of Hawai‘i.

The General Plan for the City and County of Honolulu sets forth long-range objectives for the general welfare and prosperity of the people of O‘ahu and broad policies to attain those objectives. The following discussion provides an assessment of how the proposed project conforms to and implements the General Plan.

Economic Activity

Objective A: *To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.*
Objective A. Policy 1: *Encourage the growth and diversification of Oahu's economic base.*
Objective A. Policy 2: *Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.*
Objective A. Policy 3: *Encourage the development in appropriate locations on Oahu of trade, communications, and other industries of a nonpolluting nature.*

Discussion: In addition to a limited number of short-term construction jobs, the Project will generate employment opportunities for the operation of the guided forest canopy and hiking tours. It will contribute to economic diversification by supplying jobs with skill levels varying from management to guides. The employment will be steady, stable and sufficient to provide an adequate standard of living for people living in the area.

Objective B: *To maintain the viability of Oahu's visitor industry*
Objective B. Policy 8**:** *Preserve the well-known and widely publicized beauty of Oahu for visitors as well as residents.*

Discussion: The Project will preserve the open area characteristics of the site and will provide a scenic view of the surrounding mountains and view of the ocean. The recreational facilities and hiking trails will open up the beauty of the site to greater public enjoyment. The Project will allow visitors and neighborhood residents to enjoy large expanses of undisturbed open space.

Objective E: *To prevent the occurrence of large scale unemployment.*
Objective E. Policy 1: *Encourage the training and employment of present residents for currently available and future jobs.*

Discussion: The Project will provide direct employment to area residents and indirect and induced employment elsewhere within Oahu. The Applicant will undertake a job training program to prepare community residents to fill the jobs at the development.

Natural Environment

Objective A: *To protect and preserve the natural environment.*
Objective A. Policy 1: *Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.*
Objective A, Policy 4: *Require development projects to give due consideration to natural features such as slope, flood, and erosion hazards, water recharge areas, distinctive land forms, and existing vegetation.*
Objective A. Policy 6: *Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.*
Objective B: *To preserve and enhance the natural monuments and scenic view of Oahu for the benefit of both residents and visitors.*
Objective B. Policy 1: *Protect the Island's well-known resources: its mountains and craters: forests and watershed areas; marshes, rivers, and streams; shoreline, fishponds, and bays; and reefs and offshore islands.*
Objective B. Policy 2: *Protect Oahu's scenic views, especially those seen from highly developed and heavily traveled areas.*

Discussion: The Project will preserve and enhance the natural environment by maintaining open space and the components of the nature park will not be visible from adjacent residential areas or from coastal areas.

Physical Development and Urban Design

Objective D: *To create and maintain attractive, meaningful and stimulating environments throughout Oahu.*
Objective D Policy 5: *Require new developments in stable, established communities and rural areas to be compatible with the existing communities and areas.*

Discussion: The Newtown Estates and Royal Summit areas have a suburban residential setting, with an above-average median income level. The Project will complement the area's character with new recreational facilities and open space with trails that will remain open to residents of these neighborhoods. Virtually all of the Property will remain as undisturbed open space. The Project will be designed to fit into the natural surroundings and allow a new recreational activity.

Culture and Recreation

Objective B: *To protect Oahu's cultural, historic, architectural, and archaeological resources.*
Objective B. Policy 1: *Encourage the restoration and preservation of early Hawaiian structures, artifacts, and landmarks.*
Objective B. Policy 2: *Identify, and to the extent possible, preserve and restore buildings, sites and areas of social, cultural, historic, architectural, and archaeological significance.*
Objective B. Policy 4: *Promote the interpretive and educational use of cultural, historic, architectural, and archaeological sites, buildings, and artifacts.*

Discussion: A comprehensive archaeological survey of the Property was conducted by a professional archaeologist, who determined that no historic properties are present or will be affected.

Objective D: *To provide a wide range of recreational facilities and services that are readily available to all residents of Oahu.*
Objective D. Policy 4: *Encourage public and private botanic and zoological parks on Oahu to foster an awareness and appreciation of the natural environment.*
Objective D. Policy 7: *Provide for recreational programs which serve a broad spectrum of the population.*
Objective D. Policy 10: *Encourage the private provision of recreation and leisure-time facilities and services.*

Discussion: The Project will provide recreational activities for both visitors and residents through the guided forest canopy tours.

City and County of Honolulu Primary Urban Center Development Plan

The City and County of Honolulu divides the Island of O'ahu into eight Development/Sustainable Community Plan areas. Plans for each area implement the objectives and policies of the General Plan on an area wide basis and serves as a guide for public policy, investment, and decision making within their respective region.

The pertinent plan for the Waimalu-Pearl City area is the *Primary Urban Center Development Plan* ("PUC-DP"). The PUC-DP establishes policies to shape the growth and development of the PUC over a 20 year period and maintain a compact urban core. The PUC extends from the core of historic downtown Honolulu to Pearl City in the west and Waialae-Kahala in the east, and from the shoreline of East Mamala Bay and Pearl Harbor to the Ko'olau Range in the north.

The Property follows the urban community boundary line of the designated Low-Density Residential area of Newtown Estates. The portion of the Property to be used for the Waimalu Nature Park and Zipline Canopy Tour is designated in the PUC-DP Land Use Map, which maps the long-range vision of the plan, as Preservation. This is defined as:

> "Lands suitable for growing of commercial timber, grazing, hunting, and recreation uses, including facilities accessory to such uses when said facilities are compatible with the natural physical environment."

The Project is consistent with the policies, guidelines, and vision of the PUC-DP as it supports the desired land use for the area for recreation uses and the preservation of scenic views and park lands.

3.6.3 Hawai‘i State Land Use Law

All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS.

Most of the approximately 443-acre Property is located within the State Land Use Conservation District. Approximately 76 percent of the Property (335 acres) is classified in the General subzone, and approximately 21 percent (93 acres) is classified in the Resource subzone. The remaining three percent (15 acres) of land, south of Waimalu Stream, is located within the State Urban Land Use District.

HRS 205-2(e) describes the intended uses for Conservation Districts:

> "Conservation districts shall include areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish, and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space areas whose existing openness, natural condition, or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept."

The rules for the administration of conservation lands identify permissible uses for the Resource and General subzones that include trails, recreational facilities, planting of native plants, a wilderness camp providing educational and recreational programs and land uses promoting natural open space and scenic value. Also included at HAR 13-5-23, R-8:

> "Botanical Gardens, Private Parks, and Nature Centers featuring plants or other natural resources and offering tours or other nature-based, outdoors educational and recreational activities, primarily during daylight hours. Facilities may include access road, restrooms, shelters, and not more than one structure for housing, administration, and maintenance not to exceed 1,200 square feet under a management plan approved simultaneously with the permit…"

Activities with the Conservation District must demonstrate consistency with certain criteria. A separate Conservation District Use Application (CDUA) is being prepared for the project that addresses these criteria in details. The following provides information from the application.

1. Consistency with purpose of the Conservation District. The purpose of this chapter is to regulate 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.

The proposed Waimalu Nature Park and Zipline is consistent with the purpose of the Conservation District, because it would allow enjoyment of nature resources while not jeopardizing their sustainability and in fact promoting their preservation and restoration.

2. Consistency with objectives of the subzone of the land in which the use will occur.

The objective of the General subzone "…is to designate open space where specific conservation uses may not be defined, but where urban use would be premature." The objective of the Resource subzone "…is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas."

The proposed actions are consistent with the objectives of the General and Resource subzones. The proposed actions have been designed to minimize impacts to natural resources through a minimal footprint, along with encouraging the perpetuation and the re-establishment of a native forest habitat and therefore a native bird population. The proposed actions will establish proper management for this area to ensure sustained use of the natural resources of the area. All proposed uses are *identified uses* in the General and Resource subzones, as discussed above.

3. Compliance with the provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled "Coastal Zone Management."

The property is not located in the Special Management Area (SMA) and does not require an SMA permit. However, it does comply with the applicable provisions and guidelines, per the following assessment.

- Recreational Resources: The Property is located over two miles from the ocean, and no coastal recreational resources are involved; there will be no negative impact to existing resources. The recreational value of the Property will be increased.
- Historic Resources: The project site was surveyed for historic properties, and the archaeologist's determination that no historic properties were present and there would be no effect to them is being reviewed by the State Historic Preservation Division.
- Scenic and Open Space resources: As the property is located over two miles from the ocean, it will have no effect on coastal scenic and open space resources. The location of the proposed zipline is essentially behind a series of ridges, and it will not be readily visible from adjacent subdivisions. The scale of the infrastructure – low, small platforms and poles – will make it difficult to discern from Pearl Harbor and other areas from which it is feasible to view the area.
- Coastal Ecosystems: The property is located over two miles from the shoreline, and there are no surface watercourses present that could potentially transmit pollutants and valuable coastal ecosystems are protected from disruption. There will be no impact on coastal ecosystems.
- Economic Uses: The location is not coastal dependent. It is located in an upland area suitable for productive recreational use.
- Coastal Hazards: There is no hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
- Managing Development: As the property is located over two miles from the ocean, no coastal resources are affected and therefore require no management. The public is being informed of

the proposed action through the Chapter 343 Environmental Assessment process and the Conservation District Use Application process as required by law.

- Public Participation: The Conservation District Use Application involves an Environmental Assessment, and both are subject to public review.
- Beach Protection: The use of beaches by the public for recreation will not be impacted by the proposed action.
- Marine Resources: The location of the proposed action insures there will be no impact to marine resources.

4. Lack of substantial adverse impact to existing natural resources within the surrounding area, community or region.

Native species are present, but no rare, threatened or endangered species will be adversely affected. The Project will minimize disruption of native vegetation and includes a component of vegetation restoration and alien species removal. No geological or hydrological natural resources will be affected.

5. Compatibility of proposed land use, including buildings, structures and facilities, with the locality and surrounding areas, and to the physical conditions and capabilities of the specific parcel or parcels.

The Property and surrounding land have been long used informally for recreational activities. Through the choice of facility locations and limitations of scale, the Project will not impose an undue burden on adjacent residential or Conservation District uses. The Project is fully compatible with the locality and surrounding areas, and to the physical conditions and capabilities of the specific parcel.

6. Description of how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

The Project will minimize disruption of native vegetation and includes a component of vegetation restoration and alien species removal that will increase the natural beauty. While the facilities are visible and change the character of the open space when viewed from within the property, they also open it to more enjoyment and use.

7. Subdivision of land may not be utilized to increase the intensity of land uses in the Conservation District.

The Project does not involve or depend upon subdivision.

8. Description of how the proposed land use will not be materially detrimental to the public health, safety and welfare.

Construction-phase air quality impacts, including fugitive dust emissions, would be minor and mitigated Standard precautions during drilling of supports and minor road improvements and construction of the nature center and platforms can avoid any pollution. The Project will involve minor

noise during construction and almost no noticeable noise during operation. No effects to public health, safety, or welfare are involved.

PART 4: ANTICIPATED DETERMINATION

Based on the information to this point, the Hawai‘i State Department of Land and Natural Resources (DLNR) is expected to determine that the proposed project will not significantly alter the environment. It is therefore anticipated that an Environmental Impact Statement is not warranted and that the DLNR will issue a Finding of No Significant Impact (FONSI). A final determination will be made by the DLNR after consideration of comments on the Draft EA.

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* Native species are present, but no rare, threatened or endangered species will be adversely affected. The Project involves minimal disruption of native vegetation and includes a component of vegetation restoration and alien species removal. No geological or hydrological natural resources will be affected, and no historic or cultural resources are present or will be affected.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment. The direct physical impact of the project is minor and is designed to enhance the area’s forest ecosystem.
3. *The proposed project will not conflict with the State's long-term environmental policies*. The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is minor, and fulfills aspects of these policies calling for an improved natural/native environment. It is thus consistent with all elements of the State’s long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project will benefit the social welfare of the community and State by enhancing the social and economic and physical environment. There will be negligible increases in traffic and noise that will not affect the quality of life of residents. No lowering of property values or increase in crime has been noted from the more than 20 other zipline operations in Hawai‘i and none would be expected here.
5. *The proposed project does not substantially affect public health in any detrimental way.* The proposed project will not adversely affect public health.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. No noticeable secondary effects aside from jobs are expected to result from the Project. Beyond the direct and very minor effects on neighborhood roads, there will be negligible increases in traffic on major roads or highways. No increases in demand for schools, health facilities, police or fire protection, social services, or any other public facilities or services are expected.

7. *The proposed project will not involve a substantial degradation of environmental quality*. No aspect of the Project has the potential to degrade environmental quality in any substantial way, and the Project will include restoration of native vegetation that enhances environmental quality.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* Native species are present, but no rare, threatened or endangered species will be adversely affected. The Project will minimize disruption of native vegetation and includes a component of vegetation restoration and alien species removal. The Project also includes education of visitors in the natural history and environmental issues in Hawai‘i.
9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The project is minor and is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.
10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* Due to the character of the Project no adverse effects on these resources would occur. Construction-phase air quality impacts, including fugitive dust emissions, would be minor and mitigated. Standard precautions during drilling of supports and minor road improvements and construction of the nature center and platforms can avoid any pollution. The Project will involve minor noise during construction and almost no noticeable noise during operation. No effects to public health, safety, or welfare are involved.
11. *The project does not affect nor would it likely to be damaged as a result of being located in an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the Project is necessarily located in an area of steep slopes, there will be minimal disruption of the ground surface and the Project is not imprudent to undertake in this setting.
12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* The Project will not adversely affect scenic vistas because of its topographic location behind a series of ridges and its low-key character. The current view from the Royal Summit area towards the proposed zipline location is dominated by HECO high tension lines. The platforms are located essentially at ridge level amid groves of trees and ziplines themselves are slender and minimally visible. The facilities will not be visible from Kamehameha Highway or the H-1.
13. *The project will not require substantial energy consumption*. The Waimalu Nature Park and Zipline Canopy Tour will require electrical and fuel energy for construction and operations. The Project will explore the use of photovoltaic solar.

For the reasons above, the Applicant anticipates that the Hawai‘i Department of Land and Natural Resources will determine that the action would not have any significant effect in the context of Chapter 343, Hawai‘i Revised Statues and section 11-200-12 of the State Administrative Rules.

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ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 1a
Comments in Response to Pre-Consultation

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NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

13-092
Waimalu Zipline

April 29, 2013

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for Waimalu Zipline
Lot 48-B-2, Waimalu, Island of Oahu

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated April 15, 2013. Thank you for allowing us to review and comment on the subject document. The document was routed to the Department of Health's Clean Water and Wastewater Branches. They will provide specific comments to you if necessary. EPO recommends that you review the Standard Comments (www.hawaii.gov/health/epo under the land use tab). You are required to adhere to all Standard Comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable design of communities, including the:

- U.S. Environmental Protection Agency's report, "Creating Equitable, Health and Sustainable Communities: Strategies for Advancing Smart Grants, Environmental Justice, and Equitable Development" (Feb. 2013), http://www.epa.gov/smartgrowth/pdf/equitable-dev/equitable-development-report-508-011713b.pdf;
- U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability;
- U.S. Green Building Council's LEED program: www.new.usgbc.org/leed; and
- World Health Organization, www.who.int/hia.

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at www.cdc.gov/healthyplaces/hia.htm. We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We wish to receive notice of the environmental assessment's availability when it is completed. We request a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to: 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to epo@doh.hawaii.gov. We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Manager, Environmental Planning Office

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 768-3486 • FAX: (808) 768-3487 • WEBSITE: http://envhonolulu.org

KIRK CALDWELL
MAYOR

LORI M.K. KAHIKINA, P.E.
DIRECTOR

TIMOTHY A. HOUGHTON
DEPUTY DIRECTOR

ROSS S. TANIMOTO, P.E.
DEPUTY DIRECTOR

IN REPLY REFER TO
PRO 13-033

May 3, 2013

Mr. Ron Terry
Geometrician Associates, LLC
PO Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Early Consultation for Environmental Assessment for Environmental Assessment for Waimalu Zipline, Lot 48-B-2, Waimalu, Island of O'ahu

We have reviewed the subject report as transmitted to us by your letter dated April 15, 2013, and we have no comments or objections at this time.

We do not need to be included in the review of future submittals on this subject, and can be removed from your distribution.

Should you have any questions, please call Liz Lau, Civil Engineer, at 768-3470.

Sincerely,

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

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

CHRIS T. TAKASHIGE, P.E., CCM
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

May 2, 2013

Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Attn: Ron Terry

Dear Mr. Terry:

Subject: Early Consultation for Environmental Assessment for Waimalu Zipline, Lot 48-B-2, Waimalu, Island of Oahu

The Department of Design and Construction does not have any comments to offer on the preparation of the early consultation for environmental assessment.

Thank you for the opportunity to review and comment. Should there be any questions, please contact me at 768-8480.

Sincerely,

Chris T. Takashige, P.E., CCM
Director

CTT: cf (511228)

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

KIRK W. CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE EO-WS

April 30, 2013

Mr. Ron Terry, Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

This is in response your letter dated April 15, 2013, requesting comments on the Early Consultation, Environmental Assessment (EA), for the proposed Waimalu Zipline project.

The Honolulu Police Department (HPD) anticipates that there will be short-term impacts to traffic during the construction phase of the project. We recommend scheduling construction vehicles and supply deliveries during daytime, off-peak traffic hours and informing the public of any potential delays in the project area, as the entry point into the Waimalu Zipline project is in a residential area (Ka'ahele Street).

The HPD further anticipates that once the project is completed, there will be impacts to vehicular and pedestrian traffic along Ka'ahele Street, specifically at the entry point for the Waimalu Zipline project. This may potentially cause an increase in police services to the area. Therefore, the HPD would like to be involved in any future planning for the Waimalu Zipline once the project has been completed.

The HPD also would like to request a copy of the EA when completed.

If there are any questions, please contact Major Clayton Saito of District 3 (Pearl City) at 723-8802 or via e-mail at csaito1@honolulu.gov. .

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
CLAYTON G. KAU
Assistant Chief
Support Services Bureau

Serving and Protecting With Aloha

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Ulu`ohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROSS S. SASAMURA, P.E.
DIRECTOR AND CHIEF ENGINEER

EDUARDO P. MANGLALLAN
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 13-456

May 3, 2013

Mr. Ron Terry
Geometrician Associates, LLC.
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Early Consultation for Environmental Assessment
Waimalu Zipline, Lot 48-B-2, Waimalu, Island of Oahu

Thank you for the opportunity to review and comment on the subject project. We have no comments at this time.

If you have any questions, please call Kyle Oyasato of the Division of Road Maintenance, at 768-3697.

Sincerely,

Ross S. Sasamura, P.E.
for Director and Chief Engineer

HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

May 7, 2013

Mr. Ron Terry, Principal
Geometrician Associate, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Early Consultation for Environmental Assessment
Waimalu Zipline, Lot 48-B-2
Waimalu, Oahu, Hawaii

In response to your letter of April 15, 2013, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]™, 2006 Edition, Section 18.2.3.2.2.)

   A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; UFC™, 2006 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the

exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFC™, 2006 Edition, Section 18.3.1, as amended.)

3. Submit civil drawings to the HFD for review and approval.

Should you have questions, please call Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 808-723-7151.

Sincerely,

EMMIT A. KANE
Assistant Chief

EAK/SY:bh

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

May 7, 2013

In reply, please refer to:
LUD–1 9 8 073 001-ID1294
Early Cons-Waimalu Zipline

Mr. Ron Terry, Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Early Consultation for Environmental Assessment for Waimalu Zipline, Lot 48-B-02, located on or near Kaahele Street & Kuhao Place, Waimalu, Aiea, Oahu, Hawaii 96701

Thank you for the opportunity to comment on the Early Consultation for the subject project. We have the following comments to offer.

If connection to the City and County sewer system is not available, domestic wastewater generated by the project shall be handled by wastewater systems that comply with our chapter 11-62, Hawaii Administrative Rules. Please be informed that portable toilets will not be allowed to be used for the nature center/way station.

Should you have any questions, please contact the Planning & Design Section of our Branch at our direct toll free phone number 974-4000 ext. 64294 or fax to (808) 586-4300.

Sincerely,

SINA PRUDER, P.E., ACTING CHIEF
Wastewater Branch

LM:mt

c: Ms. Laura McIntyre, Environmental Planning Office (EPO-13-092)
Mr. George Atta, C&C of Honolulu, Dept. Planning & Permitting, 7th Floor

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 15, 2013

Geometrician Associates, LLC
Attention: Mr. Ron Terry
P.O. Box 396
Hilo, Hawaii 96721

via email: rterry@hawaii.rr.com

Dear Mr. Terry,

SUBJECT: Early Consultation for Environmental Assessment for Waimalu Zipline, Lot 48-B-2, Waimalu, Island of O`ahu

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from (1) Land Division – Oahu District; (2) Office of Conservation and Coastal Lands; and (3) Division of State Parks. No other comments were received as of our suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 19, 2013

MEMORANDUM

FROM: ~~DLNR~~

DLNR Agencies:
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_Engineering Division
_X_Div. of Forestry & Wildlife
_X_Div. of State Parks
_X_Commission on Water Resource Management
_X_Office of Conservation & Coastal Lands
_X_Land Division Oahu District
_X_Historic Preservation

TO: ~~FROM~~

Russell Y. Tsuji, Land Administrator

SUBJECT: Early Consultation for Environmental Assessment for Waimalu Zipline, Waimalu, Island of O`ahu

LOCATION: Lot 48-B-2, Waimalu, Island of O'ahu

APPLICANT: Geometrician Associates, LLC for Waimalu Holding Company LLC (Owner) and Towne Development of Hawaii, Inc. (Manager)

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by May 14, 2013. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: Steve Lau
Print Name: Steve Lau
Date: 4/23/2013

c: Central Files

OA-13-141

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
2013 MAY -7 AM 10:08

2013 APR 22 A 9:48
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 19, 2013

MEMORANDUM

2013 APR 22 A 9:48
STATE OF HAWAII

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
X Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment for Waimalu Zipline, Waimalu, Island of O`ahu
LOCATION: Lot 48-B-2, Waimalu, Island of O`ahu
APPLICANT: Geometrician Associates, LLC for Waimalu Holding Company LLC (Owner) and Towne Development of Hawaii, Inc. (Manager)

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by May 14, 2013. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: [signature]
Print Name: S. MICHAEL CAIN
Date: 7 Apr 7 May 13

c: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

ref:OCCL:MC

Correspondence OA-13-149

MAY 7 2013

MEMORANDUM:

TO: Russell T. Tsuji, Land Administrator
DLNR Land Division

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR WAIMALU ZIPLINE

LOCATION: Waimalu, 'Ewa District, O'ahu

LANDOWNER: Waimalu Holding Company, LLC

TMK: (1) 9-8-073:001

The Office of Conservation and Coastal Lands has reviewed the materials provided regarding the proposed "Waimalu Zipline" on the above subject parcel. The project area appears to be in the General Subzone of the State Land Use Conservation District.

Based upon the information provided, the proposal appears to be an identified land use pursuant to Hawai'i Administrative Rules (HAR) §13-5-24 *Identified land uses in the Resource Subzone,* R-8 BOTANICAL GARDENS, PRIVATE PARKS, AND NATURE CENTERS, (D-1) *For a profit or non-profit establishment featuring plants or other natural resources and offering tours or other nature-based outdoors educational and recreational activities, primarily during daylight hours. Facilities may include access road, restrooms, shelters, and not more than one structure for housing, administration, and maintenance not to exceed 1,200 square feet, under a management plan approved simultaneously with the permit, is also required.*

This use require a Conservation District Use Permit (CDUP) from the Board of Land and Natural Resources, who have the final authority to grant, modify, or deny any permit.

Management Plans Requirements are outlined in §13-5, Exhibit 3. The Management Plan should be a separate document from the application, but both can be submitted and processed simultaneously.

Pursuant to §13-5-40, HEARINGS, public hearings are required for a proposed use of Conservation District land for commercial purposes. OCCL will coordinate the public hearing with the applicant upon acceptance of a completed application.

Filing fees for Board Permits are discussed in §13-5-34, Board Permits.

Conservation District Use Applications (CDUA), as well as copies of §13-5, are available at hawaii.gov/dlnr/occl.

You can contact Michael Cain at 587-0048 should you have any questions on this matter.

55630

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 19, 2013

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
X Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division Oahu District
X Historic Preservation

RECEIVED
LAND DIVISION
2013 MAY -3 PM 2:59
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment for Waimalu Zipline, Waimalu, Island of O`ahu
LOCATION: Lot 48-B-2, Waimalu, Island of O`ahu
APPLICANT: Geometrician Associates, LLC for Waimalu Holding Company LLC (Owner) and Towne Development of Hawaii, Inc. (Manager)

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

Please submit any comments by May 14, 2013. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: _____
Print Name: Daniel S. Quinn
Date: 4/30/13

c: Central Files

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2013-TA-0257

MAY 1 7 2013

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Subject: Technical Assistance for the Draft Environmental Assessment for the proposed Waimalu Zipline, Oahu

Dear Mr. Terry:

The U.S. Fish and Wildlife Service (Service) received your letter on April 18, 2013, requesting our comments in preparation for your draft Environmental Assessment (DEA) for the proposed Waimalu Zipline project. The project includes hiking trails and recreational activities including a zipline operation on a portion of the 447-acre private park at the terminus of Kaahele Street in the Waimalu area, Lot 48-B-2, Oahu. The proposed project will include:

- A commercially zoned intake center of approximately 2,000 square feet (sf) with adequate parking to be leased from a third party and will be located in a yet-to-be identified location with existing commercial zoning.
- Commercial van transportation from the intake center over City & County roads through the entry of the Waimalu site to a nature center/way station, which will be located 1,200 to 1,500 feet from the end of Kaahele Street.
- The nature center/way station will be a structure having no more than 1,200 sf and 10 parking stalls that will serve as: 1) the dropping off/picking up point between the van transportation and ATV transports; 2) storage for the ATVs; 3) non-customer parking; and 4) a station for 24 hour security personnel.
- On-site parking will be limited to employees, shuttle vans and service vehicles.
- ATVs will take customers from the nature center to the start of the zipline course over existing trails.
- A zipline course having 7 platforms, with platforms connected by a total of 6 pairs of zipline cables.
- The driveway to the nature center, the nature center, the trail to the start of the zipline course and the zipline course will be on the Waimalu property, and the zipline operation will attempt to control access to others who have previously used the property.
- Zipline tour customers will be put into 10-12 person groups and accompanied at all times by 2 guides.
- The tours will take about 2.5 hours from the time that they leave the intake center until their return.

- Operations will be limited to 8:00 a.m. to dusk, 365 days a year.
- Newtown Estates Community Association members will be able to access the existing trail that is accessed by Kaahele Street and a 24 hour security will prevent access to unauthorized users.
- It is estimated that 2 to 4 van round trips an hour will go from the intake center to the mauka end of Kaahele Street and an additional 2 trips per hour will be made by employees.

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program. Our data indicate that the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), endangered Oahu elepaio (*Chasiempis sandwichensis ibidis*), and the endangered Oahu tree snail (*Achatinella* spp.) may be present in the vicinity of the proposed activity. The federally threatened Newell's shearwater (*Puffinus auricularis newelii*) and wedge-tailed shearwater (*Puffinus pacificus chlorhynchus*), protected under the Migratory Bird Treaty Act [16 U.S.C. 703-712], (collectively referred to as Hawaiian seabirds), could be impacted by components of your project. In addition, designated critical habitat for the Oahu elepaio may occur in the project footprint. We offer the following recommendations to assist you in preparation for your DEA.

Hawaiian seabirds

Outdoor lighting, used for night time work and street lights, can adversely impact listed and migratory seabird species protected under the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), as amended, and the Migratory Bird Treaty Act. Night lighting poses a significant threat to protected fledgling seabirds. Seabirds fly at night and are attracted to artificially-lighted areas which can result in disorientation and subsequent fallout due to exhaustion or collision with objects such as utility lines, guy wires, and towers that protrude above the vegetation layer. Any increase in the use of night-time lighting, particularly during each year's peak fallout period (September 15 through December 15), could result in seabird injury or mortality. Once grounded, they are vulnerable to predators or often struck by vehicles along roadways. We recommend avoiding night-time work, and providing all project staff with information about seabird fallout. If lights cannot be eliminated due to safety or security concerns, then they should be positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below.

Hawaiian hoary bat

The Hawaiian hoary bat roosts in both exotic and native woody vegetation and, while foraging, will leave young unattended in "nursery" trees and shrubs. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). If site clearing is proposed as part of your action, it should be timed to avoid disturbance to Hawaiian hoary bats in the project area. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground. When barbed wire is used in fencing, Hawaiian hoary bats can become entangled. If fencing is a part of your proposed action, we recommend barbed wire not be used.

Oahu elepaio
We recommend you work with qualified biologists to obtain the most updated information on Oahu elepaio territories in the area. In areas of proposed site clearing and fencing, we recommend a qualified biologist survey to ensure any trees occupied by Oahu elepaio or their nests are not cleared or removed prior to any work being done. Territories may have shifted, added or dropped out from where they may have previously been. In addition, we recommend you avoid conducting potentially disturbing activity, such as the use of chain saws or other machinery, in the vicinity of known Oahu elepaio nests during the breeding season. Oahu elepaio breeding season is usually mid February through May, but active nests have been found January through July (VanderWerf 1998).

Hawaiian snails
We recommend a qualified biologist conduct surveys for the endangered Oahu tree snails (*Achatinella* spp.) prior to all vegetation clearing. Achatinella have been observed on both native and non-native plant species. In areas of proposed site clearing and fencing, we recommend a qualified biologist survey to ensure any trees occupied by Achatinella are not cleared or removed.

If it is determined that the proposed project may affect federally listed species, we recommend you contact our office early in the planning process so that we may assist you with Endangered Species Act (ESA) compliance. If the proposed project is funded, authorized, or permitted by a Federal agency, then that agency should consult with us pursuant to section 7(a)(2) of the ESA. If no Federal agency is involved with the proposed project and the project has potential to adversely affect protected species or adversely modify critical habitat, the applicant should apply for an incidental take permit under section 10(a)(1)(B) of the ESA. A section 10 permit application must include a habitat conservation plan that identifies the effects of the action on listed species and their habitats, and defines measures to minimize and mitigate those adverse effects.

To minimize potential adverse impacts to listed wildlife, we suggest that free movements of pets (*i.e.,* dogs off leash) be prohibited on the property. Furthermore, educational signs should be used to inform path users of leash laws and the presence of sensitive species. We also recommend the use of sturdy animal-proof garbage containers to reduce the attraction of the area to non-native and feral species, such as house mice, rats, and feral cats, which can prey on listed wildlife.

We appreciate your efforts to conserve protected species. If you have questions regarding this letter, please contact Jiny Kim, Fish and Wildlife Biologist (phone: 808-792-9400; email: jiny_kim@fws.gov).

Sincerely,

for

Loyal Mehrhoff
Field Supervisor

References

References

Vanderwerf, Eric A. 1998. Elepaio (*Chasiempis sandwichensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/344

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD/CWB

06007PMR.13

June 5, 2013

Mr. Ron Terry
Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Comments on the Early Consultation for Environmental Assessment for Waimalu Zipline, Lot 48-B-2 Waimalu, Island of Oahu, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt your letter, dated April 15, 2013, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the CWB Individual

NPDES Form through the e-Permitting Portal and the hard copy certification statement with $1,000 filing fee. Please open the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the "CWB Individual NPDES Form." Follow the instructions to complete and submit this form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommend that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

Alec Wong

ALEC WONG, P.E., CHIEF
Clean Water Branch

MR:rh

c: DOH-EPO #13-092 [via email only]

BRINGING "STRANGERS" INTO ROYAL SUMMIT

According to the KHON2 news interview, the zip line company is expecting to have one van every half hour bringing customers to the zip line site. So, if we figure they are open 8 hours (probably more) a day, that means 16 van-trips a day up Ka'ahele that we don't have now. And, assuming that the zip line ride begins and ends at the same point, those same vans will have to go back down Ka'ahele, so there is another 16 van-trips, for a total of at least 32 van-trips per day, probably 365 days a year. If we assume they are using 10-passenger vans, these van-trips will result in 320 non-Newtown residents transiting the Royal Summit area each day. While the company seems to believe that these 320 people will all be tourists from Waikiki, I don't agree with that. I believe there are many Oahu residents who would also ride this zip line. I think the spread might be closer to 50-50, at least in the beginning. Maybe after the newness wears off it would go to a 70-30 split. So, the result would be that somewhere between 96 and 160 Oahu residents would be made aware of an "above average" community that they never knew existed. And some of these people are potentially "bad" or "opportunistic" people that will get their friends and return to find out just how much "above average" cars, stereos, TVs, computers, etc., the Royal Summit residents have in homes that don't always have guard dogs or alarm systems. It would be nice if these residents were all members of the Newtown Neighborhood Security Watch, and had concerned neighbors watching out for them, but, unfortunately, this is not the case. However, based on crime statistics for the last couple of years, Newtown Estates Community Association, in general, is one of the safest areas in which to live. But if there is an apparent resulting crime-wave after the zip-line operation opens, it will be too late.

As indicated above, we are assuming that the zip line ride begins and ends at the same point. However, on the news interview it was unclear when he said that the zip-line would end "right here", whether he meant where it began or at another location, in which case we would be concerned with another part of Newtown being affected by the transiting and departing vans. Or will the ride be ending across the valley in the Pearlridge area and, if so, how do those residents feel about it?

Likewise, would Oahu residents, regardless of the area in which they reside, be required to go to Waikiki and ride the zip-line vans, or will they be allowed to come to the area in private vehicles? If they drive private vehicles to the top of Ka'ahele and park would they be allowed to walk into the zip-line site? I believe this latter situation would be totally unacceptable to Royal Summit residents.

June 27, 2013

To: Towne Development

Newtown Estates Community Association (NECA)

From: Robert S.N. Young

Re: Possible Development Zip line Above Royal Summit

I have been a long time resident of Royal Summit for approximately 30 years. My Wife and I bought our home because of the quiet streets, nice neighbors, and we believed it would be a great place to raise our children. The recreation center has been a joy to swim, have parties, play tennis, and meet friends.

However, in the past few years we have seen an increase in traffic, burglaries, and crimes in our neighborhood. A number of our fellow residents have been robbed, cars broken into, and killed. Our Neighborhood Watch Program still functions and we thank all of our Watch Captains and coordinators for their time and effort to keep our community safe. I had believed our Newtown Community Association has in the past been very helpful in keeping our Recreation Center clean, available, transparent, and accessible to all who live in our community.

Therefore, it was with great sadness that I only learned about the possible construction of a Zip line in our neighborhood just recently through some concerned residents. There were no notices placed in the Recreation Center, no newsletter articles written about this, no public notices in the newspapers, and no mail outs regarding this possible construction. I am disappointed that the Newtown Association and Towne Development did not do a better job of informing the residents and that others found out about this Zip line through the news media on KHON2 News. I am very disappointed that a presentation was made to NECA's Board of Directors, the President of NECA says he supports the project without any input from the community, and that there are no minutes of such presentation before the NECA Board. The lack of transparency of this

matter, the lack of notice and due process, the lack of other community input is disturbing, at best, and the reaction from the Manager who has been hired by the Association regarding public input is appalling. There should be more openness by the Association and Towne Development so that the community can express their concerns regarding this matter.

Thus, an Ad-Hoc Committee has been formed by concerned residents of Newtown, Royal Summit and other associations that will be directly affected by this possible construction. Some of these concerns (and not limited to the below list) are the following:

1. EIS process
2. Impact of traffic
3. Possible increase in crime
4. Zoning and permit process
5. Specifics of construction
6. Security concerns
7. Safety concerns
8. Payment to NECA and indemnification issues
9. Environmental impact regarding cultural resosurces, archeological and historical impact, flora/endangered species, fauna and impact to their natural habitat and breeding cycles

I believe a more open process by both the Newtown Association (staff as well as board members) will facilitate a better understanding of all members and the community. Attached are some of the position papers that some of the Ad Hoc committee members have already written and would like your consideration in this matter.

Finally, I believe that if parties can work together in this process, there will be a better understanding of what is being planned for the community and less friction and conflicts with everyone.

Thank you very much for your time and attention to this matter.

INCREASED TRAFFIC ON KA'AHELE STREET

According to the KHON2 news interview, the zip line company is expecting to have one van every half hour bringing customers to their zip line site. So, if we figure they are open 8 hours (probably more) a day, that means 16 van-trips a day up Ka'ahele that we don't now have. And those same vans will have to go back down Ka'ahele, so there is another 16 van-trips, for a total of at least 32 van-trips per day. Assuming they operate 365 days a year, that is an increase of 11,680 small-truck-size vehicles transiting Ka'ahele Street each year.

The speed limit on Ka'ahele Street is 25mph. However, we all know that nobody goes that speed, especially larger vehicles, such as 10-passenger vans, that go uphill at higher rates of speed in an attempt to drive at their engines' most efficient speeds in order to save gas. The Newtown Neighborhood Security Watch participates in HPD's Community Traffic Awareness Program (CTAP) on a regular basis on Ka'ahele Street at the crosswalk near the entrance to the Newtown Recreation Center. HPD officers routinely clock drivers going over 40mph both up and down Ka'ahele Street in this area.

The reasons we target this area are because: (1) In this area Newtown is split in half by Ka'ahele and the residents on the Diamond Head side us this crosswalk to get to the Newtown Recreation Center and to the bus stops going down Ka'ahele Street. At least one death has occurred in this crosswalk, and there has been at least one personal injury and death of a pet dog. (2) Cars coming up Ka'ahele at this point round a small curve and do not have clear visibility of the crosswalk until it is almost too late to slow down or stop for pedestrians in the crosswalk. (3) A major Little League field fronts Ka'ahele just above the crosswalk, and on weekends and late afternoons the park is jammed with people, many of whom have parked on the Diamond Head side of Ka'ahele Street and used the crosswalk to get to the Little League Park.

In an attempt to prevent pedestrian accidents in this crosswalk, Representative Mark Takai initiated an "orange flag" program, whereby pedestrians carry a large, orange flag when crossing in the crosswalk to increase their chances of being seen by a speeding driver. But there is still an issue of residents from the Diamond Head side of Ka'ahele Street having to make a left turn across Ka'ahele Street in order to leave the area, and the small curve blind spot discussed above works against them also. There have been many fender-benders and near misses in this area.

With an increase of an estimated 11,680 large vehicles on Ka'ahele Street each year as a result of the zip line operation, it is requested:

(1) that the developer(s) work with the City and County of Honolulu to provide a stop light at the intersection of Lulu Street and Ka'ahele Street that is demand-activated by cars leaving Lulu Street or the driveway that leads to the City's public restroom, the City's parking lot, and the Newtown Recreation Center, and by pedestrians crossing Ka'ahele Street.

(2) that, because this same increased traffic will affect residents crossing Ka'ahele Street at Komo Mai Drive, the developer(s) work with the City and County of Honolulu to provide pedestrian-activated overhead flashing yellow warning lights like they have on S. King Street near Times Market.

(3) that a Ka'ahele Street crosswalk be provided beside the neighborhood park in upper Royal Summit with some form of pedestrian-activated warning system.

HAWAII STATE LEGISLATURE
STATE CAPITOL
HONOLULU, HAWAII 96813

October 1, 2013

Mr. William J. Aila, Jr.
Chair
Board of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, HI 96813

Dear Chair Aila:

This communication pertains to the anticipated conservation district use permit application for a zip line/nature center operation on conservation district land above Royal Summit, Alea, Oahu. Our understanding is that the landowner intends to submit the application, with a draft environmental assessment, to the Board of Land and Natural Resources in October 2013. Our understanding also is that the Board has up to 180 days from receipt of a "complete" application to make a decision on the application.

The proposed use of conservation district land above a long-time residential community is controversial among area residents. Obviously, many are concerned about potential or perceived negative impacts on the community. Before a decision on the application is made, area residents, as well as the Board, need to be informed about the impacts. Area residents who are well-informed then may provide knowledgeable comments on the draft environmental assessment or testimony on the application at Board meeting or public hearing.

Thus, we request that the Board accept the application for the zip line/nature center operation as "complete" only if the application and/or accompanying draft environmental assessment comprehensively address impacts of concern to area residents and otherwise comply with pertinent laws and administrative rules. The impacts of concern include the following which may result from the zip line/nature center operation and patrons:

(1) Vehicular traffic volume, speeding, and pedestrian safety on the streets in the community, especially Kaahele Street, which leads into the proposed zip line/nature center site;

(2) Parking congestion at the adjacent residential area;

(3) Crime, vandalism, litter, filth, and trespass in the adjacent residential area;

(4) Visual and other aesthetics of the proposed site;

(5) Noise generation by the proposed operation;

(6) Cultural, historical, or archaeological site damage or destruction at the proposed site;

(7) Natural resource degradation and soil erosion at the proposed site;

(8) Water runoff from the proposed site into the adjacent residential area;

(9) Hazardous material use and presence at the proposed site;

(10) Pig hunter access reduction or gathering rights curtailment due to the proposed operation; and

(11) Future development potential on adjacent conservation land that may be enhanced by the proposed operation.

Our hope is that the information provided will be useful to area residents, the Board, and other interested parties. With good, objective information, we are confident that the Board will make a decision on the application that will be in the best interest of the State of Hawaii and Aiea/Pearl City community.

We also request that the Board hold at least one meeting or hearing in Newtown, the area of the Aiea/Pearl City community that will be directly impacted if the permit application is approved. The residents should be provided such convenience and courtesy.

Thank you for considering this request.

If you have any questions, please feel free to contact either or both of us (Senator Ige at 586-6230 or sendige@capitol.hawaii.gov or Representative Takai at 586-8455 or reptakai@capitol.hawaii.gov).

Very truly yours,

DAVID Y. IGE
Senator
Senate District 16
State of Hawaii

K. MARK TAKAI
Representative
House District 33
State of Hawaii

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:MC

Correspondence OA-14-62

OCT 2 1 2013

The Honorable David Y. Ige
Hawai'i State Capitol, Room 208
415 South Beretania Street
Honolulu, HI 96813

Dear Senator Ige,

SUBJECT: **PROPOSED ZIPLINE AND NATURE CENTER**
Waiʻanalu, 'Ewa District, Oʻahu
(1) 9-8-073:001

The Department of Land and Natural Resources (DLNR) thanks you for your recent comments regarding a possible zipline and / or nature center on the above subject parcel.

During the early consultation for the proposal's environmental assessment, the Department notified the landowner's that the project would require a Conservation District Use Permit (CDUP) and a Management Plan, both of which would need to be approved by the Board of Land and Natural Resources.

We have not received an application yet for the project. DLNR's Office of Conservation and Coastal Lands (OCCL) will be responsible for processing the permit; the Chair's Office will relay your concerns to OCCL.

Public hearings are required for commercial land uses within the Conservation District. OCCL will notify the community associations of the time and date of the hearing, and will strive to hold the meeting in the 'Aiea / Pearl City area so that it is accessible to residents.

Should you have any questions, please feel free to contact Sam Lemmo of OCCL at 587-0377.

Sincerely,

William J. Aila, Chairperson
Board of Land and Natural Resources

ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 2
Archaeological Assessment Survey

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SCS Project Number 1398-AA-1

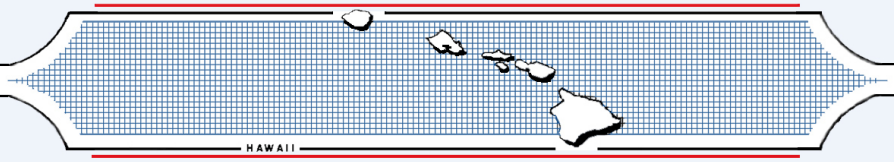
AN ARCHAEOLOGICAL ASSESSMENT FOR THE O`AHU ZIP LINE PROJECT, WAIMALU AHUPUA`A, EWA DISTRICT, ISLAND OF O`AHU, HAWAI'I [TMK (1) 9-8-073:001]

Prepared by:
Charmaine Wong, B.A.,
Guerin Tome, B.A.,
and
Robert L. Spear, Ph.D.

August 2013
DRAFT

Prepared for:
Christopher L. Lau, Executive Vice President
Towne Development of Hawaii, Inc.
220 South King, Suite 960
Honolulu, Hawai'i 96813

SCIENTIFIC CONSULTANT SERVICES Inc.



1347 Kapiolani Blvd., Suite 408 Honolulu, Hawai`i 96814

ABSTRACT

At the request of Christopher L. Lau, Executive Vice President of Towne Development of Hawaii, Inc., Scientific Consultant Services, Inc. (SCS) has prepared this Archaeological Inventory Survey Plan (AISP) in advance of ground-altering activities within the 447.464-acre project area located in Waimalu *Ahupua`a*, Ewa District, Island of O`ahu, Hawai'i [TMK: (1) 9-8-073:001].

The proposed project occurs within Lot 48-B-2 located in Waimalu. The project area involves eleven separate survey areas with a combined acreage of 2.701-acres within a 447.464-acre property designated TMK: (1) 9-8-073:001. The current project involves the construction of a zip line on the property.

No sites were identified during the Archaeological Assessment. Thus, the Archaeological Inventory Survey-level study has been completed. No further archaeological work is recommended for the proposed undertaking.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

At the request of Christopher L. Lau, Executive Vice President of Towne Development of Hawaii, Inc., Scientific Consultant Services, Inc. (SCS) has prepared this Archaeological Assessment (AA) in advance of ground-altering activities associated with the proposed zip line project. The assessment covers eleven separate survey areas with an estimated total acreage of 2.701-acres, and includes the road and trail that links the various survey areas. The 2.701-acre project area is located within a 447.464-acre parcel situated in Waimalu *Ahupua`a*, Ewa District, Island of O`ahu, Hawai'i [TMK: (1) 9-8-073:001] (Figures 1 through 5).

Fieldwork was conducted on May 13, 2013, by SCS archaeologist Guerin Tome, B.A., under the direction of the Principal Investigator Robert L. Spear, Ph.D. Initially, this project was conducted as an Archaeological Inventory Survey and was intended to identify and document the presence/absence of cultural material and archaeological features within the project area. However, because the results of the survey were negative for archaeological sites, the results are being presented in this report as an Archaeological Assessment.

GEOGRAPHIC SETTING

The proposed project occurs within Lot 48-B-2 located in Waimalu. The project area involves eleven separate survey areas with a combined acreage of 2.701-acres within a 447.464-acre property designated TMK: (1) 9-8-073:001. The current project involves the construction of a zip line on the property.

PROJECT AREA SETTING

The project parcel is situated within the Waimalu area, in Waimalu *Ahupua`a*, Ewa District, on the *mauka* (mountain) side of the Queen Liliuokalani Freeway/Interstate H-1 portion between Pearl City and Aiea. The project parcel is bounded on the south by Waimalu Stream, on the east by the Forest Reserve boundary, on the west by the subdivision and end of Ka'ahele Street, and on the north by land belonging to Bishop Estate (Beauchan and Kennedy 2012:4).

The project terrain is rugged as the area consists primarily of high ridges, deep V-shaped valleys, and steep slopes prone to erosion and large landslides (Beauchan and Kennedy 2012:4). The elevation of the project area varies from 200 to 900 feet above mean sea level (amsl). Most of the project parcel is undeveloped and is covered by fairly dense vegetation except for portions of ridge tops and areas where landslides have occurred. However, the southwestern portion (exact location and acreage unknown) of the parcel closest to the subdivision has been used as pastureland and chicken farms; this portion of land continues to be utilized for raising chickens (Beauchan and Kennedy 2012:4). Portions of the project parcel have also been adapted for recreational purposes such as dirt biking and paintball.

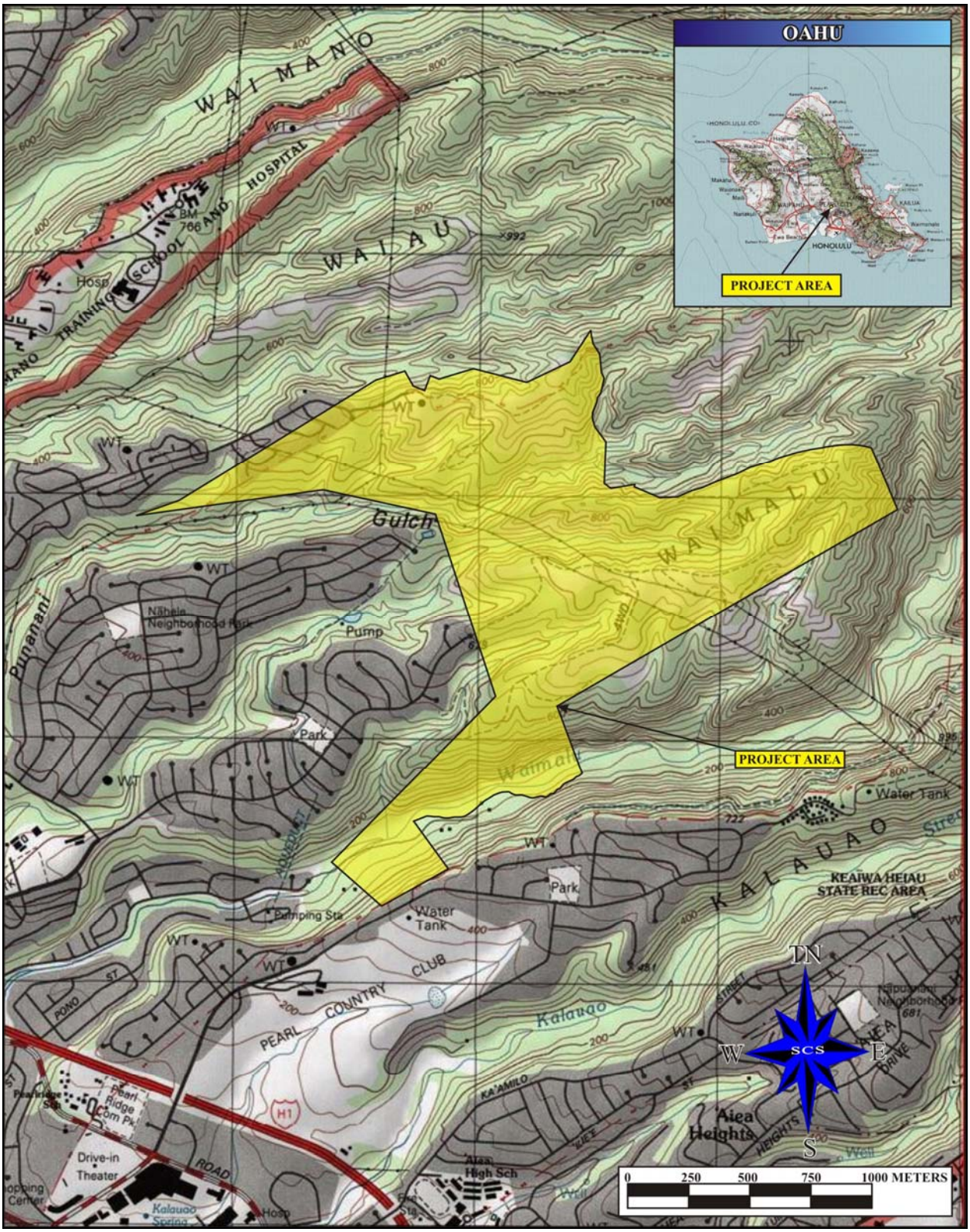


Figure 1: United States Geological Survey (USGS) Map Showing the Project Area Location.

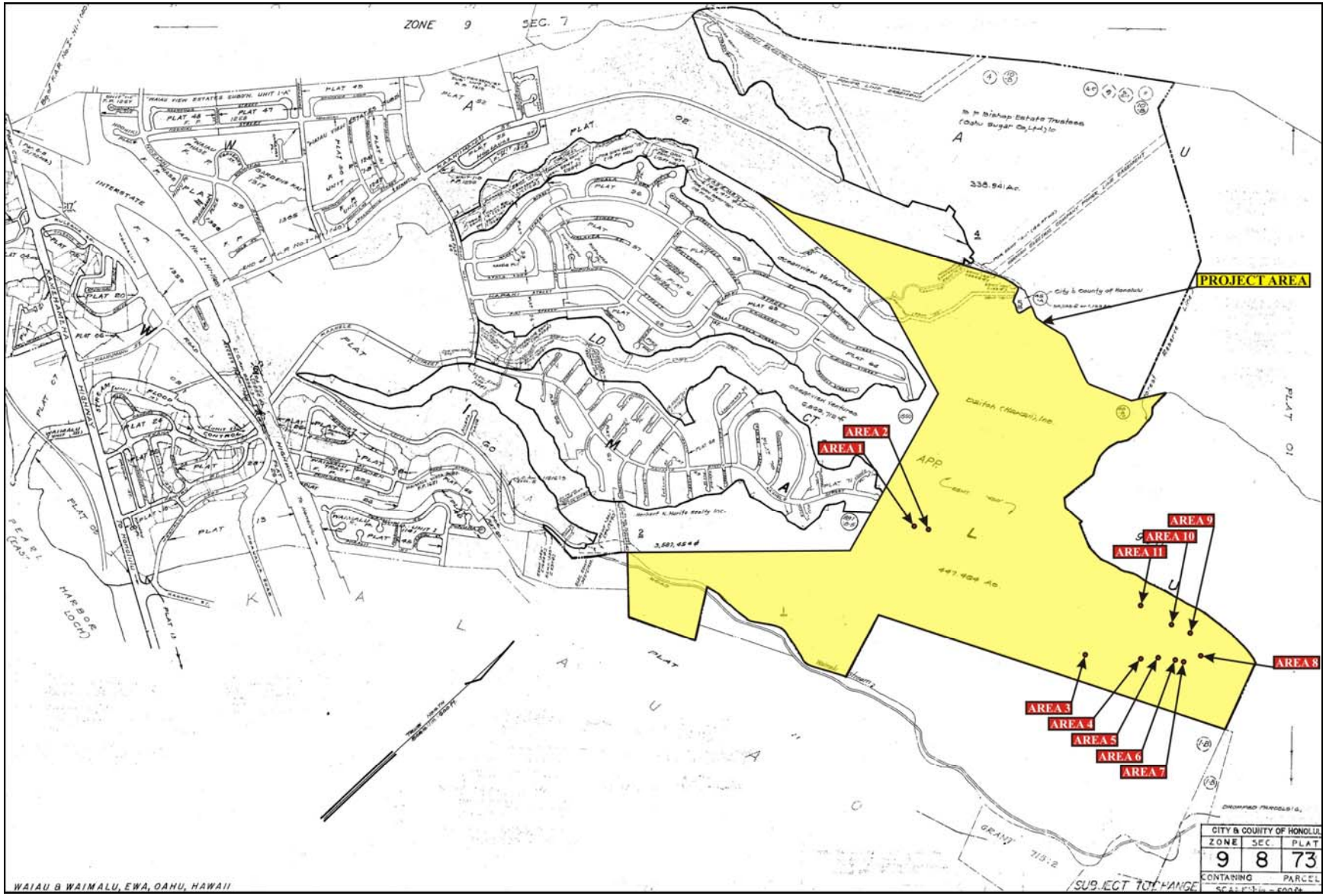


Figure 2: Tax Map Key [TMK: (1) 9-8-073:001] Showing the Project Area Parcel.

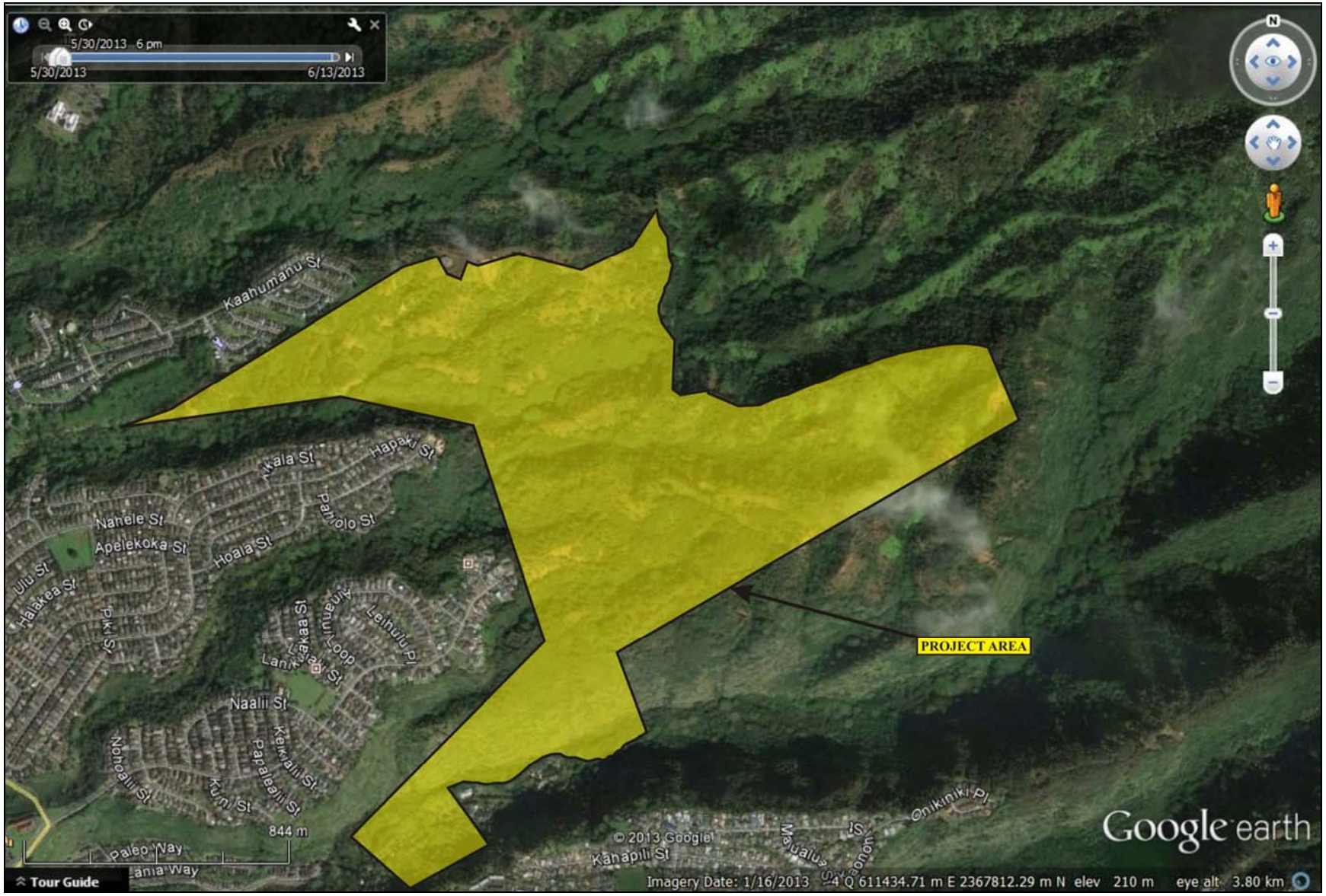


Figure 3: Google Earth Image of Project Areas.

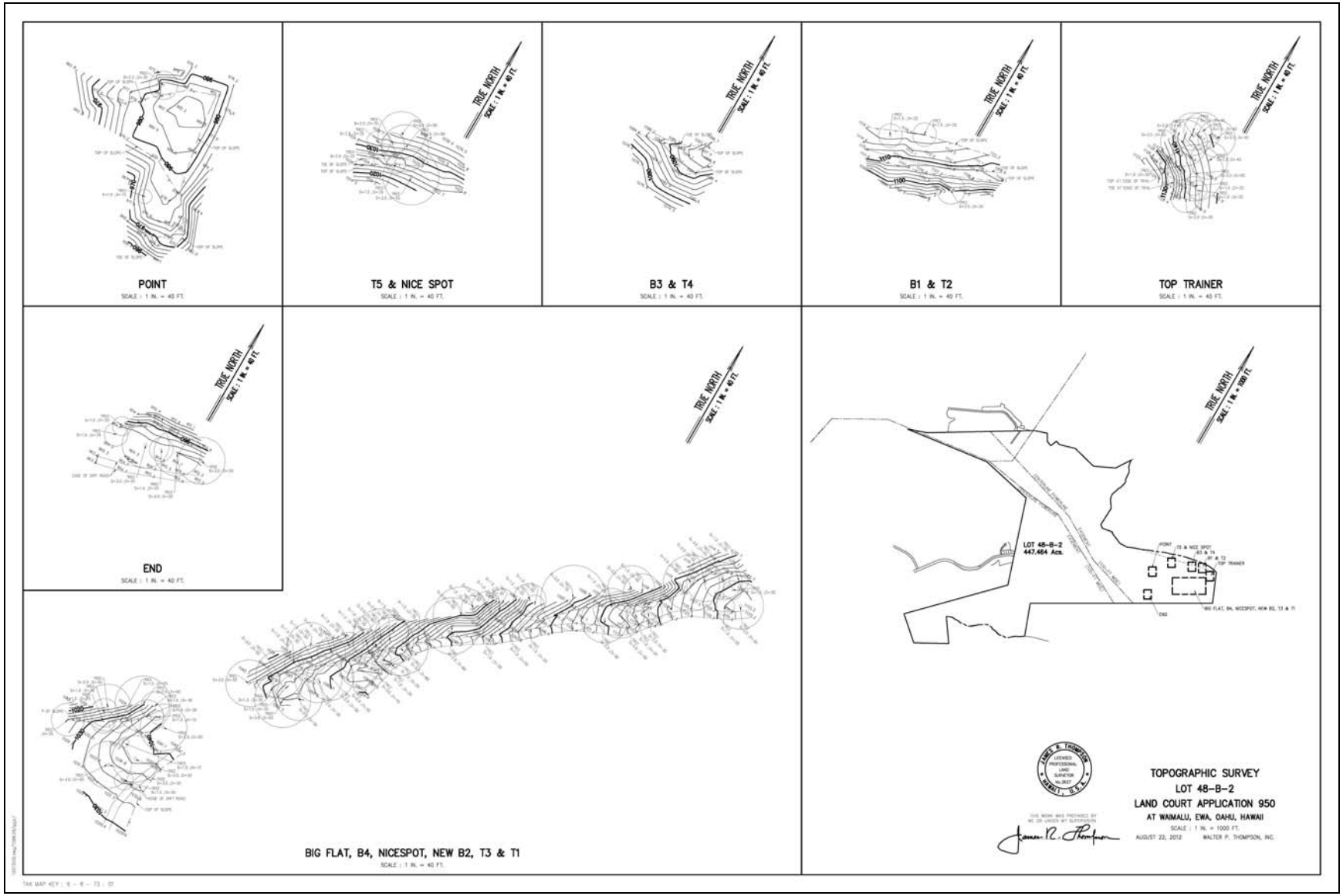


Figure 4: Client Map of Project Area.

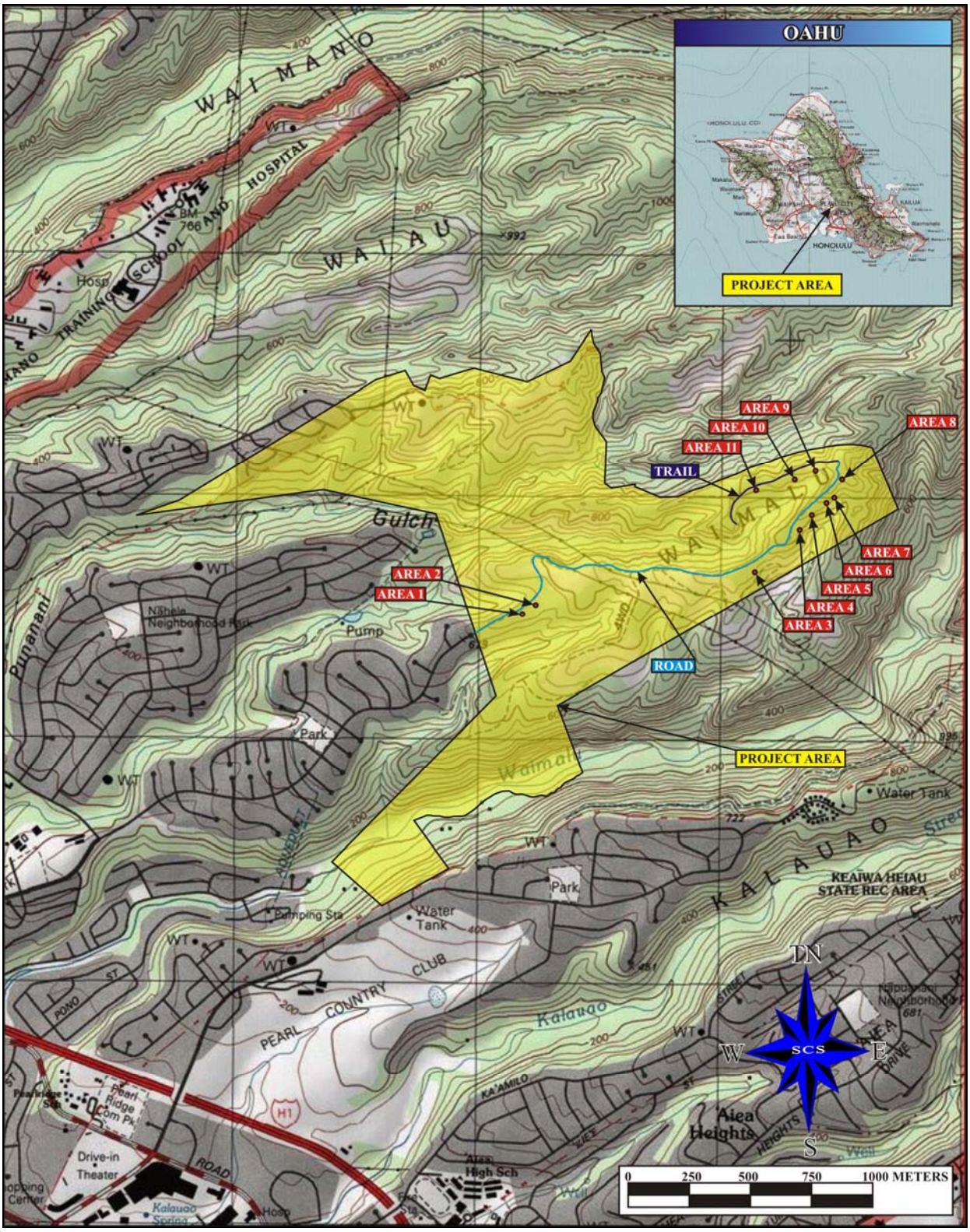


Figure 5: Topographic Map of Individual Sites in Project Areas with Road and Trail.

PROJECT AREA SOILS

According to Foote *et al*. (1972:40, 94, 119, Map 53), the project area is situated within the matrices described as Helemano Silty Clay (HLMG), Manana Silty Clay Loam (MoC), Rock Land (rRK), and Rough Mountainous Land (rRT). The Helemano Silty Clay (HLMG) with 30 to 90 percent slopes is found on the sides of V-shaped gulches including small areas of rock outcrop, steep stony land, and eroded spots. Permeability is moderately rapid, runoff is medium to very rapid, and the erosion hazard is severe to very severe. This soil type is present throughout the project area and is utilized for pasture, woodland, and wildlife habitat. The Manana Silty Clay Loam with 6 to 12 percent slopes is moderately permeable with medium runoff and moderate erosion hazard. This soil type is used for agriculture (sugarcane and pineapple) and pasture.

Rock Land consists of areas where exposed rock covers 25 to 90 percent of the surface and the soil is very shallow. The land type is nearly level to very steep containing soil material that is very sticky and very plastic with high shrink-swell potential. Rock Land is used for pasture, wildlife habitat, water supply, and urban development. Rough Mountainous Land consists of very steep land broken by numerous intermittent drainage channels. The soil mantle is very thin, ranging from 1 to 10 inches in thickness over relatively soft and permeable saprolite. This land type is used for water supply, wildlife habitat, and recreation.

PROJECT AREA CLIMATE

The project area is situated within the dry region of O`ahu's leeward side. Annual rainfall in the area ranges from 20 to 30 inches (Price 1983:62). Higher elevations within the Waimalu *Ahupua`a* are prone to receive more precipitation due to cloud descent and lower temperature climates.

PROJECT AREA VEGETATION

Vegetation within the project area consisted of ironwood trees (*Casuarina equisetifolia*), *'ōhi'a lehua* (*Metrosideros polymorpha*), *koa haole* (*Leucaena leucocephala*), strawberry guava (*Psidium cattleianum*), eucalyptus (*Eucalyptus deglupta*), grass, forest orchid, ferns, and moss.

TRADITIONAL AND HISTORIC SETTING

The island of O`ahu ranks third in size of the eight main islands in the Hawaiian Archipelago. Traditionally, the division of O`ahu's land into districts (*moku*) and sub-districts (*`ili*) was said to be performed by Mā`ilikukahi, a ruling chief of O`ahu, who was chosen by the chiefs to be the *mō`īho `oponopono o ke aupuni* (administrator of the government; Kamakau 1991). It was Mā`ilikukahi who had the Island of O`ahu thoroughly surveyed, and permanently defined the boundaries between the different divisions and lands (Fornander 1969:89). Cordy (2002: 25) places Mā`ilikukahi's reign over O`ahu at the beginning of the 16th Century. Mā`ilikukahi created six districts and six district chiefs (*ali`i `ai moku*). Land was considered the property of the king or *ali`i `ai moku* (chief who rules a *moku*) (Pukui and Elbert 1986: 20), which he held in trust for the gods. The title of *ali`i `ai moku* ensured rights and responsibilities to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser

chiefs. The *maka`āinana* (commoners) worked the individual plots of land. It is said that Mā`ilikukahi gave land to *maka`āinana* all over the island of O`ahu (*ibid*).

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili` āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) that customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina* or *`ili* were smaller land divisions next in importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (Lyons 1875:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in an *ahupua`a* was called a *kuleana* (Lucas 1995:61).The present project area was located in the *ahupua`a* of Kalauao, which literally means "the multitude [of] clouds" (Pukui *et al.*1974:75).

TRADITIONAL SETTLEMENT PATTERNS

Archaeological settlement pattern data suggests that initial colonization and occupation of the Hawaiian Islands first occurred on the windward shoreline areas of the main islands between A. D. 850 and 1100, with populations eventually settling in drier leeward areas during later periods (Kirch 2010). Although coastal settlement was dominant, Native Hawaiians began cultivating and living in the upland *kula* (plains) zones. Greater population expansion to inland areas began around the 14th Century and continued through the 16th Century. Large scale or intensive agriculture was implemented in association with habitation, religious, and ceremonial activities.

The Hawaiian economy was based on agricultural production and marine exploitation, as well as animal husbandry and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry-land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugarcane, *Saccharum officinaruma*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were cultivated. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on the leeward side of O`ahu was likely to have begun early in what is known as the Expansion Period (AD1200-1400, Kirch 1985).

The district of `Ewa was an *ali`i* stronghold undoubtedly made attractive because of the natural springs and numerous fishponds that were constructed at different points around the bay (named *Ka-awa-lau-o-Pu`uloa* by the Hawaiians). There was a great variety of shellfish, the most important being the *pipi*, or Hawaiian pearl oyster, known as *i`a hamau leo o `Ewa* (`Ewa's silent sea creature). The *pipi* was eaten raw and the shell furnished shiny shanks used in bonito (*Sarda sarda*) hooks. It was believed that this valuable oyster had been brought from Kahiki by a *mo`o* (lizard demi-god/goddess) named Kane-kua`ana (Handy and Handy 1972). Other

bivalves gathered and eaten raw, or cooked with young taro leaves included *papaua*, *`owa`owaka*, *nahawele*, *kupekala*, and *mahamoe* (*ibid*.).

Originally called *Ke Apana o `Ewa*, the District of `Ewa not only provided ideal circumstances for fishponds, but also included high interior plains and several deep valleys of the Ko`olau mountains, as well as traditionally, the Wai`anae Range. Bananas and yams were cultivated in the lower parts of the valleys and *`awa* (kava) could be found higher inland. Perennial streams spilled from the valleys on to the lowlands creating ideal conditions for taro pond-fields (*lo`i*) and fresh water springs were abundant. Terraces extended up the river valleys, some as far as a mile (e.g., Waikele Stream) and lower terraces were watered from springs, such as those in Waipahu and Kalauao. The forests, or upland jungles (*wao*) contained gardens of *wauke* and *mamaki* grew freely on the slopes. Birds and *olonā* could be found in the *wao* along with mountain apples and other necessary resources (*ibid.*).

The settlement pattern, and timing of land utilization, may be conveniently (and arbitrarily) divided into several general periods: pre-Contact settlement/traditional period, the early Historic period/early post-Contact, the recent Historic, and present land use. Together, these periods create a synthesis of land use in and near the project area as well as provide a basis on which archaeological researchers explored succinct research questions during reconnaissance and sampling work.

TRADITIONAL PERIOD

The traditional *moku* of Ewa was and continues to be one of the largest districts in O`ahu. The place-name of Ewa can be translated to mean "unequal" or "crooked." The meaning of Ewa as "unequal," based on Sterling and Summers (1978:1), alludes to the district being a favored residence of O`ahu kings in olden times, making the area a seat of power for the Hawaiian ali'i (royalty). However, according to Pukui *et al*. (1974:28), Ewa translates to mean "crooked" in reference to the myth of the gods Kāne and Kanaloa throwing stones to determine district boundaries where the stone for determining the Ewa district boundary was lost but was later found at Pili-o-Kahe. Another story reports that the boundaries of `Ewa District were established by the traveling gods, Kāne and Kanaloa (Handy and Handy 1972). At the western end, the boundary of Waikele and Hoe`ae`ae was marked by a stone named Pohaku-pili (Border stone). Set on the edge of a sheer precipice, this stone stands firm, as it was placed by the gods. Kāne and Kanaloa blessed the lands of `Ewa with coconut groves, fishponds and taro plantations (*ibid*).

The area of interest, the *Ahupua`a* of Waimalu, is one of several *ahupua`a* located within the *moku* of Ewa. Waimalu means "sheltered water" (Pukui 1974:225) referring to the *makai* portion of the *ahupua`a* which extends into the natural, sheltered harbor of Pu'uloa, known as Pearl Harbor in present times. Additionally, the *makai* portion of the Waimalu *Ahupua`a* was known for both the large number of fishponds as well as the agricultural activities in the form of extensive taro terraces irrigated by the Waimalu Stream and Waipi spring (Sterling and Summers 1978:1).

While the *Ahupua`a* of Waimalu itself is not associated with any known local mythology, the lands in the *makai* portion surrounding Pu'uloa (Pearl Harbor) were associated with an

assortment of legends. For example, Pu'uloa is said to be the first site where breadfruit, brought from Samoa, was first planted in Hawaii (Pukui 1974:201; Sterling and Summers 1978:41). Pu'uloa was also associated with various myths connected to the Kapakule and Pakule fish ponds (Sterling and Summers 1978:42-43).

EARLY HISTORIC PERIOD

The pre-contact period in O`ahu consisted of power shifts between different chiefs who ruled various districts including Ewa district which was tied to the Māweke-Kumuhonua royal line. In the early 1700's, O`ahu was united by chief Kūali'i who was succeeded by his heir, Peleiholani. With Peleiholani's death circa 1778, the royal line shifted to the Ewa line of chiefs with the selection of Kahahana as ruler (Beauchan and Kennedy 2012:13).

Early post-contact accounts by John 'Ī'ī (1959) describes Waimalu as the residence important figures such as chief Kīna'u, one of Kamehameha I sons, and Paul Marin (Beauchan and Kennedy 2012:13). The earliest record of native populations was conducted by Protestant missionaries in 1831, a few decades post-contact. The 1831-32 census recorded a population of 4,015 living within the Ewa district (Schmitt 1973:9).

MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1968:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs).

Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

While many Hawaiians were unfamiliar with the concept of private ownership and thus failed to submit land claims, the LCAs that were filed provide insight into the presence and land use of native Hawaiians in a particular area. In the case of Waimalu, the LCA records indicate that the lowlands around Pearl Harbor and the surrounding streams were primarily used by the native Hawaiians while the plateau lands were not intensively utilized (Beauchan and Kennedy 2012:14). The Indices of the Land Commission list 30 awards for Waimalu including the first LCA, LCA 1, which was granted in the Waimalu Ahupua`a to Kamanoualani for the 42.65-acre *ili* called Paepae (Beauchan and Kennedy 2012:15).

LATE 1800'S TO PRESENT

In the latter half of the 19th century, traditional agricultural pursuits were displaced with commercial cultivation of rice, sugar, and pineapple in the Ewa district. From the 1860's, the Waimalu taro terraces were replaced by rice. Incorporated as part of the Honolulu Plantation Company lands in 1899 and later incorporated into the O`ahu Sugar company in 1947, Waimalu became primarily composed of sugarcane fields (Beauchan and Kennedy 2012:15). With the introduction of commercial cultivation, worker camps were established throughout Honolulu Plantation; this included the Waimalu Stable Camp located within the Waimalu *Ahupua`a*.

In 1887, the Navy leased Pearl Harbor from the Hawaiian Kingdom, and in 1908, the Naval Shipyard was established in what had become a U.S. Territory. Realizing the military value of the harbor, the U.S. government began acquiring more and more parcels of land from the Honolulu Plantation Company's agricultural fields (Kuykendall 1938). From the early 1900's onwards, large portions of Honolulu Plantation land were turned over to the government for military use, particularly for the expansion of the U.S. Naval Facilities at Pearl Harbor and for the construction of Hickam Air Field. The land containing the Pu`uloa Plantation Camp and Watertown, which had been leased by the Honolulu Sugar Company and consisted of 15% of the Pu`uloa plantation land, was purchased in 1935 by the U.S. Army and became Hickam Air Force Base. Additional land was given up in WW II. Handy (1940: 81) records much of the old terracing gone: "The small area of low flatland covered by plantation camp, railroad, etc. below the old highway, was formerly in terraces. . . .."

After WWII, the pressing needs of urban growth ended sugarcane cultivation for the Honolulu Plantation Company. In January 1947 the Honolulu Plantation Company shut down, the `Aiea Mill closed its doors, was dismantled, and shipped off to the Philippines (Dorrance and Morgan 2000). The refinery continued to operate until 1996 and became the home to the Hawai`i Agricultural Research Center. Currently, the *makai* portion of the Waimalu *Ahupua`a* consists primarily of military facilities, the Honolulu International Airport, and subdivisions.

PREVIOUS ARCHAEOLOGICAL WORK

Due to the intensive agricultural use of the land, the archaeological landscape of the Waimalu *Ahupua`a* has been continuously altered. As such, relatively few findings are discovered during previous archaeological surveys. Previous surveys conducted within the Waimalu area have uncovered a cultural artifact in the form of an ancient wooden idol and two archaeological sites - the Naulu-a-Maihea Heiau and the Waimalu Burial Cave (Beauchan and Kennedy 2012:17). In 1900, Thrum discusses the discovery of an ancient wooden idol in a rice field in the Ewa district. This artifact was excavated and was secured by Mr. A.L.C. Atkinson of Honolulu (Thrum 1900:129 in Beauchan and Kennedy 2012:17)

The first archaeological site is Site 112, Naulu-a-Maihea Heiau (McAllister 1933:104-105). The heiau was originally identified by McAllister in the 1930's but has since been destroyed (Sterling and Summers 1978:14). Based on a 1959 archaeological site map by Bishop Museum (unnumbered map in Sterling and Summers 1978:56-57), the remains of site 112 lay southwest of the subject property. The second archaeological site, the Waimalu Burial Cave, was documented in September 1953 by Richard Nishino, Mary Stacey, and Kenneth Emory of the Bishop Museum and was reported to have been ransacked (Sterling and Summers 1978:14).

However, a carved wooden bowl was recovered from a niche ten feet west of the mouth of the cave and presented to Bishop Museum on September 11, 1953 (Beauchan and Kennedy 2012:18). In Beauchan and Kennedy's recent Cultural Impact Assessment (2012:43), interviews with several community informants indicate that the Waimalu Burial Cave has been destroyed by the development of residential areas in Waimalu. This information is consistent with the recorded location of the burial cave in the 1959 Bishop Museum map.

In April/May of 2012, a Cultural Impact Assessment (CIA) was conducted by Brittany Beauchan, B.A. and Joseph Kennedy, M.A. of Archaeological Consultants of the Pacific, Inc. The resulting unpublished CIA report, particularly the community consultations, discusses and reinforces the absence/destruction of cultural material and archaeological sites within the project area.

EXPECTED FINDINGS

The project area is situated on a mostly undeveloped, forested parcel of land consisting of deep V-shaped valleys, high ridges, and steep slopes prone to erosion. While there has been agricultural and recreational activities conducted on some portions of the project parcel, the project area itself has not been significantly altered. Based on previous cultural and archaeological work conducted at the site, any cultural or archaeological sites that may have been present have most likely been destroyed. Thus, relatively few cultural materials and archaeological sites are expected to be found within the project area.

METHODOLOGY

Archival work was conducted at the Scientific Consultant Services, Inc. library (Honolulu office). Scientific Consultant Services, Inc., archaeologist Guerin Tome, B.A., conducted the fieldwork on May 13, 2013, under the direction of Principal Investigator Robert L. Spear, Ph.D.

FIELD METHODS

A general pedestrian survey was conducted in order to identify archaeological sites and assess the project area's geographical features. The initial project plans required seven areas to be subjected to Archaeological Inventory Survey (Figure 4). The subsequent project plans were modified to include four additional survey areas. As a result, the Archaeological Inventory Survey was conducted on eleven separate areas of the project parcel according to the specifications provided by the client. Additionally, the survey included the road and trail leading to the eleven survey areas. The GPS point of each survey area was recorded with a handheld Garmin GPSMap 60CSx.

LABORATORY METHODOLOGY

No definitive cultural or archaeological features were recorded and no archaeological materials were collected during the surface survey. As such, no analysis was conducted for this project. All field notes, digital photographs, and maps were curated at the SCS office in Honolulu. All materials gathered during this project (including documentation) are ultimately the

property of the client, who may request their transfer subsequent to the acceptance of the final AA report.

SURVEY RESULTS

The current archaeological investigation of Tax Map Key (1) 9-8-073:001 did not identify any archaeological sites or artifacts through pedestrian survey. The survey was conducted on eleven separate survey areas within the project boundary. The eleven areas are discussed below:

AREA 1: PINK FLAGGED AREA #1

Area 1 is situated close to the entrance of the project property. Area 1 was not included in the map and GPS list submitted by the project surveyor. The GPS coordinates collected from the survey are UTM coordinates which were taken at the center of the area: UTM +/- 2m accuracy 611179 East/2367516 North. The survey area is roughly triangular shaped with an estimated area 17.0m long by 13.0m wide. The long axis is orientated to 090°/270° (magnetic North). The area consists of an erosional, downwards slope orientated northeast to southwest [040°/220° (magnetic North)]. There are a few young eucalyptus trees and ironwood trees. The cultural materials observed on the ground surface included .22-caliber lead bullets, .22-caliber (short) brass casings (a U stamped on the primer), and clear and amber bottle body sherds (no manufacturer's marks or diagnostic features). There were no archaeological sites observed.

AREA 2: PINK FLAGGED AREA #2

Area 2 was also not included in the map and GPS list submitted by the project surveyor. The GPS coordinates collected from the survey are +/- 2m accuracy 611229 East/2367554 North. Similar to Area 1, Area 2 is roughly triangular shaped with an estimated area of 4.0m long by 3.0m wide. The long axis is orientated 064°/244° northeast/southwest. The area is partially covered with ironwood leaves, 1-meter tall grass, and young *koa* trees. Additionally, there is a small, shallow natural earthen channel for rainwater runoff. There were no cultural materials present on the ground surface and no archaeological sites observed.

AREA 3: ½ P CL. RD #3 (END)

Area 3, also known as "END" on the surveyor's map and GPS list, is located by the centerline powerline and the 100 ft easement along the south border of the property. The GPS coordinates are 612127E/2367699N. The area is covered with decomposing vegetation, ironwood trees, and moss. The terrain undulates and then steadily slopes (about 70°) towards the east (090° MNG). There were no cultural materials present on the ground surface and no archaeological sites observed.

AREA 4: ½ P. CL. PATH

Area 4 is one of 4 survey areas located within the area known as "BIG FLAT" on the surveyor's map and GPS list. The GPS coordinates are 612320E/2367872N. The area is covered with live vegetation consisting of ferns, *ʻōhiʻa lehua*, and *koa* trees. The terrain slopes downwards approximately 45° from the northwest to the southeast. There were no cultural materials present on the ground surface and no archaeological sites observed.

Figure 6: Photograph of Area 1. View to Southwest.

Figure 7: Photograph of Area 2. View to Southeast.

Figure 8: Photograph of Area 3. View to Southeast.

Figure 9: Photograph of Area 4. View Southeast.

AREA 5: ½ P. ED PATH #2

Area 5 is one of 4 survey areas located within the area known as "BIG FLAT" on the surveyor's map and GPS list. The GPS coordinates are 612362E/2367931N. The area is covered with live vegetation consisting of ferns, *ʻōhiʻa lehua*, and *koa* trees. The terrain slopes downwards approximately 45° from the northwest to the southeast. There were no cultural materials present on the ground surface and no archaeological sites observed.

AREA 6: ½ P. ED. RD #4

Area 6 is one of 4 survey areas located within the area known as "BIG FLAT" on the surveyor's map and GPS list. The GPS coordinates are 612419E/2367981N. Area 6 is covered with decomposing and live vegetation consisting of ferns and *ʻōhiʻa lehua*. The terrain slopes downwards approximately 45° from the northwest to the southeast. There were no cultural materials present on the ground surface and no archaeological sites observed.

AREA 7: ½ P. ED. RD #5

Area 7 is one of 4 survey areas located within the area known as "BIG FLAT" on the surveyor's map and GPS list. The GPS coordinates are 612453E/2368002N. Area 7 is partially covered with live vegetation consisting of grass, *ʻōhiʻa lehua* (confirmed by flower presence), forest orchid, and ferns. The area contains erosional faces and the terrain slopes downwards approximately 20° from the northwest to the southeast. A huge earthen cliff is present a few meters northeast from where the GPS point was taken. In terms of cultural material, a brass, short .22-caliber casing was observed on the ground surface. There were no archaeological sites observed.

AREA 8: ½ P. TOP PATH (TOP TRAINER)

Area 8 is known as "TOP TRAINER" on the surveyor's map and GPS list. The GPS coordinates are 612482E/2368080N. Area 8 is mostly covered with decomposing vegetation. The live vegetation consists of *ʻōhiʻa lehua* and strawberry guava. The terrain slopes downwards approximately 5° from the north to the south. Earthen foot trails run through this area and are orientated in a general direction of north-south. A plastic Powerade bottle was observed on the ground surface. No archaeological sites were observed.

AREA 9: B1 (B1 & T2)

Area 9 is known as "B1 & T2" on the surveyor's map and GPS list. The GPS coordinates are 612375E/2368116N. The survey area is covered with live vegetation consisting of ferns and *ʻōhiʻa lehua*. The terrain slopes approximately 20° downwards from the northwest to the southeast. There were no cultural materials present on the ground surface and no archaeological sites were observed.

AREA 10: B3 (B3 & T4)

Area 10 is known as "B3 & T4" on the surveyor's map and GPS list. The GPS coordinates are 612289E/2368078N. The area is covered with live vegetation consisting of ferns and *ʻōhiʻa lehua*. The terrain slopes approximately 10° downwards from the northeast to the southwest. There were no cultural materials present on the ground surface and no archaeological sites were observed.

Figure 10: Photograph of Area 5. View to Northeast.

Figure 11: Photograph of Area 6. View to South.

Figure 12: Photograph of Area 7. View to Southwest.

Figure 13: Photograph of Area 8. View to Southeast.

Figure 14: Photograph of Area 9. View to South.

Figure 15: Photograph of Area 10. View to Southwest.

AREA 11: NICE SPOT

Area 11 is known as "T5 & NICE SPOT" on the surveyor's map and GPS list. The GPS coordinates are 612134E/2368031N. The area is covered with decomposing and live vegetation consisting of ferns, forest orchid, and trees. The terrain slopes approximately 20˚ downwards from the north to the south. The cultural material observed on the ground surface was identified as a piece of rotted, milled wood. No archaeological sites were observed.

ACCESS ROAD AND TRAIL

Apart from the specified survey areas, the road and trail leading to each of the survey areas were subject to pedestrian survey as well. There were no cultural materials present on the ground surface and no archaeological sites were observed.

DISCUSSION AND CONCLUSION

Through the pedestrian surface survey, the archaeological investigation of eleven separate survey areas, the road, and the trail located within the 2.701-acre project area situated in the 447.464-acre TMK parcel yielded no archaeological sites or deposits. Various modern cultural materials (.22-caliber lead bullets, .22-caliber brass casings, clear and amber bottle body sherds, milled wood, plastic Powerade bottle) were observed at four of the eleven surveyed areas but were not collected.

The absence of intact archaeological features or associated midden and artifacts could be attributed to the rugged terrain composed primarily of high ridges, deep V-shaped valleys, and steep slopes prone to erosion and large landslides. The difficult and erosion prone terrain might have restricted access to or discouraged the use of the area for cultural purposes.

RECOMMENDATIONS

Archaeological Investigation through pedestrian survey of Tax Map Key: (1) 9-8-073:001 did not reveal archaeological sites or deposits. No further archaeological work regarding this parcel is recommended.

Figure 16: Photograph of Area 11. View to Northeast.

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ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 3
Cultural Impact Assessment

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SCS Project Number 1408 CIA-1

A CULTURAL IMPACT ASSESSMENT FOR A PROPERTY LOCATED AT TMK: (1) 9-8-073:001 WAIMALU AHUPUA`A, `EWA DISTRICT, ISLAND OF O`AHU

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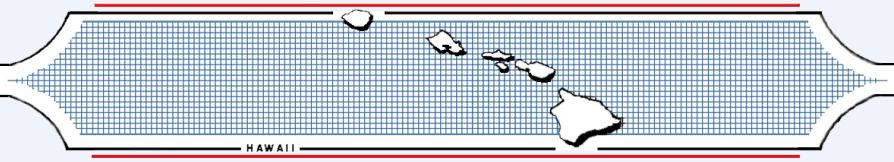

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INTRODUCTION

At the request of Mr. Chris Lau, Archaeological Consultants of the Pacific, Inc. (ACP) and Scientific Consultant Services, Inc. (SCS), in a collaborative effort, have conducted a Cultural Impact Assessment for a proposed zip line located in Waimalu Ahupua`a, `Ewa District, Island of O`ahu, Hawai`i [TMK: (1) 9-8-073:001] (Figures 1 through 3). The subject property is currently owned by Waimalu Holdings LLC., a Hawaii limited liability company, managed by Towne Development of Hawaii, Inc.

The Waimalu Holding Company LLC. proposes to obtain a Conservation District Use Permit (CDUP) to develop the Waimalu Nature Park and Zipline Canopy Tour as a private nature park on a portion of its 447-acre property in Waimalu, O`ahu. The subject property is undeveloped land within the State Land Use Conservation District, bordered on the *makai* side by residential developments, and on the *mauka*, Diamond Head and Ewa sides by undeveloped land. Access for the Project is at the terminus of Ka`ahele Street in the Royal Summit residential subdivision.

The proposed project consists of a zipline course as part of a guided forest canopy tour, having 13 to 14 sending and receiving platforms for use on seven zipline runs, each with a pair of zipline cables, starting 1.2 miles *mauka* and ending 0.7 miles *mauka* of the end of Ka`ahele Street, in an area not visible or audible from residential neighborhoods. Customers will be picked up at an offsite intake center with appropriate zoning and parking in the `Aiea or Pearl City area, and/or at hotels or similar pickup sites. No customers will be allowed to drive to the subject property or park outside.

Electricity/telephone CATV lines will be run on overhead poles along the access road. The use of photovoltaic solar will also be explored. No potable water is required, and the water necessary for washing UTVs can be collected via rainwater catchment. The limited quantities of used wash water will be stored and utilized for landscaping. If ever necessary, potable water lines can be installed in the driveway. Visitors will be on the property for only a short-time, and no extensive restroom facilities are required. The nature center will have a composting toilet.

The zipline will have a very limited physical footprint, with minimal grading and grubbing on already existing access roads/trails and at the zipline platform supports, which each take up only a few hundred square feet.

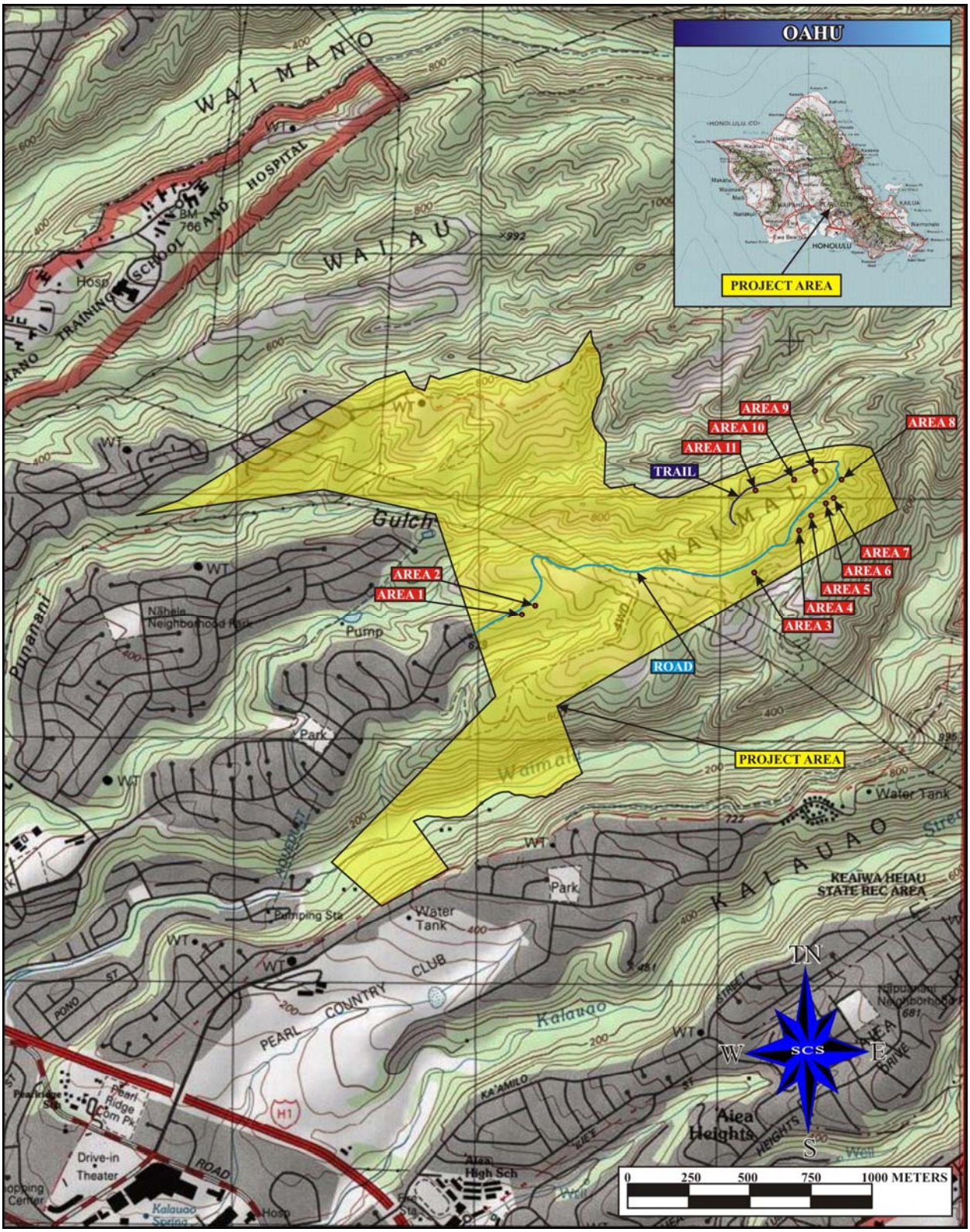

Figure 1: United States Geological Survey (Waipahu 1998) Map Showing Area of Interest and Project Area Locations.

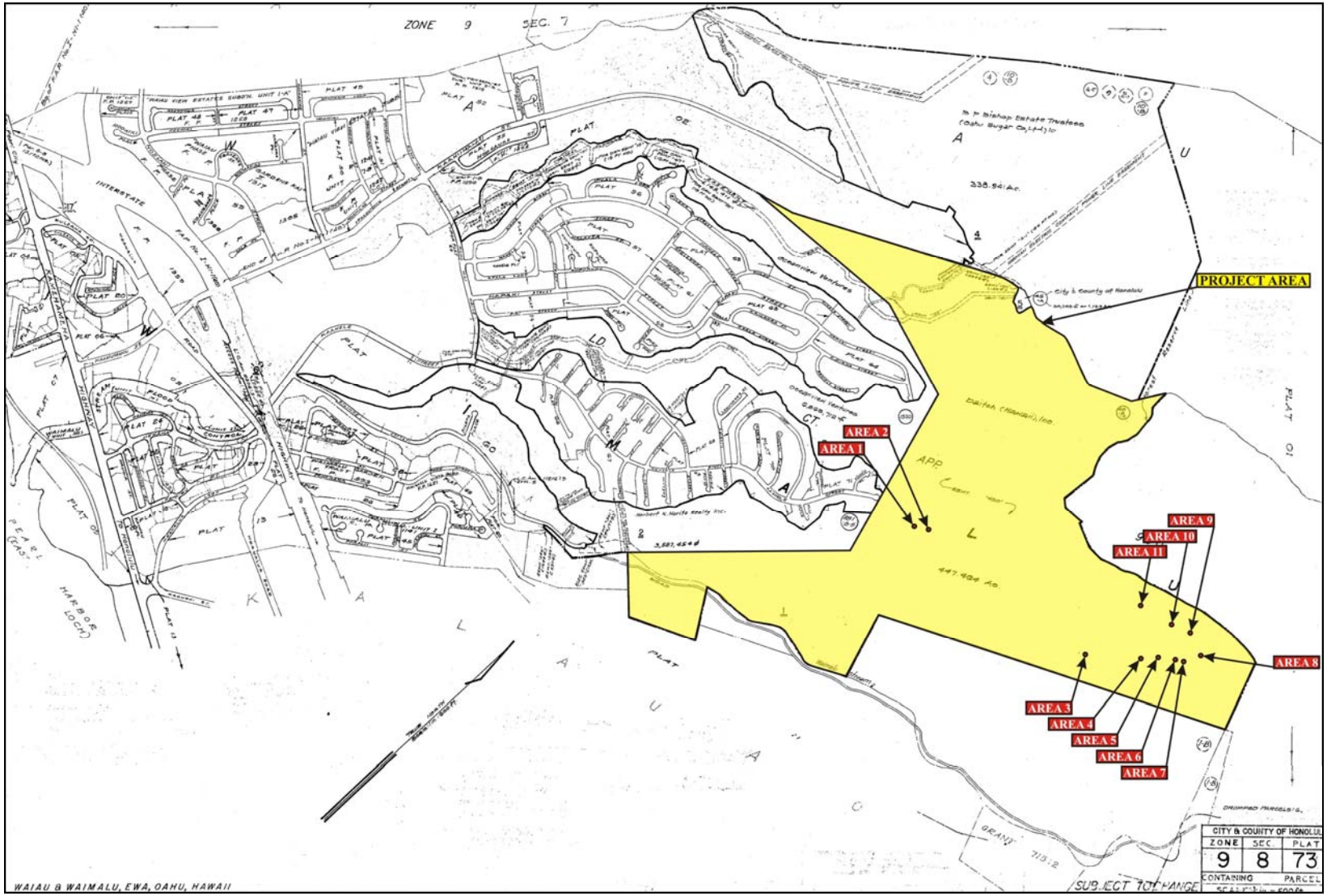

Figure 2: Tax Map Key [TMK: (1) 9-8-073:001] Showing Area of Interest and Project Area Locations.

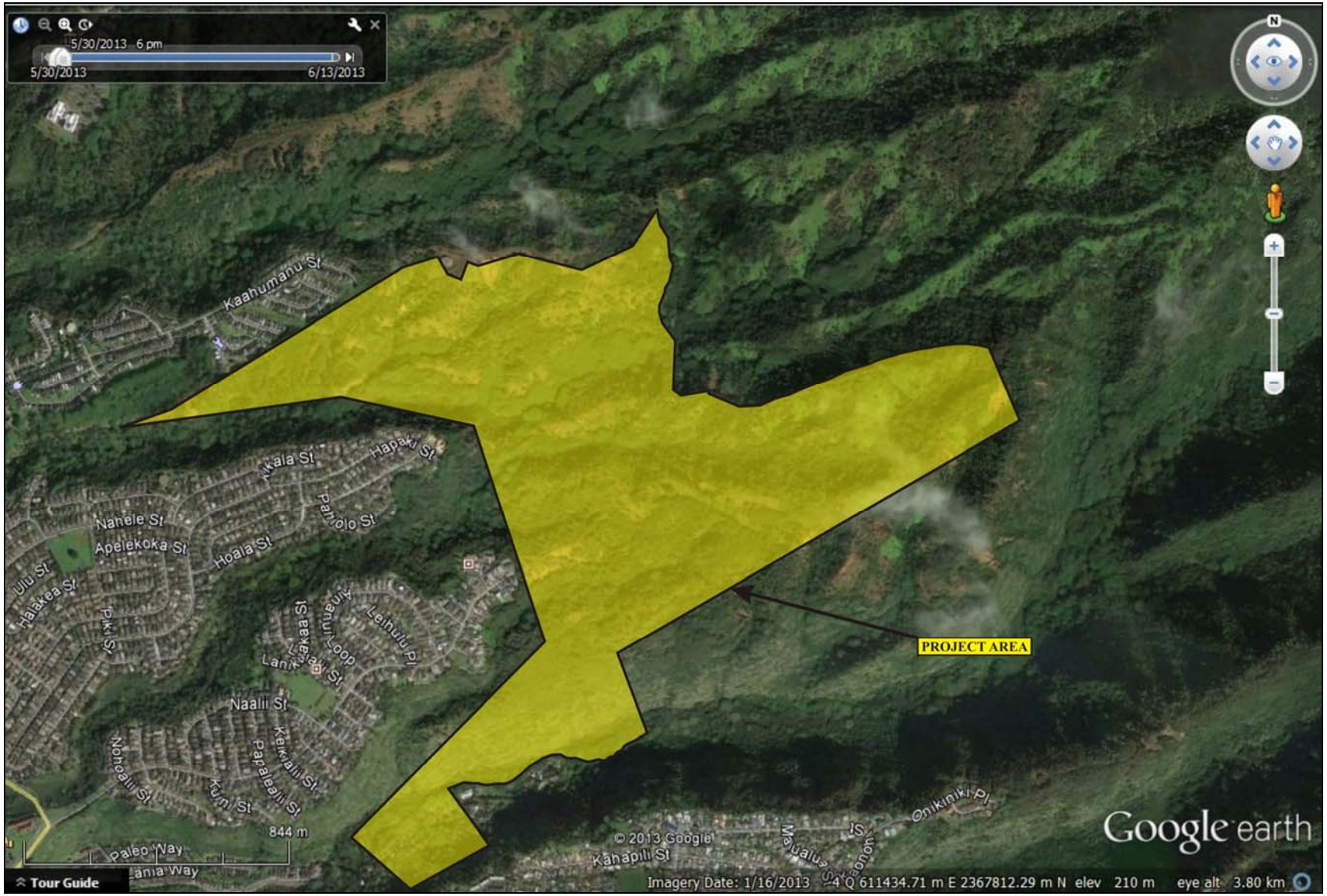

Figure 3: Google Earth Image of Area of Interest.

METHODOLOGY

This Cultural Impact Assessment was prepared as much as possible in accordance with the suggested methodology and content protocol in the Guidelines for Assessing Cultural Impacts (OEQC 2012). In outlining the "Cultural Impact Assessment Methodology", the OEQC states that:

> "…information may be obtained through scoping, community meetings, ethnographic interviews and oral histories…"

This report contains communication with individuals and organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. An example of the letters of inquiry are presented below in Appendix A; a copy of posted legal notice and affidavit are presented in Appendix B; and an example the follow-up letters of inquiry are presented below in Appendix C. This Cultural Impact Assessment was prepared in accordance with the suggested methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 2012), whenever possible. The assessment concerning cultural impacts may include, but not be limited to, the following matters:

(1) if consultation is available, a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints of limitations which might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) if conducted, interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or being interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices, or beliefs; the potential of the proposed action to isolate cultural resources, practices, or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews which were allowed to be disclosed.

If on-going cultural activities and/or resources are identified within the project area, assessments of the potential effects on the cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with Federal and State laws, and guidelines, when knowledgeable individuals are able to identify cultural practices in, or in close proximity to, the project area. If they have knowledge of traditional stories, practices and beliefs associated with a project area or if they know of historical properties within the project area, they are sought out for additional consultation and interviews. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information concerning particular cultural resources. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs (OHA), historical societies, Island Trail clubs, and Planning Commissions are depended upon for their recommendations of suitable

informants. These groups are invited to contribute their input, and suggest further avenues of inquiry, as well as specific individuals to interview. It should be stressed again that this process does not include formal or in-depth ethnographic interviews or oral histories as described in the OEQC's *Guidelines for Assessing Cultural Impacts* (2012). The assessments are intended to identify potential impacts to on-going cultural practices, or resources, within a project area or in its close vicinity.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the interview available for this study. When telephone interviews occur, a summary of the information is usually sent for correction and approval, or dictated by the informant and then incorporated into the document. If no cultural resource information is forthcoming and no knowledgeable informants are suggested for further inquiry, interviews are not conducted.

ENVIRONMENTAL SETTING

LOCATION

The project area is located in the Waimalu Mauka area, within Waimalu Ahupua`a. The area is bounded on the south by Waimalu Stream (which flows roughly northeast-southwest), on the east by the Forest Reserve boundary, on the west by the subdivision and end of Ka`ahele Street, and on the north by land belonging to Bishop Estate. The project area ranges in elevation from 200-900 ft AMSL (above mean sea level); annual rainfall in the area ranges from 20-30 inches (Armstrong 1973). Soil in the area is thin (1-10 inches) relatively soft and permeable saprolite (Dunn and Haun 1990a: 2).

The project area consists primarily of high ridges, steep slopes (55 degrees or greater), and deep V-shaped valleys. In the valleys are numerous intermittent drainages. During a survey conducted by Paul H. Rosendahl, Inc. (PHRI), in 1990, ridge tops were found to have been recently used as pasture, or were found to have been bulldozed (Dunn and Haun 1990a: 2). Dunn and Haun(1990a) found the southwestern edge of the area utilized for pastureland and chicken farms. Currently, this portion of the project area is still utilized for raising chickens. Portions of the project area have also been modified for recreational purposes, including numerous dirt jumps for bikers, as well as ropes and paths for paintballers. Large land slides are

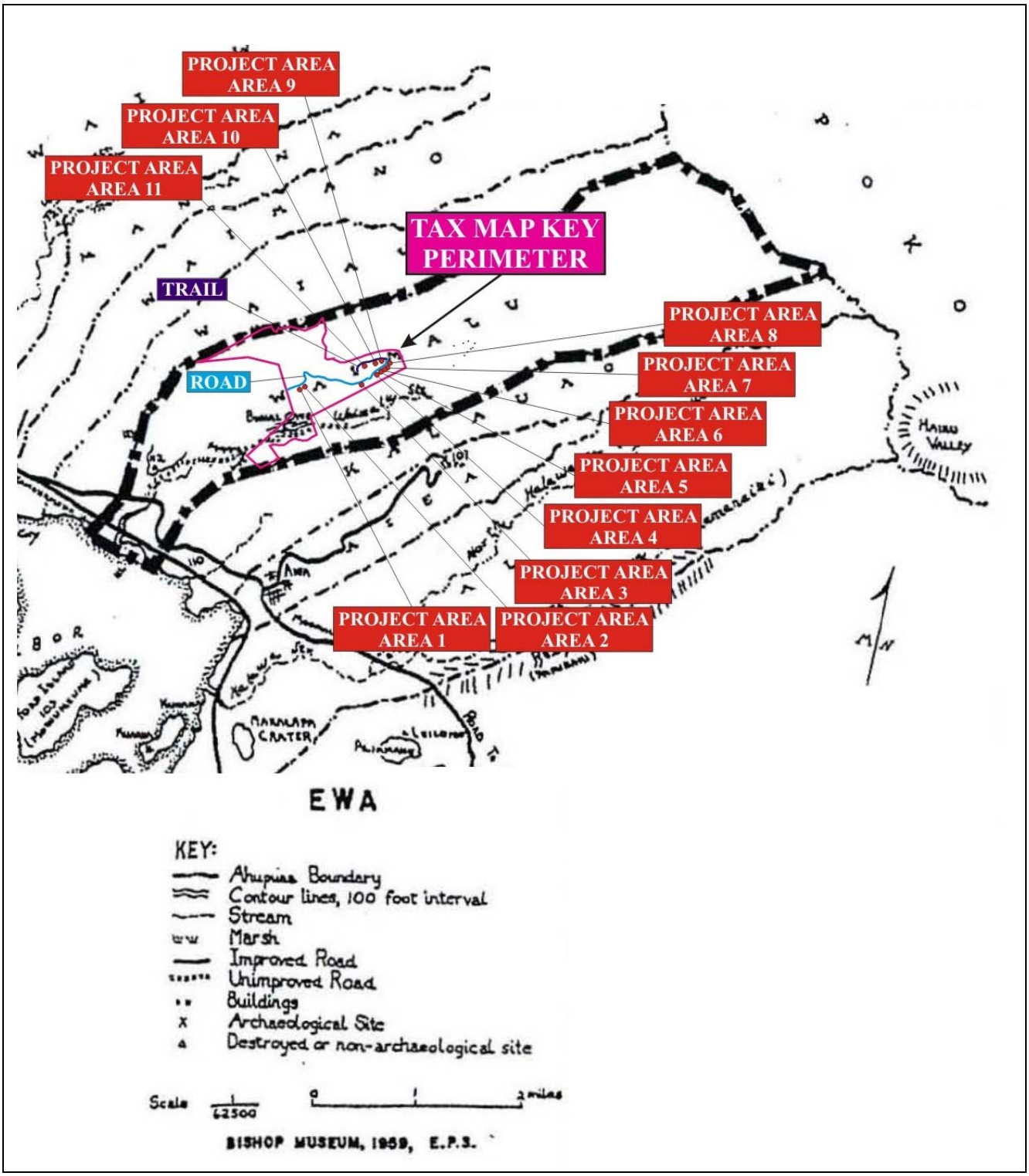

Figure 4: `Ewa District Map (from Sterling and Summers 1978) Map Showing Project Areas and the Location of Waimalu Burial Cave.

known to occur in the project area, displacing hundreds of square meters of earth near the ridge tops, and exposing red clay and decomposing bedrock (Dunn and Haun 1990a: 2).

PROJECT AREA SOILS

According to Foote *et al*. (1972:40, 94, 119, Map 53), the project area is situated within the matrices described as Helemano Silty Clay (HLMG), Manana Silty Clay Loam (MoC), Rock Land (rRK), and Rough Mountainous Land (rRT). The Helemano Silty Clay (HLMG) with 30 to 90 percent slopes is found on the sides of V-shaped gulches including small areas of rock outcrop, steep stony land, and eroded spots. Permeability is moderately rapid, runoff is medium to very rapid, and the erosion hazard is severe to very severe. This soil type is present throughout the project area and is utilized for pasture, woodland, and wildlife habitat. The Manana Silty Clay Loam with 6 to 12 percent slopes is moderately permeable with medium runoff and moderate erosion hazard. This soil type is used for agriculture (sugarcane and pineapple) and pasture.

Rock Land consists of areas where exposed rock covers 25 to 90 percent of the surface and the soil is very shallow. The land type is nearly level to very steep containing soil material that is very sticky and very plastic with high shrink-swell potential. Rock Land is used for pasture, wildlife habitat, water supply, and urban development. Rough Mountainous Land consists of very steep land broken by numerous intermittent drainage channels. The soil mantle is very thin, ranging from 1 to 10 inches in thickness over relatively soft and permeable saprolite. This land type is used for water supply, wildlife habitat, and recreation.

PROJECT AREA CLIMATE

The project area is situated within the dry region of O`ahu's leeward side. Annual rainfall in the area ranges from 20 to 30 inches (Price 1983:62). Higher elevations within the Waimalu Ahupua`a are prone to receive more precipitation due to cloud descent and lower temperature climates.

PROJECT AREA VEGETATION

Vegetation within the project area consisted of ironwood trees (*Casuarina equisetifolia*), *'ōhi'a lehua* (*Metrosideros polymorpha*), *koa haole* (*Leucaena leucocephala*), strawberry guava (*Psidium cattleianum*), eucalyptus (*Eucalyptus deglupta*), grass, forest orchid, ferns, and moss.

TRADITIONAL AND HISTORIC SETTING

The island of O`ahu ranks third in size of the eight main islands in the Hawaiian Archipelago. Traditionally, the division of O`ahu's land into districts (*moku*) and sub-districts (*`ili*) was said to be performed by Mā`ilikukahi, a ruling chief of O`ahu, who was chosen by the chiefs to be the *mō`īho`oponopono o ke aupuni* (administrator of the government; Kamakau 1991). It was Mā`ilikukahi who had the Island of O`ahu thoroughly surveyed, and permanently defined the boundaries between the different divisions and lands (Fornander 1969:89). Cordy (2002: 25) places Mā`ilikukahi's reign over O`ahu at the beginning of the 16th Century. Mā`ilikukahi created six districts and six district chiefs (*ali`i `ai moku*). Land was considered the property of the king or *ali`i `ai moku* (chief who rules a *moku*) (Pukui and Elbert 1971: 20), which he held in trust for the gods. The title of *ali`i `ai moku* ensured rights and responsibilities to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land. It is said that Mā`ilikukahi gave land to *maka`āinana* all over the island of O`ahu (*ibid*).

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili` āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) that customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili `āina* or *`ili* were smaller land divisions next in importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (Lyons 1875:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa `āina* residing in an *ahupua`a* was called a *kuleana* (Lucas 1995:61).The present project area was located in the *ahupua`a* of Kalauao, which literally means "the multitude [of] clouds" (Pukui *et al.*1974:75).

TRADITIONAL SETTLEMENT PATTERNS

Archaeological settlement pattern data suggests that initial colonization and occupation of the Hawaiian Islands first occurred on the windward shoreline areas of the main islands between A. D. 850 and 1100, with populations eventually settling in drier leeward areas during later periods (Kirch 2010). Although coastal settlement was dominant, Native Hawaiians began cultivating and living in the upland *kula* (plains) zones. Greater population expansion to inland areas began around the 14th Century and continued through the 16th Century. Large scale or

intensive agriculture was implemented in association with habitation, religious, and ceremonial activities.

The Hawaiian economy was based on agricultural production and marine exploitation, as well as animal husbandry and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry-land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as *kō* (sugarcane, *Saccharum officinaruma*) and *mai`a* (banana, *Musa* sp.), were also grown and, where appropriate, such crops as *`uala* (sweet potato, *Ipomoea batatas*) were cultivated. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on the leeward side of O`ahu was likely to have begun early in what is known as the Expansion Period (AD1200-1400, Kirch 1985).

The district of `Ewa was an *ali`i* stronghold undoubtedly made attractive because of the natural springs and numerous fishponds that were constructed at different points around the bay (named *Ka-awa-lau-o-Pu`uloa* by the Hawaiians). There was a great variety of shellfish, the most important being the *pipi*, or Hawaiian pearl oyster, known as *i`a hamau leo o `Ewa* (`Ewa's silent sea creature). The *pipi* was eaten raw and the shell furnished shiny shanks used in bonito (*Sarda sarda*) hooks. It was believed that this valuable oyster had been brought from Kahiki by a *mo`o* (lizard demi-god/goddess) named Kane-kua`ana (Handy and Handy 1972). Other bivalves gathered and eaten raw, or cooked with young taro leaves included *papaua*, *`owa`owaka*, *nahawele*, *kupekala*, and *mahamoe* (*ibid*.).

Originally called *Ke Apana o `Ewa*, the district of `Ewa not only provided ideal circumstances for fishponds, but also included high interior plains and several deep valleys of the Ko`olau mountains, as well as traditionally, the Wai`anae Range. Bananas and yams were cultivated in the lower parts of the valleys and *`awa* (*kava*) could be found higher inland. Perennial streams spilled from the valleys on to the lowlands creating ideal conditions for taro pond-fields (*lo`i*) and fresh water springs were abundant. Terraces extended up the river valleys, some as far as a mile (e.g., Waikele Stream) and lower terraces were watered from springs, such as those in Waipahu and Kalauao. The forests, or upland jungles (*wao*) contained gardens of *wauke* and *mamaki* grew freely on the slopes. Birds and *olonā* could be found in the *wao* along with mountain apples and other necessary resources (*ibid.*).

PRE-CONTACT PERIOD

The traditional *moku* of Ewa was, and continues to be, one of the largest districts in O`ahu. The place-name of Ewa can be translated to mean "unequal" or "crooked." The meaning of Ewa as "unequal," based on Sterling and Summers (1978:1), alludes to the district being a favored residence of O`ahu kings in olden times, making the area a seat of power for the Hawaiian *ali'i* (royalty). However, according to Pukui *et al*. (1974:28), Ewa translates to mean "crooked" in reference to the myth of the gods Kāne and Kanaloa throwing stones to determine district boundaries where the stone for determining the Ewa district boundary was lost but was later found at Pili-o-Kahe. Another story reports that the boundaries of `Ewa District were established by the traveling gods, Kāne and Kanaloa (Handy and Handy 1972). At the western end, the boundary of Waikele and Hoe`ae`ae was marked by a stone named Pohaku-pili (Border stone). Set on the edge of a sheer precipice, this stone stands firm, as it was placed by the gods. Kāne and Kanaloa blessed the lands of `Ewa with coconut groves, fishponds and taro plantations (*ibid*).

The area of interest, the *ahupua`a* of Waimalu, is one of several *ahupua`a* located within the *moku* of Ewa. Waimalu means "sheltered water" (Pukui *et a*l. 1974:225) referring to the *makai* portion of the *ahupua`a* which extends into the natural, sheltered harbor of Pu`uloa, known as Pearl Harbor in present times. Additionally, the *makai* portion of the Waimalu Ahupua`a was known for both the large number of fishponds as well as the agricultural activities in the form of extensive taro terraces irrigated by the Waimalu Stream and Waipi spring (Sterling and Summers 1978:1).

While the *ahupua`a* of Waimalu itself is not associated with any known local mythology, the lands in the *makai* portion surrounding Pu`uloa (Pearl Harbor) were associated with an assortment of legends. For example, Pu`uloa is said to be the first site where breadfruit, brought from Samoa, was first planted in Hawaii (Pukui *et al*. 1974:201; Sterling and Summers 1978:41). Pu`uloa was also associated with various myths connected to the Kapakule and Pakule fish ponds (Sterling and Summers 1978:42-43).

EARLY HISTORIC PERIOD

The pre-Contact Period in O`ahu consisted of power shifts between different chiefs who ruled various districts including Ewa District which was tied to the Māweke-Kumuhonua royal line. In the early 1700's, O`ahu was united by chief Kūali'i who was succeeded by his heir,

Peleiholani. With Peleiholani's death circa 1778, the royal line shifted to the Ewa line of chiefs with the selection of Kahahana as ruler.

Early post-contact accounts by John `Ī'ī (1959) describes Waimalu as the residence important figures such as chief Kīna'u, one of Kamehameha I sons, and Don Francisco Marìn (Beauchan and Kennedy 2012:13). The earliest record of native populations was conducted by Protestant missionaries in 1831, a few decades post-contact. The 1831-32 census recorded a population of 4,015 living within the `Ewa District (Schmitt 1973:9).

OBSERVATIONS OF EARLY EXPLORERS AND FOREIGN RESIDENTS

During the first decades of the 19th century, several westerners described the `Ewa landscape above Pearl Harbor. In his 1809 travels through `Ewa, Archibald Campbell (1967: 103) noted:

> We passed by footpaths winding through an extensive and fertile plain, the whole of which is in the highest state of cultivation. Every stream was carefully embanked, to supply water for taro beds. Where there was no water, the land was under crops of yams and sweet potatoes. The roads and numerous houses are shaded by cocoa-nut trees, and the sides of the mountains are covered with wood to a great height.

In 1831, visiting botanist F. J. F. Meyen (1981: 63) additionally noted of the area:

> At the mouth of the Pearl River the ground has such a slight elevation. That at high tide the ocean encroaches far into the river, helping to form small lakes which are so deep, that the long boats from the ocean can penetrate far upstream. All around these water basins the land is extraordinarily low but also exceedingly fertile and nowhere else on the whole island of Oahu are such large ad continuous stretches of land cultivated. The taro fields, the banana plantations, the plantations of sugar cane are immeasurable.

The earliest record of native populations was conducted by Protestant missionaries in 1831, some few decades post-Contact. The Four years later, in 1836, the `Ewa native population had declined to 3,423 (Schmitt 1973: 9, 36).

MĀHELE

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1968:111; Kuykendall 1938

Vol. I:145). The Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs).

Once lands were thus made available and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims did not include any previously cultivated but presently fallow land, *`okipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

While many Hawaiians were unfamiliar with the concept of private ownership and thus failed to submit land claims, the LCAs that were filed provide insight into the presence and land use of native Hawaiians in a particular area. In the case of Waimalu, the LCA records indicate that the lowlands around Pearl Harbor and the surrounding streams were primarily used by the native Hawaiians while the plateau lands were not intensively utilized (Beauchan and Kennedy 2012:14). The Indices of the Land Commission list 30 awards for Waimalu including the first LCA, LCA 1, which was granted in the Waimalu Ahupua`a to Kamanoualani for the 42.65-acre *`ili* called Paepae (Beauchan and Kennedy 2012:15).

LATE 1800'S TO PRESENT

In the latter half of the 19th century, traditional agricultural pursuits were displaced with commercial cultivation of rice, sugar, and pineapple in the Ewa district. From the 1860's, the Waimalu taro terraces were replaced by rice. Incorporated as part of the Honolulu Plantation Company lands in 1899 and later incorporated into the O`ahu Sugar company in 1947, Waimalu became primarily composed of sugarcane fields (Beauchan and Kennedy 2012:15). With the introduction of commercial cultivation, worker camps were established throughout Honolulu Plantation; this included the Waimalu Stable Camp located within the Waimalu Ahupua`a. The Honolulu Plantation Company, stretching from Hālawa to Waimalu was incorporated in 1899, the only sugar company of its kind to carry out the sugar refining process on O`ahu (Condè and Best 1973). In 1947, the Honolulu Plantation Company lands were incorporated into the Oahu Sugar Company by Benjamin Dillingham (Condè and Best 1973: 313).

In the early 1900's worker camps were distributed throughout Honolulu

Plantation. One camp, in the *ahupua`a* of Waimalu, was the Waimalu Stable Camp; Mrs. Mildred Furutani, born and raised in the Waimalu Stable Camp recounted her early memories of the area in the 1930's in an oral history project on the *ahupua`a* of Pu`uloa, (literally meaning 'long hill') (Fukuda 1994):

> Above Kamehameha Highway, it was all cane fields. Within the cane field, between Kamehameha Highway and the Stable Camp there was a dirt road that used to haul cane from the fields of the Aiea Sugar Mill for processing. The road was called Cane Haul Road by the Residents. Later this road was paved and used by cars and became Moanalua Road in the 1950's.

Mrs. Furutani (in Fukuda 1994) also elaborated upon camp life:

> Waimalu Stable Camp ... had workers from three main ethnic groups. There were Chinese Bachelor men who lived in a dormitory like setting ... Most of the men were old and did their own cooking and laundry ... There was a large group of Filipino workers. Some were bachelor Filipino men, but they lived in houses ... The largest groups of workers were *[sic)* the Japanese population ... Because Stable Camp was far from all the stores and most families did not own any vehicles, much of the food was delivered. Miura Store in lower Pearl City delivered rice, canned goods, dry goods such as material and sewing supplies. Once a week Mr. Hirata came from the "swamp" in a horse driven wagon. He bought fish from downtown and carried them on a bed of ice. The 'swamp' *[sic)* was by the present Waimalu Shopping Center. He often sold akule [big-eyed or goggle-eyed scad fish *(Trachurops crumenophthalmus)* and aku [Bonito or skipjack *(Katsuwonus pelamis)* ... Rice and vegetables were grown by the farmers in the lower Pearl City area ... Midwives often delivered the children of Waimalu Stable Camp ... Families later (1940's) went to the hospital to have their babies.

MILITARY EXPANSION AND URBANIZATION

In 1887, the Navy leased Pearl Harbor from the Hawaiian Kingdom, and in 1908, the Naval Shipyard was established in what had become a U.S. Territory. Realizing the military value of the harbor, the U.S. government began acquiring more and more parcels of land from the Honolulu Plantation Company's agricultural fields (Kuykendall 1938). From the early 1900's onwards, large portions of Honolulu Plantation land were turned over to the government for military use, particularly for the expansion of the U.S. Naval Facilities at Pearl Harbor and for the construction of Hickam Air Field. The land containing the Pu`uloa Plantation Camp and Watertown, which had been leased by the Honolulu Sugar Company and consisted of 15% of the Pu`uloa plantation land, was purchased in 1935 by the U.S. Army and became Hickam Air Force Base. Additional land was given up in WW II. Handy (1940: 81) records much of the old

terracing gone: “The small area of low flatland covered by plantation camp, railroad, etc. below the old highway, was formerly in terraces. . . ..”

After WWII, the pressing needs of urban growth ended sugarcane cultivation for the Honolulu Plantation Company. In January 1947 the Honolulu Plantation Company shut down, the `Aiea Mill closed its doors, was dismantled, and shipped off to the Philippines (Dorrance and Morgan 2000). The refinery continued to operate until 1996 and became the home to the Hawai`i Agricultural Research Center. Currently, the *makai* portion of the Waimalu Ahupua`a consists primarily of military facilities, the Honolulu International Airport, and subdivisions.

PREVIOUS ARCHAEOLOGY

Due to the intensive agricultural use of the land, the archaeological landscape of the Waimalu Ahupua`a has been continuously altered. As such, relatively few findings have been discovered during previous archaeological surveys. Previous surveys conducted within the Waimalu area have uncovered a cultural artifact in the form of an ancient wooden idol and two archaeological sites: the Naulu-a-Maihea Heiau and the Waimalu Burial Cave (Beauchan and Kennedy 2012:17). In 1900, Thrum discusses the discovery of an ancient wooden idol in a rice field in the `Ewa District. This artifact was excavated and was secured by Mr. A.L.C. Atkinson of Honolulu (Thrum 1909:129 in Beauchan and Kennedy 2012:17)

The first archaeological site is McAllister's Site 112, Naulu-a-Maihea Heiau (McAllister 1933:104-105). The heiau was originally identified by McAllister in the 1930’s but has since been destroyed (Sterling and Summers 1978:14). Based on a 1959 archaeological site map by Bishop Museum (unnumbered map in Sterling and Summers 1978:56-57), the remains of McAllister's Site 112 lay southwest of the subject property. The second archaeological site, the Waimalu Burial Cave (Figure 4), was documented in September 1953 by Richard Nishino, Mary Stacey, and Kenneth Emory of the Bishop Museum and was reported to have been ransacked (Sterling and Summers 1978:14). However, a carved wooden bowl was recovered from a niche ten feet west of the mouth of the cave and presented to Bishop Museum on September 11, 1953 (Beauchan and Kennedy 2012:18).

Paul H. Rosendahl, Inc. (PHRI) conducted an Archaeological Inventory Survey of the current project area (Dunn and Haun 1990a and b). During the survey four sites were newly identified. The sites ranged in condition from poor to good and appeared to be associated with the Historic Period. The sites features consisted of two formal types (subsurface concrete

structure and excavated pits) and two functional types (water containment and possible animal trap.

Scientific Consultant Services In., conducted an Archaeological Inventory Survey-level investigation of the project areas earlier this year (Wong and Spear 2013). No archaeological sites were identified (see Figures 1, 2, and 4).

CONSULTATION

Individuals and organizations with expertise concerning cultural resources, practices and beliefs in Waimalu, as well as those knowledgeable of the area, were identified and contacted, and willing individuals were consulted. Consultation was conducted via personal interviews and via the U.S. Postal Service. Consultation was sought from George Kaeliwai, Jr., Hawaiian Civic Club of `Ewa Dr. Kamana`opono M. Crabbe, Chief Executive Officer Office of Hawaiian Affairs; William Ho`ohuli, community member; Hinaleimoana K.K. Wong-Kalu, Chair, O`ahu Island Burial Council; Kawika McKeague, community member and former `Ewa O`ahu Island Burial Council Representative; Kawika Farm, State Historic Preservation Division, Burial Sites Program; Leimaile Quitevis, O`ahu Island Burial Council, `Ewa Representative; and Robert Oleivera, community member. The initial letters of inquiry were sent to the above individuals and organizations between July 30 and August 7, 2013, by Cathleen Dagher, B.A., of SCS.

Mrs. Coochie Cayan of DLNR-SHPD recommended Mr. Shad Kane, of the Hawaiian Burial Council to be interviewed. Mr. Kane was interviewed on May 8, 2012 at his home in Makakilo, while the interview with Mr. Blaine Fergerstrom was conducted on May 8, 2012 at the Department of Hawaiian Homelands in Kapolei. The interview with Mr. and Mrs. Miles Fukushima, members of the O`ahu Pig Hunters Association, was conducted on May 17, 2012 at their home in Waimalu. The interview with Mr. Tin Hu Young, a member of the Royal Order of Kamehameha, and a member of Kawaiaha`o Church, was conducted on May 22, 2012, at his home near Pearl Harbor.

A list of interview questions was compiled for the cultural consultations. These included the informant's full name, address, birth date, birthplace, ethnicity, historical and geographical associations with the place in question, as well as questions regarding their knowledge of possible archaeological sites within the project area boundaries. Cultural consultations were conducted in person, by Brittany Beauchan, B.A., of ACP, and the interviews were recorded by audio-cassette. This report provides edited transcriptions of all cultural consultations. Interviews were edited for time and content.

In addition, a Cultural Impact Assessment Notice was published on June 2, June 5, and June 6, 2013, in *The Honolulu Star-Advertise*r and in the July 2013 issue of the OHA newspaper, *Ka Wai Ola* (see Appendix B). These notices requested information of cultural resources or activities in the area of the proposed project, stated the Tax Map Key (TMK) number, and where to respond with pertinent information.

CULTURAL IMPACT ASSESSMENT INQUIRY RESPONSES AND INTERVIEWS

Analysis of the potential effect of the project on cultural resources, practices or beliefs, the potential to isolate cultural resources, maintain practices or beliefs in their original setting, and the potential of the project to introduce elements that may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 2012). As stated earlier, this includes the cultural resources of the different groups comprising the multi-ethnic community of Hawai`i.

As stated above, consultation was sought from individuals and organizations that may have knowledge or information pertaining to the collection of cultural resources and/or practices currently, or previously conducted in close proximity to the proposed 447.464-acre zip line project area located in Waimalu Ahupua`a, Ewa District, Island of O`ahu, Hawai'i [TMK: (1) 9-8-073:001]. These individuals and organizations included George Kaeliwai, Jr., Hawaiian Civic Club of `Ewa Dr. Kamana`opono M. Crabbe, Chief Executive Officer Office of Hawaiian Affairs; William Ho`ohuli, community member; Hinaleimoana K.K. Wong-Kalu, Chair, O`ahu Island Burial Council; Kawika McKeague, community member and former `Ewa O`ahu Island Burial Council Representative; Kawika Farm, State Historic Preservation Division, Burial Sites Program; Leimaile Quitevis, O`ahu Island Burial Council, `Ewa Representative; Robert Oleivera, a community member; Mrs. Coochie Cayan, of DLNR-SHPD; Mr. Shad Kane, of the Hawaiian Burial Council; Mr. Blaine Fergerstrom, Department of Hawaiian Homelands in Kapolei; Mr. and Mrs. Miles Fukushima, of the O`ahu Pig Hunters Association; Mr. Tin Hu Young, a member of the Royal Order of Kamehameha.

Mrs. Coochie Cayan responded to our inquiries by recommending Mr. Shad Kane, of the Hawaiian Burial Council to be interviewed. Mr. Robert Oleivera responded to the notice placed in the OHA Newsletter and requested a letter of inquiry, as he thought his family may have been from the vicinity of the project area.

Five of the individuals consulted (Mr. Shad Kane, Mr. Blaine Fergerstrom, Mr. and Mrs. Miles Fukushima, and Mr. Tin Hu Young) agreed to be interviewed. Interviews with these

individuals were conducted in person. Multiple maps were presented to the informants depicting the limits of the project area. These maps included a TMK Map, a USGS Map, a 1929 LCA Map, and a map from Sterling and Summers (1972) showing the Waimalu Burial Cave (see Figure 4). The information and concerns gathered from each individual is discussed in the following sections.

Mr. Shad Kane

Mr. Shad Kane expressed his knowledge and association with the project area within Waimalu Ahupua`a. Mr. Kane, described by Mr. Tin Hu Young as a "history buff," and fellow member of the Royal Order of Kamehameha, discussed his acquisition of *mana`o* or knowledge throughout the years. A retired police officer from HPD, Mr. Kane now is a member of the O`ahu Island Hawaiian Burial Council.

Mr. Kane knows many stories belonging to *kupuna*. His memories of these stories, combined with his own historical research, allowed him to piece together an account of the mythologies, histories, and traditional practices of not only the Waimalu area, but the entire `Ewa District of O`ahu. His knowledge of Waimalu centered on a greater over-arching Polynesian narrative, rooted in the islands of Tahiti. His discussion on the holistic nature of Hawaiian society, specifically the inter-connectedness of all things, and the inherent *mana* that is shared between these things, was expressed through his *kahilis*. Mr. Kane, a practitioner of Hawaiian arts, specifically *kahili*-making, displayed his artworks as a metaphor of *mana* passing from one object to another, likening it to the waters of Waimalu Stream, the waters of Kane, passing their *mana* throughout Waimalu Valley, all the way down to the mouth of Pu`uloa or Pearl Harbor. Mr. Kane stated that around these spiritual and symbolic waters, one could possibly find burials of significance.

Mr. Kane also expressed a concern for today's youth, especially those of Native Hawaiian descent, in regards to re-connecting with, and taking a role in, the preservation of cultural and archaeological treasures. He shared his hopes for more future involvement, by Hawai`i's youth, in archaeological work.

Interview with Mr. Shad Kane

Name: Shad Spearman Kane
Address: 92-1309 Uahanai Street, Makakilo
Birthdate: Feb. 23, 1945
Birthplace: Honolulu, Hawaii
Ethnicity: Hawaiian, German, Portuguese

Shad Kane [SK]: "There are several stories, one I've heard several times from others, like Tin Hu Young, and others. As far as cultural structures in that immediate area, the only one that I'm familiar with, is just makai of this project, is a *heiau* that once was known as Naulu-a-Maihea. That *heiau*, as far as I know, as far as I'm told, is actually named after the guy that actually built it. The one story that I'm familiar with, is actually associated with him, and that particular *heiau*. I've tried to get a sense of the location of that *heiau*, and my understanding, I've never found it, but my understanding from having talked to several other people. Oftentimes what I try to do is get a sense of where it was with respect to what's there today. From my understanding that particular heiau was actually makai of the project, right in the area of that subdivision, where the golf course is. So the subject project I think is on the next valley Honouliuli Valley, from Waimalu. This particular *heiau*, from my understanding, and I couldn't get a clear idea of where exactly it was, but it was on the low ground as you approach that rise that makes up the Waianae Ridge of Waianae Valley. So it was actually close to, kind of right across the street from where Waimalu Elementary is, there's a school there close-by. Just *mauka* of that, is a ridge that kind of goes up, the project is actually in that ridge in the back. This *heiau*, as far as I know, the Naulu-a-Maihea was on the low ground, just as it rises up into that ridge. But when I heard this story, much of that place had already been developed. There were already homes built in that area. Past cultural structures, that's one that I'm aware of. .. "

Brittany Beauchan [BB]: "Well I heard that heiau was actually destroyed ... ..

SK: "Yeah there's nothing there. Ok, so the reason I wanted to share that [pause) is because the story that I'm familiar with, is actually connected to the broader landscape. Many of the stories associated with that particular area, so anytime you speak of this particular, it's hard to speak of one place independent of everything else. To really get a clearer understanding of the location, with respect to not just the physical structure of the property, that might be impacted, but to get a sense of, in order to understand a cultural structure, to understand that location, you got to kinda have a broader understanding of the whole region, and the stories that come out of that particular area. Most all the stories of this particular area, I should say actually all of Pu`uloa, all of the surrounding area of [unintelligible] Pu`uloa, are actually stories of migration, and in some respects even Tahitian stories. Oftentimes when I speak of these stories, I don't say it's a Hawaiian story, because it's rooted in our voyaging past, and understanding when this place was settled, in respect to other places. On the island of O`ahu, the earliest settlement was several places, and Pu`uloa, this area, was one of the earliest places of settlement. The thing is, most of us are unaware that there were, from what we read, from what is shared, most people have an understanding that there were two migrations around 4-500 A.D. and one around 900 A.D. That earliest migration was actually the Nalaulu [?] family, who partially settled here and on the northern islands, and amongst those early places is Pu`uloa. For obvious reasons, for anchorage and all of that. So the stories of these places are associated with that. For example, the story associated with Naulu-a-Maihea, is a story actually associated with his sons. It actually speaks to water, and terraces, and irrigation, that's important. Let me just share the story I'm familiar with, before I explain the deeper meaning of this. On the surface, what it is, it's about his sons, I think several of his sons went out to retrieve water, in some sort of urn eke or bowl, and there was an effort to keep what they're doing secret. So they had to do, what they had to do, within a certain amount of time without being observed; that's a very typical story, of all the stories in this whole

region, cause they're actually associated with the *mo`o wahine*, the changing of a mo`o wahine into stone, similar story. They're not Hawaiian stories, they're migration stories, and they're Tahitian stories. In this particular case, the two or three young sons of Maihea, apparently were discovered. In an effort to conceal what they were doing, they broke whatever umeke or bowl with the water to conceal that. Apparently they had to get back to a safe place, which they were not able to, because they were detected. The story is basically that they ended up turning into stone, which is a very typical story of this whole region. I'm not sure of other places, I'm sure other stories share the same kind of basic stories, of the changing of one into stone, but in especially `Ewa, almost many of the stories make reference to a primary *mo`o wahine*, or women, changing into stone. This is one of the few stories that I know of, in this area, where it actually involves men, which makes it interesting in my mind, makes it extremely interesting. From my understanding around the turn of the century, like other places, these stones were sites of curiosity, so that they were on tours during that period, during the early part of the century. Stories were shared with tourists regarding specific kinds of stones, and shapes of mountains, like we do in some cases. So these stories were shared with tourists, and that is one of the stories share with tourists, as they actually drove through that area. Much of Waimalu to my understanding, was all *lo`i kalo*, anciently, and more recently today, Sumida Farms is in that area; today is water cress in that particular area, and much of that area had been developed for shopping centers, much developed in the lower area. But anciently, was all *lo`i kalo*. Subsequent to that, was rice, all Chinese and Japanese farmers, and all modem types of plants that we eat today. But the deeper understanding of not just Waimalu, but all of Pu`u loa, is understanding the role or significance of the abundance of water. This is one of the places. As a matter of fact, it served as a reason why other chiefs on other islands launched assaults on the island of O`ahu. Simply because the island of O`ahu had more water than any other island. I think the only other island that came close to the island of O`ahu, fresh water, was probably Kaua`i. The Big Island of Hawai`i, very few fresh water lakes inland, very few. On Moloka`i likewise, I don't think there's any inland freshwater lakes, they depended on rivers. On Kaua`i had some fresh water lakes, but not on the scale of the amount of water that the island of O`ahu had. The island of O`ahu, Pu`uloa was referred to as being *momona*, and Waimalu is right in that particular area. In making reference to the abundance of water, and because of the water and the abundance of fertile soil, was able to sustain a subsistence lifestyle of these early people. My understanding, the earliest settlement was in the area of Kaihuopalaai. Kaihuopalaai is West Loch, and that they actually extended, this is from a model, this is from Ross Cordy. He shared with me the settlement models with respect to all of Pu`uloa. Amongst the earliest models that he shared with us is the earliest settlement was Pu`uloa or West Loch. From West Loch they extended shoreline from West Loch, `Ewa, to Ko `Olina, the Waianae area. In it, along, today we refer to as Farrington Highway, that's west. And East, it was along the shoreline of West Loch, Middle Loch, East Loch, so this whole region, so many of these stories are associated with these Tahitian migrations, and also the location of early settlement. But I wanna get back to helping you understand water, it's associated with everything, with respect to this whole region. Of course, Waimalu is right in the middle of it. The island of O`ahu is the only island, where you have thirteen ... the name Pu`uloa makes reference to many mountains, very obviously if you speak Hawaiian, the reference many mountains, but its beyond that, its really much more to a reference of not mountains, but makes reference to the origins of the water of Kāne. The island of O`ahu is the only island, where all the *ahupua`a* within a *moku*, all the waters originate in these many *pu`u's*. The Waianae Mountains and the Ko`olau's, and all these waters exit in one

place, they exit in Pearl Harbor. That's unique, no other island, has that abundance of water, from every *ahupua`a*, that exits into one location. It's important to understand that, because with respect to the name Pu`uloa, its not just making reference to the mountains, its making reference to the origins of the waters, the waters of Kāne. And also understanding the significance of *mokuumiumi*, with respect to those waters, especially for Waimalu. *Mokuumiumi*, the name actually comes from, very obvious, moku makes reference to water, *umiumi*… I know Mary Kawena Pukui said that *Mokuumiumi*, or *umiumi* makes reference to sexual games. She was way off base, has nothing to do with playing games ... *umiumi* actually makes reference to the pushing and pulling of water, the pushing and pulling of water as water travels from a higher elevations to the lower elevations, that's the action. All that water exits in one place, exits at Pearl Harbor. Our ancestors realized that water carried with it, that that was the basis of *lo`i'*s and understanding fish and nutrients ... Hawaiians understood that at every elevation there was certain nutrients in that water that could sustain some aspect. .. and when it exited into the ocean, in this particular case, it exited into Pu`uloa ... what I'm trying to help you get a sense of with respect to Waimalu and waters is this aspect, not only does it build and create an island, this pushing and pulling action, in ancient Hawaiian thought, not only builds an island, but gives spiritual strength. You touch somebody, when you lean up against something, when you handle something, when you make a *kahili*, your hands, gives it spiritual power. So in ancient Hawaiian thought, with respect to the waters of Kane, and this pushing and pulling motion of water, it gave *mokuumiumi* or Ford Island, a place of spiritual strength or power. So anciently, *mokuumiumi* was that kind of place, and that's why it served as a place of burial. That's one of the reasons why anciently it was a place of several *mo`i*'s, one of which was Pele Iwalani [?], was buried in that particular area. So this region, especially along all the ridges is known for special burials. One such burial is actually several burial sites in the *mauka* region that is connected with this path of water, between the mountains and the sea. When you have burials at different elevations, with respect to the significance of the burial, one is a burial cave (see Figure 4) in the area where this project is. I don't know if its still there, there's no bones."

BB: "*I heard, yeah, they've all been ...*"

SK: "Yeah it's all gone. But it's shared in different places, in different traditions, in different stories of the significance of these burial caves. But I would suspect I've got a picture of where your project is, it's probably on a high ground, up above probably where you guys are considering construction. It's an important consideration because with respect to a burial of that significance, you're gonna have burials of lesser significance, in and around that burial cave. You're gonna find an abundance of burials associated with a burial cave."

BB: "*I actually have an old map right here [pointing to the map from Sterling and Summers* [1978]*, it shows the burial cave* (see Figure 4)..."

SK: "And it has a name, but I don't even know what the name is. Is it on this map?"

BB: "No, I don't think it was given a name, it *was labeled just as a burial cave* (see Figure 4)*. I actually do believe* it *is on the property. "*

SK: "The only reason I share that, the only reason I led up to all of that with respect to water, is because understanding how our ancestors select areas of burials, was actually associated with water. If you find, if there is an area, that's why a lot of burials are chiefly burials, are buried along the shore, and sand. Because of the sanctity of the clean sand. But it's also water, and that's what people fail to understand, because in Hawaiian thought you're close to Kāne. All aspects of life, whole body, is made up of Kāne. So when you die, you wanna be that close to him, so, burials are either along the shoreline, and along tributaries of waters on the high ground. As you move *mauka,* it's gonna be up above it. So for special people they would be buried in caves up *mauka*, however, people associated with these special people, would be buried below them. Just to kinda give you a sense on that. . .if this project is somewhat closer, than up above the project, is the likelihood of finding burials."

BB: "Especially along maybe caves..."

SK: "Along that wall, always that probability. So it'll be more likely in the immediate area of a burial cave, and less likely as you move further away. Does that make sense?"

BB: "Yes, burials decrease as you move away from that cave. "

SK: "The main thing to understand about Waimalu, is that, its', its' early histories associated with early migrations, it's associated with our Tahitian migrations, and it's associated with the path of water, and the abundance of water and springs, and its' potential to sustain a population of people. So there were substantial numbers of people that lived in this area. I know at the turn of the century, there were, references were made that much of this area had been abandoned. There's a good reason for that, because this is a region that suffered the greatest, from several assaults from outside islands simply because of all, because of all that they had. They had what other islands wanted. So these people suffered. They suffered from the assault by Kahekili in 1784, they also suffered from Kamehameha. But we don't talk about it today. But, so, it's the nature of warfare, the nature of warfare is when you assume control of a geographic location, you wanna make it friendly enough so you're people feel safe enough to move in. The only way you can make it safe enough for them to move in, if you remove everybody from that place. So Kahekili's plan, and Kamehameha's plan was actually genocide, to remove much of the people. So by the time westerners got into this area, what they saw was a barren land, that all came after two major assaults."

Mr. Blaine Fergerstrom

Mr. Fergerstrom, described as a "Swiss Army Knife" of communications, is an award winning, multiple-media journalist. Besides working communications at the Department of Hawaiian Homelands, Mr. Fergerstrom is a writer, editor, photographer, videographer, publisher, print producer, graphic artist, and webmaster. Mr. Fergerstrom also expressed his experiences within the realm of education, teaching technology classes to middle school and high school students at Kamehameha Schools. Mr. Fergerstrom has also spent his time instructing junior and senior college journalism students at the University of Hawai`i at Mānoa School of

communications. Mr. Fergerstrom has also participated in quarterly adult education classes at the University of Hawai`i, Mānoa, Outreach College since 2012.

Mr. Fergerstrom remains active in the Native Hawaiian Community, acting as a liaison and webmaster for the Honolulu Hawaiian Civic Club, considered the "mother club" to all other Hawaiian Civic Clubs within the islands. Besides being an active member of the civic club, Mr. Fergerstrom is also an acquaintance of Mr. Tin Hu Young. His interest was piqued in participating in a cultural impact consultation, as he had grown up in the Waimalu area. Moving into the Waimalu area with his family around the age of three, he described days during his youth, where he and his brothers would hike and explore the areas surrounding Waimalu Mauka. In his recollections, he described a landscape devoid of residences, and highways, filled with sugar cane fields and *lo`i kalo* instead. His childhood memories of Waimalu are collected within the assessment.

Interview with Mr. Blaine Fergerstrom

Name: Blaine Fergerstrom
Address: 1689 Piikea Street, Honolulu
Birthdate: April 16, 1953
Birthplace: Mo`ili`ili
Ethnicity: Portuguese, Chinese, Hawaiian, English, Swedish

Brittany Beauchan [BB]: "Your affiliation with Waimalu. so you moved there when you were four years old?"

Blaine Fergerstrom [BF]: "I grew up there, grew up playing all around it. Waimalu as a subdivision, I'm talking lower Waimalu, way down, near, near Kamehameha Highway. There's a brand new subdivision, built on what was, before that taro patches, as far as I understand from listening to, you know, stories about the place. It used to be taro patches, and when I say I'm from Waimalu, I'm from down there Waimalu, Waimalu. Way up the mountain, is like, I don't know if that's Waimalu anymore. That's more, urn, I don't know what that ridge is called [laughs). It was surrounded by cane fields, and wilds, just wild country."

BB: "What do you know of the Waimalu area, in particular, from what we've seen on the map?"

BF: "As I understood it, Waimalu started, Waimalu starts about the middle of what's now called Pearl Ridge, Pearl Ridge Hill. The middle of that, toward 'Ewa is Waimalu, and toward the other way is Kalauao. The other way has a small stream that feeds down, the little stream down by Toys-R-Us, that was all taro patches too. It was all connected to the water cress farm, that whole area was all taro patches, and there was a road that went through the middle of it, it was an extension of Moanalua Road, and it hooked up, it came out right where, right where Toys-R-Us is, and continued on to `Aiea. When they built the shopping center, they moved Moanalua Road above, onto the Cane Haul Road. There was a Cane Haul Road running above the shopping

center and it went down where Moanalua Road is now, and it hit, it reconnected with Moanalua Road, where it meets Waimalu. You come down the hill from Kam Drive-in, at the bottom of that hill; that was all Cane Haul Road, from all across the top, when it hit the bottom next to, when you leave Waimalu, the Cane Haul Road was on the right, and the highway was on the left. And there were double bridges that crossed Waimalu Stream, one was a cane haul bridge, and one was a car bridge, and then there was a foot bridge off of that, off of the side of that."

BB: "Are those still existing? Or do they ...?"

BF: "No, no, no, it's all gone. It's all gone man. They built the freeway over my best friend's house. It's gone...

BB: "So, you've hiked back into that area [referring to project area all *the map]?"*

BF: "I have hiked into the area, that you showed me on the map. I was probably 11 or 12 years old, something like that, maybe 13, with my BB gun, and maybe my brothers were with me, a couple of my brothers. We used to hike all over that area, all the way up Pearl Ridge, go 10 miles back in the mountains. On the other side, what is now Kaahe1e Street, was a cane haul road, that went up the hill, and it was all cane fields covering that whole hill. The upper part, not in the gulch, but on the upper part, was all cane fields. The cane haul road went up until the point where it turns to Komo Mai Drive. At that point the cane haul road stopped, it actually turned and went with urn, I don't know if it turned and went with Komo Mai, but it stopped right there, and after that was just a narrow one lane dirt road, all rutted, real rough country road. And we used to go up, and there was a gate, and occasionally we get brave, and jump the gate, go hiking up the mountains. Now this property, that you're talking about, I would guess 2-3 miles up the mountain, from the Komo Mai Drive.

BB: "Well I think it actually... "

BF: "Did you measure it?

BB: "Well we haven't been up to survey it yet... "

BF: "Oh yeah. Cause this is like, like this is Kamehameha Highway down here. And so Kaahele starts right at Kamehameha Highway, right past Waimalu Stream. So over here, and it goes [pointing to Google Earth view of Waimalu on his computer screen]."

BB: "Right here ... [pointing to TMK map} and this is the end of it, the street, right ... "

BF: None of this was there, in the days that we did. What I'm saying that, from here, from this point [pointing to lower section of Waimalu on the map], we had to hike all the way up and that's about maybe 2 miles

BB: "Oh and it never existed ...

BF: "Yeah, this wasn't here, it was just a dirt road, a skinny dirt road"

BB: "All that development?"

BF: "Yeah that wasn't there, that was all just wilds, mountains."

BB: "And when would you say this was, what year?"

BF: "Ohh. '62, somewhere around there, '63. Something like that, '62 or '63, and that was all just wild country, skinny, skinny dirt road. You know, there were no off road vehicles then so it was just like a pick up truck would very slowly crawl up the road."

BB: "And that was all with the plantations though, right? Sugarcane?

BF: "No there was no sugar there."

BB: "No sugar?"

BF: "No, sugar stopped right there at Komo Mai Drive, right now. The sugar stopped there, and there that was like a gate and a dirt road going up into the mountains. Like a hiking trail.

BB: "A hiking trail?"

BF: "More or less. And we hiked all the way up there, yeah."

BB: "You hiked all the way into the back? To [unintelligible] caves? Did you ever make it to the caves? Or see any caves back there? "

BF: "I never saw a cave no. I don't know where that is man. That would have freaked me out really bad. Nah, actually no as kids we would have been like, 'Wow, cave! Let's go look! '"

BB: "So you've never heard of the burial cave, until I mentioned it?"

BF: "No, never heard of it. No, no, no."

BB: "So did you ever see any kind of stone or rock structure back there?"

BF: "Up there, like old Hawaiian stuff? No. It was more, more, just there was a guy living up there. We would see him once and awhile come up the road in his truck. [Laughs]. But you know we see the guy coming up the road, we jump off the side of the road, and hide in the bushes, yeah. [Laughs]. So as far as we knew it was just somebody's ranch. I don't know what he was raising, maybe cattle or horses, whatever. But there was a guy living way the heck up there, all by himself. Way, way up, this was like way up. In what is now the wild section that you're talking about. He's living up there somewhere, or was, I don't know if he's there anymore. I would say four years ago, my kid was playing soccer, down at, down at Kaahele Field. Which is a couple blocks down from the end of the road. And I jumped in the car while he was practicing, and went up there, and got out, and climbed the fence and went inside and looked around.

[Laughs]. Just to see. Was like 'I kinda remember this yeah.' And yeah I saw a guy going in the gate, with a pick up truck yeah, so somebody's still up there. [Laughs]. So I mean he's gonna lease it to somebody, or rent it, or sell it to somebody yeah.

BB: "So did you see anything associated with sugar cane plantation?"

BF: "Up there, no, no, no ways. Sugar stopped at what is now Komo Mai Drive."

BB: "Cause I heard about, there was a Waimalu Stable Camp also?"

BF: "Stable Camp? What is that? Like horse, horses?

BB: "Yeah, yeah horses were kept there, and it *was a plantation, all the plantations workers stayed there. Mostly Chinese, and Japanese, and Filipino I believe. "*

BF: "This is like way way up the mountain. This is like miles up the mountain. Why would they put them way up there?"

BB: "Supposedly that there, yeah the Cane Haul Road. I believe I have a map of it. [Showing Mr. Fergerstrom 1929 *map]."*

BF: "Really?! That's interesting. This is fascinating stuff man."

BB: "See this is *a 1929 map [showing map]"*

BF: "OK, [looking at map with me] railroad track.

BB: "And following the stream ..."

BF: "This is Waimalu Stream. There's a railroad up there?! Wait, wait, wait. If this is Waimalu Stream, where's Pearl Harbor?"

BB: "Pearl Harbor is *way down this way [pointing to map, showing direction of where Pearl Harbor* is *located]."*

BF: "So this is way up the valley then. This couldn't have crossed the gulch, cause that gulch is too big, too deep. So this had to be, [unintelligible J. You know what, railroad track. I would guess, I would bet this is somewhere near Kamehameha Highway is right now. Remember I was talking about the island [Mr. Fergerstrom refers to an earlier, unrecorded conversation discussing an island existing where Waimalu Stream diverges into two]. That's the island. The river was split, and you could walk. [I] remember as a real young kid, walking from this point all the way around, and coming back around and finding the other end and coming back. Maybe 7 or 8 years old something like that."

BB: "Then this railroad track is *bending [along the path on the map]."*

BF: "[I] don't remember this railroad track back then. The only railroad track we knew about was down by Pearl Harbor itself. That was the one that ran along the edge of Pearl Harbor. It's still in existence actually. That way the Navy, the military rode around Pearl Harbor, it was all train track, all the way around, all the way to 'Ewa. So that the "Ewa train is actually connected to that. The tracks were still there when we were kids. Um, what is this? 300 ft. 600 feet, [Mr. Fergerstrom, using the scale on the map to get his bearings]. Yeah this is like lower Waimalu, my dads house is somewhere around here.

BB: "And this was all sugar land."

BF: "Yeah this was all sugar cane. When we moved there this was all sugar cane. The other side of Waimalu stream, a little further down, was um, is Waiao, and what is now what they call Waimalu Plaza shopping center, is a chicken farm, and sugar cane, surrounded by sugar cane. It was a chicken farm, but right on the river. [Laughs] Anyways, I know lots about the lower areas, we played in the upper areas, we spent more time on the Pearl Ridge side hiking it. We went farther back on the pearl ridge side, but I did go up into this area."

BB: "Because on this property, we do know that there was some sort of burial cave."

BF: "Yeah I did not, I don't know anything about a burial cave. Wow. That's pretty heavy."

Mr. Miles Fukushima and Mrs. Maureen Fukushima

Mr. and Mrs. Miles Fukushima, husband and wife, expressed their knowledge of and interest for the subject property. Mr. Miles Fukushima, now retired, is a member of the O`ahu Pig Hunters Association, and has hiked and hunted throughout the Waimalu area for many years. According to Mr. Fukushima, he has been hunting for over "50 years," and recollects the times that he would go hunting with his father and brother in his early teens. His wife, Maureen Fukushima has been accompanying him on his hunts throughout the years, and has accompanied him throughout the project area. Mrs. Fukushima recalled the scenery of Waimalu Mauka. Describing the flora and fauna of the area she had encountered alongside her husband, during hiking trips.

Miles described the difficult and often treacherous terrain that exists in Waimalu Valley, recalling times searching for missing hikers in the back of Waimalu. Besides hunting in the valley, Miles had also grown up in the area surrounding lower Waimalu. His family in fact, Japanese plantation workers, had once worked the sugar cane fields associated with the Waimalu sugar cane industry. Miles recalled the "Burial Cave" during the interview. Never personally being inside the said cave, he did, however, recall the site having a place amongst his own family stories; as he describes, his mother had hidden in a cave during the attack on Pearl Harbor on

December 7, 1941. Mr. Fukushima also shared numerous legends, or "obake tales" pertaining to *menehune* and night marchers moving about in Waimalu Valley.

Interview with Mr. Miles Fukushima and his wife, Mrs. Maureen Fukushima

Name: Miles Fukushima
Address: 98-813 Hapaki Street, `Aiea
Birthdate: July 12, 1945
Birthplace: Liliha
Ethnicity: Japanese

Name: Maureen Fukushima
Address: 98-813 Hapaki Street, `Aiea
Birthdate: November 14, 1946
Birthplace: Epsom, England
Ethnicity: Caucasian

Brittany Beauchan [BB]: "Your affiliation to Waimalu is [question directed to Miles Fukushima]?

Miles Fukushima [Miles F]: "I've been living in the valley since I was young, I was born you know, and raised all my life over here [referring to Waimalu], and now I stay move up here, New Town. I've been hunting since I was in high school, with my dad, and my brother used to hunt too. We pretty much know all of Waimalu, and all up New Town, and Royal Summit area. A long time I've been hunting, about 50 years, or over.

BB: "So anything that you noticed back when you were hunting in the Waimalu, like in the Waimalu Mauka area, like cultural sites or anything like that?"

Miles F: "No I never did see no cultural sites, heiau or anything."

BB: "Nothing ancient Hawaiian?"

Miles F: "No, nothing ancient Hawaiian."

BB: "But you did say you saw modern, or more relatively, you'd say maybe 40's or 50's type [of structures]back there? ..

Miles F: "Well I don't know…"

Maureen Fukushima [Maureen F]: "What?"

Miles F: "[Asking his wife Maureen Fukushima] 40's or 50's? What I seen back there"

Maureen F: "Well it wouldn't be the 40's, it would be in the 50's."

Miles F: "Yeah in the 50's, then, yeah the only thing I seen in Waimalu Valley, was da kine, big, what do you call that? Like a well..."

Maureen F: "A cistern."

Miles F: "Cement, concreted, maybe about 30 feet high, to the bottom."

Maureen F: "You talking back here in Royal Summit?"

Miles F: "No in Waimalu Valley."

Maureen F: "You wanted just the valley? [directing question to me]

BB: "Yeah I *want the whole property ..."*

Miles F: "Yeah in the valley, not on top the ridge though. In the valley, down below where the river go, on the side.

BB: "Is his property, does it comprise part of the ridge, do you think?"

Miles F: "His property look like on top of the ridge part [referring to the USGS map of the subject property]. Up Waimalu Ridge.

BB: [Pointing to the USGS map] "That's the topographical one, showing how the mountains and ridges are."

Miles F: "This is Waimalu right? [pointing to section of Waimalu on the map] So this is Royal Summit, where get that gate, where Chris can drive up. So like we get all up here [pointing to map], so it's all on the ridge I think.

BB: "What kind of vegetation is back there?"

Maureen F: "A lot of pine trees."

Miles F: "Get pine trees, get guava trees, get eucalyptus trees, all kind of trees [unintelligible], plum trees, get ferns."

Maureen F: "What are the ones I tried to walk through, and you had to cut?"

Miles F: [to his wife] "Lantana. Hau bush. A lot of things. Get rivers, get a lot of gulches. But you gotta really know the mountain, you know if you go hunting like that. Because you can go one side and you can end up the other side. You know like I can hunt from Pearl Ridge and come back on the top and come home. But you gotta climb the ridge and go over.

BB: "So did you ever go inside the gulch?"

Miles F: "Yeah. We used to go always gulch, I've been hunting."

BB: "Cause when we were doing research, we found, different people, saying different things about the burial cave, which is what we're most concerned about."

Miles F: "A cave?"

BB: "Yeah, a burial cave complex."

Miles F: "They never say where it is or what?"

BB: "I actually, the last ... Bishop Museum actually had a bunch of people go out there, and when they looked for it, this is what they wrote: Proceed up the road, on the left side of the valley, and do not turn right across the bridge to the pump house. "

Maureen F: "Oh she's talking about where your parents lived, there the cave is, that's where you said the cave is. Behind Minami's. That's where you're talking about, but that's not anywhere where you marked off [referring to map on subject property]."

BB: "Is there a piggery or something?"

Miles F: "Yeah, yeah, yeah. But no more piggery now. But the guy that used to own the piggery lives up there. His house is up there. But they no more piggery already, it's in this valley."

Maureen F: "But you said they built over it."

Miles F: "The one we used to live, by the pump house, is all houses now."

BB: "They completely built over it?"

Miles F: "They built ..."

BB: "Over what would have been considered the burial cave?"

Miles F: "The cave, where my mother them, when had the war, she took us in that."

Maureen F: "She hid in there."

Miles F: "In that cave. Where that thing, but they all went make houses over there."

Maureen F: "They didn't do any of this [referring to a cultural impact assessment]."

Miles F: "And had that pump house, and had that ridge we used to go over, and that big red [unintelligible] bridge."

Maureen F: "".That's where your parent's house was, where your sister's living now. Going back on that road you're going to hit the Minami Place. Are there more caves back there? [directing question to Miles]"

Miles F: "When I hunted, I caught one pig in a cave, but has nothing to do with burial cave or nothing. Just where the pig went in the cave and the dog caught him in the cave, and then we killed him, and dragged out the pig."

Maureen F: "[directing question to husband again] There was no signs of burials?"

Miles F: "No, no signs of burials."

Maureen F: "They're buried by the houses that they built over."

Miles F: "I don't know they said that tunnel, used to be one place where my mother them say, when had the war [referring to World War II, and the attack on Pearl Harbor], and when we was little we go and inside. But right now it's all houses over there.

Maureen F: "It could've been [referring to cave as a burial cave], and you never knew. And then they just built over it. They never did any impact statement."

Miles F: "Not unless Chris own the bottom of Minami side, where Minami lived ..."

BB: "Because we have this, this old map, and they said right here was the burial cave [pointing to map from Sterling and Summers [1978] "Sites of Oahu."

Maureen F: " ... and its right to the left of Waimalu Stream [looking at map]"

Miles F: "It's probably this place, with all the houses."

Maureen F: "It's all buried, it's all been developed, and that cave is no longer there. I remember you [referring to her husband, Miles Fukushima] showing it to me once. It's not there anymore. Approximately where it is, could you see where it is now? [directing question to Miles]"

Miles F: Yeah where we used to live, down below."

Maureen F: "You could show somebody now, where it was?"

Miles F: "Roughly where it was. But get houses now over there."

Maureen F: "And they didn't do an impact statement, and if there were burial caves there, they just built over it."

BB: "Well that's what we're worried about, because usually where there's one burial, there are other ones."

Maureen F: "On this part here, where it says its Chris' lands, there are no caves."

BB: "Is it uphill more?"

Miles F: "Yeah, all up hill."

BB: "[what is *the] Terrain [like]?"*

Miles F: "And then get gulches down below like that [pointing to USGS map of Waimalu]. I hunt all the way and no more heiau, no more nothing."

Maureen F: "No cave? [asking Miles]"

Miles F: "Only the cave that stay down Minami side."

Maureen F: "Yeah but that's all gone now."

Miles F: "This one is gone now, all houses over here, but past Minami, where we used to hunt, we caught the pig in the cave, but that's not burial ground or nothing, one cave where the pig when hide in there."

Maureen F: "Can you show them where it is?"

Miles F: "Yeah in the gulch, past Minami. But I don't think you can go through Minami's side, it might be all over there ..."

Maureen F: "...I thought you said it was creepy back there."

Miles F: "Where? Where the cave?

Maureen F: "Yeah"

Miles F: "No, just that we used to go hide in there, my mom when show us, when had the Pearl Harbor, the war, they went go hide in there."

Maureen F: "During Pearl Harbor [referring to the attack]. These guys weren't even born, but his brother, how old's your brother?

Miles F: "72"

Maureen F: "So they were all born, and she was scared, she was home alone with the little ones, so she ran and hid back there."

BB: "Was this during the attack? Was she living in this area?"

Miles F: "Yeah they was living up there [referring to Waimalu]. My father used to work for the plantation, and had all the pump houses over there, and they checked the pump, the water going for sugar cane, so we used to work. [referring to the day of the attack, and his father out working the sugar cane fields, that once covered the Waimalu hillsides]."

Maureen F: "So when Pearl Harbor hit, she was scared, and took all the kids and hid back there [referring to the cave, they believe to be the original burial cave]."

Mr. Tin Hu Young

Mr. Tin Hu Young expressed his knowledge and association with the project area within the Waimalu Ahupua`a*;* Mr. Young, referred by Mr. Shad Kane, grew up in the lower Pu`uloa area, alongside the old railroad tracks. He continues to live there today, in the area where he was raised as a child. According to Mr. Young, his lands, adjacent to Waiawa Stream, are presently surrounded by Bishop Estate. A retired Pearl Harbor and Hawaiian Airlines worker, Mr. Young now spends most of his time volunteering at Kawaiaha`o Church in Downtown Honolulu. Hawaiian history, as well as genealogy, are his past times; he maintains a belief in sharing *mana`o,* often leading tours throughout the historic church, and conducting numerous cultural consultations. A fellow member of the Royal Order of Kamehameha, with Shad Kane, he discussed the importance of genealogy, and how it connects him to the Waimalu area.

Mr. Tin Hu Young shared his wife's, Mrs. Helen Young's genealogy, specifically her relation to Don Francisco Marìn, an appointed *konohiki* of Waimalu Ahupua`a during the reign of Kamehameha I. Mr. Young suggested the possibility of the burial cave, in fact, belonging to Don Francisco Marìn, as the area near the valley was favored by the Spaniard. During his recollections, Mr. Young described the valley being filled with *lo`i kalo* and rice in his early days, with fields of sugar cane stretching up the slopes of Waimalu. Through his recollections, Mr. Young was able to illustrate a memory of once being able to gaze down from upper Waimalu, and view unbroken acreages of verdant fields of sugar cane, rice, and taro. As Mr. Young described, this green patch stretched straight to the healthy, clear, living waters of Pearl Harbor. He recalled with sadness the days when the land was healthy, and the disastrous effects of the Pearl Harbor attack on the local ecosystem. Mr. Young emphasized a need to take care of the land, of the natural resources, from the mountains to the sea.

Interview with Mr. Tin Hu Young

Name: Tin Hu Young
Address: Off Waiawa Road
Birthdate: March 20, 1927

Birthplace: Pearl City
Ethnicity: Hawaiian and Chinese

Brittany Beauchan [BB}: "I talked to Shad Kane, and he told me to talk to you. "
Tin Hu Young [THY]: "Yeah I know him through the Royal Order of Kamehameha. Yeah, and he's like a historical buff yeah. The reason why he referred you to me because of my wife. My wife belongs to the Colburn Family. The Colburn Family, actually the Colburn family is related to Don Francisco Marìn.

BB: "The guy who had area in the back of Waimalu, right?"

THY: "Yeah well I'll get to that. The reason why I'm telling you about it, leads to that. Don Francisco Marìn was Spanish, a Spanish Cadet, [pause] that we think had, I don't know, I don't know if he ran away or what but somehow ..."

BB: "He ended up in Hawai`i?"

THY: "He ended up here in Hawai`i. But he was one of these guys that was smart. He knew about plants, he knew about. .. "

BB: "Like botany?"

THY: "He knew how to fight warfare with ships."

BB: "Oh."

THY: "Cause had sailing ships those days, and the thing about Don Francisco Marìn was he knew about gunpowder, how to use a cannon on a sailing vessel. So what happened was Kamehameha got a hold of him, when he was here in the islands. So Don Francisco, so, so, Kamehameha knowing that this guy knew how to make stone walls and stone buildings, and waterproof a building, he knows how to store gunpowder. Hawaiians were building their buildings with thatched roof, yeah, rain all the time, so Kamehameha was smart. But anyway on my wife's side, she's related to the Marìn's. Marìn also happened to be a very religious man, you know, he baptized, he was Catholic by the way, you know. He baptized all his children; he was very religious, and very true to the Catholic religion. But you gotta understand, in Hawai`i, when Queen Ka`ahumanu accepted the missionaries from the mainland, they were Protestant. You know what happened to Martin Luther, huh? He was the one that got expelled, from the Catholic religion, he was a priest himself So somehow he got in an argument with the Pope at that time, got in an argument with the pope at that time, you know."

BB: "Excommunicated."

THY: "Yeah, he was excommunicated! So he was part of the Protestant religion that we accepted at Kawaiha`o today. So we're like, the Hawaiians they call us, call themselves down here in the old days, Kalawina. Kalawina in Hawaiian refers to John Calvin. John Calvin is the one that came on the Mayflower and landed in America [Young is referring to the followers of John

Calvin, English Calvinists, otherwise known as the Mayflower pilgrims]. Came to America on the Mayflower, that's where Aunty Helen (Tin Hu's wife, relation of Don Francisco Marìn) them side come from, the ones that came on the Mayflower. But of course in the beginning, going back to Don Francisco, he himself married three women. On their side [referring to his wife's side], the Colburn's side was from the first wife, the first wife. So, he had about three wives, but with the first wife, he had plenty children. His eldest daughter, Mariah Cruz was the first child he had, Maria or Mariah, they pronounce it either way. Maria Cruz or Mariah Cruz, she had married a ships captain, but in those days, you marry a ships captain in Hawai`i, you have a lot of power you know. They're like the Matson Navigation Company, control everything coming in, you know. So she married this guy Morgan, you know and he was like a private ship owner too, so and they had two children, one boy and one girl. The girl married a Colburn."

BB: "Ok. I was wondering where do the Colburn's come in?! *[laugh] "*

THY: "Yeah the girl married a Colburn, of those two children, that's why they're related to Don Francisco. So that's why Shad, Shad is going from that genealogy that's why, you know, he's going back historically. Kamehameha was smart, he wanted to recruit this Spanish young captain because he wanted a strong Navy, you know or ship that can shoot the cannon balls yeah. So what he did was he let Don Francisco Marìn take care of all of this area of Pearl Harbor, we call Pu`uloa, the whole area of Pearl, Pu`uloa, and all the way from here, all the way to Hālawa. So Hālawa was where you were interested in, a certain spot, right?"

BB: "Up in Waimalu."

THY: "Yeah that's part, between Hālawa and here, that's a big area. That's like almost up to Red Hill, all the way around, around the perimeter. So the ironic part was, that's on her Spanish side [referring to his wife, Helen, and her ancestor Don Francisco Marìn], her Spanish side, that's why she related to Don Francisco. But she's the last living heir, the oldest, so when they discovered anything around Honolulu, they go to her, for artifacts yeah, and stuff like that. If they find anything, they go to her, For instance, they were building the Marin Tower, right in town, that family, the Colburns used to own the whole block over there, they started, they also started where Aloha Tower is, you know, at that time got a lot of history connections because of Don Francisco, see. And he was very influential in Hawai`i, because he introduced a lot of like plants. He introduced a lot of plants in Mānoa Valley, and some of the plants on Vineyard. That's how Vineyard got that name, from him because he was introducing all those plants. That's how that garden got started, the one selling all those plants. You know he was planting pineapple, coffee, stuff like that. So you know he was way ahead of his time, you know but ironically, we the guys that got kicked out. .. he was the one that kicked out my family, the Hawaiian side, we were the ones that lived at the mouth of the river, they used to call it the Pearl River. .. Anyway, I've read some of the excerpts other people had written on Don Francisco Marìn they said that he was the one that was active in Waimalu, in the area there is the valley. He might be the one that have the old graves in that area."

BB: "In the burial caves?"

THY: "I think so, I'm not sure because, you know it's so funny in Hawai`i, because if you go back a certain year, say before 1830 or whatever, or before 1840, when the Monarchy, when the Kamehameha's took over they had five kings, you know. Then after the five kings, one elected king. That was Lunalilio. Lunalilo was buried at Kawaiha`, right in the front, you know, of course that's another story. The rest are in the royal mausoleum in Nu`uanu Valley .. . but the old fashioned way, like Kamehameha I they hide them in the cave, but you don't know where [referring to traditional forms of burial, of the hiding of the remains of prominent members of Hawaiian society).

BB: "So in the cave, might be Marìn?"

THY: "... But see the thing is you have to research to find out, if he was the owner of those [burial caves] at the time."

BB: "Marìn?"

THY: "Marìn. Marìn. Cause he might have got a farm or something over there."

BB: "Oh back in there in the Valley? In the gulch area?"

THY: "Yeah, yeah."

SUMMARY

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 2012) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a "good faith effort". However, when many factors need to be considered, such as in coastal or mountain development, a good faith effort might mean an entirely different level of research activity.

Analysis of the potential effect of the project on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is also a suggested guideline of the OEQC (No. 10, 2012). To our knowledge, the project area has not been used for traditional cultural purposes within recent times. Based on historical research and no additional suggestion for contacts, analysis of the potential effect of the project

on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 2012). To our knowledge, the project area has not been used for traditional cultural purposes within recent times.

In the case of the current undertaking, letters of inquiry were sent to individuals and organizations that may have knowledge or information pertaining to the collection of cultural resources and/or practices currently, or previously conducted in close proximity to the proposed 447.464-acre zip line project area located in Waimalu Ahupua`a, `Ewa District, Island of O`ahu, Hawai`i [TMK: (1) 9-8-073:001].

Historical and cultural source materials were extensively used and can be found listed in the References Cited portion of the report. Such scholars as Samuel Kamakau, Martha Beckwith, Jon J. Chinen, Lilikalā Kame`eleihiwa, R. S. Kuykendall, Marion Kelly, E. S. C. Handy and E.G. Handy, Elspeth P. Sterling, and Mary Kawena Puku`i and Samuel H. Elbert and continue to contribute to our knowledge and understanding of Hawai`i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate.

From the traditional accounts of the Waimalu area, it can be seen that the area contains a rich background, however, most Hawaiian settlement seemed to be located along the coast at Pearl Harbor, rather than Waimalu *Mauka.*

During the course of interviewing ethnographic consultants, information regarding areas of cultural and traditional importance in the vicinity of the project area and in Waimalu Ahupua`a was obtained from five individuals, three of whom were of Hawaiian ancestry. Three of the individuals had been raised in the Waimalu/`Aiea area. All informants are active members in the community and knowledgeable of the Waimalu area, serving in the Hawaiian Burial Council, the Department of Hawaiian Homelands, the O`ahu Pig Hunters Association, and Kawaiaha`o Church, respectively. Mr. Shad Kane's discourse related primarily to the mythological and prehistoric accounts of Waimalu, as well as the presence of burials. When asked about his knowledge of the remains existing in the Waimalu burial cave, Mr. Kane answered that most, if not all have been destroyed or removed.

Mr. Blaine Fergerstrom offered information relating to his geographical association to Waimalu; mostly discussing his childhood stories of exploring the upper areas of Waimalu, and iterating the general lack of "archaeological features." When asked about seeing anything of cultural or archaeological note, while exploring as a youth, he commented he had never seen anything in that area, likening it to the Aiea Loop hiking trail.

Mr. and Mrs. Miles Fukushima offered valuable information concerning the subject property, as well as the Waimalu Mauka area. Pig hunting in Hawai`i, specifically the legitimate Pig Hunters Association, very much serves the community, and can be considered, for all intents and purposes, a culture within the Hawaiian Islands. Hence, Mr. Fukushima's information is very much valuable, as he remains amongst the few individuals who still venture into O`ahu's inaccessible areas, gathering knowledge in regards to the existence of possible sites of cultural importance. During the interview, Mr. Fukushima also iterated that during his hunting trips, he has never come across any ancient Hawaiian structures or burials. He mentioned that the development of residential areas in Waimalu had most likely destroyed any burials that may have existed.

Mr. Tin Hu Young's discourse related primarily to his historical and familial connection to the Waimalu area. He mentioned his association to the area, through his wife, the last living descendent of Don Francisco Marìn, who was gifted the lands of Waimalu from Kamehameha the Great. Mr. Young stated he had not conducted much research for specifically Waimalu Mauka, however, he did recall a burial cave, and suspected that rather than being a pre-Contact site, it in fact belonged to Don Francisco Marìn, and was utilized by him for his family's private burial use.

RECOMMENDATIONS AND CONCLUSIONS

Due to the information acquired from informants, their knowledge has indicated the subject area itself has not been significantly altered, much of it remains wild forested lands, however, any cultural sites that may have existed, have most likely been destroyed by looting in the past, and finally with the development of housing subdivision in Waimalu, in recent times. Informants have suggested additional survey work to find any possible sites, with Mr. Miles Fukushima offering to show where the burial cave had once been located prior to residential development.

Thus, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities

will not be affected by development activities on the approximately 1 acre of land on and around the proposed 447.464-acre zip line project area located in Waimalu Ahupua`a, Ewa District, Island of O`ahu, Hawai'i [TMK: (1) 9-8-073:001].

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APPENDIX A: EXAMPLE LETTER OF INQUIRY

Dear: Date:

In compliance with the State of Hawai‘i Revised Statute (HRS) Chapter 343 Environmental Impact Statements Law, and in accordance with the State of Hawai`i Department of Health’s Office of Environmental Quality Control (OEQC) Guidelines for Assessing Cultural Impacts as adopted by the Environmental Council, State of Hawai`i on November 19, 2012, Scientific Consultant Services, Inc. (SCS) is in the process of preparing a Cultural Impact Assessment (CIA) pertaining to the proposed zip line project which is to be located in Waimalu Ahupua`a, `Ewa District, Island of O`ahu, Hawai`i [TMK: (1) 9-8-073:001] (Figures 1 and 2).

Scientific Consultant Services has conducted an Archaeological Assessment (Archaeological Inventory Survey with negative findings) of the proposed project area, which involves nine separate areas with a combined acreage of 2.701-acres within a larger 447.464-acre property (Wong *et al*. 2013, in prep.)

According to the *Guidelines for Assessing Cultural Impacts* (Office of Environmental Quality Control, Nov. 2012):

> 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 types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural which support such cultural beliefs…

We are asking you for any information that you or other individuals have which might contribute to the knowledge of traditional cultural activities that were, or are currently, conducted in the vicinity of the proposed zip line. We are also asking for any information pertaining to traditional cultural activities or traditional rights which may be impacted by the proposed zip line. The results of the cultural impact assessment are dependent on the response and contributions made by individuals, such as yourself.

Enclosed are maps showing the proposed project areas. Please contact me at the Scientific Consultant Services, Honolulu, office at (808) 597-1182 or via e-mail (cathy@scshawaii.com) with any information or recommendations concerning this Cultural Impact Assessment.

Sincerely yours,

Cathleen Dagher

Senior Archaeologist
Enclosures (2)

Cc: Dr. Kamana`opono M. Crabbe, Chief Executive Officer Office of Hawaiian Affairs; Kawika Farm, State Historic Preservation Division, Burial Sites Program; Hinaleimoana K.K. Wong-Kalu, Chair, O`ahu Island Burial Council; Kawika McKeague, community member and former `Ewa O`ahu Island Burial Council Representative; Leimaile Quitevis, O`ahu Island Burial Council, `Ewa Representative; George Kaeliwai, Jr., Hawaiian Civic Club of `Ewa; Mr. William Ho`ohuli, community member; Robert Oleivera, community member

APPENDIX B: LEGAL NOTICE & AFFIDAVITS

AFFIDAVIT OF PUBLICATION

IN THE MATTER OF
SCS Proj 1408 CIA for the Proposed Zipline

STATE OF HAWAII }
} SS.
City and County of Honolulu }

Doc. Date: JUN - 6 2013 **# Pages:** 1

Notary Name: Patricia K. Reese **First Judicial Circuit**

Doc. Description: Affidavit of Publication

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

JUN - 6 2013
Notary Signature Date

Information requested by Scientific Consultant Services, Inc. (SCS) on cultural resources and traditional or on-going cultural activities on or near the proposed O'ahu Zip Line Project, Waimalu Ahupua'a, 'Ewa District, O'ahu Island, Hawai'i [TMK: (1) 9-8-073:001 Portion]. Please respond within 30 days to Cathleen Dagher at (808) 597-1182.
(SA524724 6/2, 6/5, 6/6/13)

Rose Rosales being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser and MidWeek, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 3 times on:
06/02, 06/05, 06/06/2013

Midweek Wed. 0 times on:

_____ times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Rose Rosales

Subscribed to and sworn before me this _____ day
of June A.D. 20 13

Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii
My commission expires: Oct 07 2014

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

Ad # 0000524724 LN:_____

Information requested by Scientific Consultant Services, Inc. (SCS) on cultural resources and traditional or on-going cultural activities on or near the proposed O`ahu Zip Line Project, Waimalu Ahupua`a, `Ewa District, O`ahu Island, Hawai`i [TMK: (1) 9-8-073:001 Portion]. Please respond within 30 days to Cathleen Dagher at (808) 597-1182.

APPENDIX C: EXAMPLE FOLLOW-UP LETTER

This is our follow-up letter to our July 30, 2013 letter which was in compliance with the statutory requirements of the State of Hawai‘i Revised Statute (HRS) Chapter 343 Environmental Impact Statements Law, and in accordance with the State of Hawai`i Department of Health's Office of Environmental Quality Control (OEQC) Guidelines for Assessing Cultural Impacts as adopted by the Environmental Council, State of Hawai`i, on November 19, 2012.

Scientific Consultant Services, Inc. (SCS) is in the process of preparing a Cultural Impact Assessment (CIA) pertaining to the proposed zip line project which is to be located in Waimalu Ahupua`a, `Ewa District, Island of O`ahu, Hawai`i [TMK: (1) 9-8-073:001].

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According to the *Guidelines for Assessing Cultural Impacts* (Office of Environmental Quality Control, Nov. 2012):

> 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 types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural which support such cultural beliefs…

We are asking you for any information that you or other individuals have which might contribute to the knowledge of traditional cultural activities that were, or are currently, conducted in the vicinity of the proposed zip line. We are also asking for any information pertaining to traditional cultural activities or traditional rights which may be impacted by the proposed zip line. The results of the cultural impact assessment are dependent on the response and contributions made by individuals, such as yourself.

Please contact me at the Scientific Consultant Services, Honolulu, office at (808) 597-1182 or via e-mail (cathy@scshawaii.com) with any information or recommendations concerning this Cultural Impact Assessment.

Sincerely yours,

Cathleen Dagher
Senior Archaeologist

Cc: Dr. Kamana`opono M. Crabbe, Chief Executive Officer Office of Hawaiian Affairs; Kawika Farm, State Historic Preservation Division, Burial Sites Program; Hinaleimoana K.K. Wong-

Kalu, Chair, O`ahu Island Burial Council; Kawika McKeague, community member and former `Ewa O`ahu Island Burial Council Representative; Leimaile Quitevis, O`ahu Island Burial Council, `Ewa Representative; George Kaeliwai, Jr., Hawaiian Civic Club of `Ewa; Robert Oleivera, community member; William Ho`ohuli, community member

ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 4
Traffic Impact Assessment Report

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FINAL

Waimalu Zipline
Traffic Impact Report

Waimalu, Hawaii

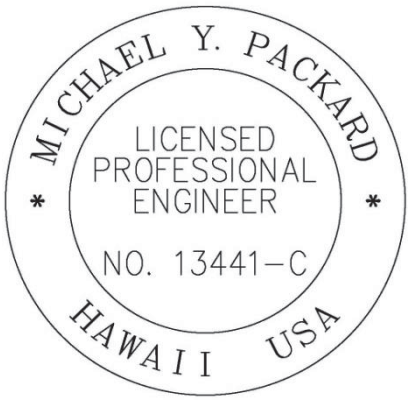
August 23, 2013

Prepared for

Towne Development of Hawaii, Inc.

Prepared by

SSFM INTERNATIONAL



This work was prepared by me or under my supervision:

Michael Y. Packard

Date: 8/23/2013

Licensed Professional Engineer
License Number 13441
Expires: 4/30/2014

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I. PROJECT DESCRIPTION

Towne Development of Hawaii, Inc. is proposing to establish a zipline tour operation with primary activities occurring in Waimalu, Hawaii. The zipline tour operations are anticipated to be underway by summer 2014. The zipline activity site ("nature center") is being proposed on a portion of TMK (1) 9-8-073-001 in a conservation zoned area (see Figure 1). The nature center will be located approximately 900 feet from the end of Kaahele Street, in the Royal Summit subdivision in Waimalu. Customers of the zipline tour operation will initially travel to an intake center located in an existing commercially zoned location. The exact location of the intake center is yet to be identified with options being in Aiea, Pearl City, or Newtown. Customers will be transported from the intake center to the nature center in shuttle vans.

Hours of operations are being proposed between 8:00 AM and dusk, 365 days a year. Vehicular access between the intake center and nature center is being proposed along a fixed route, primarily along City and County of Honolulu owned roads. Access will be established following identification of the intake center location. It is anticipated that two to three vehicular roundtrips will be completed per hour transporting customers and employees between the intake center and nature center; however, the average number of trips over an extended period of time will be two roundtrips. Zipline tour customers will be grouped into 10 to 12-person groups and accompanied at all times by two guides. Also included are trips by security/management/service which are anticipated to occur once every two hours.

The nature center will be comprised of an approximately 1,200 square-foot structure and include ten parking stalls. After being transported to the nature center, customers will travel to the ziplines on all-terrain vehicles (ATVs). On-site parking will be limited to employees, shuttle vans, and service vehicles. Newtown Estates Community Association members will be able to access the existing nature trail although 24-hour/day security for the zipline tour operation will prevent access to other unauthorized personnel.

This traffic impact report is in support of an Environmental Assessment being completed for the proposed zipline tour operation. In addition, assuming a maximum number of hourly and daily trips to and from the nature center, the number of single-family residential homes will be calculated that generates an equivalent number of trips.

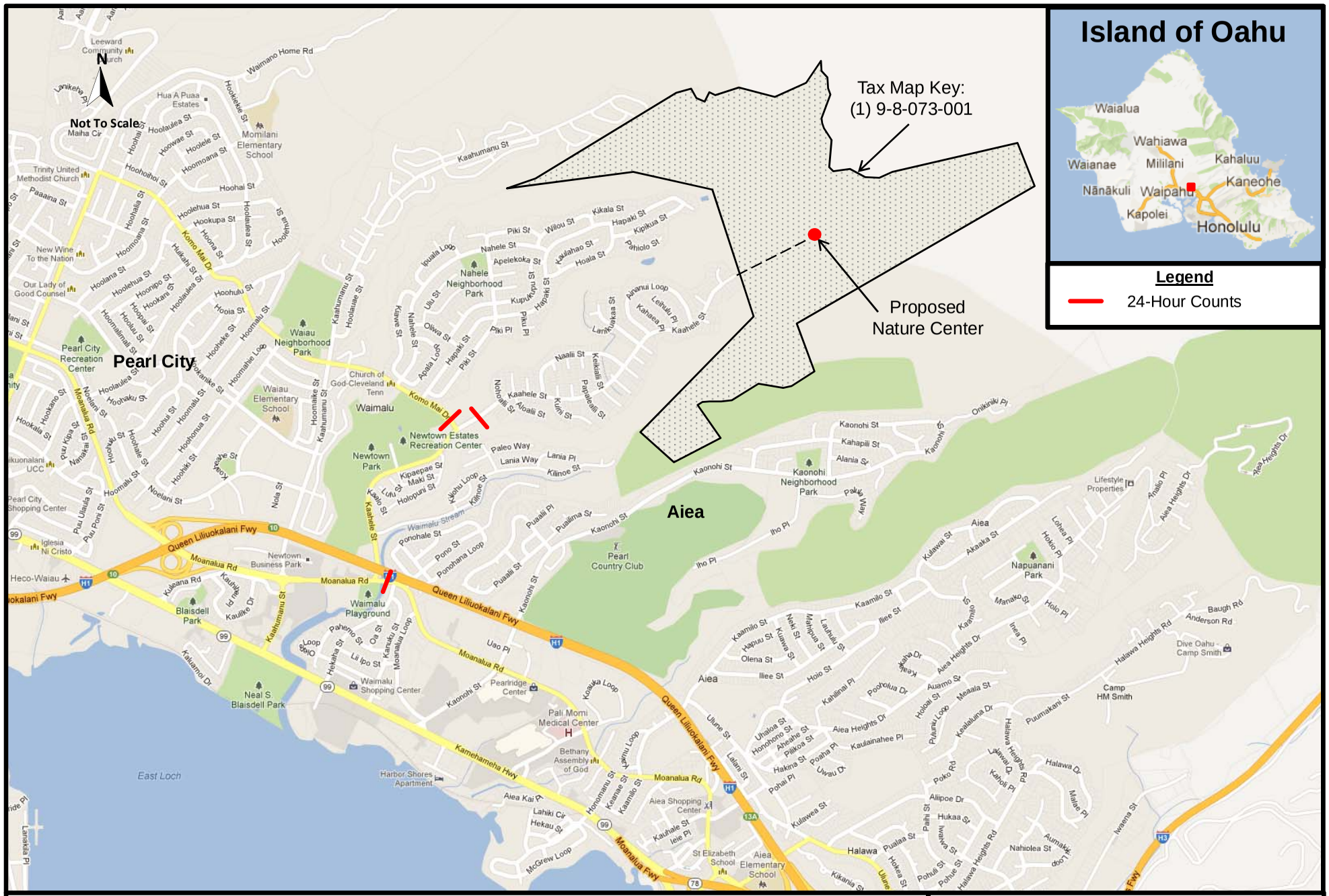


Figure 1: Location Map

SSFM INTERNATIONAL

II. EXISTING CONDITIONS

Through review of Aiea and Pearl City Neighborhood Board No. 20 meeting minutes from 2003 through 2013, the concerns and items of note in the area associated with vehicular and pedestrian traffic include the following:

- March 2003 – There were concerns of speed traps on Kaahele Street coming down from the New Town Estates.
- May 2004 – Roundabout being considered by the Department of Transportation Services at the intersection of Kaahele Street and Komo Mai Drive due to speeding concerns and lack of pedestrian safety. *(There were no further comments pertaining to this proposed action and the intersection is currently stop-sign controlled for the Komo Mai Drive approach.)*
- January 2007 – During peak traffic hours, motorists block the intersection of Kaahele Street and Moanalua Road. It was requested to install a "Do Not Block Intersection" sign.
- October 2008 – Lane striping and modification along Kaahele Street in Royal Summit were done years ago. The community would like the City to re-evaluate the area and make changes. The City was asked to educate the community and to meet with the Newtown Association. *(The intent behind the striping, modifications, and meetings is believed to be to aid in controlling speeding.)*
- September 2010 – Community Traffic Awareness Program noted signwaving event on Kaahele Street to encourage drivers to slow down. Noted the one year anniversary of pedestrian fatality in front of the Newtown Recreation Center.
- October 2010 – Speeding continues to be a concern along Kaahele Street.

A. Geometric Configuration

Access to the Waimalu Zipline nature center will come off of Kaahele Street, through the Royal Summit subdivision. Kaahele Street is an approximately two mile long, City and County of Honolulu owned collector road, traveling mauka-makai (mountain to ocean), with a posted speed limit of 25 mph. Kaahele Street is four lanes and undivided between Moanalua Road and Komo Mai Drive with parking prohibited on weekdays between 3:30-5:30 PM in the mauka-bound direction and 6:00-8:30 AM in the makai-bound direction. Mauka of Komo Mai Drive, Kaahele Street becomes a two-lane undivided road with permitted on-street parking.

Travel between the nature center and intake center will proceed along Moanalua Road which is an undivided four-lane, City and County of Honolulu owned, principal arterial with auxiliary lanes and a posted speed limit of 35 mph.

At the signalized intersection of Kaahele Street and Moanalua Road, vehicle detectors exist for the eastbound and westbound lanes as well as the makai-bound left off of Kaahele Street. Pedestrian crosswalks exist across the west and north legs of the intersection. Signalized intersections exist in close proximity along Moanalua Road, on either side of the intersection with Kaahele Street. From the intersection with Moanalua Road, Kaahele Street travels underneath interstate H-1, proceeding mauka up a moderate grade due to the elevation gain. Between Moanalua Road and the proposed nature center there is a single stop controlled intersection for the Kaahele Street approach at the all-way stop-

controlled (AWSC) intersection with Naalii Street (mauka). Here, crosswalks exist on all legs of the intersection. All other intersections are two-way stop controlled (TWSC) intersections with the stop signs controlling the intersecting side streets. At the T-intersections with Moanalua Road and with Komo Mai Drive, dedicated left and right-turn lanes exist for all approaches. Crosswalks exist on all legs of the intersection. Between the intersections with Moanalua Road and Komo Mai Drive, a crosswalk exists across Kaahele Street at the intersection with Lulu Street/Newtown Recreational Center.

At the cul-de-sac mauka end of Kaahele Street parking is prohibited. This is standard practice for City and County of Honolulu cul-de-sacs. A driveway curb cut exists at the center of the cul-de-sac which leads to a dirt/gravel path that is controlled by a locked gate and notice of private property. Best Management Practice (BMP) sediment logs have been emplaced at the driveway cutout to control erosion and runoff. Aerial mapping shows existing dirt paths proceeding mauka from the cul-de-sac. Sidewalks exist along both sides of the street along Kaahele Street, Moanalua Road, and Komo Mai Drive although no bike lanes or designated routes exist in the area.

The City and County of Honolulu transit system (TheBus) Route 71-Pearlridge runs in both directions along Komo Mai Drive and Kaahele Street (mauka of Komo Mai Drive) and includes multiple bus stops. Route 54 – Honolulu-Pearl City travels along Moanalua Road, up Kaahele Street, and along Komo Mai Drive. Route 54 runs from 4:50 AM-11:08 PM weekdays, and 5:40 AM-11:01 PM weekends, with five to eight stops during the AM and PM peak hours. Route 71 runs from 5:41-8:16 AM and 3:12-6:09 PM on weekdays, with two to four stops during the AM and PM peak hours. Route 71 does not run during the weekend.

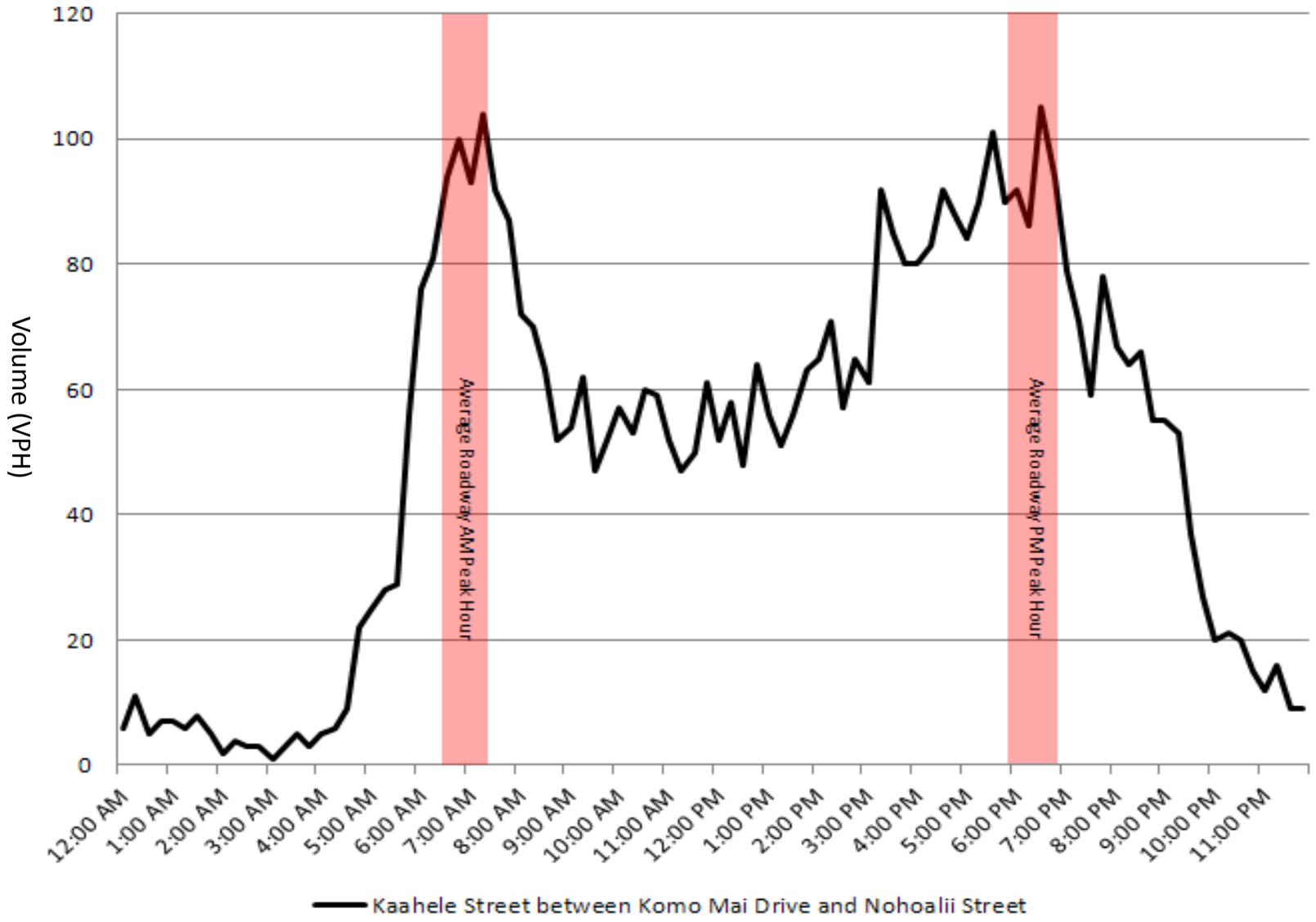
B. Volumes

Average daily traffic (ADT) and peak hour volumes along surrounding study area roads, based on Hawaii Department of Transportation (HDOT) traffic counts included in *Historical Traffic Station Maps*, are shown in Table 1. Location of these traffic counts are shown on Figure 1. 24-hour traffic volume distribution along Kaahele Street, Moanalua Road, and Komo Mai Drive at the traffic count stations (see Figures 2-4) shows the variation in travel patterns in the project area. AM/PM peak hours for Kaahele Street (6:30-7:30 AM/6:00-7:00 PM), Moanalua Road (7:00-8:00 AM/4:15-5:15 PM), and Komo Mai Drive (7:00-8:00 AM /4:15-5:15 PM) are identified on the 24-hour traffic volume figures. These figures show distinct peak periods with the PM peak period lasting a couple of hours while the AM peak period is much shorter. Traffic volumes during the middle of the day are a fraction of what they are during the peak periods.

Table 1: Roadway Traffic Volumes

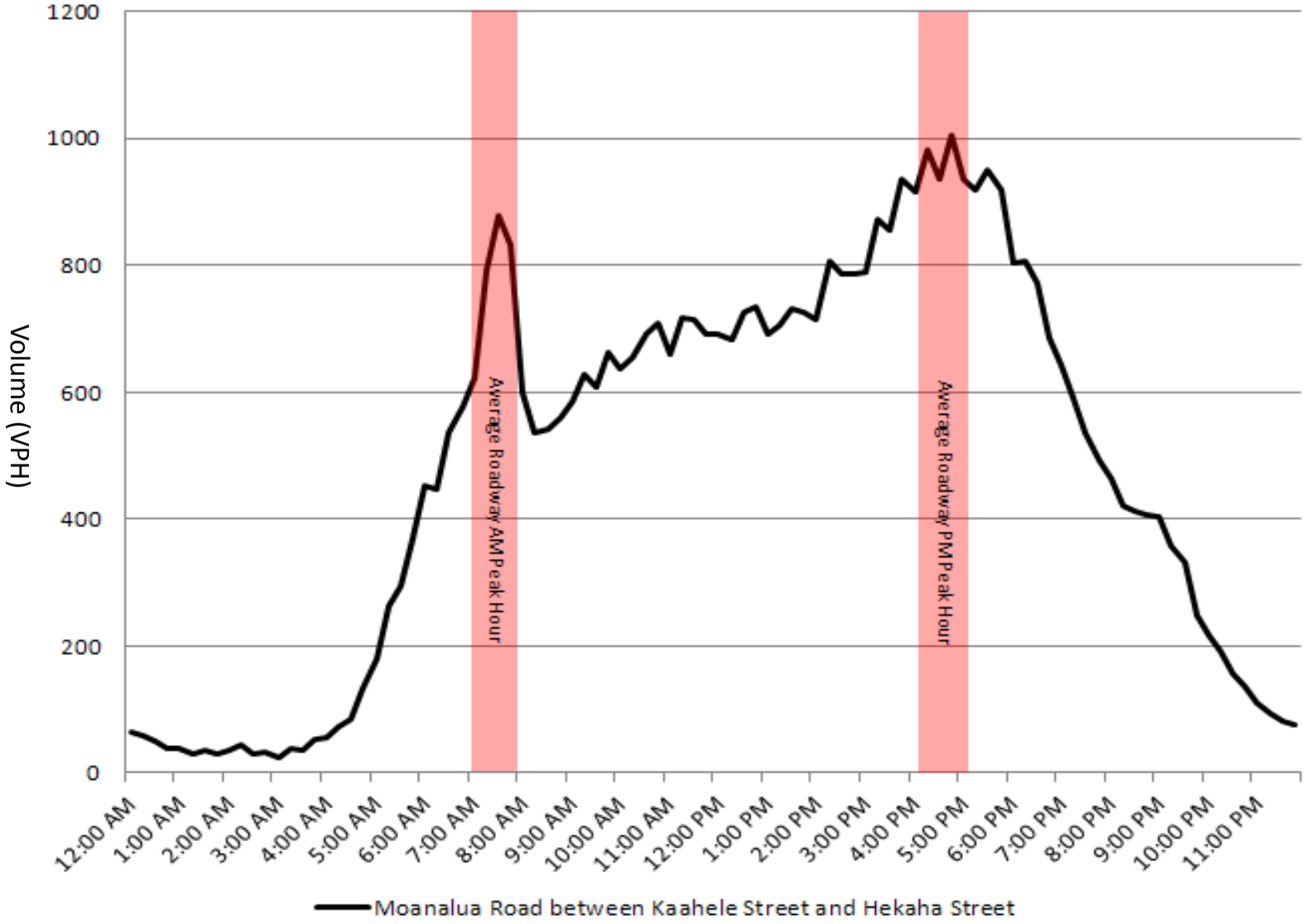
Roadway	Location	2011 ADT	Average Peak Hour Volumes	
			AM	PM
Kaahele Street	Between Komo Mai Drive and Nohoalii Street	4,810	390	380
Moanalua Road	Between Kaahele Street and Hekaha Road	46,670	3,130	3,860
Komo Mai Drive	Between Hapaki Street and Kaahele Street	9,410	870	880

Source: *Historical Traffic Station Maps* (HDOT)



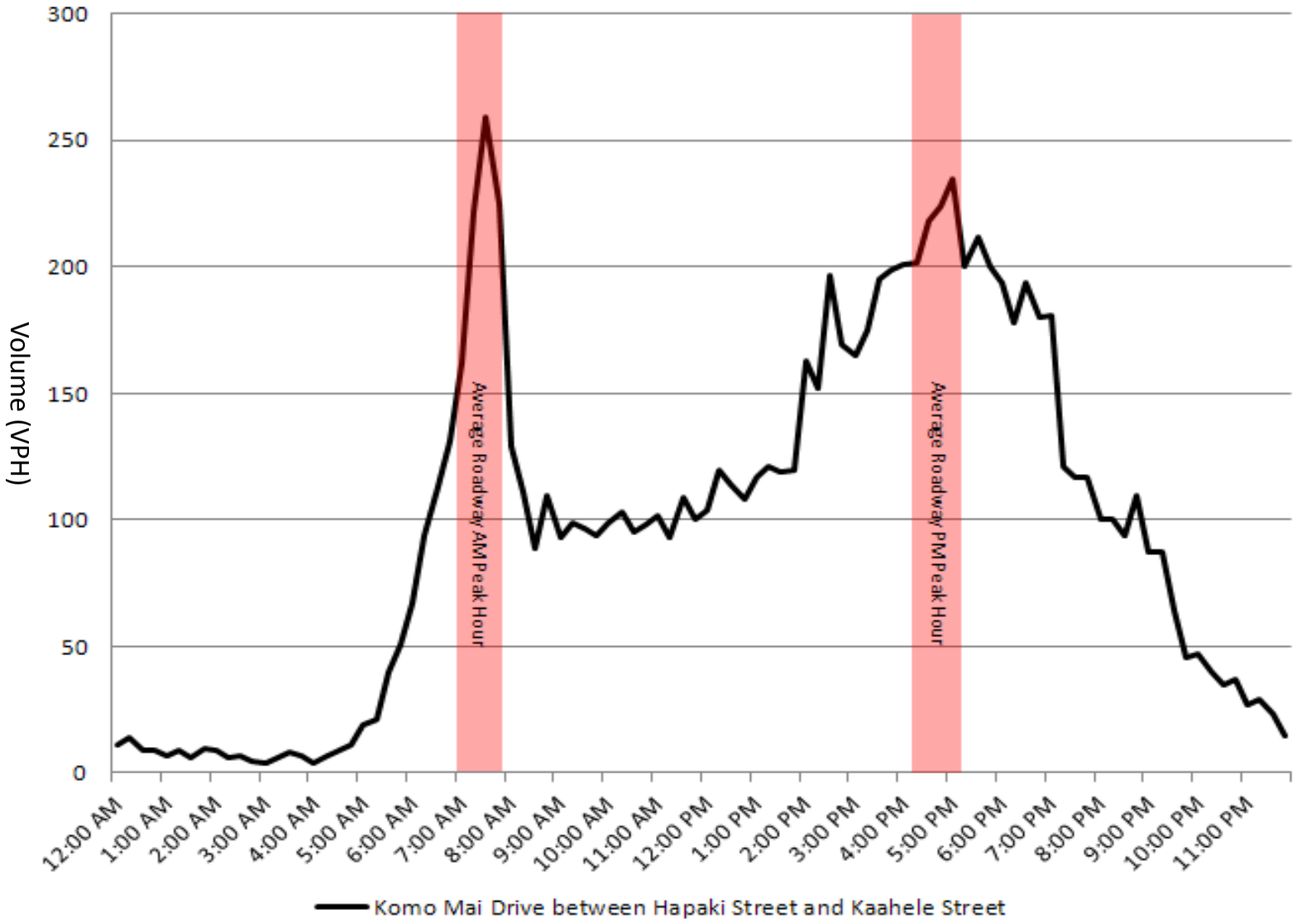
(Source: *HDOT Historical Traffic Station Maps*, April 13-14, 2011)

Figure 2: 2011 Kaahele Street 24-Hour Volume Distribution



(Source: *HDOT Historical Traffic Station Maps,* March 1-2, 2011)

Figure 3: 2011 Moanalua Road 24-Hour Volume Distribution



(Source: *HDOT Historical Traffic Station Maps*, April 13-14, 2011)

Figure 4: 2011 Komo Mai Drive 24-Hour Volume Distribution

C. Level of Service

1. Methodology

Level of service (LOS) is an operational analysis rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines from *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2011) state that an appropriate LOS for both a suburban rolling local or collector functional class road, the classifications of Kaahele Street, Moanalua Road, and Komo Mai Drive, is LOS D or better.

2. Existing Roadway Level of Service

LOS of roadway segments was determined using the 2011 peak hour bidirectional volumes from the *Historical Traffic Station Maps* (HDOT) and the methodologies of the *Quality/Level of Service Handbook* (FDOT, 2009) and *Quality/Level of Service Handbook Tables* (FDOT, 2012), which is based on accepted traffic engineering practice and the *Highway Capacity Manual* (TRB, 2010) . The area surrounding the project site is an urban area with a population more than 5,000. Based on the *2010 U.S. Census* (USCB, April 2013), the population of the surrounding areas are as follows: Waimalu = 13,730, Aiea = 9,338 and Pearl City = 47,698.

The *Quality/Level of Service Handbook* (FDOT, 2009) states that the cause of interruption to a roadway traffic stream includes traffic signals, stop signs, or other fixed causes of delay. Kaahele Street was classified as a Class II signalized roadway due to the all-way stop control intersection at Kaahele Street at Naalii Street and posted speed limit of 25 mph. In addition, Kaahele Street was analyzed as a two-lane, undivided roadway since the location of the HDOT counting station was taken mauka of Komo Mai Drive. Moanalua Road was evaluated as a Class II Signalized Arterial since it has a posted speed limit of 30 mph. Komo Mai Road was evaluated as a Class II Signalized roadway with a posted speed limit of 25 mph. Roadway segmental analysis for the study roads resulted in appropriate LOS along Kaahele Street and Komo Mai Drive but found LOS F operations along Moanalua Road during the AM and PM peak hours. Table 2 includes the resulting roadway LOS (see Appendix A for the detailed analysis). With high volumes over the peak hours along Moanalua Road, and closely spaced signalized intersections, coordinated traffic signal timing is needed to help facilitate vehicular progression. In a field visit on April 16, 2013, operations at the intersections of Moanalua Road at Kaahele Street and Kaahele Street at Komo Mai Drive were observed to function acceptably during the PM peak hour.

Table 2: Existing (2011) Roadway Segmental Level of Service

Roadway	Level of Service	
	AM	PM
Kaahele Street	C	C
Moanalua Road	F	F
Komo Mai Drive	D	D

III. FUTURE CONDITIONS

Towne Development of Hawaii, Inc. is proposing to have the zipline tour operations underway by summer 2014.

A. Surrounding Area Conditions

From research into the State of Hawaii Office of Environmental Quality Control library and Statewide Transportation Improvements Program (STIP), no additional significant developments or construction are expected in the area that would affect the roadway geometrics or traffic volumes at the study intersection.

B. Volumes

1. Background Growth

From research into HDOT *Historical Traffic Maps*, Kaahele Street and Komo Mai Drive show annual cumulative growth rates of 0.4% and 0.8% respectively. Along Moanalua Road, between Kaahele Street and Hekaha Street, a decline in traffic volume of 3.5% per year was calculated. With no anticipated developments between now and the future 2014 analysis year, and differences in traffic volume growth along study roadways, no background growth was forecast in the near term. Therefore, Future (2014) volumes were projected to remain similar to the Existing traffic volumes.

2. Project Volumes

Traffic volumes associated with the operation and use of the Waimalu Zipline facilities includes customer and employee travel to a 2,000 square-foot intake center (at a location yet to be determined) and a 1,200 square-foot nature center at the mauka end of Kaahele Street. As noted, the proposed zipline operations are going to be open 365 days a year, between 8:00 AM and dusk (6:00 to 8:00 PM, depending on the time of year). This begins after the end of the AM peak hour but ends after the PM peak hour, thereby adding traffic during the PM peak hour. Waimalu Zipline customers will be grouped into 10 to 12-person groups and accompanied by two guides at all times. The estimated maximum number of proposed vehicles traveling from the intake center to the nature center per hour includes two transport vans in addition to a single security/management/service vehicle. Appendix B includes the proposed trip generation of the zipline operation during operating hours. The zipline tours are estimated to last two and a half hours from the time that they leave the intake center until their return.

It is assumed that the intake center will occupy a space in an existing, commercially zoned location and therefore vehicular impact as a result of employees and customers traveling to this site will not differ from prior trip attractions assumed for the site. Therefore, impact as a result of trip generation to the intake center (at a location yet to be determined) is not applicable to this study.

On average, two vehicles will be traveling from the intake center to the nature center and another two vehicles will be traveling from the nature center to the intake center. At the maximum, three vehicles will be making trips to and from the nature center. This equates to 1.5% of future PM peak hour traffic along Kaahele Street, 0.2% along Moanalua Road, and 0.7% along Komo Mai Drive. Even though Komo

Mai Drive is not along the anticipated travel route between the nature center and intake center, it was included to represent a potential alternate route and volumes from the only other significant intersecting road. This small percentage of vehicles added to the study roads suggests negligible impact to roadway and intersection operations.

C. Level of Service

There will be a negligible increase to daily traffic along Kaahele Street, Moanalua Road, and Komo Mai Drive as a result of the addition of project related traffic between the intake center and nature center and therefore there is no anticipated change in LOS.

D. Equivalent Vehicular Impact

Assuming an average 11-hour day, 8:00 AM –7:00 PM, the total daily trips projected along Kaahele Street is estimated to be 66. Peak hour and daily trip generation rates of a Single-Family Detached House, from the *Trip Generation, 8th Edition* (ITE, 2008), were used to determine the number of dwelling units (residences) that would generate a similar number of trips. Table 3 shows that six to eight residences will generate an equivalent daily and time of day number of trips as the proposed zipline operations.

Table 3: Equivalent Vehicular Impact

Time	Average Rate *	Single-Family Dwelling Units
Weekday	9.57	7
Saturday	10.08	7
Sunday	8.77	8
**AM Peak Hour of Adjacent Street	0.75	8
PM Peak Hour of Adjacent Street	1.01	6
AM Peak Hour of Generator	0.77	8
PM Peak Hour of Generator	1.02	6

* - Source: *Trip Generation, 8th Edition* (ITE, 2008)

** - Project does not overlap with AM peak hour of adjacent street.

IV. SUMMARY AND RECOMMENDATIONS

Towne Development of Hawaii, Inc. is proposing to establish a zipline tour operation with activity site (nature center) located in Waimalu, at the mauka end of Kaahele Street, and intake center at a location yet to be identified with options being in Aiea, Pearl City, or Newtown. Operations are being proposed to be open 365 days per year between 8:00 AM and dusk. Hours of operation fall outside of AM peak hours of traffic although overlap with adjacent street PM peak hours. It is proposed that customers will be transported from the intake center to the nature center in shuttle vans resulting in an average of two vehicles per hour during operating hours with approximately 66 vehicles per day traveling between the two sites.

Existing roadway operations along Kaahele Street are appropriate LOS C in the PM peak hours. Komo Mai Drive also has an appropriate LOS D although Moanalua Road resulted in LOS F in the PM peak hour. Intersection operations were observed to function acceptably during the PM peak hours. With no anticipated developments between now and the future 2014 analysis year, and differences in traffic volume growth along study roadways, no background growth was forecast for the near term. Traffic being generated from the proposed project equates to 1.5% of existing PM peak hour traffic along Kaahele Street, 0.2% along Moanalua Road, and 0.7% along Komo Mai Drive. It was calculated that six to eight single family residences would generate an equivalent daily and time of day vehicular impact as the proposed project.

The projected project-related number of vehicular trips is considered minimal and is not anticipated to change the roadway LOS or have a significant impact on the surrounding roadways. Therefore, no mitigation is proposed as a result of this project. It is recommended that with the noted community concerns for pedestrian safety and vehicle speeding, the zipline tour operation vehicles be mindful of and adhere to existing traffic regulations.

V. REFERENCES

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APPENDIX A

Roadway Level of Service

Existing (2011) Analysis Year

Roadway Segment	Peak Hour Volumes AM	Peak Hour Volumes PM	Roadway Segmental LOS AM	Roadway Segmental LOS PM	Roadway Classification
Kaahele Street	400	390	**C**	**C**	Class II Signalized 2-lane
Moanalua Road	3140	3870	**F**	**F**	Class II Signalized 4-lane
Komo Mai Drive	880	890	**D**	**D**	Class II Signalized 2-lane

Peak Hour Two-Way
Areas Over 5,000 Not In Urbanized Areas
(2010 US Population: Waimalu=13,730, Aiea=9,338, Pearl City=47,698)

Class II Signalized Roadway 2 Lanes Undivided LOS	Volume Threshold	Adjusted Threshold
C	580	522
D	1200	1080
E	1280	1152

10% Adjustment Factor
-10% Non-State Signalized Roadways

Class II Signalized Roadway 4 Lanes Undivided LOS	Volume Threshold	Adjusted Threshold
C	890	801
D	2590	2331
E	2850	2565

10% Adjustment Factor
-10% Non-State Signalized Roadways
-5% Undivided With Exclusive Left Lanes
+5% With Exclusive Right Lanes

Source: *FDOT, 2012.*

APPENDIX B

Project Related Trip Generation

Waimalu Zipline

Trip Generation Based Upon an Average of Two Roundtrips Per Hour

Estimated Van Roundtrip				Security/Management/Misc.			
Time	**Up**	**Down**	**Van #**	**Up**	**Down**	**Volume**	
Hour 1	Group A	Empty	1	X		1	
	Group B	Empty	2				
Hour 2	Group C	Empty	3				
	Group D	Empty	1	X		1	
Hour 3	Group E	Empty	2		X	1	
	Group F	Group A	3				
Hour 4	Group G	Group B	1				
	Group H	Group C	2	X		1	
Hour 5	Group I	Group D	3		X	1	
	Group J	Group E	1				
Hour 6	Group K	Group F	2				
	Group L	Group G	3	X		1	
Hour 7	Group M	Group H	1		X	1	
	Group N	Group I	2				
Hour 8	Group O	Group J	3				
	Group P	Group K	1	X		1	
Hour 9	Group Q	Group L	2		X	1	
	Group R	Group M	3				
Hour 10	Empty	Group N	1				
	Empty	Group O	2	X		1	
Hour 11	Empty	Group P	3		X	1	
	Empty	Group Q	1				
	Empty	Group R	2				
Outside Hours of Operation		-	-	X		4	
		-	-		X	5	**TOTAL**
Total Vehicle Round Trips			**23**	**10**			**33**
Total Vehicle Trips			**46**	**20**			**66**

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ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 5
Sightline Profile

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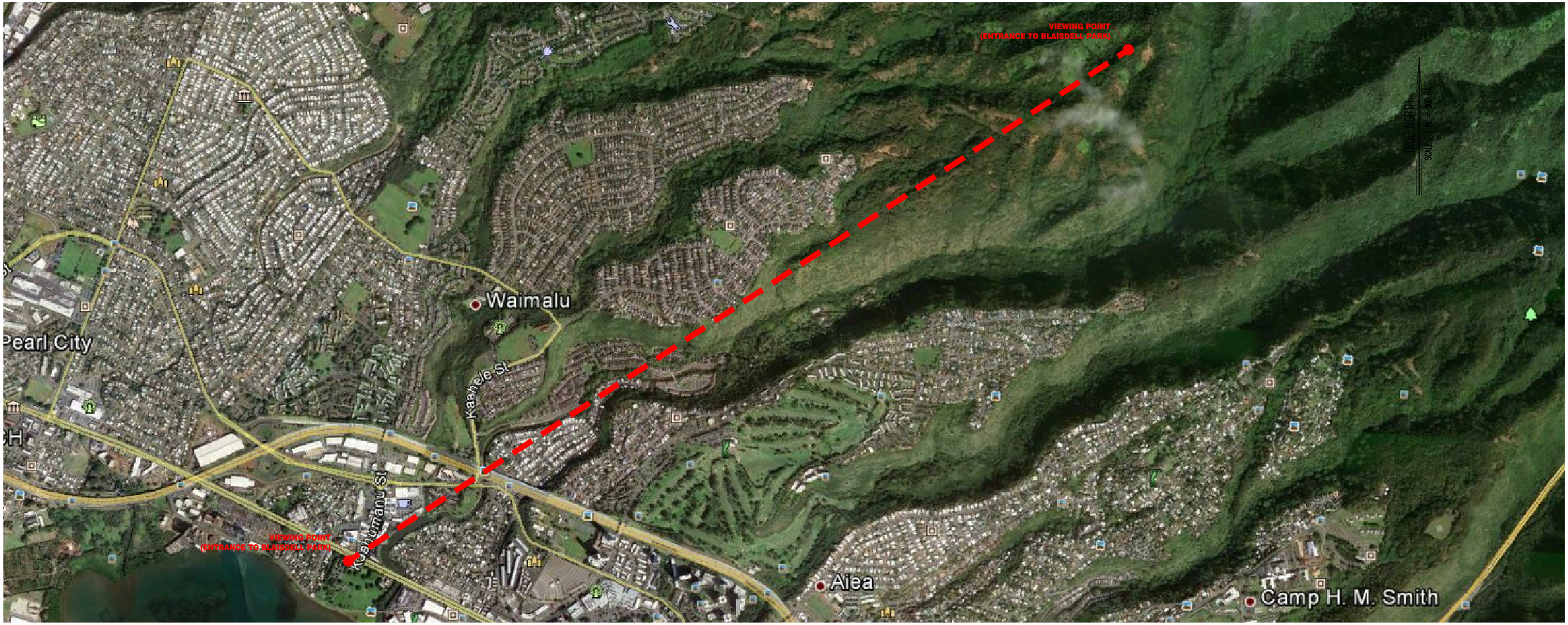
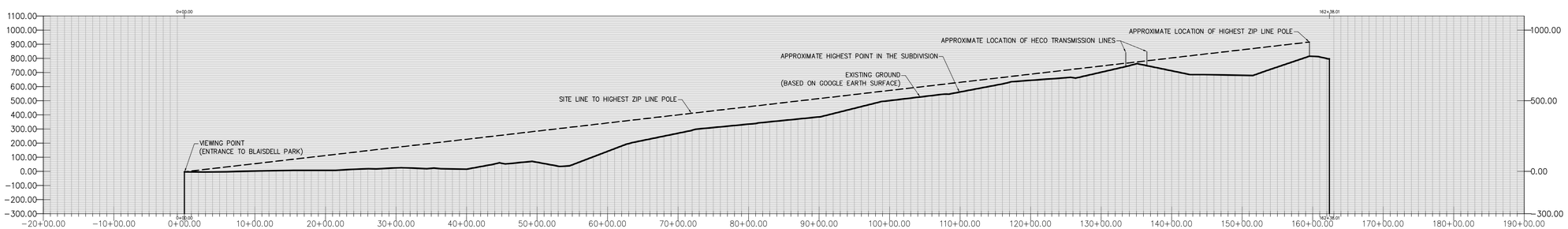


PLAN VIEW



PROFILE VIEW

MAP SHOWING
APPROXIMATE SITE LINE
PROPOSED ZIP LINE PROJECT
AT, WAIMALU, EWA, OAHU, HAWAII

SCALE : 1 IN. = 800 FT.

MAY 22, 2013 WALTER P. THOMPSON, INC.

12073c02-Profile.dwg/pgp/052113

TAX MAP KEY : 9 – 8 – 73 : 01

24"x 36" = 6.0 Sq.Ft.

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ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 6
Biological Report

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BIOLOGICAL SURVEY
WAIMALU NATURE PARK AND ZIPLINE
TMK 9-8-073-001
Waimalu, City and County of Honolulu, State of Hawai‘i

By Ron Terry, Ph.D. Geometrician Associates, LLC
Prepared for Waimalu Holding Company LLC
June 2013

This report was prepared as an appendix to an Environmental Assessment (EA) to evaluate the existing biological environment, determine potential impacts and recommend mitigation for a proposed activity in Leeward O‘ahu. Waimalu Holding Company LLC (the “Landowner”) proposes to develop a private park and nature center on its 447-acre property in Waimalu, O‘ahu, Hawai‘i identified as TMK 9-8-073-001 (the “Property”). It would include a for-profit establishment offering tours or other nature-based, outdoors educational and recreational activities, primarily during daylight hours (the “Project”) (refer to Figures 1-3 of the EA for maps, photos and diagrams). The Property is undeveloped State Land Use Conservation District land, bordered on the *makai* side by residential subdivisions, and on the *mauka*, Ewa and Diamond Head sides by undeveloped private land. Road access for the Project is at the terminus of Ka‘ahele Street in the Royal Summit residential subdivision.

The primary activity would be a zipline operation including a nature center for orientation of visitors and education in O‘ahu’s natural environment. The portion of the Property in which the Project would occur consists of two forested ridges that meet in a low saddle, separated from the residential areas below by a low rise that hides views of the areas proposed for use. One ridge, forested primarily with non-native trees, has an existing 4WD road that serves as a utility corridor access. The other ridge supports a native ‘ōhi‘a-uluhe forest that is just beginning to be invaded by non-native species, despite having a trail that was formerly cleared as a crude 4WD road. A series of seven zipline runs, each several hundreds of feet long, would criss-cross the valley between the ridges.

Supporting infrastructure, including improved roadways and trails and a nature center that will serve as the intake center, will involve disturbance of likely less than five acres, concentrated on two ridges in the center third of the Property that are already accessible by road and/or trail and are used by hikers and bicyclists. As other areas of the Property site will remain completely undisturbed, this area will be called the “project site”.

In recognition of the location of the Property within the Conservation District, the project proponents have committed to a number of measures with potential to benefit conservation biology in the area. These are expected to be incorporated in the Project’s Conservation District Use Permit (CDUP) permit as enforceable conditions, and include the following:

- Project construction activities will involve a botanist trained in identifying native plants to ensure that valuable native plants are avoided to the extent feasible during construction.

- All tours will include a component of conservation education conducted by guides specifically trained in resources and issues related to Hawaiian conservation biology;
- Some tours will include a service component involving implementation of a program of alien species removal and/or outplanting of native species. These will be conducted by qualified personnel trained in recognizing and dealing with invasive species and outplanting appropriate natives. This program will be submitted to the Department of Land and Natural Resources (DLNR) for review and comment, all actions will be documented, and the project site will be open for inspection from DLNR officials.
- The Landowner will evaluate proposals by agencies or other entities to conduct research or restoration activities on the Property, and will permit and support these actions to the extent they are consistent with the continuing use as a Nature Park.
- Implementation of the Project also involves a reduction in the intensity of other recreational uses on the property, including off-road biking and motorcycle use, which have tended over time to degrade the Property through extensive disturbance to native species and promotion of invasive species.

Biological assessment of the area began with early written consultation of the Hawai‘i DLNR, Division of Forestry and Wildlife (DOFAW) and the U.S. Fish and Wildlife Service (USFWS). See Appendix 1a of the EA for the substantive letter response from USFWS. The research also included review of literature concerning species of interest, followed by systematic field surveys for vascular plants, and opportunistic surveys for land birds and tree snails.

Existing Environment: Flora and Vegetation

The Property receives about 45 to 65 inches of rainfall per year. Vegetation on the Property consists of a mosaic of forests and shrublands, primarily dominated by non-native species but with a substantial component of native trees, shrubs, herbs, grasses, sedges and ferns as well. This reflects a long history of disturbance from agriculture, forestry plantings and most importantly invasion by non-native species. In general, the vegetation has a more native component in the upper elevations and on the western ridge. Overall, vegetation cover is mainly non-native, involving the trees Formosan koa (*Acacia confusa),* eucalyptus (*Eucalyptus* sp.), vinegar tree (*Lophostemon confertus*), paperbark (*Melaleuca quinquenervia*)*,* ironwood (*Casuarina equisetifolia*), strawberry guava (*Psidium cattleianum*) and *Ardisia elliptica*. Many of these trees are highly invasive and are rapidly overwhelming the native vegetation, accompanied by shrubby or herbaceous invaders such as Koster’s curse (*Clidemia hirta*) as well. The most common native trees in the forested areas are *‘ōhi‘a lehua* (*Metrosideros polymorpha*) and *koa* (*Acacia koa*).

We inspected all areas of the project site proposed for use, including the access road, trails, the Nature center and the platform areas. All sites were “over-surveyed” in order to ensure coverage in case of inadvertent use of adjacent areas during construction. Although not proposed for use except for a “flyover” as part of the zipline ride, we also surveyed portions of the valley floor.

There is a relatively high diversity of small native trees, shrubs, vines and ferns as well, including *‘aki‘a* (*Wikstroemia oahuensis*), *‘uhaloa* (*Waltheria indica*), *pukiawe* (*Leptecophylla tameiameiae*), *a‘ali‘i* (*Dodonea viscosa*), *naupaka kuahiwi* (*Scaevola gaudichaudiana*),

sandalwood (*Santalum freycinetianum*), *kopiko* (*Psychotria sp.*), *alahe'e* (*Psydrax odorata*), *huehue* (*Cocculus orbiculatus*), *uluhe* (*Dicranopteris linearis*) and *pala'a* (*Odontosoria chinensis*). A full list of plant species detected on the project site is contained in Table 1, below.

Existing Environment: Birds

The biological survey conducted for this EA involved review of literature concerning the presence of native birds in the area, and an onsite survey of native birds and assessment of bird habitat in the project area.

During the survey, the site was dominated by non-native birds, in particular, the Japanese White-eye (*Zosterops japonicus*), the Red-billed Leiothrix (*Leiothrix lutea*), and the Red-whiskered Bulbul (*Pycnonotus jocous*). The O'ahu 'Amakihi (*Hemignathus flavus*), a native honeycreeper, was heard singing throughout the day on both survey days. No other native birds were seen or heard, although the native 'Apapane (*Himatione sanguinea*) may also occur in the area at certain times of the year. No other native birds would be expected in this lowland area.

A full list of birds detected on the project site is contained in Table 2, below.

In addition to birds that would be detectable during standard surveys, several Hawaiian seabirds, including the federally threatened Newell's Shearwater (*Puffinus auricularis newelii*) and Wedge-tailed Shearwater (*Puffinus pacificus chlorhynchus*), protected under the Migratory Bird Treaty Act [16 USC. 703-712], overfly many areas of O'ahu.

In its April 29, 2013 letter in response to early consultation, USFWS stated concern about the possible presence of O'ahu Elepaio (*Chasiempis ibidis*):

> "We recommend you work with qualified biologists to obtain the most updated information on Oahu elepaio territories in the area. In areas of proposed site clearing and fencing, we recommend a qualified biologist survey to ensure any trees occupied by Oahu elepaio or their nests are not cleared or removed prior to any work being done. Territories may have shifted, added or dropped out from where they may have previously been."

This endangered flycatcher is found within a small, fragmented range of about 18 square miles in the Ko'olau and Wai'anae ranges, where there may be 1,200 to 1,400 birds (VanderWerf 1998; VanderWerf et al 2001, 2006). Survey records from 1976 to 2003 were mapped by the U.S. Fish and Wildlife Service in its recovery plan for the O'ahu 'Elepaio and are published by DLNR alongside designated critical habitat (Figure 1). Although the project site is directly *makai* of and adjacent to the critical habitat, no sightings are recorded in the general area, which may lack some requisite habitat characteristics or may simply be currently unoccupied habitat. Mosquito-transmitted diseases and predation by alien mammals (particularly rats) are severe threats to this bird's existence, and the project site has both rats and mosquitos. The two-day survey of the Property by professional ornithologist Dr. Patrick J. Hart failed to detect any O'ahu 'Elepaio,

Table 1. Plant Species Detected on Project Site

Scientific name	Family	Common name	Growth Form	Status
Acacia confusa	Fabaceae	Formosa koa	Tree	A
Acacia koa	Fabaceae	Koa	Tree	E
Andropogon virginicus	Poaceae	Broomsedge	Grass	A
Ardisia elliptica	Primulaceae	Shoebutton ardisia	Tree	A
Arundina graminifolia	Orchidaceae	Bamboo orchid	Shrub	A
Casuarina equisetifolia	Casuarinaceae	Ironwood	Tree	A
Cecropia obtusifolia	Cecropiaceae	Guarumo	Tree	A
Centella asiatica	Apiaceae	Gotu kola	Herb	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Shrub	A
Cibotium glaucum	Cibotiaceae	Hapu‘u pulu	Fern	E
Citharexylum caudatum	Verbenaceae	Fiddlewood	Tree	A
Clidemia hirta	Melastomataceae	Koster’s curse	Shrub	A
Coccinea grandis	Cucurbitaceae	Ivy gourd	Vine	A
Cocculus orbiculatus	Menispermaceae	Huehue	Vine	I
Conyza bonariensis	Asteraceae	Hairy horseweed	Shrub	A
Cordyline fruticosa	Asparagaceae	Ti	Shrub	A
Crassocephalum crepidioides	Asteraceae	Crassocephalum	Herb	A
Cyclosorus dentatus	Thelypteridaceae	Downy wood fern	Fern	A
Desmodium incanum	Fabaceae	Spanish clover	Shrub	A
Dicranopteris linearis	Gleicheniaceae	Uluhe	Fern	I
Diospyros sandwicensis	Ebenaceae	Lama	Tree	E
Dodonaea viscosa	Sapindaceae	‘A‘ali‘i	Shrub	I
Emilia fosbergii	Asteraceae	Flora’s paintbrush	Herb	A
Emilia sonchifolia	Asteraceae	Pualele	Herb	A
Eragrostis sp.	Poaceae	Eragrostis	Grass	A
Eucalyptus sp.	Myrtaceae	Eucalyptus	Tree	A
Falcataria moluccana	Fabaceae	Albizia	Tree	A
Ficus sp.	Moraceae	Ficus	Tree	A
Grevillea robusta	Proteaceae	Silk oak	Tree	A
Lantana camara	Verbenaceae	Lantana	Shrub	A
Leptecophylla tameiameiae	Ericaceae	Pukiawe	Shrub	I
Leptospermum sp.	Myrtaceae	Tea tree	Shrub	A
Leucaena leucocephala	Fabaceae	Koa haole	Tree	A
Lophostemon confertus	Myrtaceae	Vinegar tree	Tree	A
Megathyrsus maximus	Poaceae	Guinea grass	Grass	A
Melaleuca quinquenervia	Myrtaceae	Paperbark	Tree	A
Melinis minutiflora	Poaceae	Molasses grass	Grass	A
Melinis repens	Poaceae	Natal red top	Grass	A
Metrosideros polymorpha	Myrtaceae	‘Ohi‘a	Tree	E
Mimosa pudica	Fabaceae	Sensitive plant	Shrub	A

Nephrolepis brownii	Lomariopsidaceae	Asian sword fern	Fern	A
Table 1, continued				
Scientific name	**Family**	**Common name**	**Growth Form**	**Status**
Odontosoria chinensis	Lindsaeaeceae	Pala‘a	Fern	I
Oplismenus hirtellus	Poaceae	Basket grass	Grass	A
Paederia foetida	Rubiaceae	Maile pilau	Vine	A
Panicum repens	Poaceae	Wainaku grass	Grass	A
Paspalum urvillei	Poaceae	Vasey grass	Grass	A
Passiflora edulis	Passifloraceae	Passion fruit	Vine	A
Passiflora suberosa	Passifloraceae	Huehue haole	Vine	A
Pluchea symphytifolia	Asteraceae	Sourbush	Shrub	A
Psidium cattleianum	Myrtaceae	Strawberry guava	Tree	A
Psidium guajava	Myrtaceae	Common guava	Tree	A
Psilotum nudum	Psilotaceae	Moa	Fern ally	I
Psychotria sp.	Rubiaceae	Kopiko	Tree	E
Psydrax odorata	Rubiaceae	Alahe‘e	Tree	I
Pteridium aquilinum subsp. decompositum	Hypolepidaceae	Bracken fern	Fern	E
Pteris cretica	Pteridaceae	Cretan brake	Fern	I
Santalum freycinetianum	Santalaceae	‘Iliahi	Tree	E
Scaevola gaudichaudiana	Goodeniaceae	Mountain naupaka	Shrub	E
Schefflera actinophylla	Araliaceae	Octopus tree	Tree	A
Schinus terebinthifolius	Anacardiaceae	Christmas berry	Shrub	A
Setaria parviflora	Poaceae	Yellow foxtail	Grass	A
Spathoglottis plicata	Orchidaceae	Philippine ground orchid	Shrub	A
Sphagneticola trilobata	Asteraceae	Wedelia	Shrub	A
Sporobolus sp.	Poaceae	Dropseed	Grass	A
Stachytarpheta jamaicensis	Verbenaceae	Vervain	Shrub	A
Syzygium cumini	Myrtaceae	Java plum	Tree	A
Tabebuia heterophylla	Fabaceae	Pink tecoma	Tree	A
Urochloa mutica	Poaceae	California grass	Grass	A
Waltheria indica	Malvaceae	‘Uhaloa	Shrub	I
Wikstroemia oahuensis	Thymelaeaceae	‘Akia	Shrub	E

* A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

.

Table 2. Bird Species Detected on Project Site

Species*	Common name	status
Cardinalis cardinalis	Northern Cardinal	A
Carpodacus mexicanus	House Finch	A
Cettia diphone	Japanese Bush Warbler	A
Copsychus malabaricus	White-rumped Shama	A
Geopelia striata	Zebra Dove	A
Hemignathus flavus	O‘ahu ‘Amakihi	E
Leiothrix lutea	Red-billed Leiothrix	A
Leucodioptron canorum	Melodious Laughing Thrush	A
Pycnonotus cafer	Red-vented Bulbul	A
Pycnonotus jocosus	Red-whiskered Bulbul	A
Streptopelia chinensis	Spotted Dove	A
Zosterops japonicus	Japanese White-eye	A

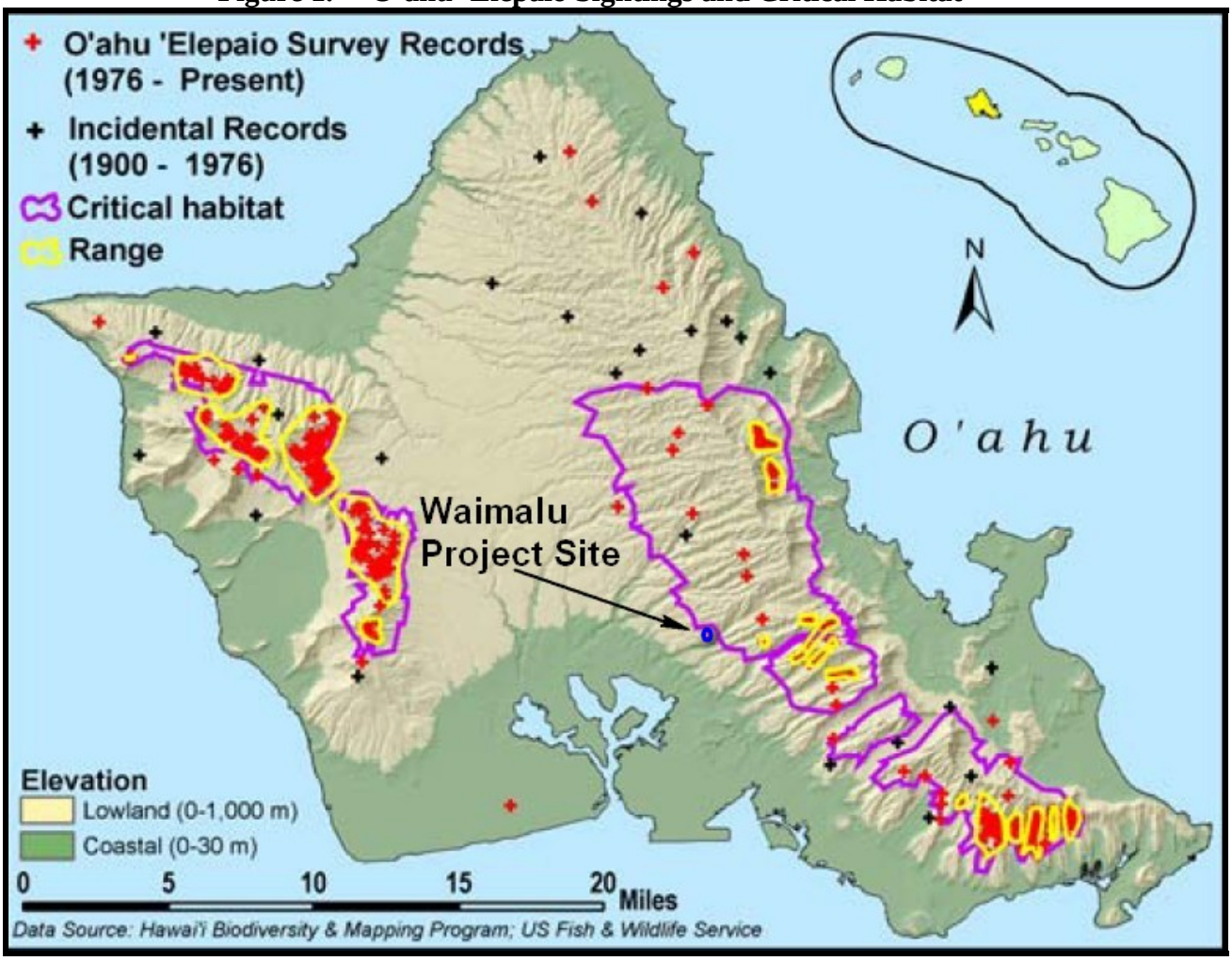
* A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

although the bird may occasionally foray into this and other lower slopes in the Leeward Ko‘olau area. It would appear highly unlikely that the bird nests on the Property.

Existing Environment: Native Mammals (Hawaiian Hoary Bat)

Relatively little is known about the behavior on the island of O‘ahu of the endangered Hawaiian Hoary Bats (*Lasiurus cinereus semotus*), the only land mammal native to Hawai‘i. According to information from the Hawai‘i DLNR (Mitchell et al 2005), although there are many historical and ongoing bat sightings on O‘ahu, evidence of breeding populations (e.g., pregnant or lactating individuals) is limited to Kaua‘i and the island of Hawai‘i. Systematic detection efforts on the North Shore found high activity in summer and low activity in winter (Ong et al 2012). Bats on the Big Island tend to retreat during winter to elevations above 4,000 feet, which are lacking in O‘ahu, and it is possible that the bats travel inter-island to access these preferred areas. The North Shore research also indicated a preference for edge habitats involving ponds and forests. Much more research is needed to gain a clear understanding of bat ecology.

Figure 1. O‘ahu ‘Elepaio Sightings and Critical Habitat



Source:http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/Forest%20Birds/oahu%20elepaio%20NAAT%20final%20!.pdf

Although bats are not known to have been observed on the Property, there are historic observations from the Leeward area. Bats tend to be observed wherever there are systematic detection efforts (Ong et al 2012), and it is entirely possible that the Property is used at least occasionally by bats.

Existing Environment: Endangered Invertebrates

In its April 29, 2013 letter in response to early consultation, USFWS stated:

> “We recommend a qualified biologist conduct surveys for the endangered Oahu tree snails (*Achatinella* spp.) prior to all vegetation clearing. Achatinella have been observed on both native and non-native plant species. In areas of proposed site clearing and fencing, we recommend a qualified biologist survey to ensure any trees occupied by Achatinella are not cleared or removed.”

Achatinella is endemic to O‘ahu and includes 41 species of small tree snails with smooth shells patterned decorated with various colors. Their frequent occurrence in Native Hawaiian stories and their use in leis indicates that O‘ahu tree snails were abundant when Polynesians arrived in Hawai‘i, but today, 22 of these species are believed to be extinct and 18 are near extinction. They are all nocturnal and arboreal, feeding on fungus that grows on the leaves of native (and perhaps certain non-native) plants. Historically, the snails were found from near sea level along the windward coast to the central plains and throughout the Ko‘olau and Wai‘anae Mountains. Today, they appear restricted to remnant native forest on the highest ridges of the Ko‘olau and Wai‘anae ranges on the island of O‘ahu (Mitchell et al 2005; USFWS 1992).

A review of the maps contained in the USFWS O‘ahu tree snail recovery plan of the known distribution of the snails (Figure 2) and the area of the Ko‘olau Mountains considered essential habitat (Figure 3) indicate that the low-elevation, heavily invaded Property is unlikely to contain snails or have the essential characteristics of the habitat they require. The biological survey included examination of *‘ōhi‘a* and other trees for evidence of the presence of *Achatinell*a snails, and none were detected. These findings indicate that O‘ahu tree snails are not likely to be present on the Property.

Existing Environment: Aquatic Ecosystems

U.S. Geological Survey topographic maps depict a perennial or intermittent stream in the steep, V-shaped valley bottom crossed by the zipline. Our fieldwork in this valley, however, definitively demonstrated that no such stream exists. The valley bottom is dry, with deep soil derived from colluvium from the adjacent slopes, with no evidence of a stream channel. No water features, wetlands or other aquatic habitat is present. The soil is heavily rooted by pigs, and the vegetation is dominated by albizia, Christmas berry, silk oak, ironwood and *kukui*. During heavy rains, there are likely brief flows, but they are apparently of a low enough frequency and magnitude that they have not carved a distinct channel.

Impacts and Mitigation Measures

While the Property contains some valuable native flora, no threatened or endangered plant species listed by the U.S. Fish and Wildlife Service were present (USFWS 2013). An expected condition of the Project is that construction activities will involve a botanist trained in identifying native plants to ensure that valuable native plants are avoided to the extent feasible during

Figure 2. Distribution of O‘ahu Tree Snails

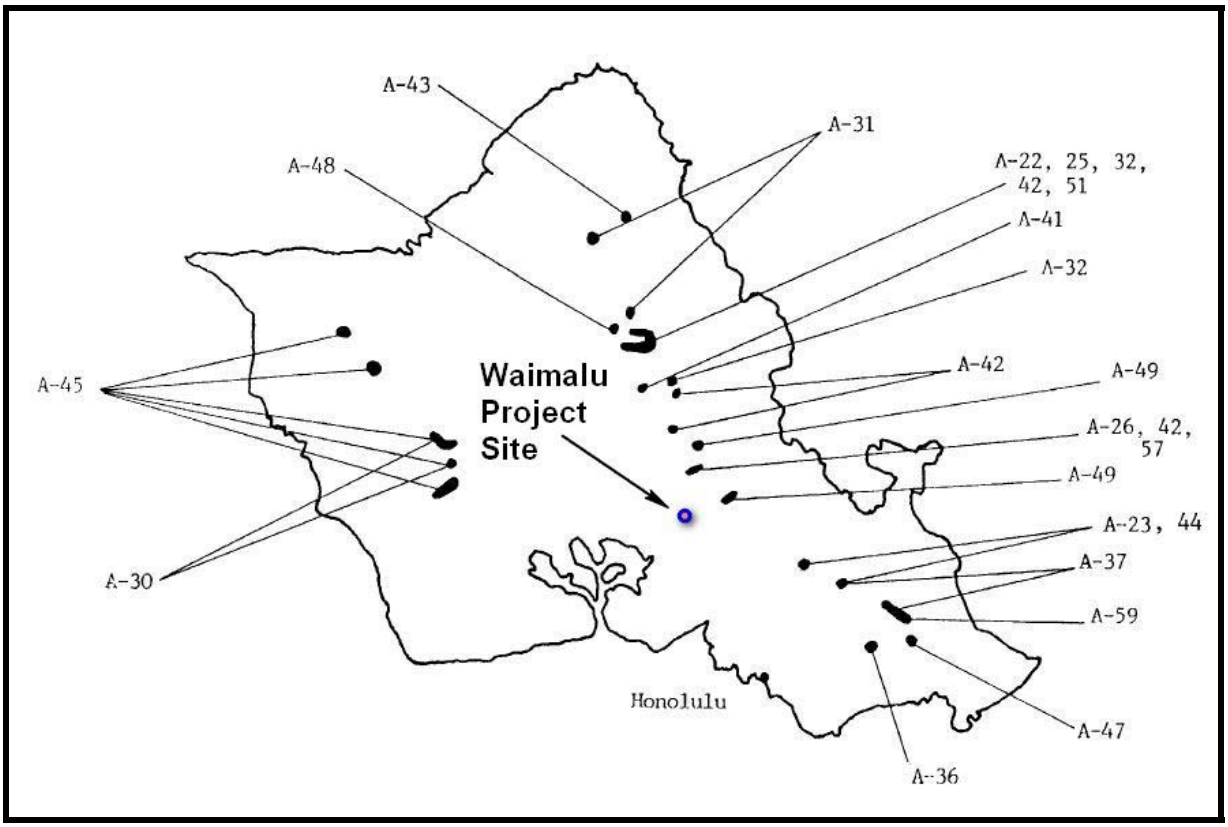
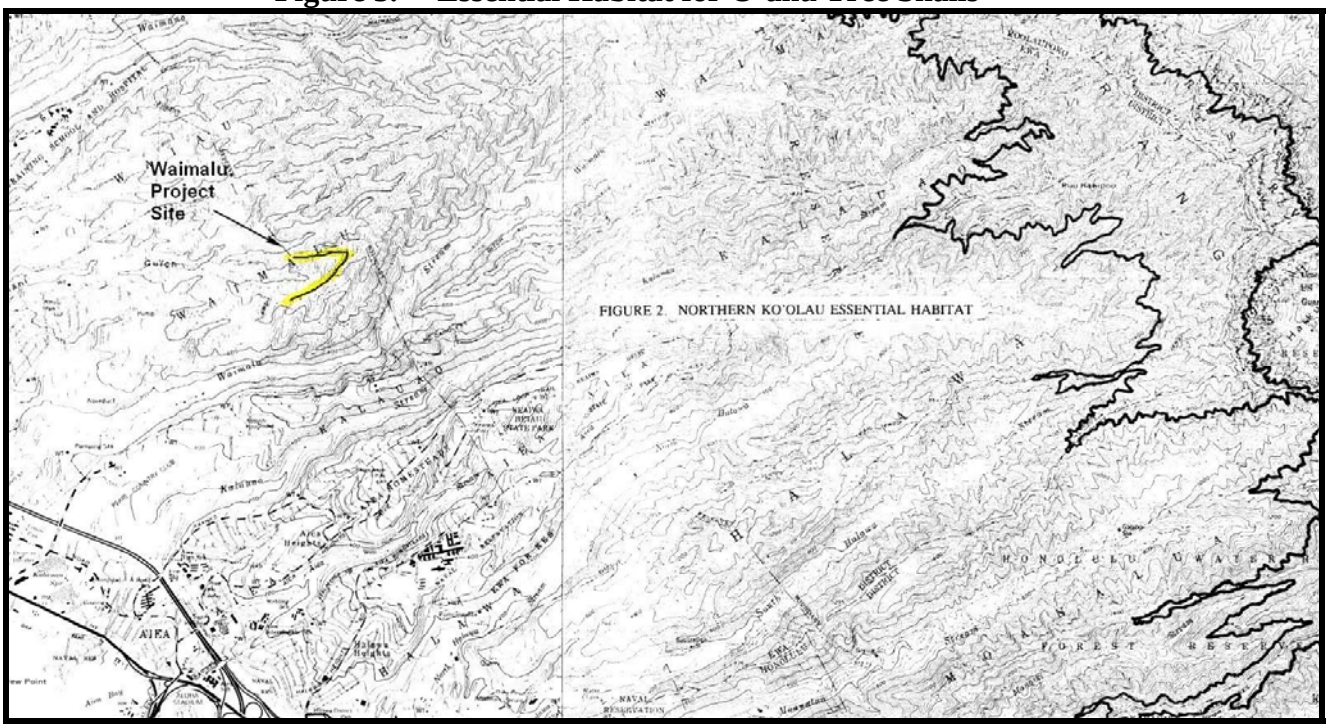


Figure 3. Essential Habitat for O‘ahu Tree Snails



construction. In our judgment, the sites chosen for the nature center, platforms and trails can be utilized with minimal damage to native plants, given this precaution. In addition, the project includes invasive species removal and outplanting of native species. In the absence of some managed program, the status of native plants on the property will inevitably degrade, and the Project could thus lead to a substantial overall net benefit for native flora.

The USFWS letter of May 17, 2013 made the following statement concerning impact to the O‘ahu ‘Elepaio:

> “In addition, we recommend that you avoid conducting potentially disturbing activity, such as the use of chain saws or other machinery, in the vicinity of known Oahu elepaio nests during the breeding season. Oahu elepaio breeding season is usually mid February through May; but active nests have been found January through July.”

As discussed above, it highly unlikely that the project area supports the nests of O‘ahu Elepaio, and the project would not appear to have any impact on this endangered bird.

Concerning Hawaiian seabirds, according to the USFWS letter of May 17, 2013:

> “Outdoor lighting, used for night time work and street lights, can adversely impact listed and migratory seabird species protected under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), as amended, and the Migratory Bird Treaty Act. Night lighting poses a significant threat to protected fledgling seabirds. Seabirds fly at night and are attracted to artificially-lighted areas which can result in disorientation and subsequent fallout due to exhaustion or collision with objects such as utility lines, guy wires, and towers that protrude above the vegetation layer. Any increase in the use of night-time lighting, particularly during each year's peak fallout period (September 15 through December 15), could result in seabird injury or mortality. Once grounded, they are vulnerable to predators or often struck by vehicles along roadways. We recommend avoiding night-time work, and providing all project staff with information about seabird fallout. If lights cannot be eliminated due to safety or security concerns, then they should be positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below.”

Accordingly, the project will avoid any night-time construction work or operation of ziplines. There will be no project lighting other than minimal security lighting at the gate and Nature center that conforms to the USFWS specifications.

For Hawaiian hoary bats, the USFWS stated in their April 29, 2013 letter in response to early consultation:

> “To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). If site clearing is

> proposed as part of your action, it should be timed to avoid disturbance to Hawaiian hoary bats in the project area. Additionally, Hawaiian hoary bats forage for insects from as low as three feet to higher than 500 feet above the ground. When barbed wire is used in fencing, Hawaiian hoary bats can become entangled. If fencing is a part of your proposed action, we recommend barbed wire not be used."

Accordingly, the project will avoid any disturbance to woody plants taller than 15 feet during the bat pupping season, from June 1 to September 15 each year, and no barb-wire fencing will be used.

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ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 7
Usage Study

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Beyond Information. Intelligence.

Established 1960

Database Marketing

Economic & Social Impact Studies

Evaluations

Research

Modeling/Forecasting

Waimalu Property Usage Study

Prepared for :

Towne Development of Hawaii, Inc.

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SMS Affiliations and Associations:

Experian
International Survey Research
Solutions Pacific, LLC
SMS Consulting, LLC
3i Marketing & Communications

June, 2013

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June 21, 2013

Chris Lau
Executive Vice President
Towne Development of Hawaii, Inc.
220 South King Street, Suite 960
Honolulu, Hawaii 96813

RE: Usage Study

Dear Chris:

It is with pleasure that we submit the attached report of Towne Development's Traffic and Usage Study undertaken on June 4-16, 2013.

We hope that the data provided in the attached report is self-explanatory. We will be happy to provide any other needed analysis. Again, many thanks for this opportunity.

Best regards,

Hersh

SMS Affiliations and Associations:

Experian
International Survey Research
Solutions Pacific, LLC
SMS Consulting, LLC
3i Marketing & Communications

INTRODUCTION AND METHODOLOGY

EXECUTIVE SUMMARY

The number of visitors entering the Waimalu property averages 35 per day. As would be expected, more people visit the property on weekends than on weekdays. An average of 27 people visit during the weekday and 42 visit during the weekend. The Waimalu property is visited almost equally throughout the day, although there are noticeable differences on weekdays versus the weekend. There is an average of 17 vehicles that bring visitors to the property on a daily basis, with the vehicle counts slightly higher on weekends. A majority of the vehicles park close to the property entrance (88%) compared to further away (12%). Close to the property parking is identified as those who park within the 10 housing units closest to the property entrance.

One out of four visitors to the property has been there more than once during the two week period. Visitors spend approximately two hours and fifteen minutes on the property. A majority of the people utilize the Waimalu property for bike riding or hiking. When asked how they learned about the property, almost 3 out of 4 people stated the source as friends or family members.

Only 10% of the visitors to the area are from Newtown. The three (3) primary geographical locations where visitors travel from are Aiea, Maunalani Heights, and Milliani Town.

BACKGROUND

Waimalu Holding Company LLC is the owner of the Waimalu property located above Kaahele Street and Towne Development of Hawaii, Inc. ("Towne Development") is the manager of the LLC. Towne Development management has identified an opportunity to develop a new visitor activity on this property. The area has great views of the mountains, ocean, Pearl Harbor and more and is conveniently located near the H1 Highway.

Though this is a private property with highly visible no access signs, a number of people enter the area illegally for a variety of activities. Furthermore, the neighbors in the area have conveyed some concerns regarding the number of cars parked in the area.

To better understand the current usage of Waimalu property, Towne Development has retained SMS Research to undertake a usage study of the property.

OBJECTIVES

The primary objectives of this research are to quantify traffic flow defined by key market indicators:

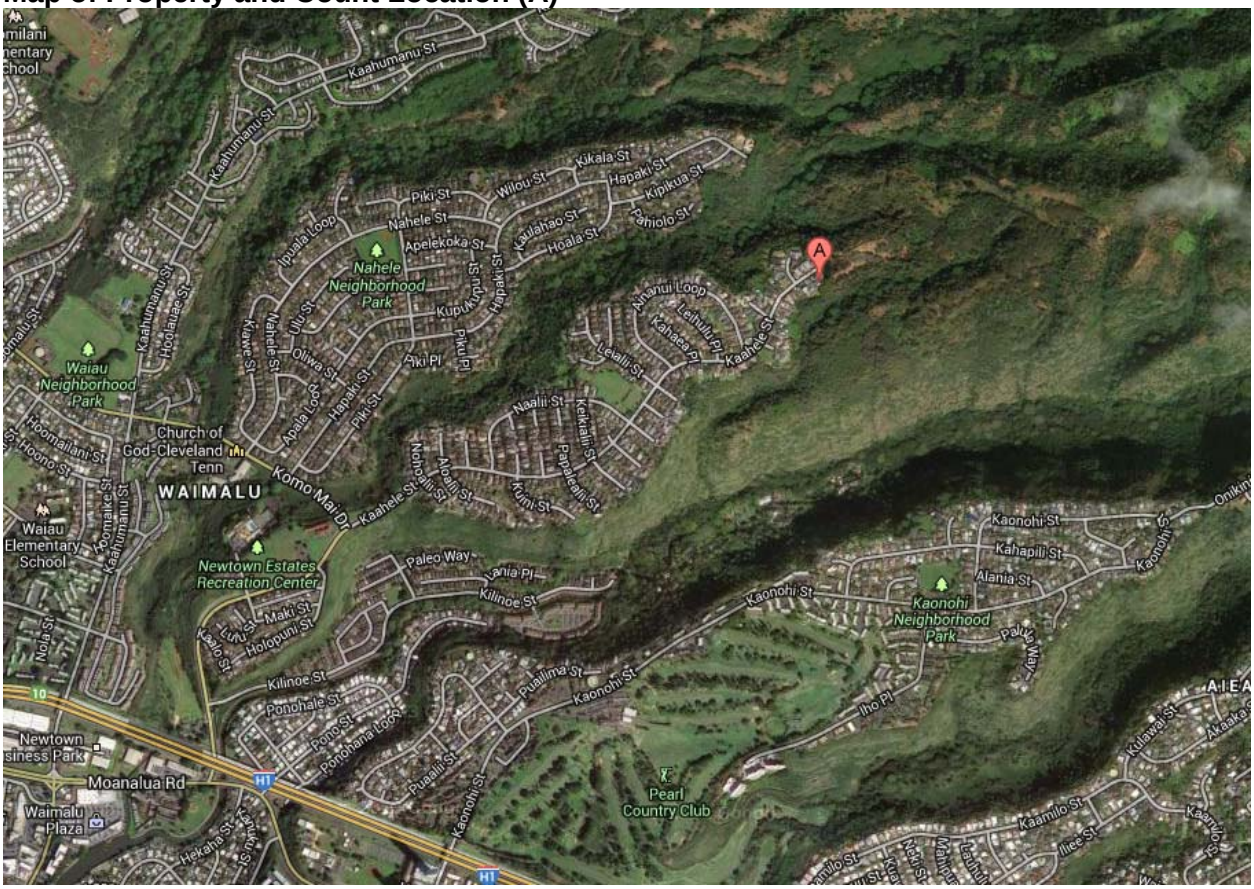
- Quantify the number of people who access the Waimalu property and the number of vehicles they come in.
- Understand a variety of facts about these people including but not limited to where they live, how they learned about the area, what are they planning to do in the property, and how many times have they come in the past and more.

METHODOLOGY

SMS provided seasoned interviewers and supervisors to undertake the data collection among adults who accessed the private property located at the end on Kaahele Street in Waimalu. The interviewers approached all adults entering the property requesting information regarding their residence and planned usage of the area. SMS interviewers also undertook counts of adults entering the area and the number of cars that deposited these adults in the area (See detailed count of cars and people in Appendix A). The survey was administered in a "confidential" manner through an aided (Survey Instructions Appendix B) and self-completion method (The survey instrument with frequencies of responses can be reviewed in Appendix C).

The surveys and counts were undertaken on representative weekdays and two weekends. Interviewers worked from 9:00AM to 6:00PM on each of those days. The data provided is based on those hours only—and since the sun rises at approximately 6:00AM and sets a little after 7:00PM, the counts summarized in this report understates the total visits to the property. Though interviewers started their day at 9:00AM, they included in their counts those visitors to the property whom they did not see enter prior to their arrival, but who exited the property after 9:00AM. Those counts were included as "before 9:00AM" counts by the interviewer.

Map of Property and Count Location (A)



PEDESTRIAN USAGE AND FREQUENCY

PEDESTRIAN USAGE

The daily average pedestrian usage (people) count was 35 for the 8 days in which counts were recorded. The weekday average was 27 and the weekend average was 42. Thirty-five pedestrians visited the area on the state holiday of King Kamehameha Day on June 11th.

Table 1: Number of Visitors to Area by Day/Date

Date	Number of People
Tuesday, 6/04/2013	26
Thursday, 6/06/2013	30
Saturday, 6/08/2013	46
Sunday, 6/09/2013	32
Tuesday, 6/11/2013*	35
Friday, 6/14/2013	18
Saturday, 6/15/2013	48
Sunday, 6/16/2013**	48
Average	*35*

* King Kamehameha Day
**Father's Day

Table 2: Average Number of Visitors by Weekday and Weekend

	Weekday	Weekend
Total	27	42

Table 3 provides visitor counts by date and day parts. On average, about 14 visitors were counted in the area from 8-11am, about 9 visitors on average visited the area from 11am-2pm, and about 12 visitors were counted in the area from 2-6pm.

There are noticeable differences between the counts by day part for weekdays and weekends. On weekdays, about 7 visitors, on average, frequented the area from 8-11am, about 4 visited the area from 11am-2pm, and about 16 visitors were counted in the area from 2-6pm. On the other hand, on weekends approximately 18 visitors frequent the area from 8-11am, approximately 15 visitors are found in the area from 11am-2pm, and the average number of visitors drops to 9 from 2-6pm.

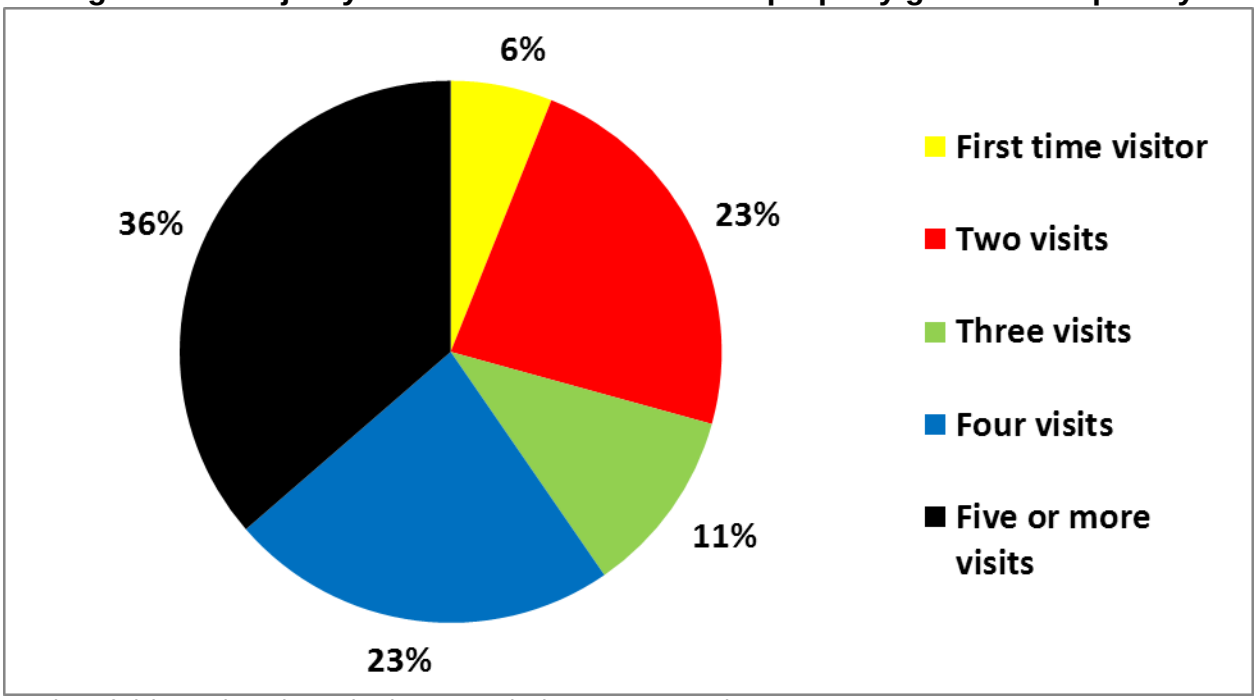
Table 3: Visitor Count by Day/Date and Day Part

Time Average	Tuesday 6/04/2013	Thursday 6/06/2013	Saturday 6/08/2013	Sunday 6/09/2013	Tuesday 6/11/2013*	Friday 6/14/2013	Saturday 6/15/2013	Sunday 6/16/2013**	Average
8a-11a	8	7	23	13	11	3	23	20	14
11a-2p	2	1	11	9	7	5	18	22	9
2p-6p	16	22	12	10	17	10	7	6	12

*King Kamehameha Day
** Father's Day

As can be noted in Figure 1, a majority of visitors to the Waimalu property go there frequently. Thirty-six (36) percent stated that they visited the area five or more times over the past two months. The visitors in this group (5 or more times in the past two months), visit the site very frequently, with some visiting the area almost on a daily basis. As a result of this high frequency among this group, the average number of visits is 5 for all visitors to the site in the past two months. Only 6% of the visitors stated that it was the first time to the area over the past two months.

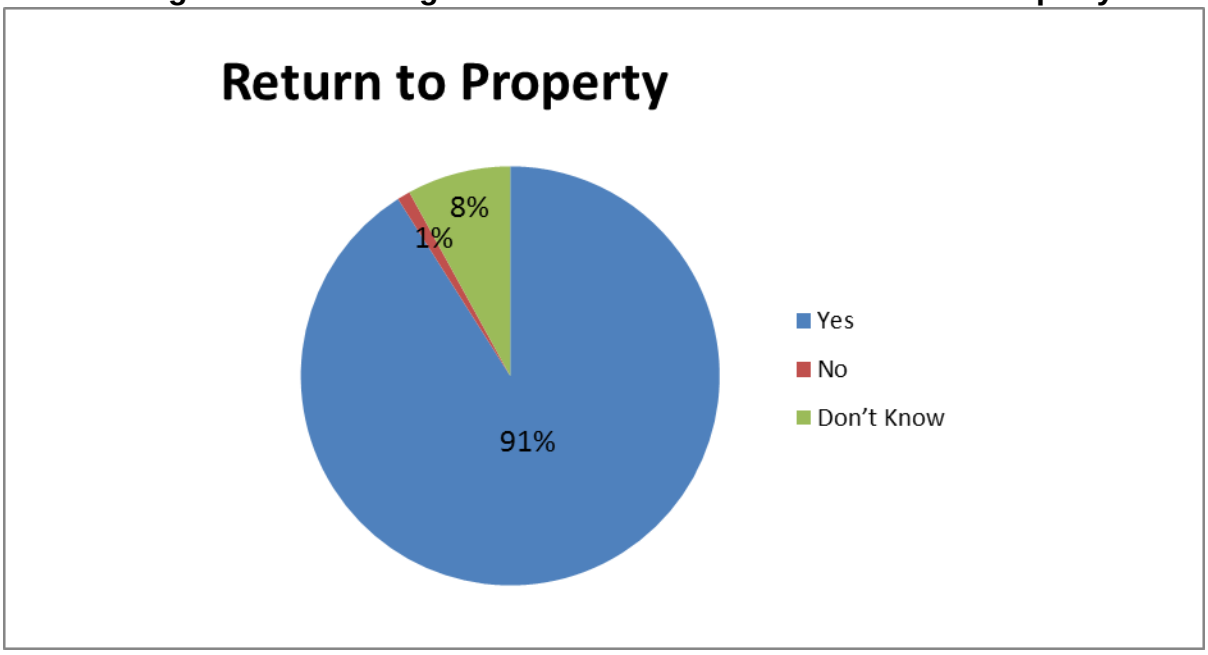
Figure 1: A majority of visitors to the Waimalu property go there frequently



Number of visits made to the Waimalu property in the past two months

When asked whether or not they intend to return to the property after the current trip, 90 percent of respondents indicated they would, one percent said no, and 8 percent indicated they didn't know at that moment.

Figure 2: Percentage of Visitors Who Will Return to the Property



VEHICLE USAGE AND FREQUENCY

The daily average vehicle count was 17 for the 8 days in which counts were recorded. The weekday average was 15 and the weekend average was 20. The thirty-five pedestrians who visited the area on King Kamehameha Day arrived in 21 vehicles.

Table 4: Number of Vehicles to Area by Day/Date

Date	Number of Vehicles
Tuesday, 6/04/2013	14
Thursday, 6/06/2013	19
Saturday, 6/08/2013	21
Sunday, 6/09/2013	14
Tuesday, 6/11/2013*	21
Friday, 6/14/2013	7
Saturday, 6/15/2013	20
Sunday, 6/16/2013**	24
Average	*17*

Table 5: Average Number of Vehicles by Weekday and Weekend

	Weekday	Weekend
Total	15	20

Table 6 provides a vehicle count by date and time part. As was the case with the average number of visitors to the area, the time part with the highest vehicle count is, on average, from 8-11am (8 vehicles), followed by 2-6pm (6 vehicles), and 11am-2pm (4 vehicles).

When broken down by weekday and weekend, the vehicle counts also mirror the visitor counts. On weekdays, about 4 cars visit the area from 8am-11am, 3 cars visit the area from 11am-2pm,

and 8 cars are found in the area from 2-6pm. On weekends, 11 cars frequent the area from 8-11am, about 5 cars visit from 11am-2pm, and 4 cars are found in the area between 2pm and 6pm.

Table 6: Vehicle Count by Day/Date and Day Part

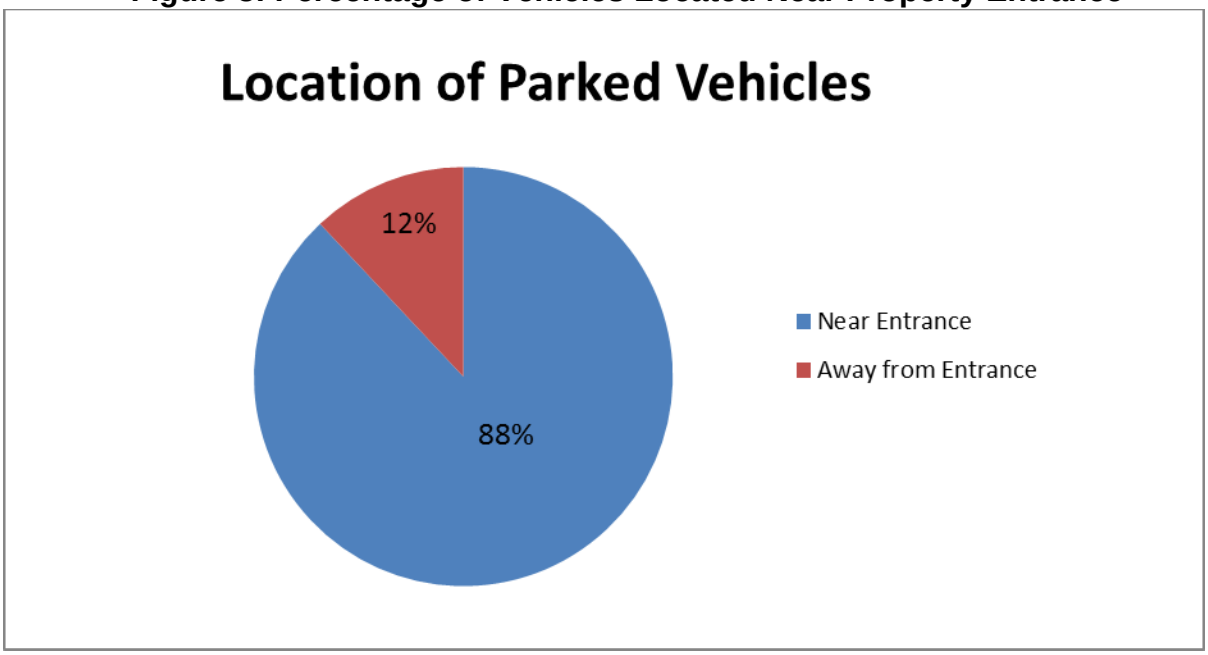
Time	Tuesday 6/04/2013	Thursday 6/06/2013	Saturday 6/08/2013	Sunday 6/09/2013	Tuesday 6/11/2013*	Friday 6/14/2013	Saturday 6/15/2013	Sunday 6/16/2013**	Average
8a-11a	5	5	12	6	5	2	12	12	8
11a-2p	1	1	4	4	6	4	5	8	4
2p-6p	8	13	5	4	10	1	3	4	6

*King Kamehameha Day
**Father's Day

Traffic to the area is dominated by vehicles. Ninety percent of visitors to the area arrived by car, five percent arrived by bicycle, four percent walked to the area, and one percent arrived by bus.

The figure below demonstrates the percentage of vehicles that were parked either near or far away from the property entrance. Approximately 88 percent of the vehicles counted in this survey were parked near the entrance. Near is defined within a distance of 10 houses from the Waimalu property entrance.

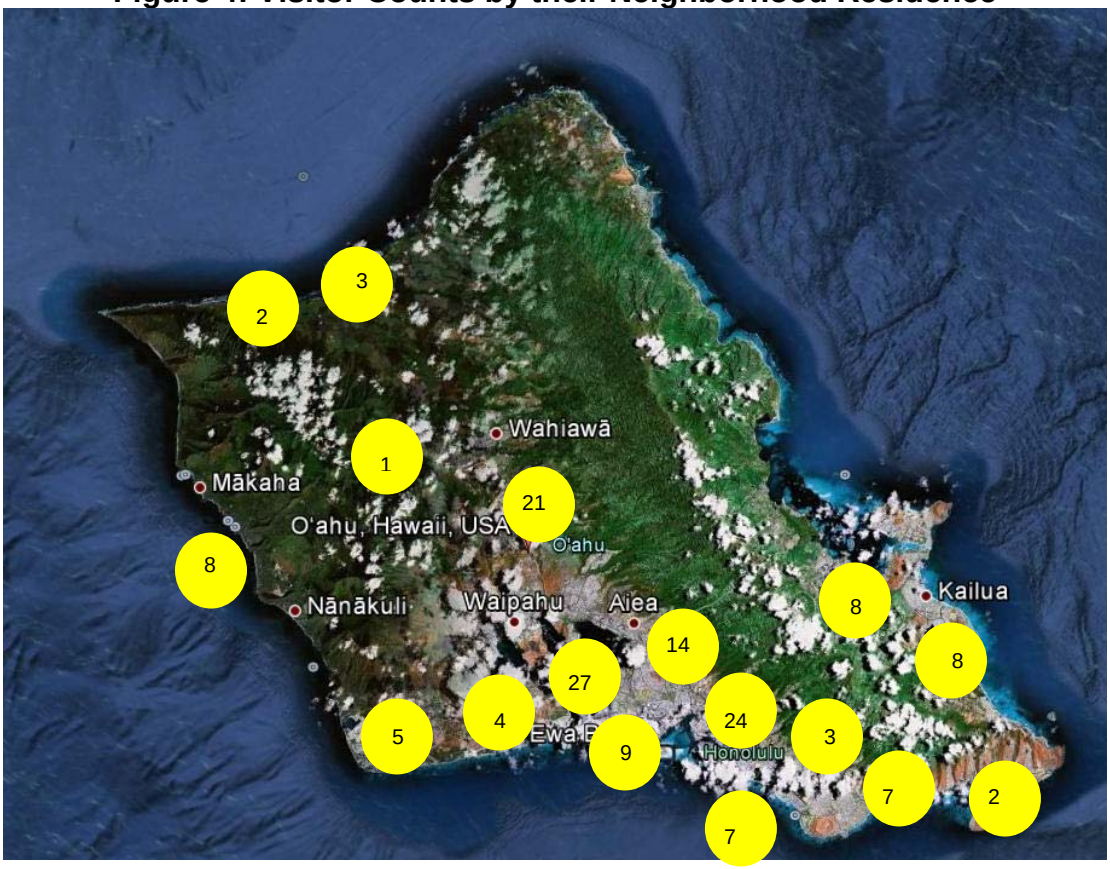
Figure 3: Percentage of Vehicles Located Near Property Entrance



USER CHARACTERISTICS

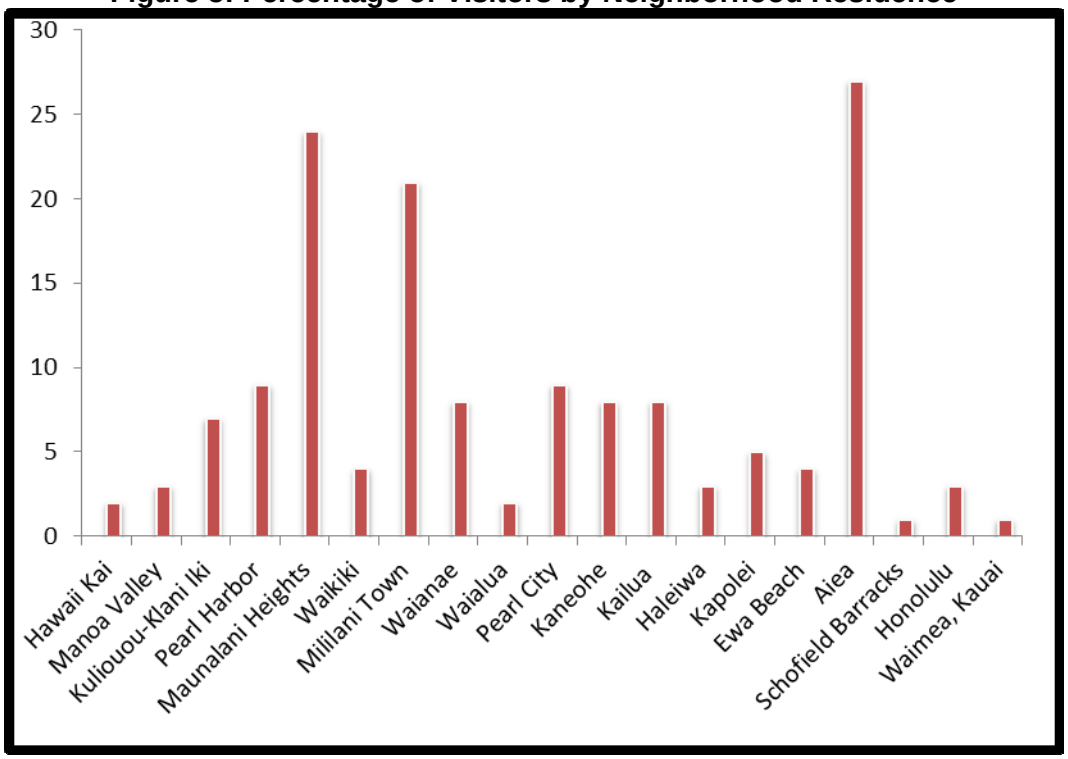
The following map provides the number of visitors by neighborhood or area of origin. The yellow circles indicate the number of visitors from each area on who participated in the intercept survey and provided a zip code for their residence. As the map indicates, most visitors to the area reside in neighborhoods that are in a close proximity to the area.

Figure 4: Visitor Counts by their Neighborhood Residence



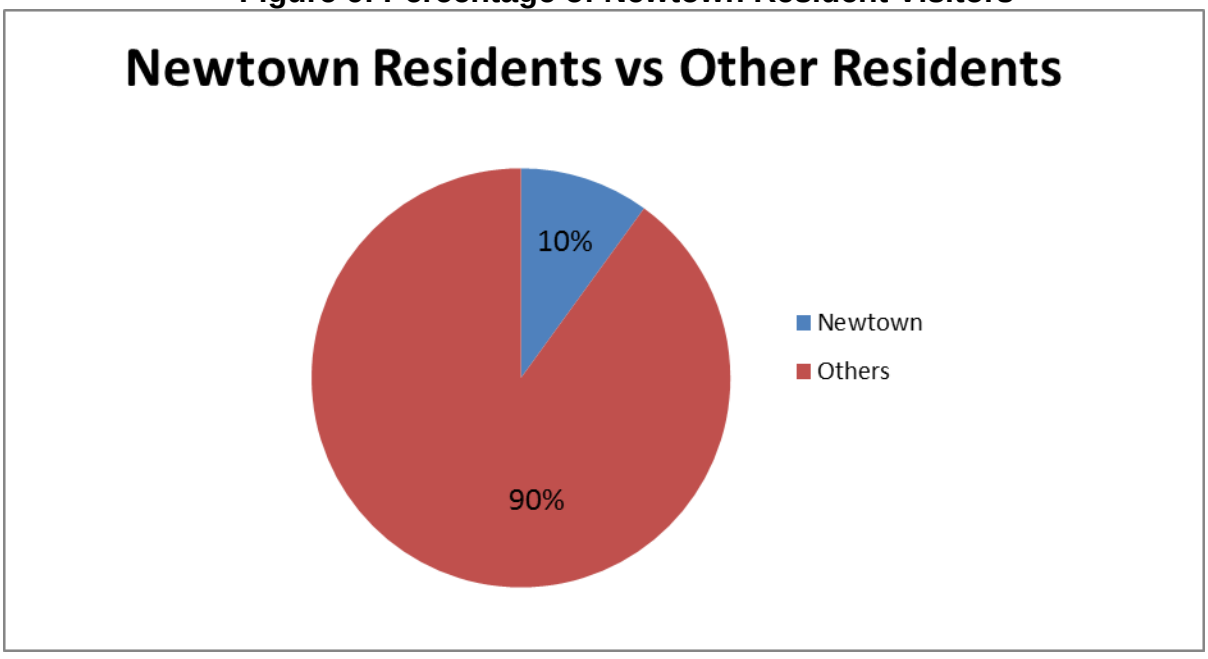
As expected, the percentage of visitors by area is similar to the number of visitors as reflected in the map. The figure below demonstrates that the greatest percentage of visitors to the area are from Aiea (19%), followed by Maunalani Heights (16%), and Mililani Town (14%).

Figure 5: Percentage of Visitors by Neighborhood Residence



Approximately 10 percent of the vistors to the area were identified as residents of Newtown. The remaining visitors reside in other areas of O'ahu. All residents that live in zip code 96701 were asked this question. Approximately 77 percent of Newtown residents arrived by car. The remaining Newtown residents arrived by an equal combination of biking, walking or by bus.

Figure 6: Percentage of Newtown Resident Visitors



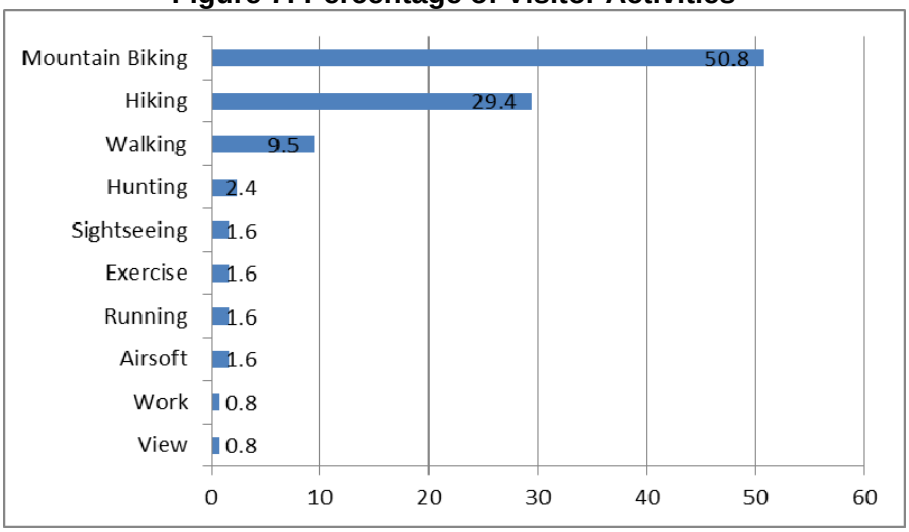
Visitor group sizes tend to be small and they don't spend a lot of time on the property. On average visitors arrive in pairs and generally spend about 2 hours on the property. Respondents to this particular survey indicate that on average, they have visited the area about 7 times over the last 5 months. This translates to an average of a little more than one visit every month.

Table 7: Visitor Group Size and Time Spent in Area

Characteristics	Mean	Median
Group Size	2.2 people	2 people
Time Spent in Area	2.2 hours	2 hours

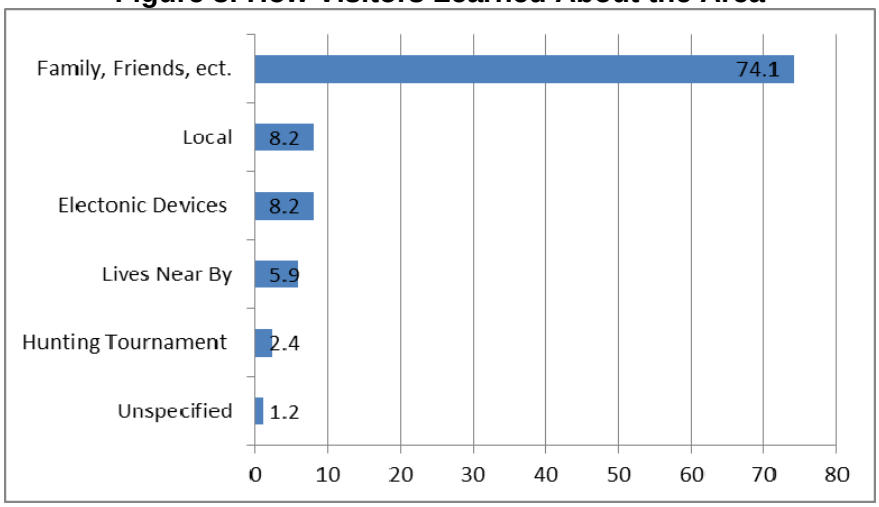
Visitors to the property are engaged in many activities. A majority of people, fifty one percent (51%) use the property to mountain bike. One in three (29%) hike in the area and another 10 percent walk in the area. The remaining participants engage in other activities such as hunting, sightseeing, and exercising.

Figure 7: Percentage of Visitor Activities



People who frequent the area are aware of it primarily because of word-of-mouth from family and friends. A smaller percentage of respondents indicated that they know of the area because they are local or area residents, or found it using electronic devices.

Figure 8: How Visitors Learned About the Area



DEMOGRAPHIC CHARACTERISTICS OF VISITORS TO THE PROPERTY

Visitors to the area represented a mix of different age groups. The largest group of visitors (21%) were aged 25-34, followed by visitors aged 55-64 (16%) and visitors aged 45-49 (14%). The mean length of residency for visitors to the area was 26 years. Visitors were overwhelmingly male (61%) compared to female (39%). In terms of ethnicity, the largest group of visitors were Caucasian (30%), followed by Japanese (16%) and Filipinos (14%).

Figure 9: Age of Visitors

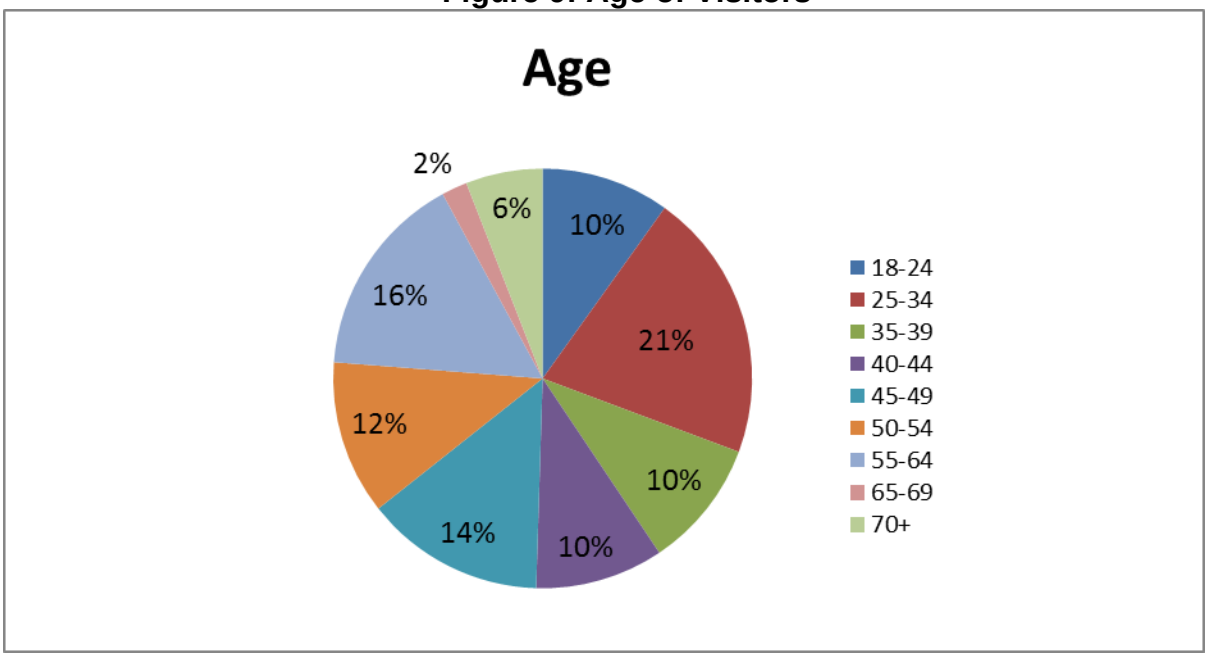


Figure 10: Gender of Visitors

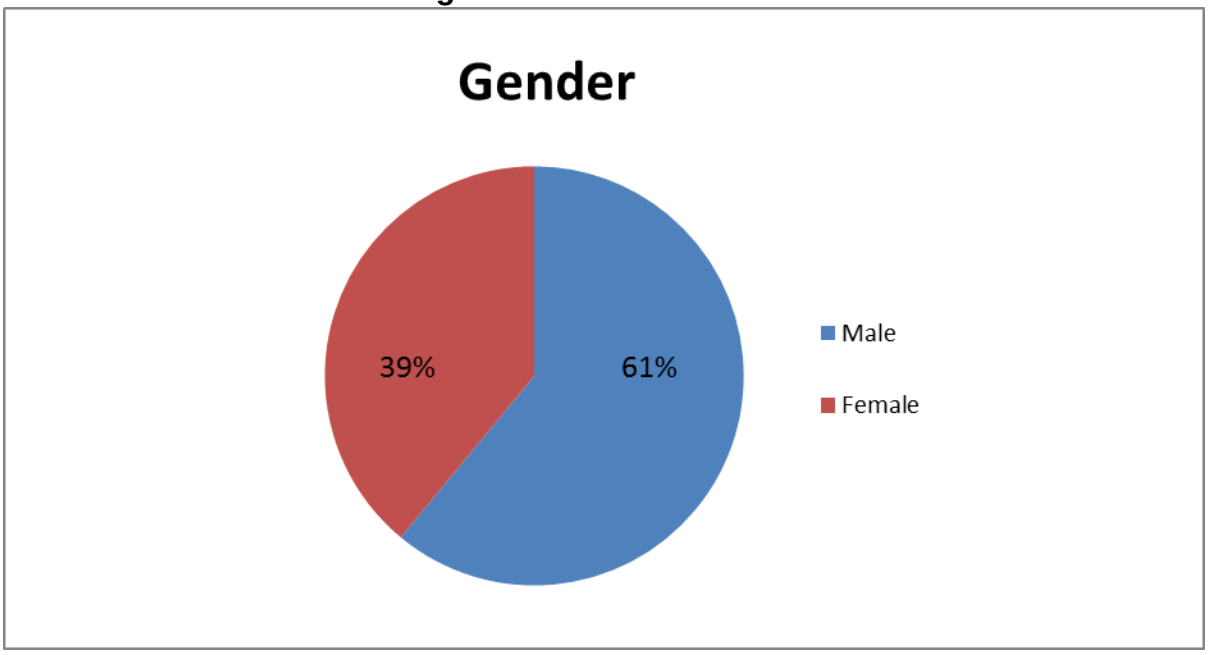
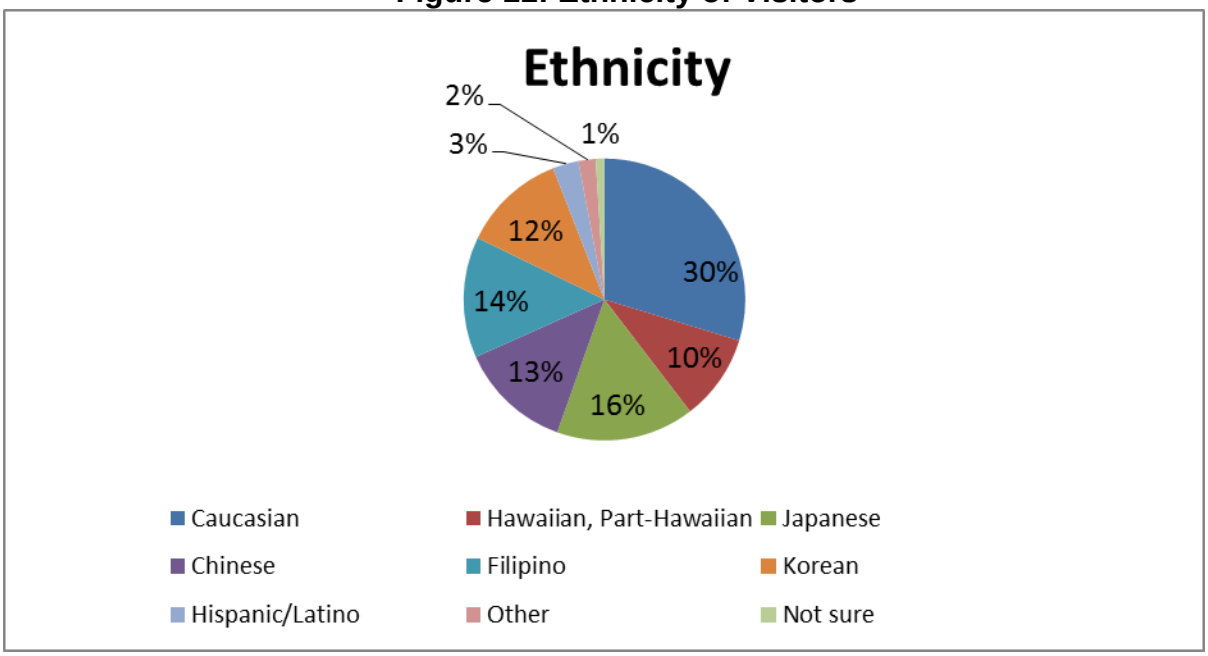


Figure 11: Ethnicity of Visitors



APPENDIX A: SURVEY AND FREQUENCIES

CONFIDENTIAL SURVEY

Aloha. On behalf of the owner of the property can you please complete this CONFIDENTIAL survey. We are not asking for your name and no one will contact you.

1. What zip code do you live at? _____

2. In your own words, can you please tell us what you are planning to do here today?

3.

Mountain Biking	48%
Hiking	27%
Walking	9%
Other	16%

4. How many hours are you planning to be here? 2.2 (mean); 2 (median) hours

5. How did you get here?

Walked	4%
By car	90%
By bus	1%
By bike	5%

6. How many people are in your group?
2.2 (mean); 2 (median) (# people)

7. Including this trip, how many times have you visited here? 6.6 (mean); 4 (median) times **In the last 4.9 (mean); 1 (median)** months

8. How did you first learn about this location?

Family and friends	74%
Local	8%
Electronic device	8%
Other	10%

9. Would you be returning to this property after this trip?

Yes	90%
No	1%
Don't know/Refused	8%

FOR CLASSIFICATION PURPOSES ONLY…

10. Can you please specify your age:

18 to 24	10%
25 to 34	21%
35 to 39	10%
40 to 44	10%
45 to 49	14%
50 to 54	12%
55 to 64	16%
65 to 69	2%
70 or older?	6%

11. Your gender:

Male	61%
Female	39%

12. How many years have you lived in Hawaii? 26 (mean); 25 (median) years

13. What is your ethnic background? *(MARK ALL THAT APPLY)*

Caucasian	30%
Hawaiian or Part-Hawaiian	10%
Japanese	16%
Chinese	13%
Filipino	14%
Korean	12%
Mixed, Not Hawaiian	0%
Black	0%
Hispanic/Latino	3%
Other (specify): _____	2%
Not sure	1%

MAHALO!

For Office Use only

Interviewer Name_____
Time survey was completed_____ Time
Location_____

APPENDIX B: DETAILED COUNTS OF PEOPLE AND VEHICLES BY DAY & BY TIME PERIOD

Number of Visitors to Area By Date and Time Period								
Time Period	**6/4/2013**	**6/6/2013**	**6/8/2013**	**6/9/2013**	**6/11/2013**	**6/14/2013**	**6/15/2013**	**6/16/2013**
Before 9:00am	3	4	5	2	4	2	11	10
9:00-9:30	5	0	9	0	4	0	2	2
9:30-10:00	0	0	5	0	1	0	3	1
10:00-10:30	0	0	1	8	0	0	0	0
10:30-11:00	0	3	0	0	2	0	5	8
11:00-11:30	0	0	3	3	0	1	3	1
11:30-12:00	1	0	4	0	1	3	0	2
12:00-12:30	0	0	1	1	3	0	2	12
12:30-1:00	0	0	3	1	1	0	6	5
1:00-1:30	0	1	0	0	0	2	4	0
1:30-2:00	1	0	3	0	2	0	5	1
2:00-2:30	0	0	0	7	0	0	1	0
2:30-3:00	2	3	1	5	2	0	0	0
3:00-3:00	6	5	5	2	0	0	2	0
3:30-4:00	0	0	0	1	1	0	0	0
4:00-4:30	4	5	5	1	1	0	0	4
4:30-5:00	2	2	0	1	9	6	2	0
5:00-5:30	2	3	1	0	2	0	2	2
5:30-6:00	0	4	0	0	2	4	0	0
Total	26	30	46	32	35	18	48	48

Number of Vehicles to Area By Date and Time Period								
Time Period	**06/04/13**	**06/06/13**	**6/8/13**	**06/09/13**	**06/11/13**	**06/14/13**	**06/15/13**	**06/16/13**
Before 9:00am	2	2	3	1	2	1	7	5
9:00-9:30	3	0	3	0	1	0	0	2
9:30-10:00	0	0	4	0	1	0	2	1
10:00-10:30	0	0	1	2	0	0	0	0
10:30-11:00	0	3	0	0	1	0	2	4
11:00-11:30	0	0	1	3	0	1	1	1
11:30-12:00	1	0	1	0	1	2	0	1
12:00-12:30	0	0	1	1	3	0	1	2
12:30-1:00	0	0	1	1	1	0	1	3
1:00-1:30	0	1	0	0	0	2	2	0
1:30-2:00	0	0	1	0	1	0	0	1
2:00-2:30	0	0	0	2	0	0	1	0
2:30-3:00	1	1	1	1	2	0	0	0
3:00-3:00	1	5	2	1	0	0	0	0
3:30-4:00	0	0	0	0	0	0	0	0
4:00-4:30	3	3	1	1	1	0	0	2
4:30-5:00	2	1	0	1	4	1	2	0
5:00-5:30	1	2	1	0	2	0	1	2
5:30-6:00	0	1	0	0	2	0	0	0
Total	14	19	21	14	21	7	20	24

APPENDIX C: INTERVIEWER INSTRUCTIONS

Usage Survey

GENERAL INSTRUCTIONS:

1. Please be sure to be dressed professionally. When arriving at the location where you will be working, please be sure to immediately put on your SMS badge.
2. Be sure to arrive at your location at least 15 minutes before the scheduled start time. Be sure to be ready for all weather conditions, so bring an umbrella, a hat, and a cooler with lots of water and food.
3. Upon arrival call or test to Hersh Singer:
   a. Office phone 440-0700
   b. Home phone 261-4767
   c. Cell phone 351-6332
4. Be aware that the client, or their representatives will be checking on you on a variety of days and times. They may or may not introduce themselves—so make sure that you are always alert.
5. We do not expect to have many people come up at once, but you will have more than one clipboard in case you need it.
6. Introduce yourself to anyone who asks who you are explain that you are undertaking a survey for Towne Realty, the owners of the land beyond the gate. Show them the letter of introduction, if necessary.
7. Do not leave any garbage or other materials behind. Make sure you park your car out of the way of anybody, especially the local neighbors.
8. Take a book with you to read in the quiet times.
9. If it is pouring with rain, call me and we will decide whether to cancel for the day or not.

HOW TO APPROACH A POTENTIAL PARTICIPANT:

1. Track the number of vehicles that you see arriving at the gate and count the number of people that walk through the gate—recording them on the daily count sheet. If the people walked up to the gate (not driven) count only them—do not assume that they have a vehicle somewhere.
2. Approach all participants politely, and with a smile. **(Note: Only one person per group is to complete a survey.)** Introduce yourself, and ask them to complete the confidential survey. Again, if they ask who it is for—tell them it is for the landlord, but we will not be asking for their names, or phone numbers. The landlord simply wants to learn who is using the property and for what purpose. If potential participant declines to participate, thank them politely. **Then, take an empty survey and complete it to the best of your ability. Be sure to mark it stating that you did the survey, not a respondent.**
3. If they want clarification on the survey instrument, help them as much as you can.

Record time completed on the front of the survey and put into the daily envelope.

ENVIRONMENTAL ASSESSMENT
WAIMALU NATURE PARK AND ZIPLINE CANOPY TOUR

TMK 9-8-073:001
Waimalu, City and County of Honolulu, State of Hawai‘i

APPENDIX 8
Noise Report

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Noise Study for a Proposed Zip Line in Waimalu, Oahu

Prepared for
Towne Development of Hawaii

October 16, 2013

Cardno TEC
Shaping the Future

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Proposed Action

The installation and operation of a zip line course is proposed on property owned by Towne Development of Hawaii in Waimalu, Oahu at the upper end of the valley, over the ridgeline from the Royal Summit residential community. Visitors would park in a commercial area by Kamehameha Highway, where customers would go through a safety briefing before boarding a 15-passenger van to transport them to a proposed nature center at the top of the hill via Kaahele Street, at an anticipated frequency of one van every half hour. As part of the proposed action, the dirt road from Kaahele Street to the potential location of the nature center would be paved. This distance from the end of the paved road to the proposed nature center is estimated to be 700 feet. From the nature center, visitors would board four-wheel Utility Vehicles (UTV) to go higher up the ridge to the top of the zip lines. There would be seven dual zip lines, allowing two riders to go in parallel with each other.

This report considers both construction and operational noise for the proposed zip line project. Construction noise would involve the installation of the zip line and the paving of the dirt road at the top of Kaahele Street. Operational noise would result from the transport of visitors via 15-passenger van on Kaahele Street to and from the nature center, transport of visitors via UTV between the proposed nature center and the start and end of the zip line, and riders on the zip line.

Such potential construction- and operation-related sources of noise have given rise to public concern and resistance to other recent projects involving zip lines. Residents of the Royal Summit residential community have expressed concerns about the potential noise from this proposed zip line project, drawing comparisons to the noise generated by screaming riders at an amusement park (e.g., the Gold Strike rise at Great America in San Carlos, California, which was voluntarily shut down for noise to retrofit a sound enclosure when noise from the riders was determined to exceed local ordinances). However, anticipated noise from the construction and operation of the proposed zip line differs significantly from that expected from an amusement park. This report provides background information on how noise is defined, the methodology used to analyze the noise that would be generated as a result of the proposed action, the results of the analysis conducted for this report, and a conclusion on the extent of any impacts resulting from zip line related noise.

Introduction to Noise

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. The perception and evaluation of sound involves three basic physical characteristics:

- ***Intensity*** – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- ***Frequency*** – the number of cycles per second the air vibrates, in Hertz (Hz)
- ***Duration*** – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual.

Basics of Sound and A-weighted Sound Level

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that a linear scale would accurately represent sound intensity, which is why the logarithmic unit of the decibel (dB) is used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or hertz (Hz).

To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. Specifically, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit to clearly identify that a given measurement has been made with this filtering process (dBA). In this document, the dB unit refers to A-weighted sound levels.

Table 1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

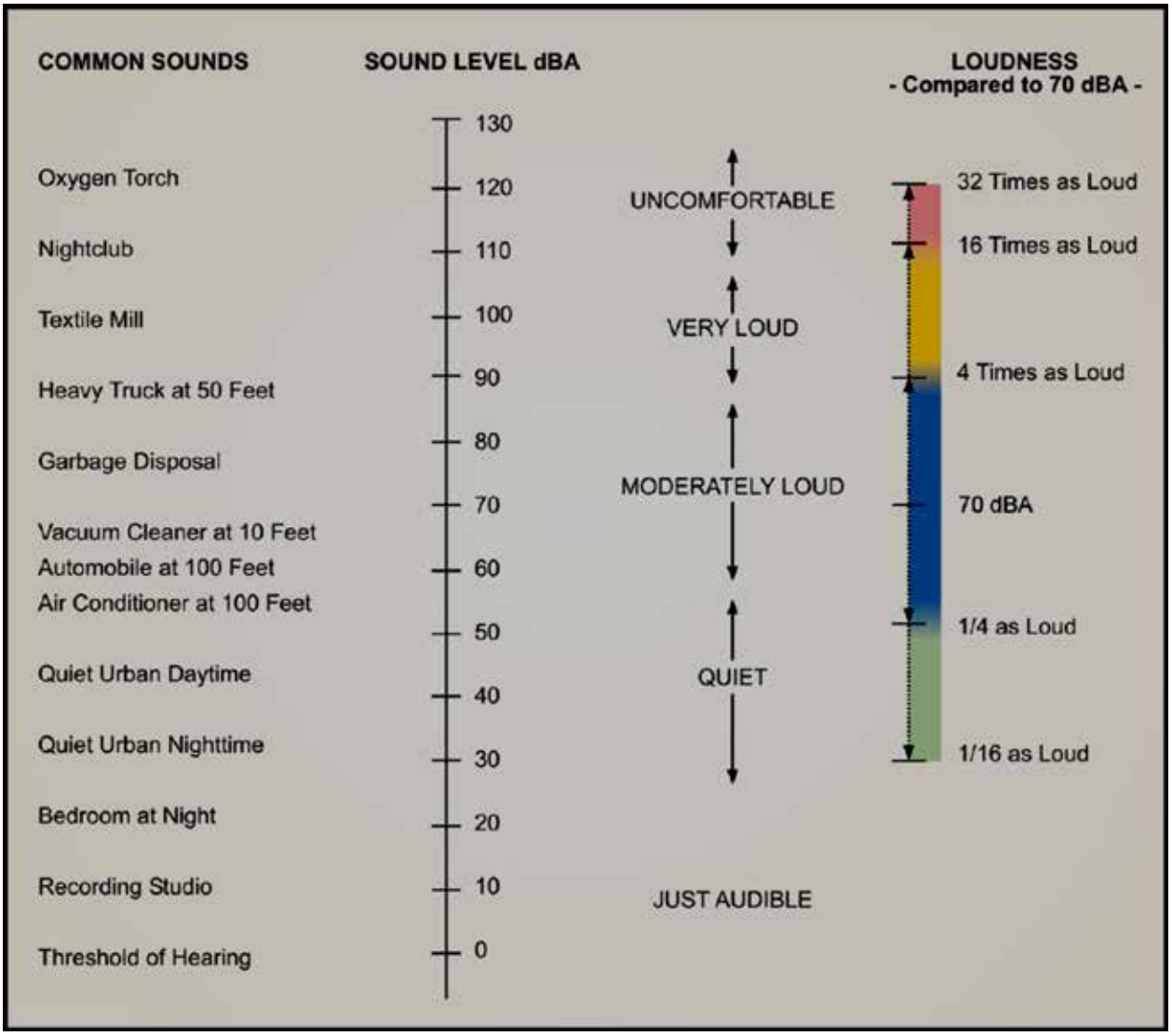
Table 1. Subjective Responses to Changes in A-Weighted Decibels (dBA)

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

A chart of A-weighted sound levels from typical noise sources is provided in Figure 1. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban

daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

All noise levels discussed in this report are A-weighted.



Sources: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 1. A-Weighted Sound Levels from Typical Sources

Methodology

This section describes the methodology used in this report to evaluate the noise expected to occur as a result of the proposed zip line project in terms of metrics, models, and calculations.

Noise Metrics

Equivalent Sound Level (L_{eq})

A cumulative noise metric useful in describing noise is the equivalent sound level (L_{eq}). L_{eq} is the continuous sound level that would be present if all of the variations in sound level occurring over a specified time period were smoothed out as to contain the same total sound energy. Typical time periods for L_{eq} are 1 hour, 8 hours, and 24 hours.

Maximum Sound Level (L_{max})

The highest A-weighted sound level measured during a single event where the sound level changes value with time (e.g., a passing automobile or van) is called the maximum A-weighted sound level or L_{max}. During a noise event, the noise level starts at the ambient or background noise level, rises to the maximum level as the noise source gets closest to the observer, and returns to the background level as the source recedes into the distance. L_{max} defines the maximum sound level occurring for during the event and L_{max} occurs instantaneously.

Noise Models/Calculations

The Road Construction Noise Model (RCNM) was developed by the U.S. Department of Transportation, Federal Highway Administration (FHWA 2006) and is used to determine construction noise. Operational noise for traffic uses Noise Impact Assessment Spreadsheet (Copyright 2007 HMMH Inc.) developed for the Federal Transit Authority to determine the noise level of the 15-passenger van. Traffic noise levels considers nighttime noise more intrusive and annoying than noise during the day and called acoustic night and day, respectively. Hours for acoustic night are from 10:00p.m.-7:00 a.m. and acoustic day is 7:00 a.m. to 10:00 p.m. ATV data was obtained through a report prepared for the State of California Department of Parks and Recreation by Wyle Laboratories of various off-road vehicles including motorcycles and ATVs (Wyle 2005). The purpose of the study was to determine the effectiveness of the California off-road vehicle noise standards using test methods developed by the U.S. Environmental Protection Agency (USEPA) and the Society of Automotive Engineers (SAE). Lastly, noise emitting from enthusiastic riders was obtained from the KPIX News reports that took noise measurements adjacent to the Great America theme park Gold Strike roller coaster and at the nearby receptors. This information was correlated with noise levels measured near the Thunder Dolphin roller coaster in Tokyo, Japan (AP 2003) and from a report published in the Institute of Noise Control Engineering (Menge 1999). From a mechanical point of view with respect to noise making, an ecotourism zip line tour and am amusement park roller coaster have little in common apart from the fact that riders in each case often scream, and the screaming is the loudest noise generated for these activities.

Results

Construction Noise

Noise associated with construction that would affect residences along Kaahele Street would be due to paving 700 feet of the dirt access road to the nature center and the installation of a new access gate. Construction equipment would likely include a grader, paver, roller, and dump truck. The nearest receptors would be the residences at the end of the cul-de-sac on Kaahele Street, which would be within 60 feet of the site. The equipment listed above could be used simultaneously to finish construction quicker, which would mean reaching noise levels of 81.2 dBA Leq. Should the work be performed using one piece of the equipment listed above at a time, the grader would be the noisiest at 79.4 dBA Leq. Using the equipment individually may be advantageous since there is little exceed space to stage multiple pieces of equipment and the total 700 feet could probably be completed within a few days. The elevated noise levels would be extremely short-term.

Operational Noise:

Van Noise

A 15-passenger van is proposed to transport visitors on Kaahele Street from the base of the hill in a commercial area near Kamehameha Highway to the top of Kaahele Street, past a gate to the proposed nature center. The speed limit on Kaahele Street is 25 miles per hour. The population at the top of Kaahele Street is less dense and would see a proportionally greater increase of vehicles per hour than at the bottom of Kaahele Street with a much denser population.

The Royal Summit development has 560 home sites and the Traffic Impact Report (SSFM International, Inc. 2013) indicates an average of ten trips per day (9.57 per weekday, 10.08 trips per Saturday, and 8.87 trips on Sunday). This includes all ancillary traffic in the area including residents, mail delivery, buses, parcel deliveries, and all other vehicle trips. Since there are 45 houses above Ainanui Loop, upper Kaahele Street averages 27 trips per hour during day hours (45 houses * 9 trips per day / 15 hours per day 7am-10pm), assuming ten percent occur at night, nine trips per household during acoustic day hours (7 a.m. to 10 p.m.) and one trip during acoustic night hours (10 p.m. to 7 a.m.). At the entrance of Royal Summit, traffic would be 336 trips per hour. These represent average traffic loads and peak morning and afternoon traffic counts would likely be higher and midday traffic would be less, Under the proposal, there would be an additional four vehicle trips added resulting in an average of 31 trips per hour at the top of Kaahele Street and 340 trips per hour at the bottom of Kaahele Street.

Baseline equivalent average noise levels would be 45.1 dBA Leq at the top of Kaahele Street and 56.1 dBA Leq at the bottom. Adding two round trips for a 15-passenger van (4 one-way trips per hour) the noise levels would increase to 45.7 dBA Leq at the top and no increase at the bottom of Kaahele Street. A change in noise level needs to be about 1.5 dB before it is detectable by the human ear. For the bottom of Kaahele Street, four additional trips would not be a sufficient change to alter the noise level. At the top of Kaahele Street, the noise level would increase by 0.6

dB and be imperceptible. A single van trip would generate a maximum noise level of about 68 dBA at a residence located 40 feet from the van, but the duration from ambient noise level to peak back down to ambient would only last about 20 seconds.

UTV Noise

Most studies involving ATV/UTV noise are used to certify the ATV/UTV for public sale to satisfy US Environmental Protection Agency and Society of Automotive Engineers requirements. These studies determine maximum noise levels at very high revolutions per minute (RPM) simulating high speed, and thusly the most noisy conditions. Results of the study included measurements for eight ATVs, mostly small or medium sized ATVs. One of the ATVs included in this study was the Kawasaki KFX700, a very large and powerful ATV, but not likely to be used for transporting zip line riders to the top of the proposed zip line tours. Using the USEPA method, the average noise level for the small and medium-sized ATVs was 78 dBA at a distance of 50 feet.

The nature center would be 700 feet from the gate at the top of Kaahele Street and UTV use would start at the nature center and travel away from the residences. Noise decreases by about 6 dBA for every doubling of the distance between the noise source and the recipient, so noise levels at the residences would decrease from 78 dBA to 55 dBA Lmax. This level would be at the same noise level as ambient noise for a suburban neighborhood (55 dBA), meaning it would be audible but not intrusive. These levels would last a short time and would occur twice per hour.

Zip Line Noise Literature Review

A literature search was performed to determine whether previous noise studies have been performed specifically for zip line noise, but no studies were found. However, several examples of empirical measurements for noise around amusement rides to determine overall noise levels due to the riders screaming were found.

Zip lines and roller coaster rides are quite dissimilar mechanically, but sound levels from screams can be compared. Two of the roller coasters investigated had a capacity of 24 riders while the proposed zip lines would be dual zip lanes, meaning two riders can go at the same time. Menge (1999) discusses the results of a formal noise study for roller coasters - under "much screaming" conditions, noise levels of 86 dBA were measured 15 meters (50 feet) from the roller coaster.

Without normalizing for the number of passengers, the following equation provides an estimate for what the noise level would be at the residences at the top of Kaahele Street from screams at the top of the nearest zip line. To calculate noise levels at a different distance from the measured distance in the Menge study, the following formula is used:

$$L2 = L1 - 20 \times Log(\frac{D2}{D1})$$

Where: L2 is the noise level at point 2

L1 is the noise level at point 1

D2 is the distance from the noise source at point 2

D1 is the distance from the noise source at point 1

From the Menge (1999) study described above, point 1 (top of closest zip line) is 86 dB at 50 feet. As shown on Figure 2, the gate at Kaahele Street is 4200 feet, which means L2 would be 48 dBA at the gate, according to the formula shown above.

This level would be well below the ambient level of 55 dBA and would actually be less since there would only be two riders on the zip line compared to numerous screaming riders on a roller coaster (24 person capacity in the Menge study). To normalize to two "much screaming" riders, an initial assumption of riders on the roller coaster is made for about half or less than the full capacity of 24 for a conservative estimate of 8 screaming riders. Since noise increases or decreases by 3 dB for each doubling (or halving) of noise sources, two riders that are both screaming on the dual zip line would be 6 dB less than a "mostly screaming" roller coaster. Therefore, noise levels would be about 42 dBA at the residences at the top of Kaahele Street.

Figure 2 also shows that there is no direct "line of sight" between the top of the zip line and the residences. This, along with the fact there is dense vegetation between the zip line and the residences would further reduce noise levels perhaps as much as 5 or 10 dB, but it is difficult to quantify exactly how much reduction would occur.

Conclusion

Noise would be generated by the installation and operation of the proposed zip line on Towne Development of Hawaii's property in Waimalu, Oahu, but noise levels would be at or below ambient levels. The exception would be during the access road construction, but this would be short term and would diminish once construction moves away from the residences and cease upon completion of the work.

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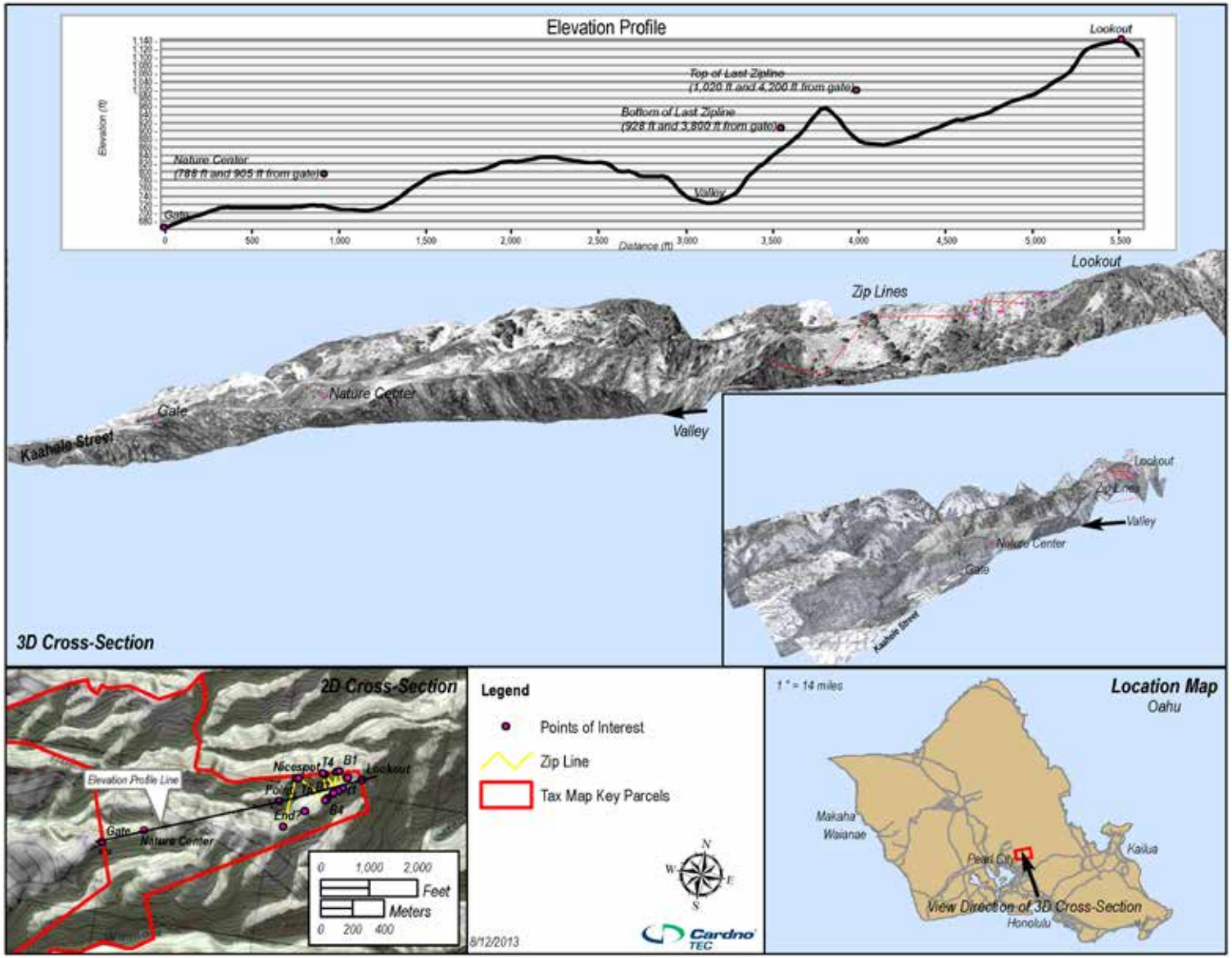
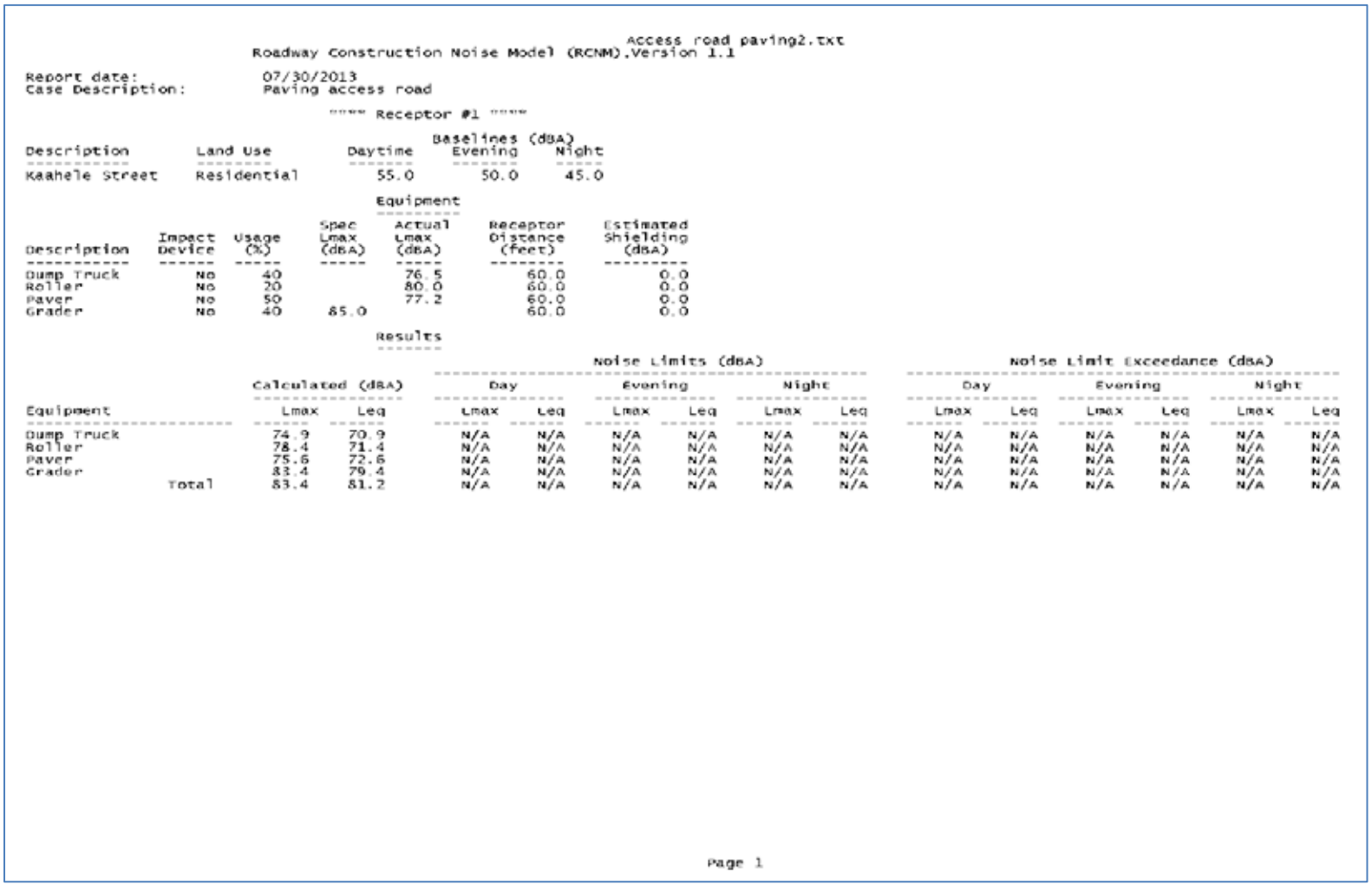


Figure 2. Views of the Zip Line in Relation to the Gate at Kaahele Street

Noise Calculation Worksheets

Road Construction Noise Model Worksheet.



Access road paving2.txt

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 07/30/2013
Case Description: Paving access road

"""" Receptor #1 """"

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Kaahele Street	Residential	55.0	50.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dump Truck	No	40		76.5	60.0	0.0
Roller	No	20		80.0	60.0	0.0
Paver	No	50		77.2	60.0	0.0
Grader	No	40	85.0		60.0	0.0

Results

		Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dump Truck		74.9	70.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		78.4	71.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		75.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		83.4	79.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	83.4	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Page 1

Construction Worksheet 1 – Road Paving Top of Kaahele Street

FTA Noise Impact Assessment Spreadsheets.

Federal Transit Administration
Noise Impact Assessment Spreadsheet
Copyright 2007 HMMH Inc.
version: 7/3/2007

Project:	Towne Development Zip Line Van

Receiver Parameters	
Receiver:	Bottom of Kaahele St Average Baseline
Land Use Category:	2. Residential
Existing Noise (Measured or Generic Value):	60 dBA

Noise Source Parameters	
Number of Noise Sources:	1

Noise Source Parameters		Source 1
	Source Type:	Highway/Transit
	Specific Source:	Automobiles and Vans
Daytime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	336
Nighttime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	34
Distance	Distance from Source to Receiver (ft)	40
	Number of Intervening Rows of Buildings	0
Adjustments	Noise Barrier?	No

Project Results Summary

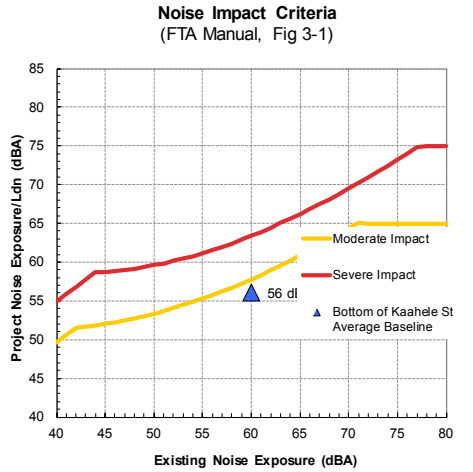
Existing Ldn:	60 dBA
Total Project Ldn:	56 dBA
Total Noise Exposure:	61 dBA
Increase:	1 dB
Impact?:	None

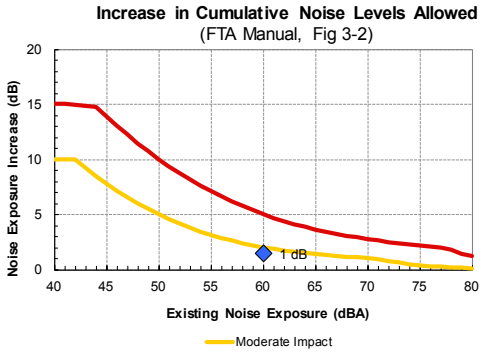
Distance to Impact Contours

Dist to Mod. Impact Contour (Source 1):	31 ft
Dist to Sev. Impact Contour (Source 1):	13 ft

Source 1 Results

Leq(day):	56.1 dBA
Leq(night):	46.1 dBA
Ldn:	56.1 dBA





Traffic Sheet 1 – Bottom of Kaahele Street Baseline

Federal Transit Administration
Noise Impact Assessment Spreadsheet

version: 7/3/2007

Project:	Towne Development Zip Line Van

Receiver Parameters	
Receiver:	Top of Kaahele St Average Baseline
Land Use Category:	2. Residential
Existing Noise (Measured or Generic Value):	60 dBA

Noise Source Parameters	
Number of Noise Sources:	1

Noise Source Parameters		Source 1
	Source Type:	Highway/Transit
	Specific Source:	Automobiles and Vans
Daytime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	27
Nighttime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	3
Distance	Distance from Source to Receiver (ft)	40
	Number of Intervening Rows of Buildings	0
Adjustments	Noise Barrier?	No

Project Results Summary

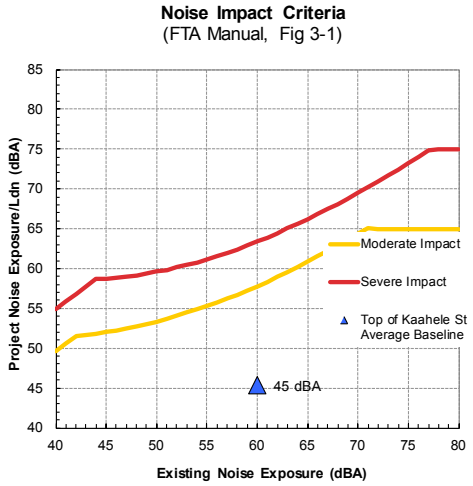
Existing Ldn:	60 dBA
Total Project Ldn:	45 dBA
Total Noise Exposure:	60 dBA
Increase:	0 dB
Impact?:	None

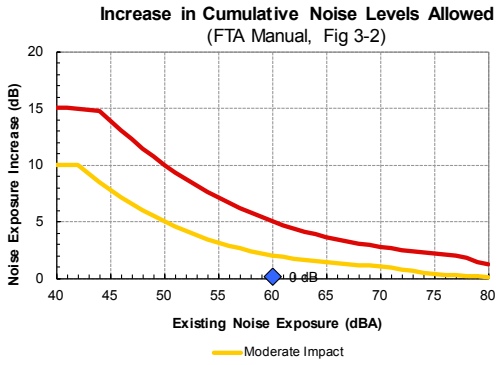
Distance to Impact Contours

Dist to Mod. Impact Contour (Source 1):	6 ft
Dist to Sev. Impact Contour (Source 1):	2 ft

Source 1 Results

Leq(day):	45.1 dBA
Leq(night):	35.6 dBA
Ldn:	45.3 dBA





Traffic Sheet 2 – Top of Kaahele Street Baseline

Federal Transit Administration
Noise Impact Assessment Spreadsheet

version: 7/3/2007

Project:	Towne Development Zip Line Van

Receiver Parameters	
Receiver:	Bottom of Kaahele St Proposed
Land Use Category:	2. Residential
Existing Noise (Measured or Generic Value):	60 dBA

Noise Source Parameters	
Number of Noise Sources:	1

Noise Source Parameters		Source 1
	Source Type:	Highway/Transit
	Specific Source:	Automobiles and Vans
Daytime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	340
Nighttime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	34
Distance	Distance from Source to Receiver (ft)	40
	Number of Intervening Rows of Buildings	0
Adjustments	Noise Barrier?	No

Project Results Summary

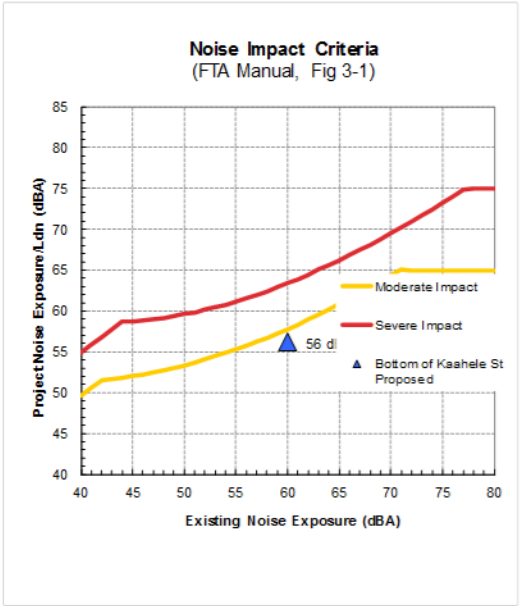
Existing Ldn:	60 dBA
Total Project Ldn:	56 dBA
Total Noise Exposure:	61 dBA
Increase:	1 dB
Impact?:	None

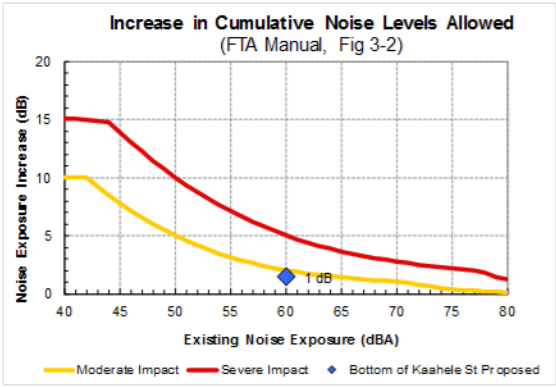
Distance to Impact Contours

Dist to Mod. Impact Contour (Source 1):	31 ft
Dist to Sev. Impact Contour (Source 1):	13 ft

Source 1 Results

Leq(day):	56.1 dBA
Leq(night):	46.1 dBA
Ldn:	56.1 dBA





Sheet 3 – Bottom of Kaahele Street Proposed

Federal Transit Administration
Noise Impact Assessment Spreadsheet
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version: 7/3/2007

Project:	Towne Development Zip Line Van

Receiver Parameters	
Receiver:	Top of Kaahele St Proposed
Land Use Category:	2. Residential
Existing Noise (Measured or Generic Value):	60 dBA

Noise Source Parameters	
Number of Noise Sources:	1

Noise Source Parameters		Source 1
	Source Type:	Highway/Transit
	Specific Source:	Automobiles and Vans
Daytime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	31
Nighttime hrs		
	Speed (mph)	25
	Avg. Number of Events/hr	3
Distance	Distance from Source to Receiver (ft)	40
	Number of Intervening Rows of Buildings	0
Adjustments	Noise Barrier?	No

Project Results Summary

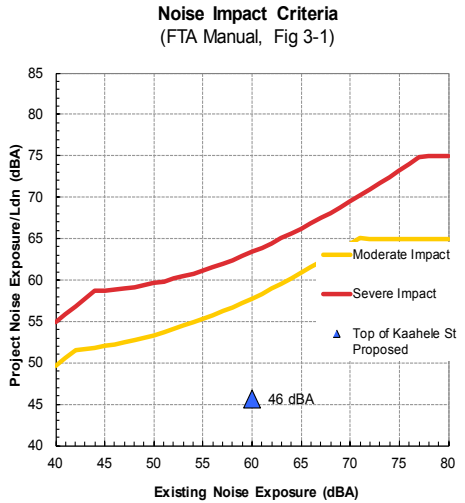
Existing Ldn:	60 dBA
Total Project Ldn:	46 dBA
Total Noise Exposure:	60 dBA
Increase:	0 dB
Impact?:	None

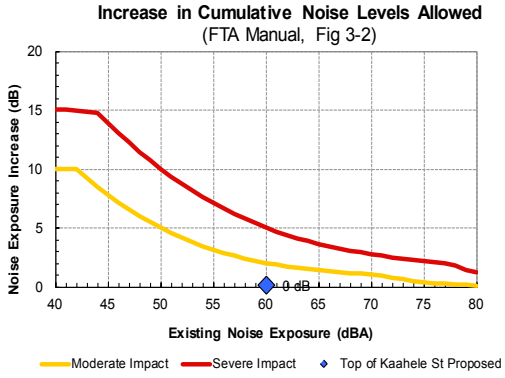
Distance to Impact Contours

Dist to Mod. Impact Contour (Source 1):	6 ft
Dist to Sev. Impact Contour (Source 1):	3 ft

Source 1 Results

Leq(day):	45.7 dBA
Leq(night):	35.6 dBA
Ldn:	45.7 dBA





Sheet 4 – Top of Kaahele Street Proposed