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74-5044 Ane Keohokālole Hwy
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County of Hawai‘i
PLANNING DEPARTMENT

Zendo Kern
Director

Jeffrey W. Darrow
Deputy Director

East Hawai‘i Office
101 Pauahi Street, Suite 3
Hilo, Hawai‘i 96720
Phone (808) 961-8288
Fax (808) 961-8742

October 30, 2024

Mary Alice Evans, Director
Office of Planning and Sustainable Development
Environmental Review Program
235 S. Beretania Street, Room 702
Honolulu, Hawai‘i 96813

Dear Ms. Evans,

Subject: **Draft Environmental Assessment (DEA) Anticipated Finding of No Significant Impact (AntFONSI) (PL-ENV-2024-000025)**
Applicant: **Hilo Benioff Medical Center (HBMC)**
Project: **Hilo Benioff Medical Center – Kea‘au Outpatient Center**
TMK: **(3) 1-6-003:081, Kea‘au, Puna District, Island of Hawai‘i**

The Hawai‘i County Planning Department has reviewed the draft environmental assessment for the subject project and anticipates a Finding of No Significant Impact (AntFONSI) determination for the proposed Hilo Benioff Medical Center-Kea‘au Outpatient Center project. Please publish notice of availability for this project in the November 8, 2024, Environmental Notice.

In addition to this letter, the applicant’s representative on our behalf, has submitted the electronic version of the Environmental Review Program Publication Form and a searchable PDF-formatted copy of the DEA through the online submission platform.

If there are any questions regarding this letter, please contact Christian Kay at (808) 961-8146 or via email at christian.kay@hawaiicounty.gov You may also contact the project consultant, John Pipan with Land Planning Hawaii, LLC, with questions related to the submittal of the DEA at (808) 333-3391.

Sincerely,

Jeffrey W. Darrow
Jeffrey W. Darrow (Oct 30, 2024 13:21 HST)

JEFFREY W. DARROW
Deputy Planning Director

cc via email: Land Planning Hawaii, LLC

From: webmaster@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Wednesday, October 30, 2024 2:58:29 PM

Action Name

Hilo Benioff Medical Center Kea'au Outpatient Center

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds

Judicial district

Puna, Hawai‘i

Tax Map Key(s) (TMK(s))

(3)1-6-003:081

Action type

Applicant

Other required permits and approvals

County Special Permit, Grubbing & Grading, Building Permits, Permit to Perform Work on State Highways, Permit for the Occupancy and Use of State Highways, National Pollution Discharge Elimination System (NPDES) Permit, Storm Water Pollution Prevention Plan, Wastewater Treatment Works Permit, Construction Environmental Hazard Management Plan

Discretionary consent required

County Special Permit

Agency jurisdiction

County of Hawaii

Approving agency

Planning Department

Agency contact name

Jeffrey Darrow

Agency contact email (for info about the action)

Jeff.Darrow@hawaiicounty.gov

Email address for receiving comments

john@landplanninghawaii.com

Agency contact phone

(808) 961-8159

Agency address

101 Pauahi Street Suite 3
Hilo, HI 96720
United States
Map It

Applicant

Hilo Benioff Medical Center - Hawaii Health Systems Corporation

Applicant contact name

Kris Wilson

Applicant contact email

kwilson@hhsc.org

Applicant contact phone

(808) 932-3802

Applicant address

1190 Waianuenue Avenue
Hilo, HI 96720
United States
Map It

Is there a consultant for this action?

Yes

Consultant

Land Planning Hawaii

Consultant contact name

John Pipan

Consultant contact email

john@landplanninghawaii.com

Consultant contact phone

(808) 333-3391

Consultant address

194 Wiwoole Street
Hilo, Hawaii 96720
United States
Map It

Action summary

Hilo Benioff Medical Center (HBMC) is proposing to construct a new medical clinic facility on approximately 7 acres of land in Kea‘au, Hawai‘i. The subject property is located to the west of Highway 130 at 16-790 Kea‘au Pāhoa Road, approximately 780 feet south from its convergence with Kea‘au-Pāhoa Bypass Road. Plans include construction of a single-story medical office building complex consisting of a clinical wing and a behavioral health wing and totaling approximately 36,000 square feet. Sufficient paved parking stalls and loading zones are proposed meeting zoning code requirements. On-site supporting infrastructure is expected in the form of driveways,

electrical, water supply, storm water management, and wastewater disposal facilities. The proposed clinic will improve access to medical services delivery in the Puna District. No sensitive biological, hydrological, archaeological, cultural or other resources are present on the previously cleared site.

Reasons supporting determination

The County of Hawai‘i Planning Department has reviewed the referenced project in conformance with Hawai‘i Administrative Rules (HAR) Section 11-200.1-13 to evaluate the sum of effects of the proposed action on the quality of the environment, and to determine if there will be a “significant effect” on the environment. The thirteen (13) criteria listed in HAR 11-200.1-13(b) have been applied to the proposed project and are discussed in the DEA.

Attached documents (signed agency letter & EA/EIS)

- 2024-10-21_HMC-Keaau_Draft-Environmental-Assessment.pdf

Action location map

- HBMC.zip

Authorized individual

John Pipan

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

HILO BENIOFF MEDICAL CENTER
KEA‘AU OUTPATIENT CENTER

DRAFT ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT FOR
HILO BENIOFF MEDICAL CENTER (HBMC)
CONSTRUCTION OF MEDICAL OFFICES
KEA‘AU, PUNA, ISLAND OF HAWAI‘I
TMK (3) 1-6-003: 081

OCTOBER 2024

Prepared by
Land Planning Hawai‘i LLC
194 Wiwo‘ole Street
Hilo, Hawai‘i 96720

This document is prepared pursuant to:
The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200.1, Hawai‘i Department of Health Administrative Rules (HAR)

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TABLE OF CONTENTS

FIGURES

APPENDICES

ABBREVIATIONS

HMC	Hilo Medical Center
HBMC	Hilo Benioff Medical Center
KOC	Kea‘au Outpatient Center
DWS	Department of Water Supply
BMPs	Best Management Practices
TIAR	Traffic Impact Analysis Report
HDOT	Hawai‘i Department of Transportation
SHPD	State Historic Preservation Division

GP	Hawai‘i County General Plan
PCDP	Puna Community Development Plan
SPP	Special Permit
EA	Environmental Assessment
DEA	Draft Environmental Assessment
FEA	Final Environmental Assessment
HEPA	Hawai‘i Environmental Policy Act
HRS	Hawai‘i Revised Statutes
HAR	Hawai‘i Administrative Rules
FONSI	Finding of No Significant Impact
EIS	Environmental Impact Statement
DOH	Department of Health
USGS	United States Geological Survey
USDA	United States Department of Agriculture
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
SMA	Special Management Area
HWMO	Hawai‘i Wildfire Management Organization
UIC	Underground Injection Control
DOFAW	Division of Forestry and Wildlife
DLNR	Department of Land and Natural Resources
ROD	Rapid ‘Ōhi‘a Death
CAA	Clean Air Act
ESA	Environmental Site Assessment
ASTM	American Society for Testing and Materials
REC	Recognized Environmental Condition
MSDS	Material Safety Data Sheets
PPE	Personal Protective Equipment
WWTW	Wastewater Treatment Works
LUPAG	Land Use Pattern Allocation Guide
CDP	Community Development Plan
NPDES	National Pollutant Discharge Elimination System
SWPPP	Storm Water Pollution Prevention Plan
SWMP	Solid Waste Management Plan
DEM	Department of Environmental Management
ALICE	Asset Limited, Income Constrained, Employed
LCA	Land Commission Award
IPCC	Intergovernmental Panel on Climate Change

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES

Hilo Medical Center (HMC), recently renamed Hilo Benioff Medical Center (HBMC) has served as the largest hospital and primary healthcare provider on the Island of Hawai‘i since 1897. They have also played a vital role in expanding healthcare access to rural areas of the island by establishing primary and specialty care clincs throughout Puna. The Puna District faces many healthcare challenges including increasing demand, overcrowding, and accessibility issues. Therefore, HMC is proposing to construct a new medical facility in Kea‘au known as the Kea’au Outpatient Center (KOC) to help address these issues.

The subject property is located to the west of Highway 130 at 16-790 Kea‘au Pahoa Road, approximately 780 feet south from its convergence with Kea‘au-Pāhoa Bypass Road (**Figure 1**). The site is 7.013 acres of land zoned *Agricultural 20-acres* (A-20a). The property was subdivided in February 2024 from the larger 26.76-acre parent parcel by subdivision 2023-000216. HBMC has retained an option to purchase and develop an additional contiguous 2 acres should the project require additional land area. The current extent of the proposed project includes 7-acre lot and the optional additional 2 acres (hereinafter referred to as “property”).

Plans include construction of a single-story medical office building complex consisting of a clinical wing and a behavioral health wing, totaling approximately 36,000 square feet. Sufficient paved parking stalls and loading zones are proposed meeting zoning code requirements. The total disturbance area for the project is proposed to be approximately 7-9 acres (**Figure 2).**

On-site infrastructure is expected in the form of driveways, parking, electrical, water supply, storm water management, and wastewater disposal facilities. Electricity is available to the site via existing overhead transmission and distribution poles along Kea‘au-Pāhoa Road. The subject property is fronted by a Department of Water Supply (DWS) 8- inch water main which is looped back into the existing 12-inch water main on Kea‘au-Pāhoa Road. Consultation with DWS indicates that adequate water is available for the proposed use and for fire suppression. Water calculations will be developed in consultation with DWS to determine appropriate water supply lateral size for the proposed development. There is no county sewer line in the area. Wastewater will be handled through a wastewater treatment facility that provides secondary treatment required per Department of Health rules.

Minor and short-term construction phase impacts to noise, air and water quality will be mitigated by Best Management Practices (BMPs) associated with County Special Permits, Department of Health regulations, Grubbing and Grading Permits, a National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP).

Access to the subject property is proposed via a driveway off Old Pahoa Government Road near the intersection of Old Kea‘au-Pāhoa Road and Mamaka Street. An alternative to connect the project driveway to Old Kea‘au-Pāhoa Road is also evaluated (**Figure 3**). A sliver parcel identified as TMK (3) 1-6-003: 080 is State land located between the subject property and the

Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, US Census Bureau, USDA, USFWS, Esri, NASA, NGA, USGS, Sources: Esri, USGS

FIGURE 1 LOCATION MAP

ArcGIS Web AppBuilder

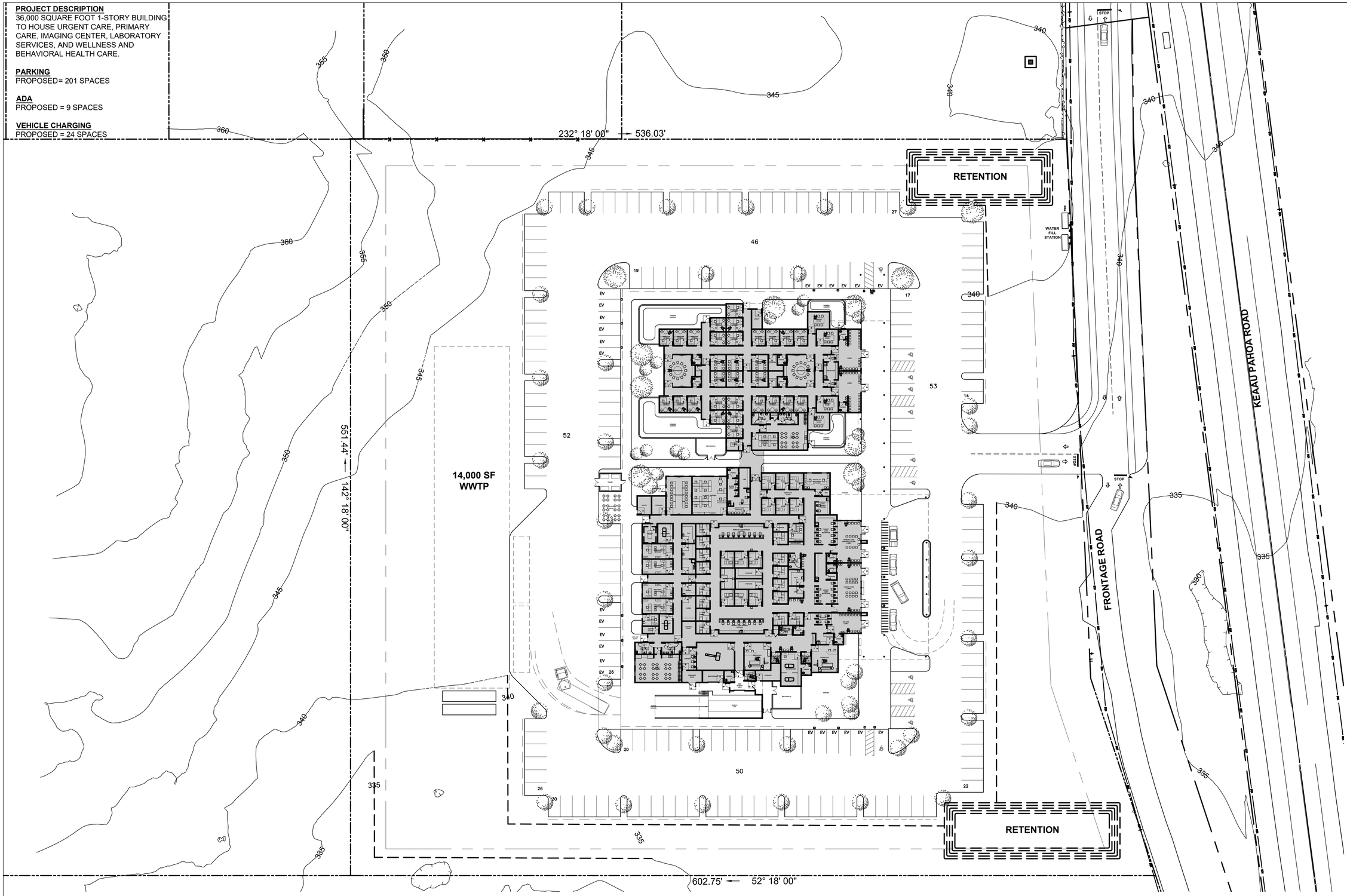
Sources: Esri, USGS | Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, US Census Bureau,

PROJECT DESCRIPTION
36,000 SQUARE FOOT 1-STORY BUILDING TO HOUSE URGENT CARE, PRIMARY CARE, IMAGING CENTER, LABORATORY SERVICES, AND WELLNESS AND BEHAVIORAL HEALTH CARE.

PARKING
PROPOSED= 201 SPACES

ADA
PROPOSED = 9 SPACES

VEHICLE CHARGING
PROPOSED = 24 SPACES



1 **SITE PLAN**
SCALE: 1/32" = 1'-0"

NORTH

FIGURE 2 CONCEPTUAL SITE PLAN

FLEMING & Associates, LLC
557 MANONO STREET
HILO, HAWAII

SCOTT E. FLEMING
LICENSED PROFESSIONAL ARCHITECT
No. 11441
HAWAII, U.S.A.

EXP. DATE: 04/30/2026

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION AS DETAILED IN SECTION 16-115-5 HAWAII ADMINISTRATIVE RULES, DEPT. OF COMMERCE AND CONSUMER AFFAIRS, ENTITLED PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

THE KEA'AU BENIOFF HEALTH CENTER WELLNESS AND BEHAVIORAL HEALTH SCHEMATIC DESIGN

OLD PAHOA GOVERMENT ROAD
HILO, HAWAII, 96749
TAX MAP KEY: (3) 1-6-003-0081: LOT 1-A

CONSULTANT:

REVISIONS

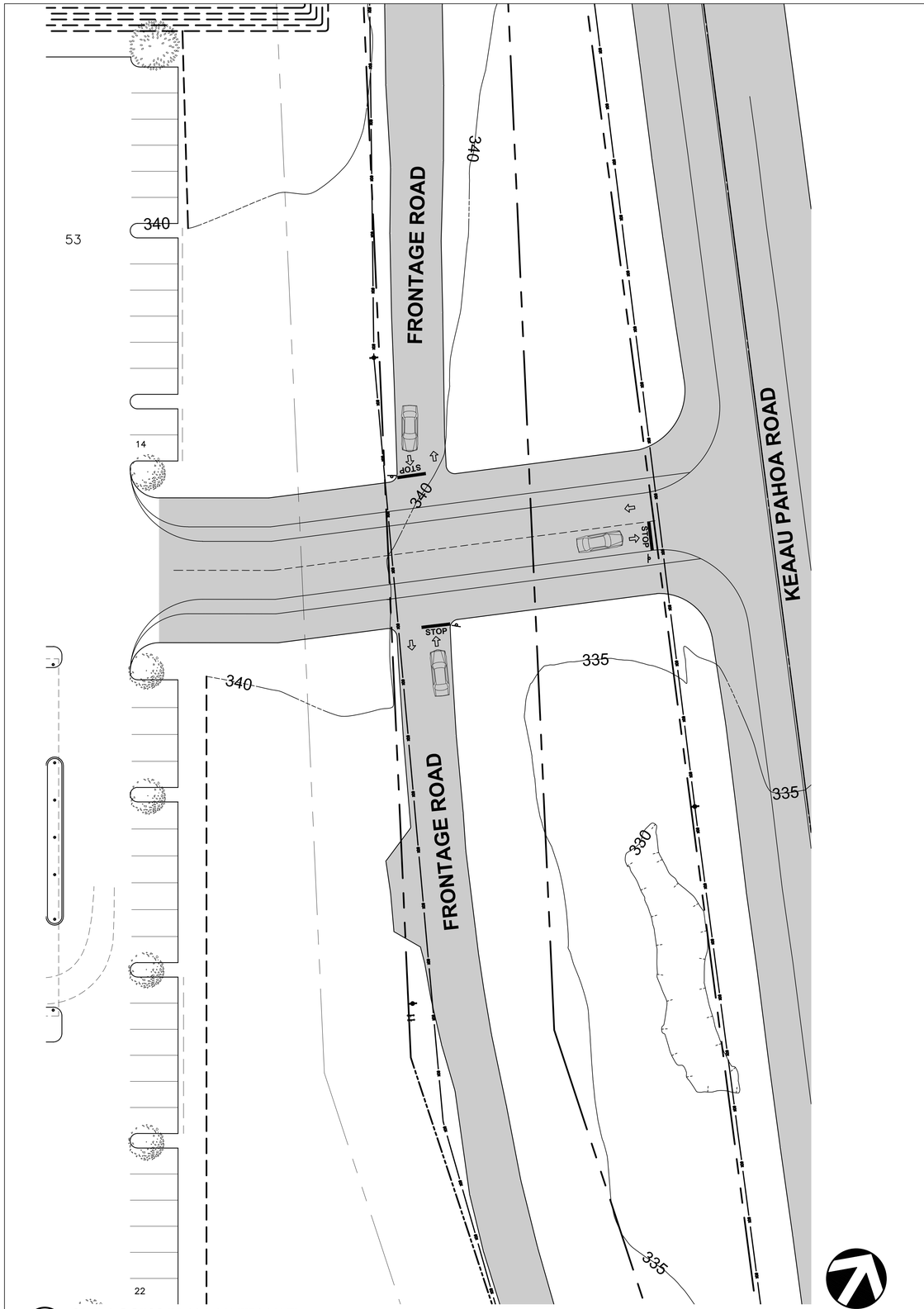
Rev	Description	Date

PROJECT NO.: 24007.00
PROJECT ARCH.: SF
PROJECT PLANS:

SHEET CONTENTS:
SITE PLAN

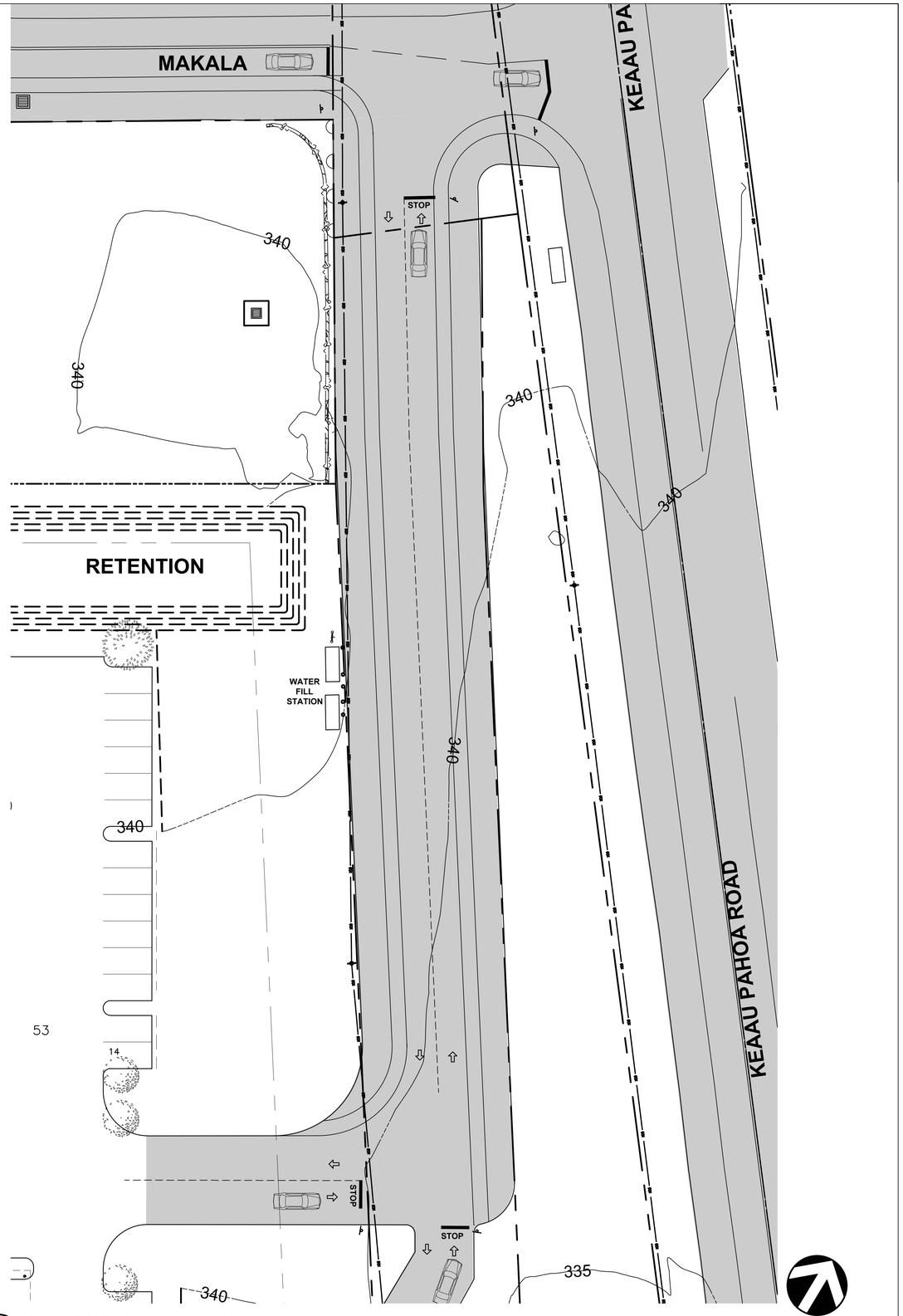
DATE: SEPTEMBER 2024

SHEET:
A01



2 **SITE ACCESS PLAN ALTERNATE 2**
SCALE: NO SCALE

NORTH



1 **SITE ACCESS PLAN ALTERNATE 1**
SCALE: NO SCALE

NORTH

FIGURE 3 PROPOSED ACCESS ALTERNATIVES

FLEMING &
Associates, LLC
557 MANONO STREET
HILO, HAWAII

SCOTT E. FLEMING
LICENSED PROFESSIONAL ARCHITECT
No. 11441
HAWAII, U.S.A.

EXP. DATE: 04/30/2026

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. OBSERVATION AS DETAILED IN SECTION 16-115-5 HAWAII ADMINISTRATIVE RULES, DEPT. OF COMMERCE AND CONSUMER AFFAIRS, ENTITLED PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS.

THE KEA'AU BENIOFF HEALTH CENTER
WELLNESS AND BEHAVIORAL HEALTH
SCHEMATIC DESIGN
OLD PAHOA GOVERMENT ROAD
HILO, HAWAII, 96749
TAX MAP KEY: (3) 1-6-003-0081: LOT 1-A

CONSULTANT:

REVISIONS

Rev	Description	Date

PROJECT NO.: 24007.00
PROJECT ARCH.: SF
PROJECT PLANS:

SHEET CONTENTS:
SITE ACCESS PLAN
ALTERNATE 1 & 2

DATE: SEPTEMBER 2024

SHEET:
A04

Kea‘au-Pāhoa Road Right-of-Way (ROW). Therefore, roadway improvements within the ROW will require State of Hawai‘i Department of Transportation (HDOT) review and approval. A Traffic Impact Analysis Report (TIAR) was completed by SSFM in October 2024. The TIAR is summarized in Section 3.3.1 and the full report can be found in **Appendix A**. All traffic and access improvements will be completed in consultation with HDOT.

Surveys have determined that no threatened or endangered flora or fauna species are present on the property. Vegetation mainly consists of foxtail palm (*Wodyetia bifurcate*), bismark palm (*Bismarckia nobilis*), Mexican fan palm (*Washingtonia robusta*), ironwood (*Casuarina equisetifolia*), areca palm (*Dypsis lutescens*), guinea grass (*Megathyrsus maximus*), gunpowder tree (*Trema orientale*), avocado (*Persea* americana), and albizia (*Falcataria Moluccana*).

The subject site has been previously cleared and used for agricultural purposes since at least the early 1950’s. In the unlikely event that undocumented archaeological resources, including shells, bones, midden deposits, lava tubes, or similar finds, are encountered during construction, work in the immediate area of the discovery will be halted, and the State Historic Preservation Division (SHPD) will be contacted to determine the appropriate actions.

A Phase I Environmental Site Assessment (ESA)(**Appendix C**) was conducted in September 2023 and subsequent Hazardous Materials survey and soil screen (**Appendix D**) on the subject Property from June 20-21, 2024, by Lehua Environmental Inc. The survey determined that the grey mastic located throughout the metal corrugated roof of the warehouse was a category I non-friable asbestos-containing material (ACM). The applicant will strictly follow the recommendations of the survey and have the material removed and disposed of by a qualified asbestos abatement contractor prior to disturbance. Additionally, the services of a qualified consultant will be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of ACM.

Additionally, the survey also identified lead-containing paint (LCP) in poor to fair conditions on various interior and exterior painted surfaces within the planned areas of disturbance. The recommendations of the survey will be followed to ensure property handling and disposal of LCPs.

Arsenic-impacted soils with concentrations that exceed the arsenic Hawaii Department of Health Tier 1 Environmental Action Level for unrestricted land use was detected in the northern corner of the lot 0” – 6” below ground surface. The requirements and recommendations listed in the report and concurred by the Department of Health will be strictly followed.

The proposed action does not conflict with the Hawai‘i County General Plan (GP) or the Puna Community Development Plan (PCDP). A Special Permit (SPP) will be submitted to the Hawai‘i County Planning Department in conjunction with this EA to justify unusual and reasonable use according to State Land Use Regulations. The Special Permit petition area does not exceed 15 acres in land area; therefore, the County Winward Planning Department has the authority to review and grant the Special Permit. Establishment of the proposed use will not be contrary to the objectives sought to be accomplished by State Land Use Laws and Regulations.

PART 1: PROJECT DESCRIPTION AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Purpose and Need

Hilo Benioff Medical Center is tasked with serving not only the residents of Hilo but also those from surrounding areas including Puna, Volcano, and the Hāmākua Coast. Puna is the fastest growing region in the state. According to census data, it has seen a population increase from about 31,000 people in 2000 to nearly 52,000 people in 2020 and is expected to top 75,000 residents within the next 6 years. Its rapid population growth has created increased demand on the existing healthcare services, which are currently insufficient to serve the growing population, especially with regard to urgent health care and specialty services. The entire Puna District currently contains only two small emergency health clinics – the East Hawaii Health Clinic in Kea‘au and the East Hawaii Health Clinic in Pahoa. Urgent care services are only provided by these clinics between 7:00 a.m. and 7:00 p.m. and 7:00 a.m. and 5:00 p.m., respectively. Additionally, access to specialty care, EKG and imaging services are also very limited in Puna and currently only offered at the Kea‘au East Hawaii Health Clinic. Insufficient access to health services in Puna requires many Puna residents to seek care in Hilo. As a result, Hilo Medical Center has strained to accommodate the influx of patients, resulting in long wait times, overcrowding, and compromised quality of care at times. Development of the new Hilo Medical Center facilities in Kea‘au will help to fill in existing gaps in availability of urgent care, specialty care and imaging services for Puna residents.

The Hawai‘i County General Plan discusses the importance of social services including:

Social services include not only programs to provide assistance to special needs populations, but also health and medical facilities to serve the entire community. “Medical facilities”, in this instance, does not apply to County emergency paramedical services, which are covered in the following Section 3.4. With a growing population, Puna clearly needs more social and health care services within the district. Yet, there are two major challenges to making them accessible to residents:

- *As a rural area with a rudimentary transportation system and dispersed population, it is difficult for residents in need to reach the services; and*
- *Puna’s high percentage of low-income residents tends to increase the need for social services, yet discourages private health care providers from locating in Puna due to insurance issues.*

1.2 Project Description and Location

The subject property is located to the west of Highway 130 at 16-790 Kea‘au Pahoa Road, approximately 780 feet south from its convergence with Kea‘au-Pāhoa Bypass Road.

Plans include construction of a single-story medical office building complex consisting of a clinical wing and a behavioral health wing and totaling approximately 36,000 square feet. Sufficient paved parking stalls and loading zones are proposed meeting zoning code

requirements. The total disturbance area for the project is proposed to be approximately 7-9 acres.

The proposed facilities will provide urgent care services seven (7) days per week, including holidays, from 8:00 a.m. to 8:00 p.m. Primary care services, specialty clinic services (e.g. cardiology), imaging services (e.g. X-rays, CT scans, ultrasounds), laboratory services, and behavioral health and counseling services will be available Monday – Friday from 8:00 a.m. – 4:00 p.m. The facilities will serve the general public, but primarily residents of Puna and South Hilo. It is anticipated that the facility will serve over 100 patients per day.

The facility will provide outpatient care only and will not be an emergency room, will not receive ambulances, and will not provide drug rehabilitation services.

1.3 Cost and Schedule

Total project construction costs are roughly $90 million, completion is estimated by the end of 2027.

1.4 Environmental Assessment Process

In 1974 the Hawai‘i State Legislature enacted the Hawai‘i Environmental Policy Act (HEPA), which requires State and County agencies to conduct an environmental impact analysis prior to making decisions on actions that may impact the environment.

This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS), along with the implementing regulations, Title 11, Chapter 200.1, of the Hawai‘i Administrative Rules (HAR). This law is the basis for the environmental impact assessment process in the State of Hawai‘i. An EA is necessary for the proposed project since the project involves the use of State of Hawai‘i funds and land. Improvements within the State Right-Of-Way are anticipated for the proposed access to the project, and as mitigation for traffic impacts to nearby intersections. Additionally, the project will utilize public funding sources for its completion. Since discretionary approval is required for the project in the form of a Special Permit, HRS 343-5.5 requires the EA to be completed.

According to Chapter 343, an EA is prepared to determine impacts associated with a proposed action, develop mitigation measures for any discovered adverse impacts, and determine whether the impacts are significant (according to the thirteen specific criteria). If a study concludes that no significant impacts would occur from implementation of the proposed action, a Finding of No Significant Impact (FONSI) is prepared. If a study finds that significant impacts are expected to occur because of a proposed action, then an Environmental Impact Statement (EIS) is prepared to allow deeper investigation of impacts and allow more extensive public involvement.

The following EA discusses alternatives to the proposed action, existing environment and impacts associated with the proposed action, the anticipated determination and the findings made by the applicant in consultation with the County of Hawai‘i Planning Department and the expert consultants who prepared supporting studies for this EA.

1.5 Public Involvement and Agency Coordination

Agency coordination and public involvement are crucial components of the environmental assessment process to understand the impacts caused by the proposed action. The agencies, organizations, and individuals below have been consulted as part of the environmental assessment process. Copies of correspondence during the early consultation period can be found in **Appendix B.**

State of Hawai‘i

- Department of Land and Natural Resources, Land Division
- Department of Land and Natural Resources, Division of Aquatic Resources
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- Department of Land and Natural Resources, Office of Conservation & Coastal Lands
- Department of Land and Natural Resources, Engineering
- Department of Land and Natural Resources, Historic Preservation
- Hawai‘i Department of Transportation
- Office of Hawaiian Affairs
- State Department of Health
- State Office of Planning and Sustainable Development
- Department of Education

County of Hawai‘i:

- Planning Department
- Fire Department
- Police Department
- Department of Environmental Management
- Department of Public Works
- Department of Water Supply
- Civil Defense

Private

- Ke Kula ‘o Nāwahīokalani‘ōpu‘u Iki Lab Public Charter School
- Surrounding Property Owners within 300 feet of the Property outline

PART 2: ALTERNATIVES

2.1 Alternate Location

During early phases of project planning HBMC evaluated alternate locations for the project in the general area. After full consideration the property was selected as it provides the best overall location for the proposed facility. The property is centrally located and of sufficient size for the full buildout. Necessary utilities and infrastructure also exist at the project site.

There do not appear to be any significant environmental or other factors relating to the proposed use of the site. As such no alternative sites have been identified for study in the Environmental Assessment.

2.2 Alternate Site Layout, Phasing, Access & Building Design

Aside from the proposed action, two alternative site designs were evaluated for the project. The first included constructing three (3) two-story 20,000 square foot buildings over two (2) construction phases. The second alternatve design proposed constructing two (2) single-story 20,000 square foot buildings over two (2) construction phases. These alternative designs or other similar designs would entail similar overall impacts to the proposed action. The phasing alternaives similarly, do not affect the overall impact of the project.

Access Alternatives

There are two potential driveway alignments being considered for the development. Alternative 1 proposes direct access via a driveway off Old Pahoa Government Road, that would be proposed for improvement, located just off of the intersection of Old Kea‘au Pāhoa Road and Mamaka Street. Alternative 2 proposes driveway access to extend from the site as a newly improved road, crossing the existing Old Pahoa Government Road, and connecting to Old Kea‘au Pāhoa Road. Alternative 2 is the preferred alternative.

2.3 No Action

Under a No Action alternative, the medical facility would not be built, and no improvements would be made to the land. The lot would remain in agricultural use and primarily undeveloped. The potential for economic development and positive community impact would largely be lost. This EA considers the No Action alternative as the baseline for this project and all environmental effects will be based off this alternative.

PART 3: ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

3.1 Physical Environment

3.1.1 Geology, Geologic Hazards, and Soils

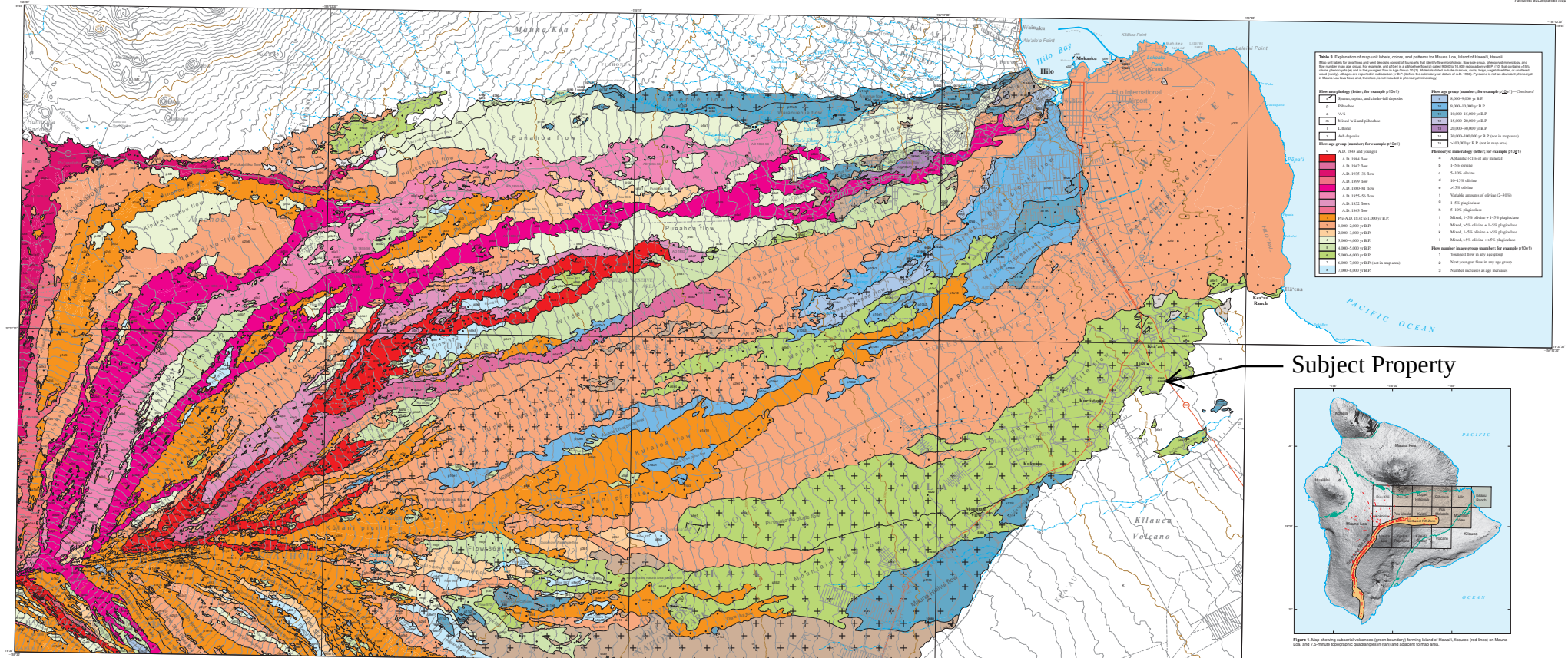
Environmental Settings

Volcanic Activity

Geological hazards are frequent island wide, but particularly so in the Puna area. According to the Puna Community Development Plan, all of Puna lies within the three most hazardous geological risk zones, Lava Zone 1, 2 and 3, on a scale ranging from 9 to 1, ranking least hazardous to most. The subject property lies within Lava Zone 3, approximately 1-5 percent of

U.S. Department of the Interior
U.S. Geological Survey

Scientific Investigations Map 2932–A
Sheet 1 of 2
Pamphlet accompanies map



THIS MAP IS NOT INTENDED FOR NAVIGATION

FIGURE 4 GEOLOGY

which has been covered by lava flows since 1800, and 15-75 percent within the past 750 years (Thomas et al., 1992).

The subject property sits close to the boundary between Mauna Loa and Kīlauea volcanoes. Nonetheless, according to most geological maps, the site falls just within the boundaries of Mauna Loa.

Mauna Loa is the largest active volcano on earth, rising over 13,500 feet above sea level and extending to a depth of 16,400 feet below sea level. The sea floor is depressed another 26,250 feet due to the volcano's enormous mass. Therefore, from the base to the summit, Mauna Loa is more than 56,000 feet high (HVO, 2022). Since 1843, Mauna Loa has erupted 33 times with an average of one eruption every five years. Exceptions to this pattern occurred during a 25-year hiatus between 1950 and 1975 and a 38-year hiatus from 1984 to 2022. On Sunday November 27, 2022, an eruption began in the summit caldera, Moku'āweoweo. After some hours, new fissures opened along the Northeast Rift Zone. By December 2, the eruption was limited to one fissure, which advanced less than 2 miles from Saddle Road. On December 13, 2022, the eruption ceased.

It's probable that the subject property hasn't experienced a lava flow for thousands of years because of its considerable distance from Mauna Loa's most active rift zones. A USGS geological map of the northeast flank of Mauna Loa suggests the subject property is located near the pu'u maka'ala picrite flow identified as *p6e1*, which was a pahoehoe flow that occurred between 5,000 and 6,000 years ago (**Figure 4**) (Trusdell and Lockwood, 2017). Furthermore, Moore and Trusdell (1991), suggest only eleven lava flows have traveled northeast from Kilauea's East Rift Zone over the past 1,500 years.

Earthquake Activity

Aside from lava, the Island of Hawai'i is also susceptible to earthquakes. The USGS recently came out with a model of earthquake probability for the Hawaiian Islands, which better estimates hazard probability compared to previous models. The ground shaking model indicates that Hawai'i Island has a greater than 90 percent chance of experiencing an earthquake with slight (or greater) damage during the next 100 years (**Figure 5**).

The Kea'au area is susceptible to ground shaking from earthquakes originating from both Mauna Loa and Kīlauea volcanoes. It is not uncommon to experience frequent slight tremors in Kea'au as a result. Larger events, however, occur much less frequently and are more difficult to predict.

Notable earthquakes that have impacted the area have occurred in 1973, 1975, and 2018. In 1973, a magnitude-6.2 earthquake struck 29 miles beneath the town of Honomu, just north of Hilo. The depth of the earthquake is what caused such widespread and severe damage. Eleven people were reported injured in Hilo, four of which were hospitalized. An unknown number of injuries were also reported in Waimea. Approximately $5.6 million dollars of structural damage was recorded across the island (~$40 million today). In 1975, a magnitude-7.2 earthquake struck the southern flank of Kīlauea volcano near the town of Kalapana and caused significant shaking throughout the entire island. This earthquake event also caused significant subsidence along

southeastern shores of the island. Most recently, the 2018 Kīlauea eruption proved to be historic in many ways, including the magnitude-6.9 earthquake that rattled the entire island. This earthquake caused significant shaking throughout Puna and Hilo. There were even some reports of shaking as far as O‘ahu.

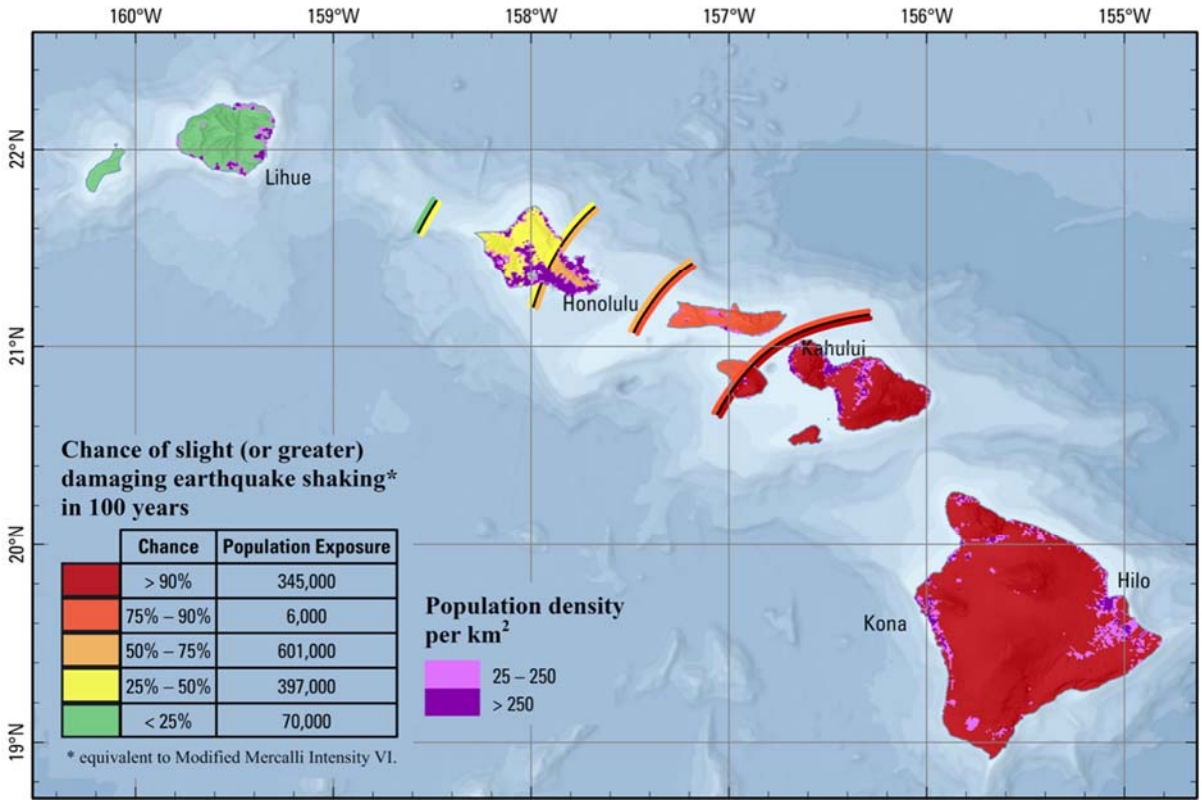


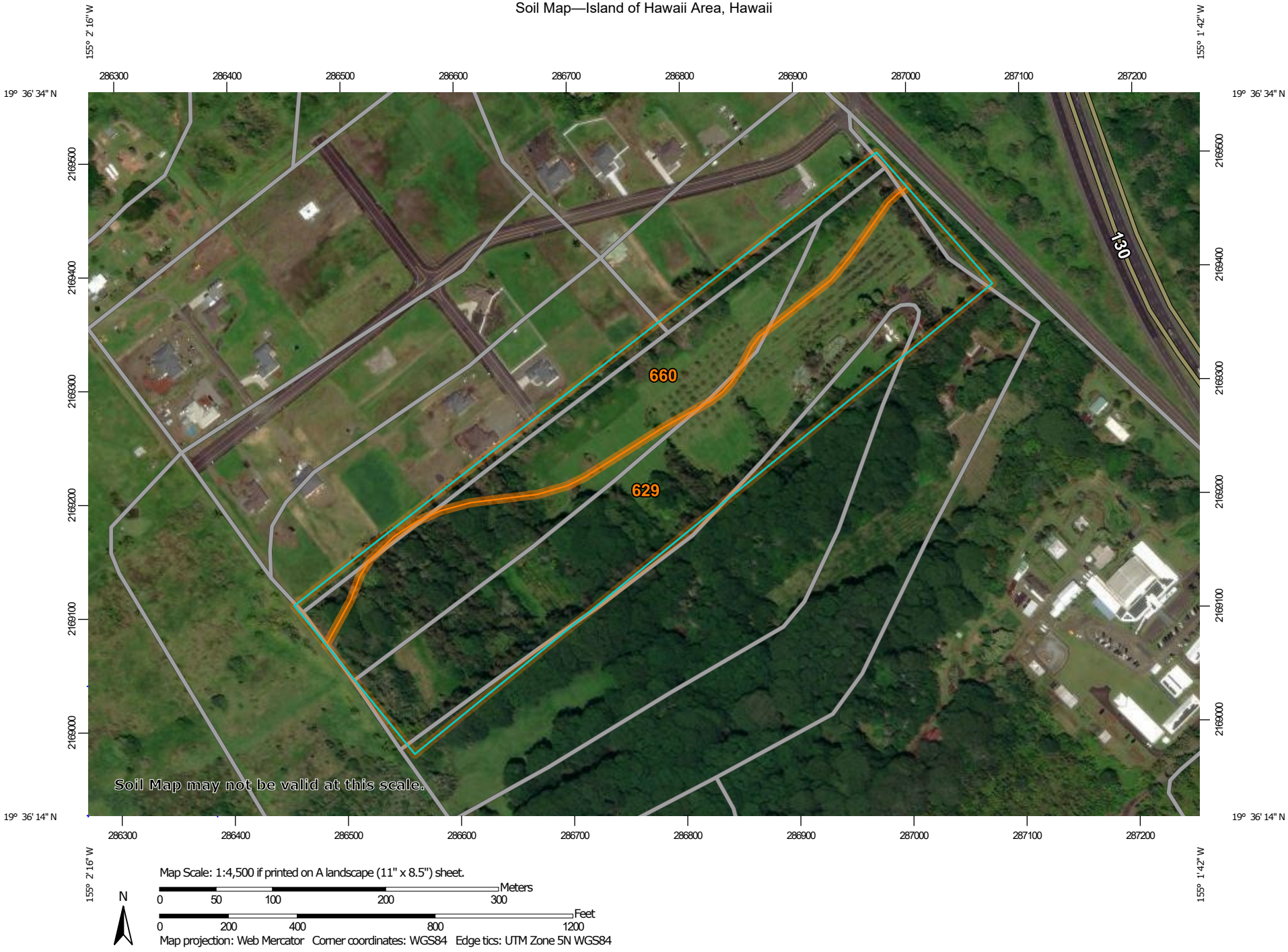
Figure 5: 2021 USGS Model of Earthquake Probability for the Hawaiian Islands

Topography and Soil

The topography of the property directs surface flow from the back southwest end at 400 feet in elevation, to the front northeast end, roughly 330 feet above sea level.

The United States Department of Agriculture (USDA) Natural Resources Conservation Service, Soils Survey Report classifies approximately 30 percent of the soil in this area as Ola‘a Series (OID) cobbly hydrous loam with 2 to 10 percent slopes (*2kllk*). This series is basic volcanic ash over a‘a lava, which is well-drained and has a low runoff class. The other 70 percent of soil on the property is designated as Panaewa very cobbly hydrous loam with 2 to 10 percent slopes (*2klkz*). This series is basic volcanic ash over pahoehoe lava and is moderately well drained with a high runoff class. Neither soil type is considered prime farmland. **Figure 6** shows the Ola‘a series on the northern half of the property identified as 660 and the Panaewa series lies on the southern half, labeled 629.

Soil Map—Island of Hawaii Area, Hawaii



Potential Environmental Impact from Proposed Action

The proposed action is not anticipated to increase the likelihood of volcanic activity or earthquakes, and potential impacts from such events is expected to be minimal. Potential impacts from geological hazards and soils will not change appreciably under any alternative action, except a no action alternative. In the event of an earthquake, there may be some ground shaking, particularly during a significant seismic event. However, all structures will be designed and engineered to withstand seismic activity, adhering to the standards outlined in Hawai‘i County Code.

Should a lava flow pose a threat to Kea‘au, there would likely be adequate time to evacuate to a secure location. Located just west of Highway 130, the subject property offers a strategic position for swift and efficient evacuation. However, considering the intended use of the project as a medical facility, it may be necessary to develop an emergency response plan. If required, HBMC will ensure the development and implementation of a comprehensive evacuation strategy to safeguard the safety and well-being of all occupants.

Mitigating Measures Geology, Geological Hazards, and Soils

Considering and implementing appropriate safety measures and protocols associated with geological hazards is essential in the development of any public facility. All buildings intended for the proposed development will be engineered and designed to endure seismic hazards, in compliance with the Hawai‘i County Code. If required, an Emergency Preparedness and Response Plan will be submitted to the Hawai‘i County Civil Defense Agency for review and approval.

Best Management Practices for construction activities will be strictly followed to prevent adverse impacts to soil. Hawai‘i Administrative Rules Chapter 11-55, Appendix C, under Special Conditions for Land Disturbances, describes the following construction management techniques to protect soil:

a. Clearing and grubbing shall be held to the minimum necessary for grading and equipment operation.
b. Construction shall be sequenced to minimize the exposure time of the cleared surface area.
c. Construction shall be staged or phased for large projects. Areas of one phase shall be stabilized before another phase is initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
d. Erosion and sediment control measures shall be in place and functional before earth moving operations begin. These measures shall be properly constructed and maintained throughout the construction period.
e. All control measures shall be checked and repaired as necessary, for example, weekly in dry periods and within twenty-four hours after any rainfall of 0.5 inches or greater within a 24-hour period. During prolonged rainfall, daily checking is necessary. Record of checks and repairs must be maintained.

f. Records of the duration and estimated volume of storm water discharge must be maintained.
g. A specific individual shall be designated to be responsible for erosion and sediment controls on the project site.

3.1.2 Flood Zones

Environmental Setting

According to the Federal Emergency Management Agency (FEMA), the subject property is located within Flood Zone X, which is outside the 500-year floodplain (**Figure 7**). It is also located 4 miles from the coast and is not within the County Special Management Area (SMA) or the County Tsunami Evacuation Zone. The proposed project will not be impacted by any coastal hazards or affect erosion, coastal ecosystems, or marine resources. There are no naturally occurring wetlands, ponds, or lakes in the area. However, USGS Stream Stats indicate the presence on an unnamed drainage path that runs parallel to the southern property line and also transects the southwest corners of the site. The drainage basin extends to cover over half the site on the southwest end. The drainage basin appears to extend from the slopes of Mauna Loa and is calculated to generate 3,220 cubic feet per second (cfs) of runoff in a 100-year storm event (USGS, 2024).

Potential Environmental Impact from Proposed Action

Since the property is outside of the 500-year floodplain, overall flooding risk for the site is low. During a storm event there is potential for localized flooding from overwhelmed drainage systems. The drainage path on site exacerbates this risk.

Potential impacts from flooding will not change appreciably under any alternative action, except a no action alternative. However, a no-action alternative lacks significant justification since appropriate measures will properly mitigate risks.

Impacts and Mitigating Measures

Consideration should be given to allowing offsite drainage to flow through the project site using a properly sized natural or man-made channel. Depending on the existing drainage structures (culverts) along the highway, there may be instances of overtopping of this drainage. The design of the building pad should account for the impact of backwater conditions.

Improvements to onsite drainage must adhere to the Drainage Standards of the Hawai‘i County Department of Public Works. The drainage design will undergo review and approval by DPW-Engineering before plan submission for approval. The design for storm drainage will be based on a 10-year, one-hour storm event, with all post-development increases required to be retained on-site.

As indicated, in the NRCS soil survey, surface runoff infiltration is expected to be rapid. Consequently, shallow drainage sumps are deemed appropriate for the site.

National Flood Hazard Layer FIRMette

FEMA

155°2'12"W 19°36'47"N

FIGURE 7 FLOOD ZONE MAP

155°1'34"W 19°36'13"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/4/2023 at 6:50 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

3.1.3 Climate and Climate Change

Environmental Settings

Climate

The climate in the subject area is warm and moist, with an average annual rainfall of 142 inches and a mean annual temperature of 75 degrees Fahrenheit (Giambelluca et al., 2013).

Climate Change

The Hawai‘i Revised Statues §226-109 and Hawai‘i Administrative Rules §11-200.1 strongly encourages a climate change perspective be incorporated into the environmental assessment process. This entails evaluating how the outcomes of the analysis may be influenced by foreseeable future conditions impacted by climate change. Given the widespread impact of climate change on U.S. communities, it is imperative to assess the vulnerability of each factor under review to present and anticipate climate change effects. Additionally, careful consideration should be given to ensuring that the project and its occupants are adequately safeguarded from the potential impacts of climate change. This proactive approach aligns with the commitment to environmental responsibility and resilience in the face of evolving climatic conditions.

Human activities, particularly the emissions of greenhouse gases, have undeniably caused global warming, resulting in a 1.1°C increase in global surface temperature from 2011 to 2020 compared to 1850-1900 levels. The rise in greenhouse gas emissions stems from unsustainable practices in energy use, land use, lifestyle, and consumption patterns, contributing to an uneven global impact. This has triggered widespread and rapid change across the atmosphere, ocean, cryosphere, and biosphere, influencing various weather and climate extremes globally. These changes have led to adverse impacts on nature and people, causing significant losses and damage. Regional effects include heightened tropical cyclones, extratropical storms, increased aridity, and elevated fire weather. Continued emissions are projected to further raise global temperatures, potentially reaching 1.5°C in the near term, intensifying multiple concurrent hazards with each incremental warming (IPCC, 2023).

The University of Hawai‘i’s Sea Grant College Program confirms that Hawai‘i is getting warmer. Data shows an increase in air temperature over the last 30 years of roughly 0.3°F per decade. For Hawai‘i this not only means rising sea levels, but also more contrast in the wet and dry season, which may lead to more frequent and intense precipitation and flooding (Tetra Tech, 2020).

In general, rainfall in Hawai‘i has been variable in the recent past with some drier years and some wetter years on average. El Niño provides periodic variation in winds and sea surface temperatures in the Pacific contributing to warming phases, while La Niña contributes to cooling phases. Increases in air temperature related to climate change will lead to more evaporation and more moisture in the air, which will contribute to variability in El Niño and La Niña events.

The 2019 Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing Climate explicitly highlights a rise in the frequency of Category 4 and

5 tropical cyclones, commonly referred to as ‘hurricanes’ in the central Pacific.

> The average intensity of tropical cyclones, the proportion of Category 4 and 5 tropical cyclones and the associated average precipitation rates are projected to increase for a 2°C global temperature rise above any baseline period (*medium confidence*). Rising mean sea levels will contribute to higher extreme sea levels associated with tropical cyclones (*very high confidence*). Coastal hazards will be exacerbated by an increase in the average intensity, magnitude of storm surge and precipitation rates of tropical cyclones (Collins et al., 2019).

In addition, according to the AR6 Synthesis Report produced by the IPCC in 2023, “It is *likely* that the global proportion of major (Category 3–5) tropical cyclone occurrence has increased over the last four decades”.

Historically, the Island of Hawai‘i has been viewed as largely protected from experiencing storms of this magnitude due to the presence of Mauna Loa and Mauna Kea. However, recent years have shown that storms such as Iselle (2014) and Lane (2018) can have very damaging effects to the island.

On August 8, 2014, Hurricane Iselle made landfall in the Puna District of Hawai‘i County as a moderate tropical storm with sustained wind speeds of 70 miles per hour. Significant damage was felt in the southeastern portions of the Big Island, especially in the Wai‘ōpae area, which is a coastal stretch dotted with anchialine ponds and tidepools, known as Kapoho Tide Pools. Many homes were heavily damaged in this area. This was the most heavily damaged area, which is approximately 23 miles southeast of the subject site. Most of the southeastern portion of the Big Island experienced high winds, heavy rain, downed trees, and powerlines, cutting thousands of people off from electricity, water, and transportation for several days (Kimberlain et al., 2018).

Hurricane Lane occurred in late August 2018 and brought significant damage to the Hawaiian Islands from flash flooding and mudslides. Over a four-day period, Hawai‘i Island received an average of 17 inches of rain. Up to 159 structures were damaged, making it the wettest tropical storm to impact the Island. Although most of the flooding impacts were concentrated to Hilo, much of the southern windward side, including southern Puna, experienced impacts (Beven, 2019).

Wildfires are becoming more frequent and intense due to rising temperatures, change in rainfall patterns and the growth of non-native, fire prone grasses and shrubs. According to the Pacific Fire Exchange (PFE) (2021), “Fire risk is closely tied to wet and dry cycles where grasslands and savannas grow and then dry out”. Up to 25% of land in Hawai‘i is at fire-prone risk. According to the Hawai‘i Wildfire Management Organization (HWMO), about 0.5% of Hawai‘i’s total land area burns every year. Climate change is beginning to play a very serious role in the frequency and intensity of fires seen across the state. “Human ignitions coupled with an increasing amount of non-native, fire-prone grasses and shrubs and a warming, drying climate have greatly increased the wildfire problem” (HWMO, 2018). Further, expanding non-native, fire-prone grasses are less likely to recover from wildfires. Wildfires were once limited to active volcanic

eruptions and infrequent lightning strikes. The increase in wildfire prevalence poses threats to safety, agricultural production, natural and cultural resources (PFE, 2014).

In early August 2021, a vegetation fire ignited near Mana Road and traveled throughout Waimea and South Kohala. Approximately 40,000 acres were burned according to estimates from fire officials. It was the largest wildfire every recorded in Hawai‘i County. Thousands of people were forced to evacuate from Waiki‘i Ranch and Pu‘u Kapu Hawaiian Homesteads, where two homes were destroyed. Govenor David Ige declared a state of emergency on August 4, 2021, to protect the health, safety, and welfare of Hawai‘i (West Hawai‘i Today, 2021). **Figure 8** is a map of wildfires in Hawai‘i between 1999 and 2022, including the Mana Road Fire depicted in dark red.

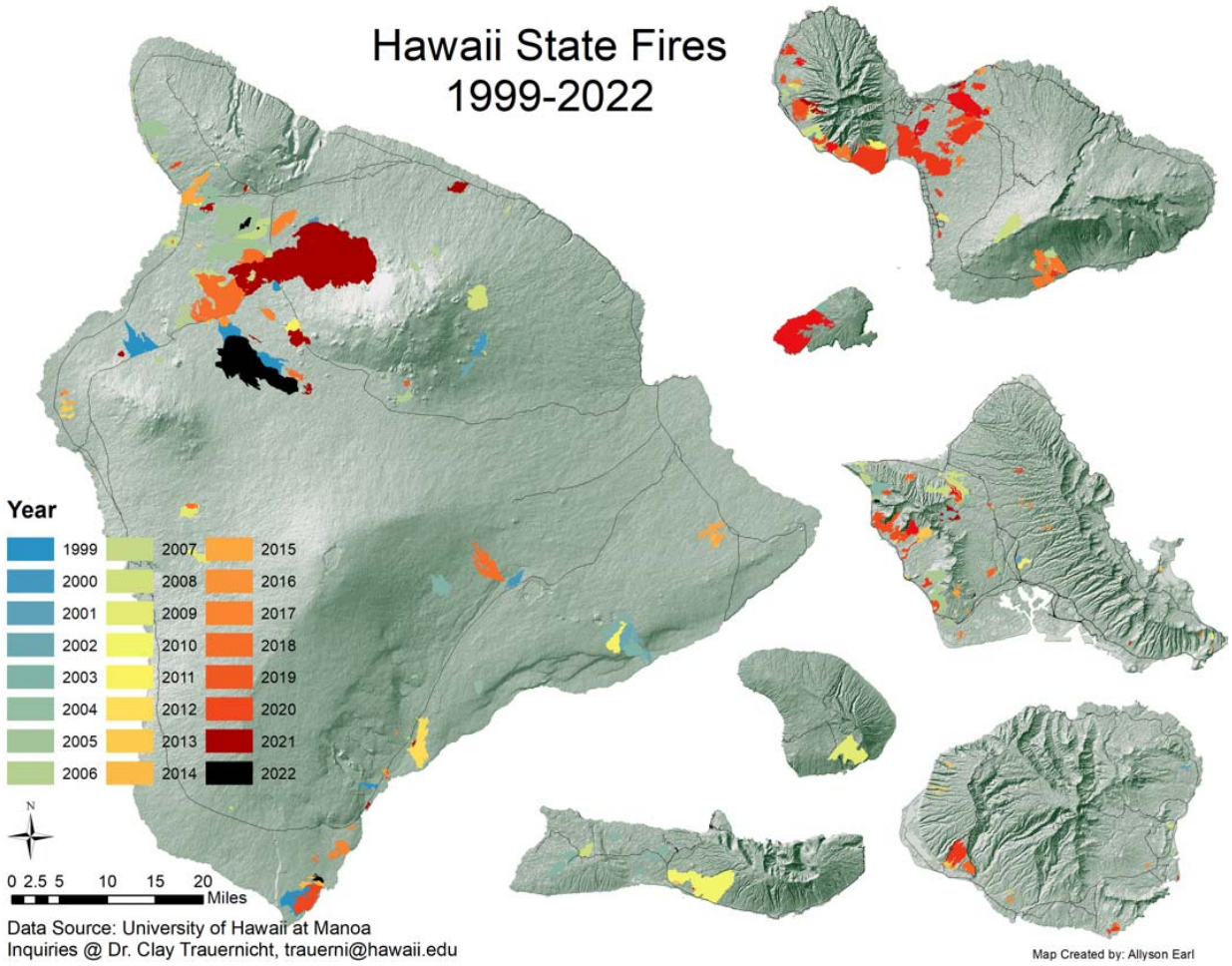


Figure 8: Hawai‘i State Fires Between 1999 and 2022

Not depicted on the above map are the devastating wildfires that occurred in August 2023. Hurricane Dora, moving south of the Island of Hawai‘i, interacted with a robust anticyclone north of the Hawaiian Islands. This interaction resulted in a sharp pressure gradient, generating powerful winds. Coupled with prevailing drought conditions, it led to wildfires on both Maui and Hawai‘i Island.

Early on August 8, 2023, several brush fires fueled by strong winds ignited on Maui. A Lahaina fire flareup prompted evacuations, road closures, and shelter-in-place advisories on western Maui. However, little warning, few escape routes, and interruption to cell phone service created a perfect storm of disastrous conditions. The Lahaina wildfire has since become the largest natural disaster in Hawai‘i’s state history and one of the deadliest wildfires in recorded U.S. history. More than 100 lives were lost, and over 2,200 buildings destroyed in Lahaina alone.

On the same day, wildfires ignited in the Kohala District on Hawai‘i Island, prompting evacuations for several nearby subdivisions and beach resorts. Roughly 1,000 acres of land burned with no loss of life.

Communities on the leeward side of the Hawaiian Islands are generally characterized by drier conditions and are therefore particularly vulnerable to wildfires. However, those on the windward side are progressively at greater risk due to the islands undergoing more frequent episodes of drought.

Potential Environmental Impact on the Proposed Action

While the proposed action will not exacerbate the adverse effects of climate change, it may be at risk of experiencing impacts from climate events. Coastal flooding and sea level rise do not currently pose a threat to the subject parcel due to its distance from the shoreline, however, hurricanes have the potential to extend their impact several miles inland. Potential impacts from hurricanes could include high winds, heavy rainfall, and localized flooding from mountain regions and overwhelmed drainage systems. Additionally, wildfires in the vicinity have the potential to produce poor air quality, disruptions to power, and property damage in extreme cases. Any potential impacts relating to climate change will not change appreciably under any alternative action.

Impacts and Mitigating Measures for Climate and Climate Change

It is imperative the development of any public facility implements appropriate safety measures and protocols in case of an adverse climate event. All buildings will be designed and engineered to withstand wind hazards according to the Hawai‘i County Building Codes.

The proposed action will comply with all required codes and regulations regarding drainage and runoff mitigation. These protections will prevent any adverse impacts relating to flooding potential in a storm event.

The proposed action will not contribute to adverse impacts resulting from climate change. The development will not promote any fire prone vegetation.

As these protective regulations apply equally to each alternative, there are no appreciable differences in potential impacts between project alternatives. If required, an emergency response plan will be drafted for the proposed development in the case of potential adverse impacts from a storm event.

3.1.4 Water Quality

Environmental Setting

According to the State Department of Health, the Underground Injection Control (UIC) line was established to protect ground water resources with drinking water potential. Areas *mauka* of the line are considered potential drinking water sources from the Hilo Aquifer. This is where most municipal water comes from. In contrast, areas *makai* of the line are considered non-potable. The subject property lies above the UIC line, however, a UIC permit may be required at the time of engineering site design, depending on whether deep or shallow drywells are used.

Potential Environmental Impact from the Proposed Action

The proposed action is not expected to pose a significant adverse risk to water quality, aquatic, or marine habitats due to the establishment of mitigating measures and BMPs. Additionally, the proposed action would control stormwater runoff from the site with appropriate drywells or similar drainage features. Furthermore, current construction plans do not anticipate encountering groundwater at the site.

No jurisdictional water bodies are present on site per Section 404 of the Clean Water Act, and a jurisdictional determination from the U.S. Army Corps of Engineers will not be necessary.

The implementation of mitigating measures means potential impacts to water quality won't change appreciably under any alternative action.

Impacts and Mitigating Measures

To safeguard near-shore waters and marine ecosystems, Best Management Practices will be implemented before and after construction to effectively contain soil and sediment and prevent potential harm. HBMC will ensure all earthwork and grading will be conducted in compliance with:

(a) "Storm Drainage Standards," County of Hawai'i, 1970 and as revised
(b) "Flood Control," Chapter 27 of the Hawai'i County Code
(c) Standards and regulations of the Federal Emergency Agency (FEMA)
(d) "Erosion and Sedimentation Control," Chapter 10 of the Hawai'i County Code
(e) Conditions of an NPDES permit, if required, and any additional Best Management Practices required by the Department of Health Clean Water Branch

Construction activities may occur in an area greater than one acre and thus may require a National Pollutant Discharge Elimination System (NPDES) permit and a Storm Water Pollution Prevention Plan (SWPPP). A list of Best Management Practices (BMPs) will be established to properly manage storm water runoff. These BMPs may include, but are not limited to:

- Minimizing soil loss and erosion by revegetating and stabilizing slopes and disturbed areas of soil.

- Minimizing sediment loss by placing structural controls including silt fences, gravel bags, sediment ponds, check dams, and other barriers.
- Applying sediment wattles and protective covers to soil and material stockpiles.
- Gravel check dams in gutters.
- Constructing and using a stabilized construction vehicle entrance, with a designated vehicle wash area that discharges to a sediment pond.
- Washing of all vehicles in the designated wash area before leaving the project site.
- Use of drip pans beneath vehicles to trap vehicle fluid.
- Performing routine inspection and maintenance of structural BMPs by trained personnel.
- Properly cleaning significant leaks or spills and disposing at an approved site.

Impermeable surfaces can increase the volume and rate of stormwater runoff. However, per Hawai‘i County Code, Chapter 27, the volume of stormwater leaving the site will not increase. Wastewater will be managed by a wastewater treatment plant on site.

3.1.5 Flora and Fauna

Environmental Settings

Flora

Section 7(c) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), requires an official species list from the United States Fish and Wildlife Service (USFWS) of identified threatened and endangered species, as well as critical habitat, that may occur within the boundary of the project area.

According to the USFWS, it would be possible for the following seven (7) endangered flowering plants and one (1) endangered fern to possibly exist in the area, although no critical habitat exists on or near the property:

1. `Aku`aku (*Cyanea platyphylla*)
2. Alani (*Melicope zahlbruckneri*)
3. Haiwale (*Cyrtandra nanawaleensis*)
4. Hau Kuahiwi (*Hibiscadelphus giffardianus*)
5. Holei (*Ochrosia haleakalae*)
6. Holei (*Ochrosia kilaueaensis*)
7. Nanu (*Gardenia remyi*)

A biotic survey conducted on May 30, 2024, found no threatened, or endangered flora species on the property aside from one cultivated specimen of Mao hau hele (*Hibiscus brackenridgei)*. Plant species identified on the property are listed below.

Table 1. Flora Species Found on Property – Under Status: A = Alien or Non-native species, I = Indigenous species, PI = Polynesian Introduced species, E = Endemic, En = Endangered

Latin Name	**Common Name**	**Family**	**Status**
Falcataria moluccana	Albizia	Fabaceae	A
Commelina diffusa	Honohono grass	Commelinaceae	A
Brachiara mutica	California grass	Poaceae	A
Clusia rosea	Autograph tree	Clusiaceae	A
Polystichum munitum	Sword fern	Dryopteridaceae	A
Macaranga	Bingabing	Euphorbiaceae	A
Casuarina equisetifolia	Ironwood	Casuarinaceae	A
Clidemia hirta	Koster's curse	Melastomataceae	A
Cecropia obtusifolia	Trumpet tree	Moraceae	A
Mimosa pudica	Sensitive Grass	Fabaceae	A
Chamaecrista fasciculata	Partridge Pea	Fabaceae	A
Dypsis lutescens	Areca Palm	Arecaceae	A
Bismarckia nobilis	Bismarck Palm	Arecaceae	A
Wodyetia bifurcata	Foxtail Palm	Arecaceae	A
Eugenia brasiliensis	Brazilian Cherry	Myrtaceae	A
Cassia fistula	Golden Shower Tree	Fabaceae	A
Megathyrsus maximus	Guinea Grass	Poaceae	A
Euphorbia hirta	Hairy Spurge	Euphorbiaceae	A
Abutilon grandifolium	Hairy Abutilon	Malvaceae	A
Syzygium malaccense	Mountain Apple	Myrtceae	PI
Ricinus communis	Castor Bean	Euphorbiaceae	A
Trema orientale	Gunpowder Tree	Cannabaceae	A
Cycas sp.	Cycad	Cycadaceae	A
Washingtonia fillifera	Californian Fan Palm	Arecaceae	A
Washingtonia robusta	Mexican Falm Palm	Arecaceae	A
Crotalaria sp.	Rattlepod	Fabaceae	A
Sphagneticola trilobata	Bay Biscayne	Asteraceae	A
Tibouchina Herbacea	Cane Tibouchina	Melastomataceae	A
Fagraea berteroana	Puakenikeni	Gentianaceae	A
Paspalum dilatatum	Dallis Grass	Poaceae	A
Paederia foetida	Stinkvine	Rubiaceae	A
Polygala polygama	Racemed milkwort	Polygalaceae	A
Indigofera suffruticosa	Anil de Pasto	Fabaceae	A
Canavalia rosea	Baybean	Fabaceae	A
Vigna luteola	Hairypod Cowpea	Fabaceae	A
Cestrum nocturnum	Night-blooming Jasmine	Solanaceae	A

Fraxinus uhdei	Tropical Ash	Oleaceae	A
Desmodium incanum	Creeping Beggarweed	Fabaceae	A
Dracaena reflexa	Song of India	Asparagaceae	A
Codiaeum variegatum	Croton	Euphorbiaceae	A
Cyperus rotundus	Nutgrass	Cyperaceae	A
Phymatosorus grossus	Lauae	Polypodiaceae	A
Solanum nigrum	Popolo	Solanaceae	I
Andropogon virginicus	Broomsedge	Poaceae	A
Zomia furfuracea	Cardboard zamia	Zamiaceae	A
Psidium guajava	Guava	Myrtaceae	A
Pandanus tectorius	Hala	Pandanaceae	I
Cocos nucifera	Coconut Palm	Arecaceae	PI
Cordyline fruticosa	Ti	Liliaceae	PI
Hibiscus brackenridgei	Mao hau hele	Malvaceae	E, En
Hibiscus tiliaceus	Hau	Malvaceae	I
Aleurites moluccana	Kukui Nut Tree	Euphorbiaceae	PI

Fauna

No native fauna were observed during the biotic survey, although common non-native birds were observed including common myna (*Acridotheres* Trista), saffron finch (*Sicalis flaveola*), house sparrow, Chinese hwamei (*Garrulax canorus*), spotted dove (*Streptopelia chinensis*), and feral chickens (*Gallus domesticus*). It would be possible for one (1) mammal and seven (7) federally listed bird species to fly over, roost, or utilize resources near the subject property. While not on the federal list, it may also be possible for one (1) state listed mammal to frequent the area. These include the following:

Federally Listed:

1. Hawaiian Hoary Bat (‘Ope‘ape‘a) (*Lasiurus cinereus semotus*)
2. Hawaiian Coot (Alae ke‘oke‘o) (*Fulica alai*)
3. Hawaiian Duck (*Anas wyvilliana*)
4. Hawaiian Stilt (*Himantopus mexicanus knudseni*)
5. Band-rumped Storm-petrel (*Hydrobates castro*)
6. Hawaiian Goose (Nēnē) (*Brunta (=Nesochen) sandvicensis*)
7. Hawaiian Petrel (*Pterodroma sandwichensis*)
8. Newell’s Shearwater (*Puffinus newelli*)

State Listed:

9. Hawaiian Hawk (I‘o) (*Buteo solitarius*)

This Environmental Assessment will focus on the nine (9) State and Federally listed mammal and bird species that may fly over, roost, or otherwise utilize resources near the subject property, as they are the most likely to be potentially impacted by the proposed project. The following provides a description of each species, their range, and preferred habitat.

1. Hawaiian Hoary Bat (‘Ope‘ape‘a) (*Lasiurus cinereus semotus*)

   Federally Listed Endangered

   The Hawaiian Hoary Bat prefers roosting within the foliage of both native and non-native trees. Their foraging grounds encompass a diverse range of habitats, such as forest gaps, clearings, areas above the forest canopy, and alongside roads. Notably, on the Big Island, the Ōpe‘ape‘a engage in seasonal migration, with summers spent in the lowlands and overwintering occurring in higher altitude regions.

2. Hawaiian Coot (Alae ke‘oke‘o) (*Fulica alai*)

   Federally Listed Endangered

   The Hawaiian Coot typically inhabits lowland wetland environments, generally below 1,300 feet in elevation, such as the Waiaka-Loko Waka ponds located on Hawaii Island. However, instances of their presence have been documented at altitudes as high as 6,600 feet on the island. These birds display a preference for wetland habitats characterized by the presence of appropriate emergent plant species amidst open water, particularly favoring freshwater wetlands and reservoirs.

3. Hawaiian Duck (*Anas wyvilliana*)

   Federally Listed Endangered

   The Hawaiian duck is found in various habitats such as low wetlands, river valleys, coastal ponds, lakes, swamps, flooded grasslands, and mountain streams, ranging from sea level to elevations of 3,300 meters. Social interactions may occur more frequently in managed wetlands for waterbirds compared to wetlands cultivated with taro, while resting was observed more often in taro cultivated wetlands. This suggests that both managed and cultivated wetlands are crucial for meeting the basic daily and seasonal needs of this species. However, the wider array of activities and foraging techniques observed in managed wetlands may indicate a greater diversity of habitats in these areas.

4. Hawaiian Stilt (*Himantopus mexicanus knudseni*)

   Federally Listed Endangered
   Hawaiian stilts make use of diverse aquatic environments, mostly in lower-altitude areas, yet their presence is influenced by water depth and the density of vegetation. These birds depend on early-stage marshlands with water depths below 24 centimeters (9 inches), and they frequent regions with scant, short perennial plants or open tidal flats. Hawaiian stilts

seem to prefer nesting sites with minimal or no surrounding vegetation, likely to maintain visibility and better detect potential predators.

5. Band-rumped Storm-petrel (*Hydrobates castro*)

   Federally Listed Endangered

   The Band-rumped Storm-petrel is a seabird known to nest in remote cliff locations on, in steep open to vegetated cliffs, and in little vegetated, high-elevation lava fields. These birds are regularly seen in and around coastal waters of Kauaʻi, Niihau, and Hawaiʻi Island.

6. Hawaiian Goose (Nēnē) (*Brunta (=Nesochen) sandvicensis*)

   Federally Listed Threatened

   Historically, The Hawaiian Goose (Nēnē) (*Branta sandvicensis*) were found in lowland dry forests, shrublands, grasslands, and montane dry forests. Their current habitat preferences may be influenced by the release locations of captive-bred birds. Presently, they inhabit a diverse array of environments, such as coastal dune vegetation and non-native grasslands (like golf courses, pastures, and rural areas), sparsely vegetated low- and high-elevation lava flows, mid-elevation native and non-native shrublands, early successional cinderfall, cinder deserts, native alpine grasslands and shrublands, and open interfaces between native and non-native alpine shrubland-woodland communities. Nēnē nest in various habitats, including beach strands, shrublands, grasslands, lava rocks, and across different elevations.

7. Hawaiian Petrel (*Pterodroma sandwichensis*)

   Federally Listed Endangered

   The Hawaiian Petrel is found in remote and high elevation areas on the island of HawaiʻI, Maui, Molokaʻi, Lanai, and Kauaʻi.

8. Newell's Shearwater (*Puffinus newelli*)

   Federally Listed Threatened

   The Newell's Shearwater nest on the slopes and cliffs of Kauaʻi. Small colonies also exist on Molokaʻi, Maui, and Hawaiʻi Island.

9. Hawaiian Hawk (Iʻo) (*Buteo solitarius*)

   Formerly State Listed Endangered

   The Hawaiian Hawk (Iʻo) (*Buteo solitarius*) inhabits lowland non-native forests, urban

locales, agricultural fields, pasturelands, and high-elevation native forests. Primarily, nesting takes place within native 'ōhi'a trees, though instances also occur in non-native tree species such as eucalyptus, ironwood, mango, coconut palm, and macadamia. During winter, sightings have been recorded in subalpine māmane-naio forests, indicating potential seasonal migrations. Their habitat can range between near sea level and 8,000 feet above sea level.

Potential Environmental Impact from the Proposed Action

The Hawaiian Hoary Bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they forage. During the pupping season, clearing trees or shrubs taller than 15 feet poses a danger, as the young bats, unable to fly and still very vulnerable, may inadvertently suffer harm or death if they are unable to move away. Furthermore, these bats search for insects anywhere from as low as 3 feet to heights exceeding 500 feet above ground level, putting them at risk of becoming tangled in barbed wire typically used for fencing.

Hawaiian waterbirds, such as the Hawaiian stilt, coot, and duck listed by the USFWS, inhabit fresh and brackish-water marshes as well as natural or man-made ponds. Hawaiian stilts can also be seen in areas with temporary or permanent standing water. These species face challenges from non-native predators, loss of habitat, and habitat deterioration. Additionally, Hawaiian ducks are at risk due to hybridization with introduced mallards. The creation of standing or open water may result in the attraction of Hawaiian waterbirds to a site. In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g. ponding water), if water is present. Hawaiian waterbirds attracted to sub-optimal habitat may suffer adverse impacts, such as predation and reduced reproductive success, and thus the project may create an attractive nuisance.

Hawaiian seabirds might pass through the project area during the nighttime breeding, nesting, and fledging seasons, spanning from March 1st to December 15th. The presence of outdoor lighting could lead to disorientation, fallout, and potential injury or death for these seabirds. These birds are naturally drawn to lights, and after circling them, they may become fatigued and collide with nearby structures such as wires, buildings, or other objects, or they may even land on the ground. Seabirds that have landed are at a higher risk of mortality due to collisions with vehicles, starvation, and attacks by predators such as dogs, cats, and other wildlife. Young birds, particularly fledglings, traversing the project area between September 15th and December 15th, during their first flights from mountain nests to the sea, are especially susceptible to being attracted to lights. Permanent lighting also poses a risk of seabird attraction, and as such should be minimized or eliminated to protect seabird flyways and preserve the night sky. Additionally, seabirds have been known to collide with fences, powerlines, and other structures near nesting colonies.

Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ‘Ōhi‘a Death), vertebrate and invertebrate pests (e.g., Little Fire Ants and Coqui Frogs), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm native species and ecosystems. Additionally, the invasive Coconut Rhinoceros Beetle (CRB) scientifically known as *Oryctes rhinoceros,* is an invasive species present on the islands of O‘ahu, Hawai‘i Island,

Maui, and Kaua‘i. On July 1, 2022, the Hawai‘i Department of Agriculture implemented Plant Quarantine Interim Rule 22-1. This regulation imposes restrictions on the transportation of CRB-host material within or to and from O‘ahu, which is defined as the Quarantine Area. Items considered regulated materials (such as host plants or materials) pose a potential risk for CRB infestation.

Specifically, CRB-host materials include:

a. Entire dead trees;
b. Mulch, compost, trimmings, fruit, and vegetative scraps;
c. Decaying stumps.

CRB host plants encompass live palm plants from the following genera:

- Washingtonia, Livistona, and Pritchardia (all commonly known as fan palms)
- Cocos (coconut palms)
- Phoenix (date palms)
- Roystonea (royal palms)

The movement of such materials or these specified plants carries the risk of CRB spread, as they could harbor CRB at any stage of their life cycle. Mitigating measures will be implemented to avoid or minimize all potential impacts from plant material.

HBMC will adhere to all mitigating measures to protect listed mammals and birds as outlined in the section below.

Impacts and Mitigating Measures

Table 2 outlines mitigating measures for all listed species that may be potentially impacted by the proposed project.

In addition, the Hawai‘i Division of Forestry and Wildlife (DOFAW) recommends minimizing the movement of plant or soil material between worksites to avoid or reduce potential impacts from fungal pathogens. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

Native plant species that are appropriate for the area will be used for landscaping. No detrimental invasive species will be planted on site. DOFAW recommends consulting with the Big Island Invasive Species Committee (BIISC) to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. The Plant Pono guide found at www.plantpono.org can also be used for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants to be used on site.

Cats are natural predators of native birds, including State-listed endangered waterbirds, seabirds, and forest birds. Their hunting instincts mean that even well-fed cats will actively hunt and prey on wildlife. As a result, DOFAW advises that no feeding of feral cats takes place on the property. With the mitigating measures outlined below impacts to native flora and fauna will not change appreciably under any alternative action, except a no action alternative.

Table 2: Mitigating Mesures for Federal and State Listed Mammals and Birds

Category	Common Name	Scientific Name	Status	Project Mitigating Measures
FEDERALLY LISTED				
Mammals	Hawaiian Hoary Bat	*Lasiurus cinereus semotus*	Endangered	**To avoid and minimize impacts to the endangered Hawaiian hoary bat, HBMC will follow these applicable measures:** - Do not disturb, remove, or trim woody plants greater than 15 feet during the bat birthing and pup rearing season between June 1 and September 15. - Do not use barbed wire for fencing.
Waterbirds	Hawaiian Coot	*Fulica alai*	Endangered	**To avoid and minimize potential project impacts to Hawaiian waterbirds, the following applicable measures will be incorporated:** - In areas where waterbirds are known to be present, post and enforce reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site. - Incorporate Best Management Practices for Work in Aquatic Environments into the project design. - Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys, where appropriate habitat occurs within the vicinity of the proposed project site, prior to project initiation. Repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). - If a nest or active brood is found: 1. Contact USFWS within 48 hours for further guidance. 2. Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer. 3. Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.
	Hawaiian Duck	*Anas wyvilliana*	Endangered	
	Hawaiian Stilt	*Himantopus mexicanus knudseni*	Endangered	
Seabirds	Band-rumped Storm-petrel	*Hydrobates castro*	Endangered	**To avoid and minimize potential project impacts to seabirds, HBMC will incorporate the following measures:** - Any outdoor lighting must conform to the standards established by the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 14, Article 9: “Outdoor Lighting”). - The minimum possible amount of outdoor/exterior lighting should be used and should be turned off when not needed. Motion sensor activated lighting will be used wherever feasible. - All exterior lighting should be fully shielded. This means that all lighting fixtures must emit zero light above the horizontal plane. - Conformity to the Outdoor Lighting Ordinance also requires the use of blue-deficient exterior lighting. This means that exterior LED lighting must emit less than 2% of its total energy at wavelengths less than 500 nm. The best choice for this is either filtered LED lights, or amber LED lights. - White light should be avoided. Any white light used should have Correlated Color Temperature of 2700 K or below. - Rig lights during construction and operation of the proposed water well must be shielded to minimize stray lighting. - Avoid nighttime constructin during the seabird fledging period between September 15th and December 15th. If nighttime construction is required during the seabird fledging season (September 15 to December 15), a qualified biologst will be present at the project site to monitor and assess the risk of seabirds being attracted or grounded due to the lighting. If seabirds are seen
	Hawaiian Petrel	*Pterodroma sandwichensis*	Endangered	

Table 2: Mitigating Mesures for Federal and State Listed Mammals and Birds

	Newell's Shearwater	*Puffinus newelli*	Threatened	circling the area, lights will be turned off. If a downed seabird is detected, the State Division of Forestry and Wildlife (DOFAW) will be contacted and their response protocol will be followed. **To avoid and minimize the likelihood of collision with fences, powerlines, and other structures, YWCA will incorporate the following:** - Where fences extend above vegetation, three strands of polytape will be integrated into the fence to increase visibility. - For powerlines, guywires, and other cables, minimize exposure above vegetation height and vertical profile.
Birds	Hawaiian Goose	*Branta (=Nesochen) sandvicensis*	Threatened	**To avoid and minimize potentail project impacts to nēnē HBMC will incorporate the following measures:** - Do not approach, feed, or disturb nēnē. - If nēnē are observed loafing or foraging within the project area during the breeding season (September through April), have a biologist familiar with nēnē nesting behavior survey for nests in and around the project area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). - Cease all work immediately and contact USFWS for further guidance if a nest is discovered within a radius of 150 feet of proposed project, or a previously undiscovered nest is found within the 150-foot radius after work begins. - In areas where nēnē are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site. **Nēnē 4(d) rule:** A 4(d) rule was established at the time the nēnē was downlisted to threatned status. Under the 4(d) rule, the following actions are not prohibited under the Act, provided the additional measures described in the downlisting rule are adhered to: - Take by landowners, or their agents, conducting intentional harrassment in the form of hazing or other deterrent measures not likely to cause direct injury or mortality, or nēnē surveys. - Take that is incidental to conducting lawful control of introduced predators or habitat management activities for nēnē . - Take by authorized law enforcement officers for the purpose of aiding or euthanizing sick, injured, or orphaned nēnē; disposing of dead speciments; and salvaging a dead specimen that may be used for scientific study.
STATE LISTED				
Mammals	Hawaiian Hawk	(*Buteo solitarius*)	Endangered	**To avoid and minimize potentail project impacts to the Hawaiian hawk HBMC will incorporate the following measures:** DOFAW recommends that pre-construction surveys of the area be conducted by a qualified biologist following appropriate survey methods to ensure no Hawaiian Hawk nests are present, which may occur during the breeding season from March to September. The survey should be conducted at least 10 days prior to the start of construction. If a hawk nest is detected, a buffer zone of 100 meters (330 feet) should be established around it where no construction shall occur until the chick(s) have fledged, or the nest is abandoned and DOFAW stall should be immediately notified. If adult individuals are detected in the area during construction, all activities within 30 meters (100 feet) of the bird should cease. Work may continue when the bird has left the area on its own.

3.1.6 Air Quality

Environmental Setting

Air quality in this area is currently very good. In the past, volcanic emissions such as sulfur dioxide from the Kīlauea volcano, have resulted in "vog," which can impact air quality in the Puna District at times. Vog is created when sulfur dioxide reacts chemically with sunlight, oxygen, dust particles and water in the air. During eruptions, the trade winds generally keep the Kea'au area free from severe vog, however, weak winds particularly in the winter may result in worse conditions. In the future, during episodes of volcanic eruptions, HBMC would have no worse air quality conditions than the rest of the Puna District.

Vehicles are another source of minor air pollution, which is minimal on Hawai'i Island. Vehicle emissions in the area would mainly come from the Kea'au-Pāhoa Road, which is adjacent to the subject site and Highway 130. All Hawai'i Island meets the standards set by the Clean Air Act (CAA) and HRS §342B.

Potential Environmental Impact from the Proposed Action

Air pollutants during construction will be limited and temporary. The main sources of short-term air pollutants are construction equipment exhaust and dust. During operation, the main source of air pollution will be through regular vehicle trips including the movement of employees and patients. With the outlined mitigation measures, potential impacts to air quality will not change appreciably under any alternative action.

Mitigating Measures

Air pollutants during construction will be limited and temporary. The main sources of short-term air pollutants are construction equipment exhaust and dust. HAR §11-60 on Fugitive Dust prohibits visible emissions of dust from constriction activities. These regulations will be strictly followed to prevent dust impacts to Kea'au-Pāhoa Road. In addition, reasonable measures to control airborne and visible fugitive dust from road areas are outlined by the Department of Health's Clean Air Branch. These measures include, but are not limited to:

- Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact.
- Providing adequate water sources at the site prior to start-up of construction activities; Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase.
- Minimizing airborne, visible fugitive dust from shoulders, and access roads.
- Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities.
- Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

These mitigating measures will be used during all phases of construction to prevent significant impacts to the Kea‘au-Pāhoa Road, Highway 130, and surrounding areas.

3.1.7 Noise

Environmental Setting

Noise on the project site varies from low to moderate, with the main source being from vehicles on Kea‘au-Pāhoa Road and Highway 130.

Potential Environmental Impact from Proposed Action

Short-term noise impacts may occur during construction from excavation, grading, vehicle and equipment operation, and the construction of new infrastructure, which will be mitigated by BMPs.

Noise levels are expected to increase moderately during operation with higher levels of traffic to and from the proposed medical center, as well as more occupants and users from the community. However, hours of operation will be primarily Monday – Friday from 8:00 a.m. – 4:00 p.m., with urgent care services available seven (7) days per week from 8:00 a.m. to 8:00 p.m. The facility will not be an emergency room, will not receive ambulances, and will not provide drug rehabilitation services. Thus, noise impacts should be similar to those of other nearby commercial and community uses. Potential impacts relating to noise will not change appreciably under any alternative action, except a no action alternative.

Mitigating Measures

Rules and regulations outlined in Hawai‘i Administrative Rules Title 11, Chapter 46 “Community Noise Control,” will be followed during all construction and operation activities. If there is a potential for construction noise to exceed the State Department of Health’s maximum permissible noise levels, a noise permit will be sought. During operation, appropriate landscaping will be incorporated to screen the property and buffer noise to surrounding areas.

3.1.8 Scenic Resources

Environmental Setting

There are no scenic resources listed in the Hawai‘i County General Plan on or near the subject parcel.

Potential Environmental Impact from Proposed Action

No significant impacts are expected to scenic resources. The grounds and buildings will be aesthetically pleasing and screened by appropriate vegetation. While there is a risk of light pollution affecting scenic views, the night sky visibility, and potentially impacting seabirds utilizing nearby resources, these concerns will be effectively addressed through the implementation of BMPs discussed below. Views to and from the shoreline will not be impacted

by the project. Potential impacts to scenic resources will not change appreciably under any alternative action.

Mitigating Measures

Light pollution is another important aspect of maintaining scenic resources and the visibility of the night sky. Therefore, the following guidelines to minimize light pollution will be adhered to:

1. Any outdoor lighting must conform to the standards established by the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 14, Article 9: “Outdoor Lighting”).
2. The minimum possible amount of outdoor/exterior lighting should be used and should be turned off when not needed. Motion sensor activated lighting will be used wherever feasible.
3. All exterior lighting should be fully shielded. This means that all lighting fixtures must emit zero light above the horizontal plane.
4. Conformity to the Outdoor Lighting Ordinance also requires the use of blue-deficient exterior lighting. This means that exterior LED lighting must emit less than 2% of its total energy at wavelengths less than 500 nm. The best choice for this is either filtered LED lights, or amber LED lights.
5. White light should be avoided. Any white light used should have Correlated Color Temperature of 2700 K or below.
6. Rig lights during construction and operation of the proposed water well must be shielded to minimize stray lighting.

3.1.9 Hazardous Substances, Toxic Waste, and Hazardous Conditions

Environmental Settings

A Phase I Environmental Site Assessment (ESA) was conducted on the subject Property in September 2023 by Lehua Environmental Inc (**Appendix C).** in accordance with the Environmental Protection Agency (EPA) and American Society for Testing and Materials (ASTM) standards. The assessment was conducted to evaluate current conditions, investigate the environmental history, and identify the presence of Recognized Environmental Conditions (REC’s), Historic REC’s, and Controlled REC’s, defined as the following:

- REC: “(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products, in, or, or at the subject property due to the release of likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property that pose a material threat of a future release to the environment”.

- Historical REC: “a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable

regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls".

- Controlled REC: "a recognized environmental conditions affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls" (ASTM, 2021).

The ESA assessment did not reveal any current, historical, or controlled RECs. However, the subject property has a history of being utilized for commercial agricultural purposes dating back to at least 1954. Previous studies on former commercial agricultural lands in Hawai‘i have indicated higher concentrations of pesticides and metals in the soil. Additionally, there have been findings of increased levels of arsenic in the soil within the vicinity. Furthermore, during the site inspection, various kitchen appliances, construction materials, and a deteriorating pesticide sprayer were noted in proximity to the warehouse/caretaker residence on the premises. Thus, in conjunction with the proposed development, Lehua Environmental Inc. conducted a subsequent Hazardous Materials survey and soil screen of the property from June 20-21, 2024 (**Appendix D**).

The survey determined that the grey mastic located throughout the metal corrugated roof of the warehouse was a category I non-friable asbestos-containing material (ACM). The applicant will strictly follow the recommendations of the survey and have the material removed and disposed of by a qualified asbestos abatement contractor prior to disturbance. Additionally, the services of a qualified consultant will be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of ACM.

Additionally, the survey also identified lead-containing paint (LCP) in poor to fair conditions on various interior and exterior painted surfaces within the planned areas of disturbance. The recommendations of the survey will be followed to ensure property handling and disposal of LCPs.

Finally, arsenic-impacted soils with concentrations that exceed the arsenic Hawaii Department of Health Tier 1 Environmental Action Level for unrestricted land use was detected in the northern corner of the lot 0" – 6" below ground surface. The requirements and recommendations listed in the report will be followed.

Potential Environmental Impact from Proposed Action

The soil contaminants found in the Hazardous Materials survey and soil screening pose potential environmental hazards should there be any direct exposure of construction workers, site personnel, and future users of the site to contaminated soil during project activities. Any potential impacts from the contaminants in the soil will be mitigated through strict adherence to the requirements and recommendations of the soil report.

Medical facilities generate a variety of hazardous waste, which requires specialized handling and disposal procedures. Effective waste management practices are vital to ensure the safety of staff, patients, and the environment.

Petroleum products may be used for landscaping equipment such as lawnmowers, weedwhackers, and other machinery for general maintenance. Petroleum products can be considered hazardous if not handled or stored properly.

Compliance with Department of Health mitigation and remediation procedures will ensure potential impacts relating to Hazardous Materials will not change appreciably under any alternative action, except a no action alternative.

Mitigating Measures

Appropriate mitigating measures outlined in the Hazardous Materials survey and soil screen report will be strictly adhered to. This will include the following:

- Asbestos-containing material (ACM) will be removed and disposed of by a qualified asbestos abatement contractor prior to disturbance. Additionally, the services of a qualified consultant will be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of ACM.
- Spot remove and dispose of all Lead-containing paint (LCP) that may be disturbed or become dislodged during renovation activities in accordance with applicable local, state, and federal regulations.
- Spot remove and dispose of all loose and flaking (poor condition) LCP that may be disturbed or become dislodged during renovation activities in accordance with applicable local, state, and federal regulations.
- Workers performing disturbance of LCP must take appropriate measures to comply with applicable OSHA and HIOSJ regulations pertaining to the handling of lead containing materials, lead dust and worker protection. Note that OSHA and HIOSH regulate activities that disturb paint which contain any detectable concentration of lead. Note that detectable levels of lead in the paint were found throughout the Subject Site.
- A qualified consultant should be obtained to conduct air monitoring and inspection activities to ensure compliance with applicable state and federal regulations pertaining to the handling of lead paint.
- The owner/operator of the facility must immediately notify the Hawai'i State Emergency Response Commission and the appropriate Local Emergency Planning Committee via the appropriate channels if there is a release into the environment of a hazardous substance that is equal to or exceeds the minimum reporatble quantity in a 24-hour period as set forth in regulation.
- Use of good general hygiene practices for tenants, pubilic, employees and workers to avoid soil exposure.
- Limit exposure to the contaiminated soils to properly trained personnel by fencing or blocking off all bare soil or patchy grass areas so that children, site workers and the general public will not be able to access bare soil or patchy grass areas.

- Prior to construction activities that disturb the arsenic-impacted soils, prepare and submit for appropval to the Hawaii DOH Hazard Evaluation and Emergency Response (HEER) office a Construction-Envrionmental Hazard Management Plan (C-EHMP) which outlines the proper handling and management of soil and/or groundwater, sampling and analysis protocol for soil, the planned re-use/disposal locations for excavated soil, health and safety measures to be taken to protect workers, environment and the general public. The C-EHMP should be approved by the HEER office prior to the start of arsenic-impacted soils disturbance at the Subject Site.

  If applicable, develop a Removal Action Report presenting the results of the removal action, based on the Removal Action Work Plan.

- Assume all untested soils at the Subject Site are arsenic-contaminated until further testing determines otherwise.

If at any time, any additional hazardous substances or waste are discovered on the property during construction, all work will cease, and appropriate authorities will be contacted. A remediation specialist will be contacted to supervise the appropriate disposal and management of substances deemed necessary. HBMC will require all users and occupants of the proposed facilities to follow all government regulations pertaining to hazardous and toxic substances.

The solid waste items found on site including the kitchen appliances, construction materials, and a deteriorating pesticide sprayer will be properly recycled and/or disposed of in accordance with County and State rules.

All petroleum products used for landscaping purposes will be stored properly in a secure location. Personnel who have completed the proper education and training will be the only qualified individuals to handle such products, which will only be used according to the original label on the container. Material Safety Data Sheets (MSDS) must be made readily available and visible in an appropriate area. Personal Protective Equipment (PPE) will be used at all times and checked regularly.

Following the guidelines of State and County requirements, to minimize the possibility for spills and hazardous materials during construction, the applicant proposes the following:

- Unused materials and excess fill (if any) will be properly disposed of at an authorized waste disposal site.
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will adhere to “Good Housekeeping” for all appropriate substances, with the following instructions:
    - Onsite storage to minimum practical quantity of hazardous materials necessary to complete the job;
    - Fuel storage and use will be conducted to prevent leaks, spills or fires;
    - Products will be kept in their original containers unless non-resealable, and original labels and safety data will be retained

- Disposal of surplus will follow manufacturer's recommendation and all regulations;
- Manufacturers' instructions for proper use and disposal will be strictly followed;
- Regular inspection by contractor to ensure proper use and disposal;
- Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance;
- Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean; and
- All spills will be cleaned up and properly disposed of immediately after discovery.

3.1.10 Solid Waste

Environmental Setting

The Environmental Site Assessment noted that several discarded kitchen appliances, construction materials, and a pesticide sprayer in poor condition, near, and at the onsite warehouse/caretaker residence were observed during the site inspection. These solid waste items will be properly recycled and/or disposed of in accordance with County and State DOH rules.

Potential Environmental Impact from Proposed Action

The quantity of waste to be produced from the medical facility is not known. However, a solid waste management plan will be developed prior to any project activities to determine potential impacts and appropriate mitigating measures. Potential impacts relating to solid waste will not change appreciably under any alternative action, except a no action alternative.

Mitigating Measures

During operation, local waste management companies will be contracted to dispose of waste on site. HBMC will also plan for recycling stations throughout the facilities.

Additionally, HBMC will comply with the following regulations outlined by the Hawai‘i County Department of Environmental Management (DEM) Solid Waste Division:

- Commercial operations, State and Federal agencies, religious entities and non-profit organizations may not use transfer stations for disposal.
- Aggregates and any other construction/demolition waste should be responsibly reused to its fullest extent.
- Ample room should be provided for rubbish and recycling.
- Green waste may be transported to the green waste sites located at the West Hawai‘i Organics Facility and East Hawai‘i Organics Facility, or other suitable diversion programs.
- Construction and demolition waste is prohibited at all County Transfer Stations.

- All construction and demolition waste shall be transported to the West Hawai‘i Sanitary Landfill for disposal.

HBMC will also submit a Solid Waste Management Plan (SWMP) completed by a licensed engineer or architect in accordance with DEM guidelines. The SWMP will be used to:

1. Promote and implement recycling and recycling programs.
2. Predict the waste generated by the proposed development and anticipate the impacts on County Solid Waste Management Facilities.
3. Predict the additional vehicular traffic being generated because of waste and recycling transfers.

According to DEM guidelines, the SWMP will contain the following:

1. A description of the project and the potential waste that may be generated: e.g. analysis of anticipated waste volume and composition. This includes waste generated during the construction and operation or maintenance phases. Waste types shall include (but not be limited to):
    a. Organics (including food waste and green wastes);
    b. Construction and demolition materials;
    c. Paper (including cardboard);
    d. Metal (including ferrous and non-ferrous metals);
    e. Plastic;
    f. Special (including ash, sludge, treated medical waste, bulky items, tires);
    g. Hazardous (including paint, vehicle fluids, oil, batteries); and
    h. Glass.
2. Indicate onsite source separation by waste type, e.g. source separation bins for glass, metal, plastic, cardboard, aluminum, etc. Provide ample space for rubbish and recycling.
3. Identification and location of the proposed waste reduction, waste re-use, recycling facility or disposal site and associated transportation methods for the various components of the development’s waste management system, including the number of vehicle movements and associated routes that will be used to transport the waste and recycled materials.
4. The report will include identification of any impact to County-operated waste management facilities, and the appropriate mitigation measures that will be implemented by the development to minimize these impacts.
5. Analysis will be based on the highest potential use or zoning of the development.

3.2 Socioeconomic and Cultural

3.2.1 Land Use

Environmental Setting

Puna is desirable for its relatively inexpensive land, which typically ranges in size from 1 to 3 acres. Residents from the U.S. mainland and other parts of the State of Hawai‘i continue to seek

these affordable properties. The basis of the economy of Puna has evolved from cattle ranching and sugar to diversified agriculture and tourism stimulated by Kīlauea volcano. The Puna District is a significant socioeconomic area for Hawai‘i County. It is the leader in the agriculture industry on the Island of Hawai‘i. Some Puna subdivisions between Pāhoa and Hilo (including Hawaiian Paradise Park, Hawaiian Beaches, and Hawaiian Shores), are now primarily bedroom communities for Hilo's workforce.

Kea‘au has become a convenient central hub for services within the Puna District including grocery and retail stores, restaurants, cafes, gas stations, and healthcare facilities.

The subject property and the adjacent parcels to the north, south, east and southwest are zoned Agricultural – 20 acres (A-20a). To the west is a cluster of land zoned Agricultural – 1 acre (A-1a). Kea‘au Village Center is located to the north with mixed commercial and residential zoning.

It is noted that a Change of Zone application to redesignate the subject parcel and the parcel immediately to the southwest, containing a combined area of 26.76 acres, from A-20a to Family Agricultural – 1 acre (FA-1a) is currently pending and has been forwarded to the Committee on Legislative Approvals and Acquisitions with a favorable recommendation from both the Planning Department and the Windward Planning Commission. The proposed FA-1a zoning would allow for a blend of small-scale agricultural operations associated with residential activities and which may be characterized by farm estates, small acreage farms or subsistence lots. If the requested change of zone is approved, the landowner intends to subdivide the property into 23 lots, with a minimum lot size of 1 acre. Should HBMC obtain the necessary approvals to proceed with the subject project, the landowner will revise the proposed 23-lot subdivision layout to exclude the HBMC project area. However, should the HBMC project not proceed, the landowner will proceed with the proposed 23-lot subdivision.

The Ke Kula ‘o Nāwahīokalani‘ōpu‘u Iki Lab Public Charter School, a Hawaiian language immersion charter school serving kindergarten through grade 12, is located 600 feet to the southeast. It is situated near Kea‘au High School, which is 650 feet to the north, and Kea‘au Elementary School, located 0.4 miles to the northwest. Residential and agricultural lots are found to the west and northwest.

Potential Environmental Impact from Proposed Action

The proposed development aligns with the existing and proposed land use patterns in the surrounding area, characterized by a mix of schools, businesses, housing, and community spaces. Potential impacts to land use will not change appreciably under any alternative.

Mitigating Measures

The proposed land use will require a Special Permit approved by the County Windward Planning Commission to ensure the proposed use is compatible and complies with all land use laws.

3.2.2 Socioeconomic Characteristics

Environmental Setting

According to the 2022 United State Census Bureau, the two most populated census county divisions (CCD) within the Puna District are the Kea‘au-Mountain View CCD, with a population of 41,210 and an average median household income of $65,750 and the Pahoa-Kalapana CCD, with a population of 10,494 and an average median houshold income of $38,162. These average median incomes are notably lower than the State median of $83,173. Furthermore, a significant 58% of families in State House District 4, which contains the majority of the Puna District, are classified as Asset Limited, Income Constrained, Employed (ALICE), a term used to describe households in the community earning more than the Federal Poverty Level, yet falling short of covering the basic cost of living in Hawai‘i County, often despite working multiple jobs (ALICE Threshold, 2022; American Community Survey, 2022). Even though these households are employed, they grapple with meeting essential expenses such as housing, childcare, food, transportation, and healthcare. By far, the largest employment industry in both CCDs is *educational services, and health care and social assistance*, which comprises approximately 25.9% of the Kea’au-Mountain View CCD workforce (Figure 9) and 33.1% of the Pahoa-Kalapana CCD workforce (Figure 10).

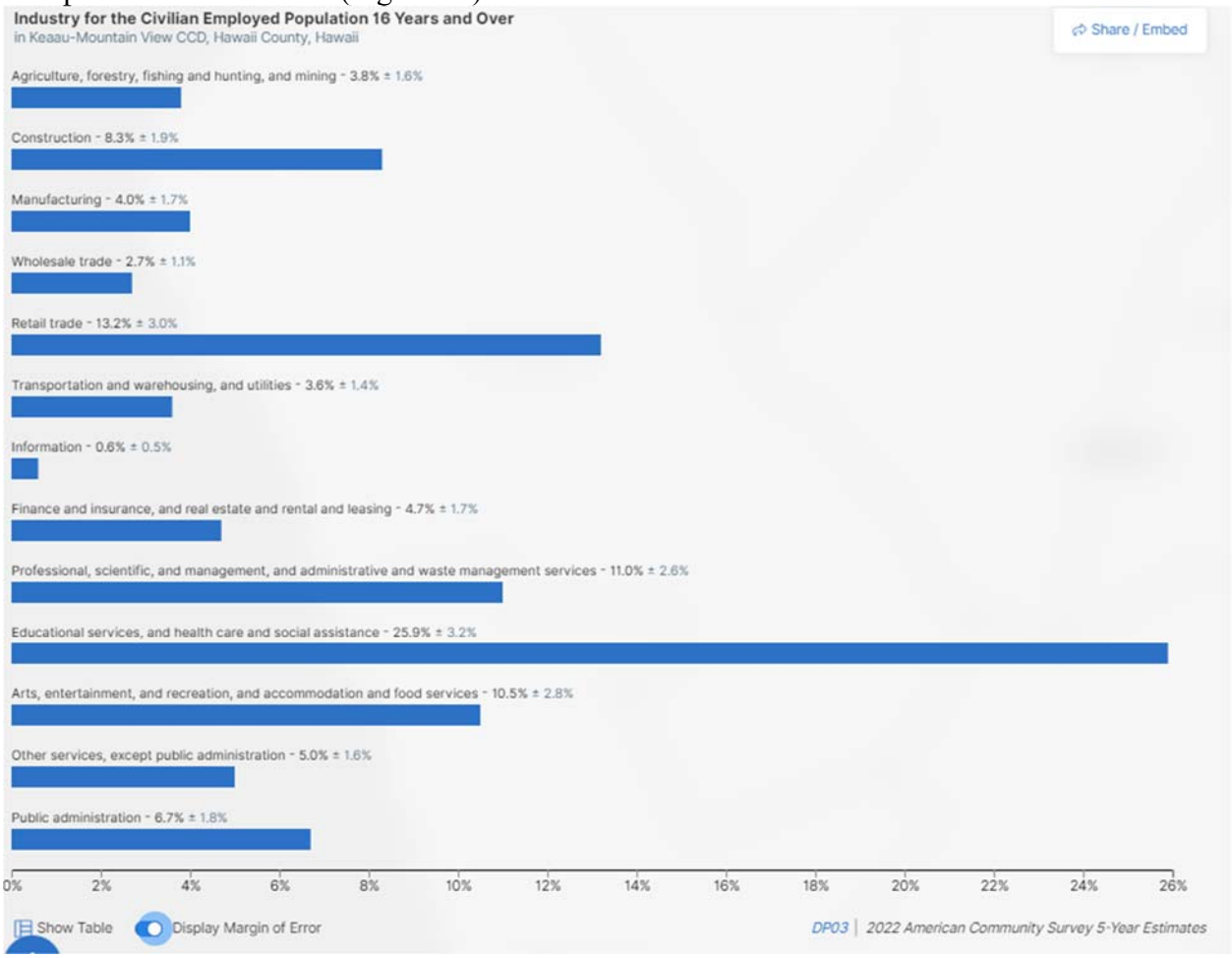


Figure 9. Employment Industries in Kea‘au-Mountain View CCD

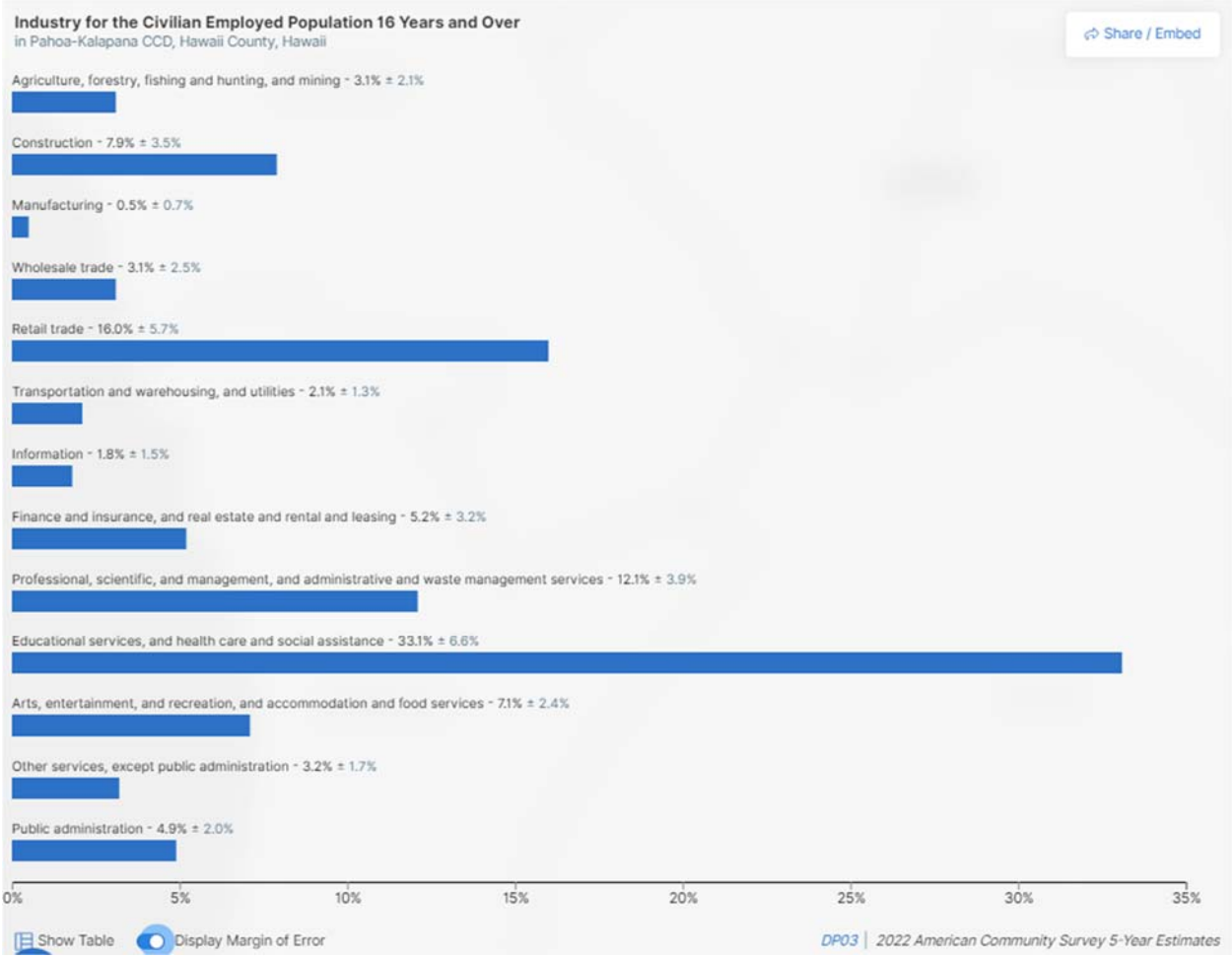


Figure 10. Employment Industries in Pahoa-Kalapana CCD

Potential Environmental Impact from Proposed Action

The proposed project will have a positive impact on socioeconomic characteristics in the Kea‘au area and larger Puna District by stimulating economic growth through job creation and increased access of essential healthcare services. In the short term, the project is estimated to create upwards of 50 full-time & temporary jobs related to the design and build-out phase of the project. These jobs will include professional services (i.e. architectural, engineering, etc.) as well as trade workers (i.e. contractors, builders, masons, electricians, plumbers, landscapers, etc.).

In the long term, the proposed medical facility is anticipated to create approximately 50 full-time positions. These positions would include medical professionals, administrators, therapists, social workers and maintenance and custodial workers. As noted above, the primary labor industry in the area is *educational services, and health care and social assistance.* Employees are anticipated to be primarily Puna and Hilo residents making the creation of additional health care and social assistance jobs appropriate for this area. Furthermore, in addition to alleviating travel

time for patients who would otherwise have to go to Hilo to receive health care services, the creation of additional health care related employment opportunities in Puna will decrease commute times for health care workers living in the Puna District.

Mitigating Measures

The project is expected to have a measurable positive impact on socioeconomic characteristics through the creation of over 100 short-term and long-term employment opportunities and increased access to healthcare services for Puna residents. Therefore no mitigating measures are required.

3.2.3 Parks and Recreation

Environmental Setting

There are no notable public parks or recreation areas within the vicinity of the subject parcel.

Potential Environmental Impact from Proposed Action

The proposed action will have negligible impact on nearby parks and recreation activities. Public access to the parks and ocean will not be impacted by the request. This will not change under any action alternative.

Mitigating Measures

No mitigating measures are expected to be necessary for parks and recreation.

3.2.4 Cultural and Historic Resources

Environmental Settings

Ahupua‘a

Hawai‘i is believed to be first inhabited by voyagers from the Marquesas around 1,000 A.D, however, recent studies have shown that initial Polynesian colonization of Hawai‘i Island occurred between 1220 and 1261 A.D.

Early Hawaiian settlements incorporated new strategies and structures to adapt to their new environment. Traditional Polynesian philosophies and ideals were used to form new societal standards and structures including the principle of genealogical seniority, observance of gods such as *Kāne, Ku, and Lono*, the *kapu* system of law and order, *ahupua‘a* land systems, and various beliefs and values that determined day-to-day protocol and lifestyle such as *mana* and the *‘aumakua*.

It is believed that Hilo is likely one of the first settlements on Hawai‘i Island. Hilo is known to have rich marine resources accessed at Hilo Bay and additional abundant resources from the

forests that descend from Mauna Loa and Mauna Kea. Ancient Hawaiians understood the critical importance of fresh water. Fresh water streams and springs were believed to be created by the gods Kāne and Kanaloa, which established a spiritual connection between people and water. In accordance with the native Hawaiians respect for water, land management units were organized around freshwater supplies in a traditional system known as the *ahupua'a* resource-management system (CWRM, 2019). According to the Water Resource Protection Plan, "water was viewed as such a critical resource to the health and well-bring of the people of ancient Hawai'i, that the concept of private ownership did not exist" (CWRM, 2019).

The *ahupua'a* system, divided near the end of the 16th century, or early 17th century, was designed to provide all the necessary resources to live including agricultural resources inland and ocean resources at the coast. The subject property is located within the Kea'au Ahupua'a.

Puna District

The earliest documentation of Hilo is found in 'Umi-a-Liloa's conquest of Hawai'i Island in the sixteenth century, which established Hilo as a royal center for the island. In the account, 'Umi-a-Liloa began his conquest of the Island of Hawai'i by defeating chief Kulukulu'ā, who lived in Waiākea, and the other chiefs of Hilo. 'Umi-a-Liloa's son Keawe-nui-a-'Umi ruled Hamākua, Hilo and Puna. After the death of Keawe-nui-a-'Umi, the ruling kingdom was divided into three parts and was established under warring chiefs (Kamakau, 1992).

In 1738 Kamehameha I was born. Chief Kalani'opu'u was the high chief during Cook's arrival in 1779. After the chief's death in 1782, his son Kiwala'o, and his nephew, Kamehameha I began to compete for control of the west side of Hawai'i Island. Kamehameha won the battle of Moku'ohai against Kiwala'o in Kona, officially controlling the western half of the island. In 1791, Kamehameha, having gained control of Hilo, fought, and won a battle against his cousin Keoua at Kawaihae for control of the entire Island of Hawai'i. In 1795, Kamehameha conquered Maui, Moloka'i, Lana'i and O'ahu. He also received Kaua'i by cession in 1810 (Kamakau, 1992). Kamehameha's son Liholiho was born in Hilo in November 1797. Waiākea was inherited by Lihiliho after Kamehameha's death. The *'ili kūpono* of Pi'opi'o and its royal fishpond were given to his favorite wife, Ka'ahumanu (Escott and Dols, 2020).

The Puna District was originally one of six chiefdoms or *moku* of the island of Hawai'i. Puna was not a district that produced any great and powerful chiefs; the area was often controlled by chiefs and rulers from the Hilo District to the north, or the Ka'u District to the south (Cordy, 2000). Puna is historically known for its rich soils, high rainfall, and frequent volcanic activity. Many parts of the district have been covered in lava over the past 1,000 years. The coastal areas are characterized by thin soil and steep volcanic cliffs, which are met by rough and wind-blown ocean. Historic settlement patterns reflected favorable agricultural activities, which were found inland from the coast. Villages were often spread out across large areas and abundant in population (Kelly et al. 1981).

The Puna District is known for its valuable products, such as hogs, gray *kapa* cloth (*'eleuli*), tapas made of *mamaki* bark, fine mats made of young pandanus blossoms (*'ahuhinalo*), mats made of young pandanus (*Hala*) leaves (*'ahuao*), and feathers of the *'o'o* and *mamo* birds. Puna was also famous for its abundant *ulu* (breadfruit) (Ellis, 1963). Neighboring villages in the 'Ola'a

Ahupua‘a were known for their hand made products. These two Ahupua‘a were important sources of forest and agricultural products for the ruling elite in Hilo.

In 1839, King Kamehameha III signed the Bill of Rights, which sought to ensure that the people’s land would not be taken from them. In 1840, the first Constitution of Hawai‘i was enacted. In 1845, the Land Commission was created by Kamehameha III to award land claims, although this could not be done under the current feudal system of land tenure as individuals did not hold title to the land. In 1848 The Great Māhele (Land Division) established a system of private land ownership, which divided all Hawai‘i’s land into three classifications: Crown Lands, Government Lands and Konohiki Lands. The Keauohana, Kehena Ahupua‘a was deemed Government Lands. Crown, Government and Konohiki lands remained subject to the rights of the *kanaka* who were in possession and cultivating the lands. As land sales between the Crown, Government and Konohiki continued, the rights of the kanaka became an issue. In 1850, the Land Commission moved to award title of land to kanaka who remained in physical possession, cultivated, or improved any portion of Konohiki Lands. These became Kuleana Lands. Very few Kuleana Land claims were made during the Māhele for Puna (McGregor, 1999). Only 19 Land Commission awards were granted in the entire Puna District. Of these, 16 awards were made in large tracts to 10 chiefs who lived outside of Puna. The nearby ahupua‘a of Kea‘au was granted to William C. Lunalilo as part of Land Commission Award (LCA) 8559-B.

In 1893, the Hawaiian Monarchy was over-thrown, and Queen Liliuokalani was imprisoned. The remaining Crown Lands were confiscated by the government and made a part of the public domain (Chinen, 1961).

Between 1845 and 1900 Hilo began to significantly change through the increased presence of foreign vessels, expansion and growth of tourism, the establishment of missions, private land ownership legalization, the presence of the whaling, cattle, and sugar industries, and the construction of Government roads and railroad lines (Kelly et al. 1981). The changes that occurred in the Hilo district began to dictate and impact surrounding districts such as the Puna district to the south. Changes and patterns of residential locations and growth of towns and villages in the Puna district were driven by the demand for agricultural products, thus prompting settlement near land suited to commercial crops and near newly constructed roads and transportation networks.

In 1881, the entire Kea‘au Ahupua‘a was purchased by William H. Shipman who operated cattle ranches across the island in places such as Kapoho, Waiakea, and Kea‘au. Portions of Kea‘au Ahupua‘a were leased to the Ola‘a Sugar Company in 1899. The expansion and operation of the Ola‘a Sugar Company led to the construction of the sugar mill in Kea‘au, numerous sugar company camps, which created and influenced modern day Kea‘au as a small residential and commercial center in the district. Ola‘a Sugar Company became the largest sugar cane operation in the district. It was eventually sold to American Factors (AMFAC) in 1969, who expanded production to include a bagasse and trash burning power plant that produced 12.5KW of power for Hawaiian Electric Light Company (HELCO). By 1982, AMFAC closed Puna Sugar Company and sold it to Fiji Sugar Corporation in 1988.

Potential Environmental Impact from Proposed Action

Archaeological

Although an archaeological survey was not conducted on the site, it is highly unlikely any such resources exist due to the prior clearing of the property and its use for agriculture. Furthermore, an April 18, 2023 letter from the Department of Land and Natural Resources State Historic Preservation Division issued a determination of "no historic properties affected" in conjunction with a previous grubbing permit for the property (**Appendix E**).

Cultural

The Hawai'i State Supreme Court's PASH and Ka Pa'akai O Ka 'Aina decisions require decision-makers to consider a project's impact to native Hawaiian practices and resources. Specifically, prior to making a decision, State and County agencies must identify the cultural, historical, and natural resources and associated traditional and customary practices of the subject site, the impacts of the proposed project to those resources and practices, and the feasible action (i.e. mitigating measures), if any, to protect such resources and practices.

It is not known whether the subject property or immediate surrounding area have ever been used for the gathering of plants by native Hawaiians in the past. However, it would appear very unlikely that the site would serve such a purpose today and/or in the recent past due to past commercial agricultural use. Therefore, it does not appear that the project would have any potential adverse impact relating to cultural practices in the area. These potential impacts will not change appreciably under any alternative.

Mitigating Measures

In the event any undocumented archaeological or cultural resources are found on site, all work will cease in the immediate area of the find, and the State Historic Preservation Division will be contacted for appropriate action.

3.3 Public Roads, Services, and Utilities

3.3.1 Roads and Access

Environmental Setting

The property is currently accessed via a driveway off Old Pahoa Government Road near the intersection of Old Kea'au-Pāhoa Road and Mamaka Street. A sliver parcel identified as TMK (3) 1-6-003: 080 is State land located between the subject property and Route 139 Right-of-Way (ROW).

There are two potential driveway alignments being considered for the development. Alternative 1 proposes direct access via a driveway off an Old Pahoa Government Road, that would be proposed for improvement, located just offset of the intersection of Old Kea'au Pāhoa Road and Mamaka Street. Alternative 2 proposes driveway access to extend from the site as a newly

improved road, through the existing Old Pahoa Government Road, and connect to Old Kea‘au Pāhoa Road. Alternative 2 is the preferred alternative.

Old Pahoa Government Road is a State-owned access road consisting of pavement widths of approximately 15 to 20 feet. Improvements are anticipated to be required to Old Pahoa Government Road in both access alternatives. HBMC anticipates that improvements may include but are not limited to pavement widening, drainage improvements, and pedestrian safety improvements such as curb-gutter-sidewalk design standards.

A Traffic Impact Analysis Report (TIAR) was completed in October 2024, by SSFM International to evaluate potential traffic impacts from the proposed project based on Existing Conditions (2024), and Future Without Project and Future With Project Conditions in 2027 for both alternatives. The TIAR analyzed peak period turning movements at the following nine (9) intersections based on three (3) Hawai‘i Department of Transportation 24-hour traffic count locations (**Figure11**).

Study Intersections:

1. Route 11 at Route 139
2. Route 139 at Old Volcano Road
3. Route 139 at Kikania Street
4. Route 139 at Kukula Street
5. Route 139 at Kea‘au High School Driveway
6. Route 139 at Old Kea‘au-Pāhoa Road
7. Route 130 at Route 139
8. Old Kea‘au-Pāhoa Road at Mamaka Street
9. Old Kea‘au-Pāhoa Road at Future Alternative 2 Driveway

HDOT 24-Hour Traffic Count Locations

A. Route 9 between Route 130 and Route 139
B. Route 130 between Kukula Street and Route 139
C. Route 139 between Kukula Street and Route 130

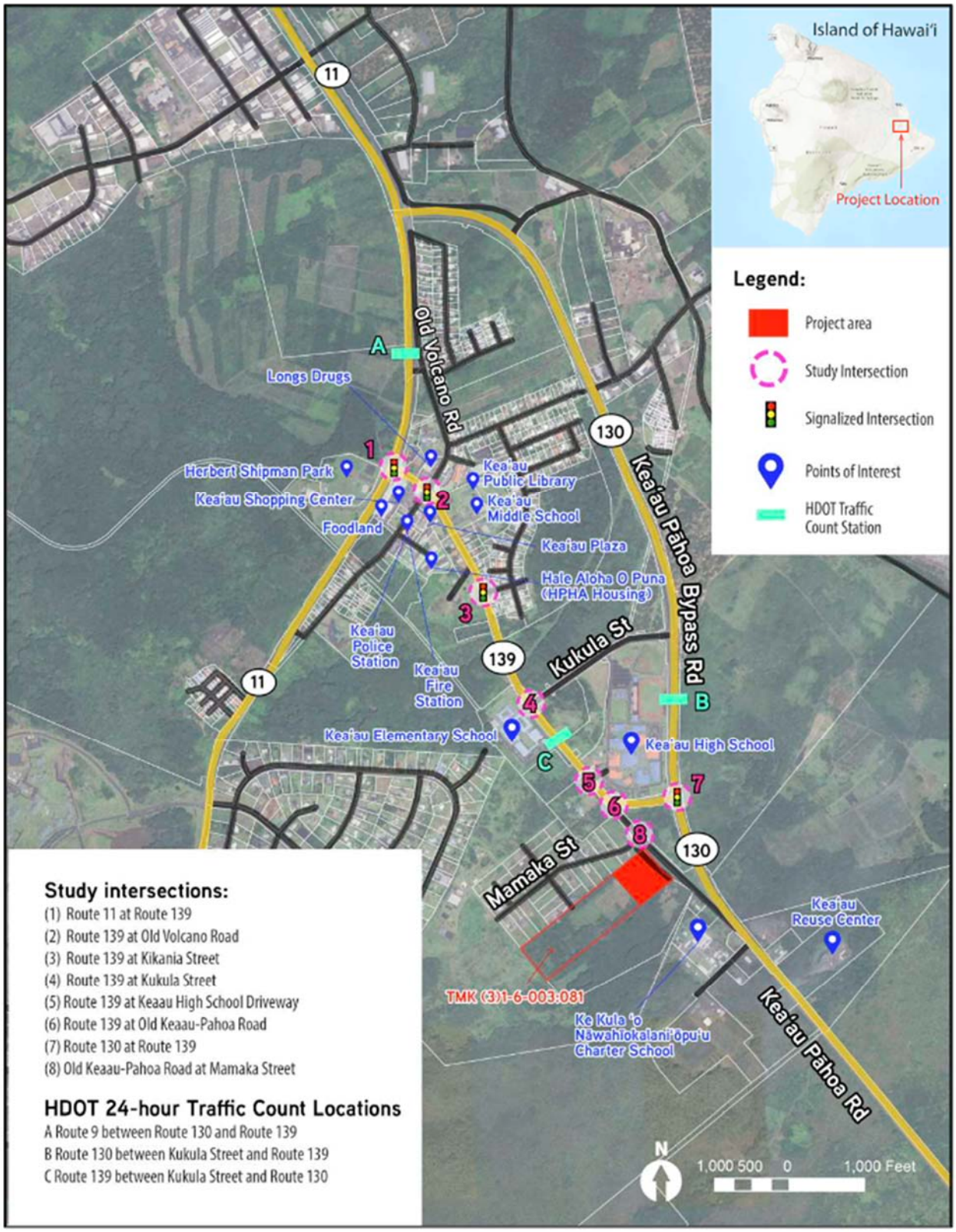


Figure 11: Map of Study Intersections and 24-Hour Traffic Count Locations

Peak traffic hours were found to be between 7:00 to 8:00 AM and 4:00 to 5:00 PM. Existing (2024) intersection Levels of Service for AM and PM peak hours were determined using *Synchro 11* traffic analysis software. Level of Service is a quantitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A, with little to no delays, to congested conditions at LOS F, where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersection and movements.

Existing (2024) Intersection LOS Analysis

The following are the existing (2024) LOS at each study intersection. The four (4) intersections in bold had intersection movements that operated at LOS E during AM or PM peak hours. The remaining study intersections had all movements operate at LOS C or better (**Table 4**).

1. **Route 11 at Route 139**
    a. The Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hours, respectively.
2. Route 139 at Old Volcano Road
    a. All movements occurred at LOS C or better.
3. **Route 139 at Kikania Street**
    a. The Kikania Street southbound approach operates at LOS E (v/c of 0.26) during AM peak hour.
4. Route 139 at Kukula Street
    a. All movements occurred at LOS D or better.
5. Route 139 at Keaʻau High School Driveway
    a. All movements occurred at LOS B or better.
6. **Route 139 at Old Keaʻau-Pāhoa Road**
    a. The Old Keaʻau-Pāhoa Road northbound approach operates at LOS E (v/c of 0.47) during the AM peak.
7. **Route 130 at Route 139**
    a. The Route 130 northbound left turn operates at LOS E (v/c of 0.87) during the PM peak hour.
8. Old Keaʻau-Pāhoa Road at Mamaka Street
    a. All movements occurred at LOS B or better.

Table 4: Existing (2024) LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**28.0**	-	**C**	**24.1**	-
Route 11 NB Left	E	61.2	0.44	F	84.4	0.41
Route 11 NB Through-Right	C	31.6	0.77	C	29.1	0.70
Route 11 SB Left	D	51.0	0.83	D	35.8	0.82
Route 11 SB Through-Right	C	20.5	0.39	C	20.1	0.53
Shipman Park EB Left-Through-Right	B	13.8	0.03	B	11.6	0.05
Route 139 WB Left-Through	C	21.1	0.53	B	13.6	0.26
Route 139 & Old Volcano Road	**B**	**14.1**	-	**B**	**14.5**	-
Old Volcano NB Left	B	16.2	0.15	C	25.0	0.33
Old Volcano NB Through-Right	B	18.0	0.61	C	22.4	0.48
Old Volcano SB left	C	24.6	0.45	C	27.6	0.39
Old Volcano SB Through-Right	B	14.3	0.22	C	21.0	0.32
Route 139 EB Left	B	15.0	0.31	A	6.2	0.07
Route 139 EB Through-Right	B	11.0	0.45	A	6.5	0.25
Route 139 WB Left	B	17.7	0.41	A	8.4	0.18
Route 139 WB Through	B	10.1	0.37	A	5.6	0.11
Route 139 WB Right	A	9.8	0.33	A	5.3	0.05
Route 139 & Kikania Street	-	**0.8**	-	-	**0.3**	-
Route 139 EB Left-Through	A	9.9	0.01	A	7.8	0.01
Kikania SB Left-Right	E	37.6	0.26	B	14.5	0.04
Route 139 & Kukula Street	**B**	**17.5**	-	**A**	**3.9**	-
Route 139 EB Left	A	9.1	0.36	A	2.6	0.04
Route 139 EB Through	A	7.1	0.46	A	2.6	0.34
Route 139 WB Through-Right	B	13.5	0.70	A	4.5	0.18
Kukula SB Left	D	54.8	0.88	C	26.7	0.46
Route 139 & Kea'au HS Driveway	-	**2.4**	-	-	**0.1**	-
Route 139 EB Left-Through	A	8.3	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.1	0.23	A	9.0	0.01
Route 139 & Old Kea'au-Pāhoa Road	-	**5.3**	-	-	**0.9**	-
Route 139 WB Left-Through	A	9.1	0.16	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	41.9	0.47	B	13.5	0.02
Old Kea'au-Pāhoa NB Right	B	12.1	0.17	B	11.1	0.03
Route 130 & Route 139	**C**	**20.1**	-	**C**	**26.6**	-
Route 130 NB Left	D	52.0	0.93	E	64.3	0.87
Route 130 NB Through	A	8.8	0.69	A	7.3	0.30
Route 130 SB Through	C	24.0	0.31	C	24.7	0.74
Route 139 EB Left	D	44.7	0.35	C	33.4	0.07
Route 139 EB Right	C	21.9	0.45	D	43.5	0.85
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.5**	-	-	**1.1**	-
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

Future Without Project Conditions

A. Background Growth Rate

The historical average annual daily traffic (AADT) data for Route 11, 130, and 139 within the study area between 2014 and 2021 demonstrated annual growth rates ranging from 2.20% to 3.89%. However, the overall trend indicates consistent AADT levels without notable growth during that period.

According to the Federal-Aid Highways 2035 Transportation Plan for the District of Hawai‘i, the forecast anticipates a compounded annual increase of 2.12% in traffic within the planning district of Puna from 2020 to 2035. A 2.12% compounded annual growth rate was therefore applied to through volumes on Route 11, 130, and 139, and for turns to/from Route 139 to/from Route 11 and Route 130.

B. Surrounding Projects

1. Kea‘au Village Master Plan Phase 1 and 2

   The Kea‘au Village Master Plan was proposed to construct 590 single-family homes, 250 multi-family homes, 220,408 square feet of commercial space, 43,600 square feet of office space, and 100 hotel rooms. The project was expected to be completed over 2023, 2028, and 2038.

   Construction has yet to commence for the project, and the timeline for its initiation remains uncertain. Moreover, even after construction begins, it will likely be a couple of years before the first units are completed and occupied, thereby generating traffic. Consequently, due to this uncertainty, the individual project-related trips resulting from the Kea‘au Villages MP TIAR were excluded from the future analysis. It is assumed that any forthcoming development within the next 13-16 years will be encompassed within the projected 2.12% annual background growth rate.

2. Kea‘au Mountain View Public Library

   A 12,000 square foot public library is proposed northeast of the intersection of Route 139 and Old Volcano Road to replace the existing library at the Kea‘au Middle School and Mountain View Elementary School. The project is expected to be complete by 2027 and therefore was included in the subject project’s traffic analysis.

Additionally, the short-and medium-term improvements outlined in the Puna Community Development Plan and recommended by DOT, as well as the Statewide Pedestrian Master Plan, Bike Plan Hawai‘i, and ongoing roadwork in the area were evaluated with respect to the proposed project. These projects were determined to be unnecessary to include in the future analysis.

C. Future (2027) Without Project Traffic Volumes

Projected traffic volumes for Future (2027) Without Project were determined by combining Future (2027) Background volumes and a 2.12% annual growth rate over 3 years, with projected trips generated from the Kea‘au Mountain View Public Library project in 2027 (**Figure 12**).

The following are the Future (2027) Without Project LOS at each study intersection. The five (5) intersections in bold had intersection movements that operated at LOS E or F during AM or PM peak hours. The remaining study intersections had all movements operate at LOS C or better (**Table 5**).

1. **Route 11 at Route 139**
    a. The Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hours, respectively.
    b. The Route 11 southbound left turn is projected to operate at LOS E (v/c of 0/85) with a left turn volume of 170 vehicles per hour during the AM peak hour.
2. Route 139 at Old Volcano Road
    a. All movements operate at LOS C or better.
3. **Route 139 at Kikania Street**
    a. The Kikania Street southbound approach operates at LOS E (v/c of 0.30) during the AM peak hour.
4. **Route 139 at Kukula Street**
    a. The Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour.
5. Route 139 at Kea‘au High School Driveway
    a. All movements operate at LOS B or better.
6. **Route 139 at Old Kea‘au-Pāhoa Road**
    a. The Old Kea‘au-Pāhoa Road northbound approach operates at LOS E (v/c of 0.52) during the AM peak hour.
7. **Route 130 at Route 139**
    a. The Route 130 northbound left turn operates at LOS E (v/c of 0.83) during the PM peak hour.
8. Old Kea‘au-Pāhoa Road at Mamaka Street
    a. All movements operate at LOS B or better.

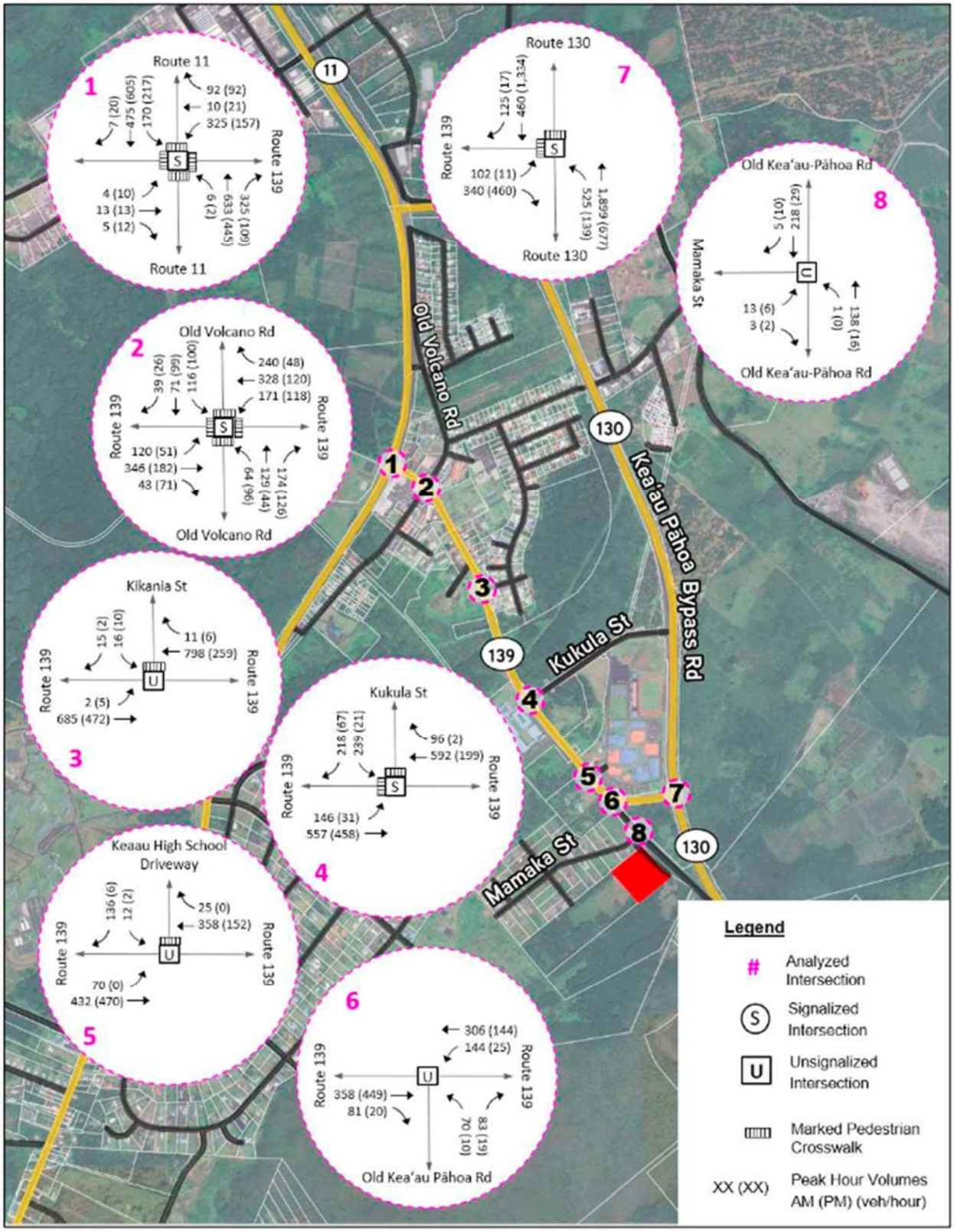


Figure 12: Future (2027) Without Project Intersection Peak Hour Volumes

Table 5: Future (2027) Without Project LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.3**	-	**C**	**23.9**	-
Route 11 NB Left	E	62.6	0.44	F	84.8	0.41
Route 11 NB Through-Right	C	32.5	0.79	C	29.0	0.71
Route 11 SB Left	E	55.3	0.85	D	35.6	0.83
Route 11 SB Through-Right	C	20.1	0.40	B	19.3	0.54
Shipman Park EB Left-Through-Right	B	15.0	0.03	B	15.5	0.05
Route 139 WB Left-Through	C	24.0	0.58	B	14.9	0.29
Route 139 & Old Volcano Road	**B**	**14.6**	-	**B**	**14.6**	-
Old Volcano NB Left	B	16.6	0.16	C	25.5	0.33
Old Volcano NB Through-Right	B	18.9	0.62	C	22.8	0.48
Old Volcano SB left	C	25.5	0.47	C	28.3	0.41
Old Volcano SB Through-Right	B	14.6	0.22	C	21.4	0.32
Route 139 EB Left	B	16.0	0.33	A	6.4	0.07
Route 139 EB Through-Right	B	11.5	0.48	A	6.6	0.26
Route 139 WB Left	B	19.2	0.43	A	8.7	0.19
Route 139 WB Through	B	10.5	0.40	A	5.7	0.12
Route 139 WB Right	B	10.1	0.34	A	5.4	0.05
Route 139 & Kikania Street	-	**0.9**	-	-	**0.3**	-
Route 139 EB Left-Through	B	10.2	0.01	A	7.9	0.01
Kikania SB Left-Right	E	45.6	0.30	C	15.3	0.04
Route 139 & Kukula Street	**B**	**18.1**	-	**A**	**4.0**	-
Route 139 EB Left	B	10.0	0.38	A	2.7	0.04
Route 139 EB Through	A	7.4	0.49	A	2.7	0.36
Route 139 WB Through-Right	B	14.3	0.61	A	4.6	0.20
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	-	**2.4**	-	-	**0.1**	-
Route 139 EB Left-Through	A	8.4	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.5	0.25	A	9.1	0.01
Route 139 & Old Kea'au-Pāhoa Road	-	**5.5**	-	-	**0.8**	-
Route 139 WB Left-Through	A	9.2	0.17	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	48.6	0.52	B	14.1	0.03
Old Kea'au-Pāhoa NB Right	B	12.4	0.17	B	11.3	0.03
Route 130 & Route 139	**C**	**21.1**	-	**C**	**26.1**	-
Route 130 NB Left	D	52.2	0.93	E	66.3	0.83
Route 130 NB Through	B	10.0	0.73	A	8.1	0.30
Route 130 SB Through	C	26.7	0.35	C	23.3	0.74
Route 139 EB Left	D	44.7	0.36	C	31.5	0.03
Route 139 EB Right	C	20.2	0.45	D	48.6	0.87
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.5**	-	-	**1.1**	-
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

Future With Project Traffic Volumes

Future traffic volumes with the proposed project were analyzed using rates developed by the Institute of Transportation Engineers (ITE) and published in the Trip Generation Manual, 11th Edition.

A. Future (2027) With Project Traffic Volumes – Alternative 1 Driveway Alignment

These numbers are the sum of Future (2027) without volumes and the project generated volumes for Alternative 1 Driveway Alignment (**Figure 13**).

The following are the Future (2027) With Project LOS at each study intersection for the Alternative 1 driveway alignment. The five (5) intersections in bold had intersection movements that operated at LOS E or F during AM or PM peak hours. The remaining study intersections had all movements operate at LOS C or better (**Table 6**).

1. **Route 11 at Route 139**
    a. The Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hours, respectively.
    b. The Route 11 southbound left turn is projected to operate at LOS E (v/c of 0.85) with a left turn volume of 173 vehicles per hour during the AM peak hour.
2. Route 139 at Old Volcano Road
    a. All movements operate at LOS C or better.
3. **Route 139 at Kikania Street**
    a. The Kikania Street southbound approach operates at LOS F (v/c of 0.34) during the AM peak hour.
4. **Route 139 at Kukula Street**
    a. The Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour.
5. Route 139 at Kea‘au High School Driveway
    a. All movements operate at LOS B or better.
6. **Route 139 at Old Kea‘au-Pāhoa Road**
    a. The Old Kea‘au-Pāhoa Road northbound approach operates at LOS F (v/c of 0.76) during the AM peak hour.
7. **Route 130 at Route 139**
    a. Route 130 northbound left turn and eastbound right turn operates at LOS E (v/c of 0.84 and 0.95, respectively) during the PM peak hour.
8. Old Kea‘au-Pāhoa Road at Mamaka Street
    a. All movements operate at LOS B or better.

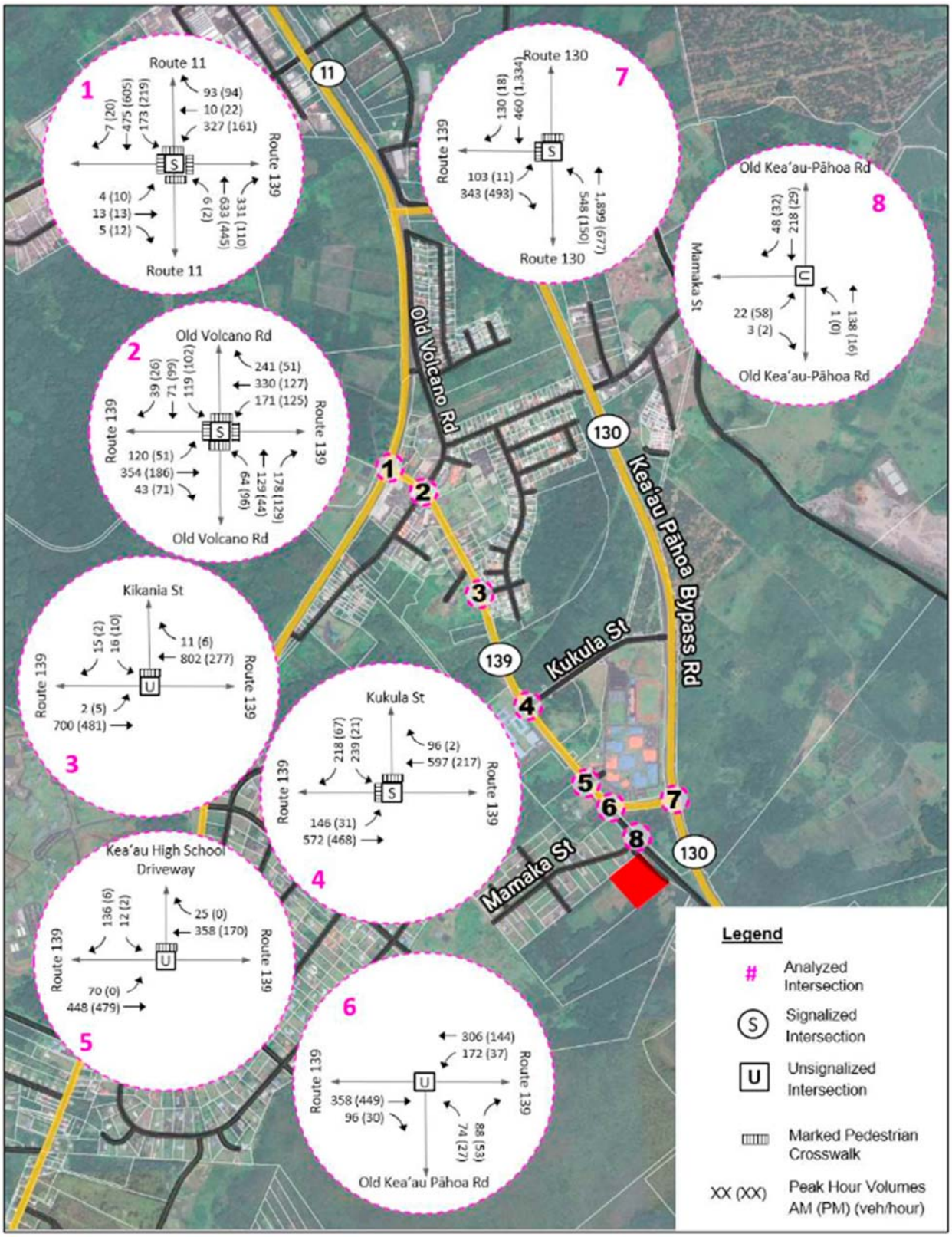


Figure 13: Alternative 1 Driveway Alignment - Future (2027) With Project Intersection Peak Hour Volumes

Table 6: Future (2027) With Project LOS – Alternative 1 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.6**	-	**C**	**24.0**	-
Route 11 NB Left	E	62.8	0.44	F	84.9	0.41
Route 11 NB Through-Right	C	32.6	0.79	C	29.1	0.71
Route 11 SB Left	E	56.1	0.85	D	35.6	0.83
Route 11 SB Through-Right	B	20.0	0.40	B	19.3	0.53
Shipman Park EB Left-Through-Right	B	15.1	0.03	B	12.6	0.05
Route 139 WB Left-Through	C	24.2	0.59	B	15.1	0.29
Route 139 & Old Volcano Road	**B**	**14.7**	-	**B**	**14.8**	-
Old Volcano NB Left	B	16.1	0.15	C	26.0	0.33
Old Volcano NB Through-Right	B	18.0	0.62	C	23.3	0.49
Old Volcano SB left	C	24.8	0.46	C	29.1	0.42
Old Volcano SB Through-Right	B	14.1	0.21	C	21.8	0.32
Route 139 EB Left	B	16.5	0.33	A	6.5	0.07
Route 139 EB Through-Right	B	12.0	0.50	A	6.7	0.26
Route 139 WB Left	C	20.2	0.45	A	9.0	0.20
Route 139 WB Through	B	10.8	0.41	A	5.8	0.12
Route 139 WB Right	B	10.4	0.35	A	5.5	0.06
Route 139 & Kikania Street	-	**1.0**	-	-	**0.3**	-
Route 139 EB Left-Through	B	10.3	0.01	A	7.9	0.01
Kikania SB Left-Right	E	47.5	0.31	C	15.8	0.04
Route 139 & Kukula Street	**B**	**18.1**	-	**A**	**4.0**	-
Route 139 EB Left	B	10.2	0.39	A	2.7	0.04
Route 139 EB Through	A	7.5	0.51	A	2.8	0.37
Route 139 WB Through-Right	B	14.4	0.62	A	4.7	0.22
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	-	**2.2**	-	-	**0.1**	-
Route 139 EB Left-Through	A	8.5	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.6	0.25	A	9.2	0.01
Route 139 & Old Kea'au-Pāhoa Road	-	**7.2**	-	-	**1.8**	-
Route 139 WB Left-Through	A	9.4	0.20	A	8.5	0.04
Old Kea'au-Pāhoa NB Left	F	69.5	0.65	C	15.2	0.08
Old Kea'au-Pāhoa NB Right	B	12.6	0.18	B	11.8	0.10
Route 130 & Route 139	**C**	**21.1**	-	**C**	**28.1**	-
Route 130 NB Left	D	51.3	0.94	E	66.0	0.84
Route 130 NB Through	A	9.9	0.73	A	8.1	0.30
Route 130 SB Through	C	27.8	0.36	C	24.1	0.75
Route 139 EB Left	D	44.8	0.36	C	31.5	0.03
Route 139 EB Right	B	19.3	0.44	D	54.7	0.92
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.8**	-	-	**4.2**	-
Old Kea'au-Pāhoa NB Left-Through	A	8.1	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.7	0.07	A	9.5	0.11

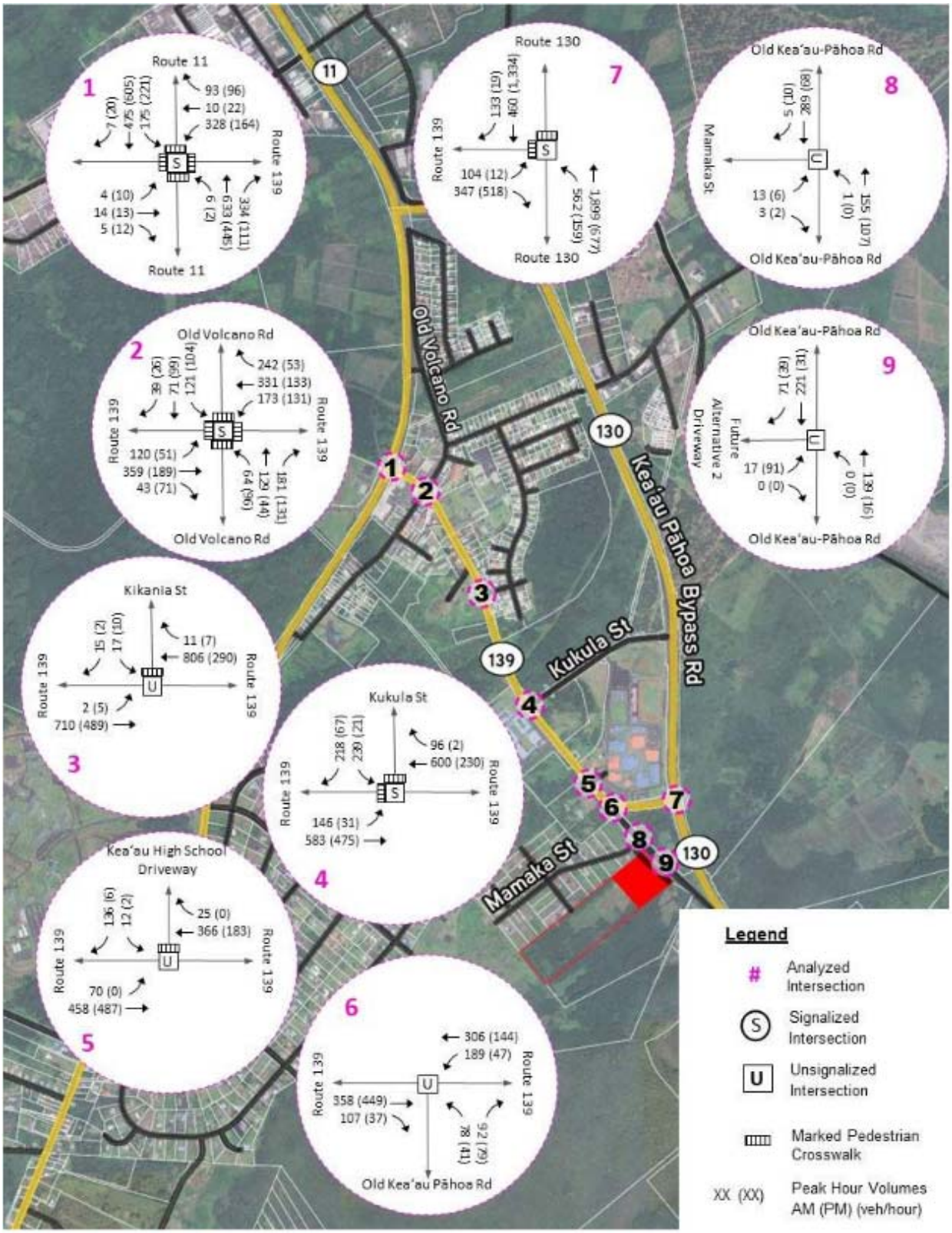


Figure 14: Alternative 2 Driveway Alignment - Future (2027) With Project Intersection Peak Hour Volumes.

B. Future (2027) With Project Traffic Volumes – Alternative 2 Driveway Alignment

These numbers are the sum of Future (2027) Without Project traffic volumes and the project generated volumes for Alternative 2 Driveway Alignment (**Figure 14**). For Alternative 2, the volumes at Old Kea'au-Pāhoa Road at Mamaka Street would be redistributed to Old Kea'au Pāhoa Road at the Alternative 2 Driveway. The traffic volumes at all other study intersections will remain the same. The results are shown in **Table 7**. All movements at both intersections operate a LOS B or better.

Table 7: Future (2027) With Project LOS – Alternative 2 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Old Kea'au-Pāhoa Road & Mamaka Street	-	**0.5**	-	-	**0.4**	-
Old Kea'au-Pāhoa NB Left-Through	A	8.2	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	13.3	0.05	A	9.9	0.02
Old Kea'au-Pāhoa Road & Alternative 2 Driveway	-	**0.4**	-	-	**4.8**	-
Old Kea'au-Pāhoa NB Left-Through	A	0.0	0.00	A	0.0	0.00
Alternative 2 Driveway EB Left-Right	B	11.4	0.03	A	9.3	0.11

Summary and Recommended Mitigating Measures

Future (2027) Without Project analysis added 2.12% annual background growth for major movements, along with the project trips associated with the Kea'au Mountain View Public Library relocation. All signalized intersections are projected to operate at an acceptable LOS. Movements that are projected to operate at LOS E or worse are not significant and the TIAR did not recommend improvements for Future (2027) Without Project conditions.

Based on the *Trip Generation Manual 11th Edition*, the project is projected to generate up to 88 total trips during the AM peak hour and 130 total trips during the PM hour. At the intersection of Route 130 and Old Kea'au Pāhoa Road, the study projected that the northbound Old Kea'au Pāhoa Road left-turn at Route 139 will operate at LOS F during the AM peak hour in Future (2027) With Project for both alternatives. The study states that a refuge lane for the northbound left turn movement will allow vehicles to make the northbound left turn into the refuge lane without conflicting with the westbound through movement and the resulting northbound left turn will improve from LOS F to LOS D. The study recommends that future conditions be monitored and a northbound left turn refuge land be added if necessary.

Additionally, Future (2027) With Project conditions project that the eastbound Route 130 right turn at the signalized intersection with Route 130 will operate at LOS E during the PM peak hour. The TIAR reports that the eastbound right turn movement is projected to operate at LOS D in Future (2027) With Project with the signal timing adjusted to allocate green time from the northbound and southbound through movements to the eastbound approach. The report

recommends that future conditions be monitored, and for the signal timing to be adjusted as needed.

Additional Considerations

There is a Department of Water Supply standpipe at the end of the Old Pahoa Government Road near its intersection with Mamaka Street. In the Alternative 1 Driveway Alignment, this could create a conflict between water hauler trucks filling and medical facility traffic. Mitigations would include construction of adequate shoulder area for trucks to safely fill off of the road. However, it is noted that Alternative 2, which is the preferred alternative, would not interfere with the standpipe use.

If required by conditions of the required Special Permit, HBMC would complete reasonable mitigating measures as outlined above necessary for the project.

3.3.2 Public Utilities and Services

3.3.2.1 Water Supply

Environmental Setting

The subject property is fronted by a Department of Water Supply (DWS) 8- inch water main which is looped back into the existing 12-inch water main on Kea‘au-Pāhoa Road. Consultation with DWS indicates that adequate water is available for the proposed use and for fire suppression. Water calculations will be developed in consultation with DWS to determine appropriate water supply lateral size for the proposed development.

Potential Environmental Impact from the Proposed Action

Estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai‘i, will be submitted to DWS for review and approval. These calculations will include estimated peak flow in gallons per minute and the total estimated maximum daily water usage in gallons per day, including irrigation use. Based on the water demand calculations, the Department will determine the appropriate service lateral and meter size required to satisfy all water needs including fire suppression requirements.

Mitigating Measures

Water conservation measures will be implemented into the project design to minimize water use. Water efficient fixtures such as low flow systems and timed shut off in appropriate areas.

The Commission on Water Resource Management also recommends implementing appropriate landscaping irrigation conservation Best Management Practices endorsed by the Landscape Industry Council of Hawai‘i. These include the following installation and maintenance BMPs:

Installation Best Management Practices:

1. Irrigation system plans and specifications should include post-construction documentation, including drawing of record (as-built drawings), maintenance recommendations, design precipitation rates and manufacturer's operational guide.
2. Design irrigation system with sprinklers spaced with head-to-head coverage or better.
3. Irrigate with a precipitation rate not exceeding soil infiltration rate.
4. Design systems to irrigate similar hydrozones such as slope, sun exposure, soil conditions, and plant materials with similar water use.
5. Use smart controllers.
6. Encourage the use of drip irrigation for individual specimen plants, shrubs, and trees during establishment period.
7. Use flow sensors with smart controllers to detect leaks or drastic changes in water use.
8. Use an irrigation submeter that measures water use on large sites.
9. Use water conservation irrigation components, such as rotary nozzles, pressure regulated spray heads and valves, rain switches, and high efficiency nozzles.
10. Sprinklers in low-lying areas and slopes should be equipped with check valves.
11. Incorporate Low Impact Development (LID) storm water design methods, including rain gardens, infiltration beds, rain barrels, swales, and basins, that allow water to collect and soak into the ground on site.
12. Preserve existing native trees and non-invasive vegetation where feasible during development and do not install irrigation in these areas.
13. Incorporate compost into soils at planting.
14. Encourage xeriscaping practices to include native and non-invasive ornamental plants.
15. Encourage the use of non-potable water for irrigation.
16. Use a qualified irrigation designer, irrigation supplier, landscape architect and installation contractor.

Maintenance Best Management Practices:

1. If not using a climate-based controller, manually manage controller run times and days to water according to soil conditions and seasonal weather conditions.
2. Program irrigation controller to encourage deep watering by using longer, less frequent watering times to improve deep rooting and increase drought resistance.
3. To reduce the amount of water evaporating from the soil surface, schedule night or early morning (5 p.m. to 9 a.m.) start times for established plantings. In areas where ponding, compaction, or runoff occurs, set 2-3 short run time cycles.
4. Mulch with wood chips around base of trees and shrub beds and refresh as necessary to maintain a minimum of two inches.
5. Allow grass to grow taller in summer months to conserve water and encourage deep rooting.
6. Aerate lawns when compaction occurs.
7. At a minimum, conduct a monthly inspection to verify system operation and correct deficiencies.
8. Conduct a practical water audit once every 2 to 5 years by a qualified irrigation professional.

9. Attend water conservation seminars and webinars including Board of Water Supply, Landscape Architects, University of Hawai‘i, EPA Water Sense, and the Irrigation Association.
10. Use a licensed maintenance contractor with water conservation expertise.

3.3.3.2 Wastewater

Environmental Setting

There is no municipal sewer system available in the vicinity of the project and onsite wastewater treatment works (WWTW) will be required. Records from the Department of Health (DOH) indicate no existing Cesspool or Individual Wastewater System on the site, necessitating the assumption that any such system will require location and proper abandonment in accordance with DOH guidelines.

Potential Environmental Impact from Proposed Action

Improper management of wastewater has the potential to contaminate ground and surface waters and could pose a hazard to human health. With a properly designed and maintained WWTW the potential for environmental impacts from wastewater are minimized.

Mitigating Measures

The project is anticipated to generate wastewater at more than 1,000 gallons per day (gpd), mandating compliance with DOH regulations for a Wastewater Treatment Works (WWTW) providing secondary treatment. Acceptable treatment technologies include Activated Sludge, Sequential Batch Reactor, Fixed Bed Biofilm Reactor (FBBR), Moving Bed Biofilm Reactor (MBBR), Membrane Bioreactor (MBR), or other advanced methods ensuring effluent quality aligning with DOH’s Chapter 11-62 standards.

The treated effluent will be disposed of underground via an absorption bed or other types of drain field. A 100% backup of disposal system is required by DOH. Due to the potential fast percolation rate, soil replacement below the absorption bed may be required for septic effluent. However, the soil replacement requirement may be waived if it is used to receive WWTW effluent.

Efforts to minimize wastewater are reflected in the design of the project, including water efficient fixtures (e.g. low flow systems and timed shut off for appropriate devices in all bathroom and proposed kitchens) and landscaping practices as outlined above.

3.3.2.3 Electricity

Environmental Setting

Electricity is available to the site via existing overhead transmission and distribution poles along Kea‘au-Pāhoa Road, supplied by Hawai‘i Electric Light Company (HELCO).

Potential Environmental Impact from the Proposed Action

The project would impose only modest demands on utility services and would not require any mitigation or special planning.

Mitigating Measures

HBMC is proposing to install solar photovoltaic and solar hot water systems for non-critical patient carte areas.

3.4 Secondary and Cumulative Impacts

The proposed project will not generate any long-term secondary impacts, such as population changes or effects on public facilities. Any effects on public facilities are

Cumulative impacts occur when the implementation of multiple separate projects with limited individual impacts combine to produce more severe impacts or conflicts. Impacts should be considered with respect to past and current impacts on area resources. Planned projects in the area that reasonably could affect area resources include:

Kea‘au Village Master Plan Phase 1 and Phase 2
The proposed Master plan was projected to be completed in three construction phases over years 2023, 2028, and 2038 and would include:

- 590 single-family homes,
- 350 multi-family homes,
- 220,408 SF of commercial space,
- 43,600 SF of office space, and
- 100 hotel rooms

Construction for the project has not begun and it is not known when it may begin. With this ambiguity it is difficult to predict when possible impacts from this development may occur. Therefore, it is assumed that should any portion of this development be completed in the next 13-16 years, it will be accounted for in the 2.12% annual background growth rate included in the TIAR calculations.

Kea‘au Mountain View Public Library
The Kea‘au Mountain View Public Library is proposed to be developed northeast of the intersection of Route 139 and Old Volcano Road. The proposed library will be 12,000 SF and will replace the existing library at the Kea‘au Middle School and Mountain View Elementary School. The project is anticipated to be completed in 2027 and anticipated traffic from the library has been incorporated into the TIAR calculations

Although there is the potential to increase traffic above future estimated levels without the project, the total traffic is expected to be within the capacity of the system to accommodate it without significant effects. Nearly all long-term impacts from the proposed project are

negligible, with no meaningful effects on ecosystems or protected species, water quality, erosion and sedimentation, historic properties, noise and air quality and other measures.

PART 4: CONSISTENCY WITH GOVERNMENT PLANS AND POLICIES

4.1 Hawai‘i County General Plan

4.1.1 2005 Hawai‘i County General Plan

The Hawai‘i County General Plan serves as a guiding document for decision-making and the implementation of goals for Hawai‘i Island. The plan was adopted in 1989 by ordinance and most recently revised in 2005.

The General Plan uses the Land Use Pattern Allocation Guide (LUPAG) Map to designate land on Hawai‘i Island for future developments. The LUPAG is a broad, flexible design tool to guide the direction and quality of future developments in a coordinated and manner. It indicates the general location of various land uses in relation to each other. Although the LUPAG map shows the project area as important agricultural land, the Planning Director determined that the area should be situated within the extensive agricultural designation given its similar agricultural characteristics to EA designated lands to the west (**Appendix F**). The extensive agricultural designation signifies lands that are not capable of producing sustained, high agricultural yields without the intensive application of modern farming methods and technologies due to certain physical constraints such as soil composition, slope, machine tillability and climate.

Due to the importance of the LUPAG designations in determining the suitability of land-use projects and developments, the following goals, policies, and standards that align with the proposed action are discussed below:

ECONOMIC GOALS

a. Provide residents with opportunities to improve their quality of life through economic development that enhances the County’s natural and social environments.
b. Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawai‘i.
c. Strive for diversity and stability in the economic system.
d. Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County’s cultural, natural, and social environment.
e. Strive for an economic climate that provides its residents an opportunity for choice of occupation.
f. Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
g. Strive for full employment.
h. Promote and develop the island of Hawai‘i into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development

should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

ECONOMIC POLICIES

x. Encourage the health/wellness industry.

Discussion: The proposed project is set to advance economic development in the area by creating stable long-term employment opportunities, including roles such as doctors, nurses, medical technicians, office administrators, and grounds and maintenance workers.

ENVIRONMENTAL QUALITY GOALS

a. Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
b. Maintain and, if feasible improve the existing environmental quality of the island.
c. Control pollution.

ENVIRONMENTAL QUALITY POLICIES

a. Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

a. Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well-being, through the enforcement of appropriate Federal, State and County standards.
b. Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
c. Federal and State environmental regulations shall be adhered to.

Discussion: HBMC will adhere to all environmental quality goals, policies, and standards. The subject site will be serviced by a Wastewater Treatment Works and control potential stormwater runoff.

FLOODING AND OTHER NATURAL HAZARDS GOALS

a. Protect human life.
b. Prevent damage to man-made improvements.
c. Control pollution.
d. Prevent damage from inundation.
e. Reduce surface water and sediment runoff.
f. Maximize soil and water conservation.

FLOODING AND OTHER NATURAL HAZARDS POLICIES

d. Any development within the Federal Emergency Management Agency designated floodplain must be in compliance with Chapter 27.
g. Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.
q. Consider natural hazards in all land use planning and permitting.
r. Discourage intensive development in areas of high volcanic hazard.

FLOODING AND OTHER NATURAL HAZARDS STANDARDS

a. "Storm Drainage Standards," County of Hawai'i, October 1970, and as revised.
b. Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai'i County Code.
c. Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
d. Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai'i County Code.
e. Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The Flood Insurance Rate Map (FIRM) designates the subject site to be in Flood Zone X (areas outside of the 500-year floodplain). There are no identified drainage ways, naturally occurring wetlands, ponds, lakes, or rivers on the parcel. The site has been previously cleared and has been in agricultural use for decades. Accordingly, the site has not been and should not be subject to flooding, coastal hazards, or erosion. The property is outside the Tsunami Evacuation Zone and Special Management Area.

HISTORIC SITES GOALS

a. Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.
b. Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

a. Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
b. Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings, and objects.
c. Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
d. Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: There are also no known archaeological or cultural resources on the property as it has been cleared and used for agricultural purposes for decades. In the event any inadvertent historic, archaeological, or cultural discoveries are made, all work will cease, and the applicant will immediately notify the Hawai‘i County Planning Department and the State DLNR and secure their clearances before proceeding further.

NATURAL BEAUTY GOALS

a. Protect, preserve, and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
b. Protect scenic vistas and view planes from becoming obstructed.
c. Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

h. Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.

Discussion: There are no notable areas of natural beauty that would be impacted by the proposed action. The proposed improvements will be aesthetically pleasing and may improve the overall visual appeal and functionality of the site of the site. Appropriate landscaping will be incorporated to beautify the property.

NATURAL RESOURCES AND SHORELINES GOALS

a. Protect and conserve the natural resources from undue exploitation, encroachment, and damage.
b. Provide opportunities for recreation, economic, and educational needs without despoiling or endangering natural resources.
c. Protect and promote the prudent use of Hawai‘i’s unique, fragile, and significant environmental and natural resources.
d. Protect rare or endangered species and habitats native to Hawai‘i.
e. Protect and effectively manage Hawai‘i’s open space, watersheds, shoreline, and natural areas.
f. Ensure that alterations to existing landforms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

a. Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.

p. Encourage the use of native plants for screening and landscaping.
r. Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
u. Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The proposed project will adhere to strict environmental standards and will not encroach on any open spaces or areas of natural beauty. Wastewater will be handled by an on site WWTW. Contractors will follow all County and State laws to manage stormwater runoff during construction. Plantings will screen the property. The site is not adjacent to the ocean and does not have any access to shoreline areas, public trails, or hunting areas. It is roughly 4 miles inland at an elevation of approximately 300-400 feet above sea level. It is also outside the County Tsunami Evacuation Zone. As such, the proposed project should not have any adverse impacts on the area's coastal zone or shoreline resources.

PUBLIC FACILITIES GOALS

a. Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.

PUBLIC FACILITIES: HEALTH AND SANITATION POLICIES

e. Encourage the establishment or expansion of community health centers and rural health clinics.

PUBLIC FACILITIES: HEALTH AND SANITATION STANDARDS

c. Hospitals shall be served by a public sewage system or have self-contained sewage systems.
d. Hospital solid waste shall be disposed of in accordance with all Federal, State, and County laws and regulations.

PUBLIC FACILITIES: HEALTH AND SANITATION COURSES OF ACTION

a. Improvement and expansion of hospital facilities shall be undertaken as the need arises

Discussion: The proposed project would significantly increase access to health care services in a traditionally underserved and quickly growing area. Should the project not proceed the improvements to health care would not be realized.

LAND USE GOALS

a. Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.
b. Protect and preserve forest, water, and natural and scientific reserves and open areas.

LAND USE POLICIES

f. Encourage the development and maintenance of communities meeting the needs of its residents in balance with the physical and social environment.

Discussion: There are no significant adverse land use concerns since the proposed action will be limited in extent and will fulfill a community need.

4.2 Puna Community Development Plan

The Puna Community Development Plan (PCDP) was developed through the implementation of the 2005 County of Hawai‘i General Plan. CDP’s are designed to translate and implement the goals, policies, and standards of the General Plan as they apply to specific communities and districts. Additionally, they serve as important framework for a community’s intended outcome and vision and are often used as forum for community input in terms of land-use, availability of public resources, and overall development. The vision of the Puna CDP is for “residents of Puna live in harmony with the land, while promoting a sustainable vibrant local economy, healthy community, and a viable transportation system that is accessible, friendly and safe for now and future generations.” The following goals and objectives outlined in the PCDP apply to the project area and proposed development:

2.1.1 Goals

a. Structures and cultural sites that are significant to Puna’s history and cultural traditions are preserved.
b. The design character and natural setting of older communities that are representative of Puna’s historic development are perpetuated.
c. Areas of scenic and cultural interest are accessible to the public in a manner that does not detract from their aesthetic, natural and cultural value.
d. Awareness and appreciation of the host culture is expanded.

3.1.1 Goals

a. Puna retains a rural character while it protects its native natural and cultural resources.
b. The quality of life improves, and economic opportunity expands for Puna’s residents.
c. Services and community facilities are more accessible in village/town centers that are distributed throughout the region, including the underserved subdivisions that have been experiencing higher levels of development growth.
d. Exposure to high risk from natural hazards situations is reduced.

3.3.1 Goals

a. Puna residents have improved access to emergency and primary medical care and preventative public health programs.

3.3.3 Actions

a. Develop a centrally-located, 24-hour, full-service medical facility, with trauma care, in Puna.

3.4.1 Goals

a. All residents have an equitable level of service access to police, fire, and paramedical services.

3.4.2 Objectives

a. Provide additional locations for emergency services to reduce the response time to a larger percentage of residents.

4.1.1 Goals

b. The percentage of residents who commute to employment or travel for services outside of Puna is reduced.

4.1.2 Objectives

b. Provide more services and employment within Puna's village and town centers.
c. Create new employment opportunities in Puna to reduce long commuting.

Discussion: The proposed project would significantly increase access to health care services in a traditionally underserved and quickly growing area. Should the project not proceed the improvements to health care would not be realized.

4.3 County Zoning and Special Management Area

The County Zoning of the property is currently A-20a. Although the property and surrounding areas are designated for agricultural uses by both State and County land use laws, through the issuance of a Special Permit, various "non-agricultural" services and uses may be allowed. HBMC will prepare and submit a Special Permit application for review and approval by the County Windward Planning Commission.

It is noted that a Change of Zone application to redesignate the project area from A-20a to FA-1a is currently pending and has been forwarded to the Committee on Legislative Approvals and Acquisitions with a favorable recommendation from both the Planning Department and the

Windward Planning Commission. Should the change of zone be approved, the property will retain its agricultural status and agricultural State land use designation and the Special Permit requirement and application process will remain the same.

The property does not lie within the Special Management Area. The subject property is located approximately 4 miles from the nearest shoreline and will not be impacted by coastal hazards or beach erosion. There is no designated public access to the mountain or shoreline areas over the property. As such, the proposed project will not adversely affect any recreational resources, including access to and along the shoreline, scenic and open space or visual resources, coastal ecosystems, and marine and coastal resources Therefore, the proposed use is not contrary to the objectives of Chapter 205 A, HRS relating to coastal zone management.

4.4 Hawai‘i State Land Use Law

All land in the State of Hawai‘i is classified into one of four categories for land use – Agricultural, Conservation, Rural, or Urban. These districts have been established by the State Land Use Commission pursuant to Chapter 205 HRS. The property is designated State Land Use Agricultural. Although the property and surrounding areas are designated for agricultural uses by both State and County land use laws, through the issuance of a Special Permit, various “non-agricultural” services and uses may be allowed. HBMC will prepare and submit a Special Permit application for review and approval by the County Windward Planning Commission.

4.5 Required Permits and Approvals

The following permits and approvals are required for the proposed construction of a medical office and emergency room:

County of Hawai‘i

Special Permit
Building Code/Structural Permits
Grubbing/Grading Permits
Electrical Review
Mechanical/Plumbing Review
Fire Review
Engineering Review
Sanitation Review
Potential Noise Permit
Solid Waste Management Plan

State of Hawai‘i

Permit to Perform Work Upon State Highways
Permit for the Occupancy and Use of State Highways
Permit to Operate of Transport Oversize and/or Overweight Vehicles and Loads Over State Highways

National Pollutant Discharge Elimination System (NPDES) Permit
Storm Water Pollution Prevention Plan (SWPPP)
Department of Health Individual Wastewater Treatment Works (WWTW)
Department of Health Construction-Environmental Hazard Management Plan (C-EHMP)
& if necessary a Removal Action Work Plan (RAWP) and Removal Action Report (RAR)

PART 5: DETERMINATION, FINDINGS, AND REASONS

5.1 Determination

The applicant expects that the County of Hawai‘i Planning Department will determine that the proposed action will not significantly alter the environment and will accordingly issue a Finding of No Significant Impact (FONSI). This determination will be based on comments to the Draft Environmental Assessment (DEA). The Final Environmental Assessment (FEA) will outline the final determination.

5.2 Findings and Supporting Reasons

Agencies must consider several factors to determine whether an Action has significant effects, as outlined in HAR Chapter 11-200.1. The following factors evaluate the sum of effects of the proposed action on the quality of the environment by considering every phase of a proposed action, the expected impacts, and the proposed mitigation measures:

1. ***The proposed project will not involve an irrevocable commitment or loss or destruction of any natural, cultural, or historic resource.***

   No valuable natural or cultural resources would be affected or lost due to construction of the proposed project. The property has been previously cleared and used agriculturally for many years, thus it is unlikely that the project would involve an irrevocable commitment or loss or destruction of any natural, cultural or historic resource.

2. ***The proposed project will not curtail the range of beneficial uses of the environment.***

   No restriction of beneficial uses would occur under the proposed action. It is not known whether the Properties have been used for cultural practices in the past, however, it is very unlikely it is used in such a capacity today due to current and historic land use.

3. ***The proposed project will not conflict with the State’s environmental policies or long-term environmental goals established by law.***

   The State’s long-term environmental policies are set forth in HRS Chapter 344. The broad goals of this policy are to conserve natural resources and enhance quality of life. The requested action will have no significant impact to environmental processes, nor will it negatively impact quality of life.

The proposed project would improve the quality of life for the community by providing access to required health care services. No significant impacts to natural resources will occur. It is therefore consistent with all elements of the State's long-term environmental policies.

4. ***The proposed project will not have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.***

   The proposed action will create positive impacts on the economic and social welfare of the region by providing employment opportunities and vital health care options.

5. ***The proposed project will not have a substantial adverse effect on public health.***

   The proposed action would have a positive effect on public health by providing expanded, improved and more convenient health care services for the community. Minor and short-term impacts to air quality and noise levels may occur during construction but will be mitigated by using Best Management Practices and appropriate permitting such as noise permits. Public health is anticipated to improve with the proposed action by providing essential healthcare and emergency services to an underserved area.

6. ***The proposed project will not involve adverse secondary impacts, such as population changes or effects on public facilities.***

   The proposed action does not include new residential units and thus will not involve adverse impacts to population changes. The project aims to help manage the current upward trend in population growth by meeting the rising demand for healthcare services, enhancing accessibility, alleviating overcrowding, customizing healthcare services to fit community requirements, and strengthening emergency readiness in the area. The project will aid in retaining residents by providing accessible healthcare services, reducing the need for travel.

7. ***The proposed project will not involve a substantial degradation of environmental quality.***

   The proposed action is relatively minor and environmentally benign and thus would not contribute to environmental degradation. The property has been previously cleared and used extensively for agricultural purposes.

8. ***The proposed project is not one which is individually limited and will not have substantial adverse effect upon the environment or involve a commitment for larger actions.***

   The proposed action will not have substantial adverse effect upon the environment or involve a commitment for larger actions. Nearly all long-term impacts from the proposed

project are negligible, with no measurable effects on sensitive ecosystems or rare species, water quality, erosion and sedimentation, historic properties, noise and air quality, and other measures. Potential cumulative impacts on area traffic conditions has been detailed in the included traffic study which found that the total anticipated traffic is expected to be within the capacity of the system to absorb it and only modest mitigations are expected for traffic.

9. ***The proposed project will not have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.***

   A biotic survey of the Properties found no naturally occurring rare, threatened, or endangered species. With the proposed mitigation measures, impacts to rare, threatened or endangered species will not occur.

10. ***The proposed project will not have a substantial adverse effect on air or water quality or ambient noise levels.***

    The proposed action would have minimal and short-term effects on air quality and ambient noise levels during construction. Mitigating measures will be strictly followed to reduce impacts to both air quality and noise during construction. If maximum permissible levels are exceeded during any stage, the contractor will consult with the Department of Health and determine whether permits are necessary.

    The facility will provide outpatient care only and will not be an emergency room and will not receive ambulances. Thus, the long-term noise impacts of the proposed project will be on par with other commercial-type uses in the area.

11. ***The proposed project will not have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.***

    The subject property is located 4 miles inland from the shoreline and will not be impacted by any coastal hazards such as tsunamis, sea level rise, or erosion. The property is also in an area of minimal flood hazard. The property is located in an area subject to volcanic and seismic hazards, however much of the island shares these hazards. All buildings would be designed according to County building codes to withstand an acceptable level of seismic activity and wind resistance.

12. ***The proposed project will not have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.***

    The proposed construction will not impose on views to or from any listed resource in the General Plan. After construction, landscaping will be incorporated to beautify the site.

13. The proposed project will not require substantial energy consumption or emit substantial greenhouse gases.

The proposed action will not emit substantial greenhouse gases. The main source of greenhouse gas emissions will be from vehicles. Energy consumption will be mitigated through energy and water conserving practices. Such methods include energy efficient appliances and lights, low flow systems in bathrooms for toilets and sinks with timed shut off for appropriate devices and landscaping vegetation that requires minimal watering.

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APPENDIX A - TRAFFIC IMPACT ANALYSIS REPORT

Kea‘au Medical Office
(Hilo Medical Center – Kea‘au Parcel)
Traffic Impact Analysis Report

TMK (3) 1-6-003:081
Kea‘au, Hawai‘i
October 2024

Prepared for:
Fleming & Associates, LLC

Prepared by:
SSFM International

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I. PROJECT DESCRIPTION

Hilo Medical Center is proposing to develop a new medical office in Kea'au, on the Island of Hawai'i. The project location is shown in Figure 1. The project is located on Tax Map Key (TMK) (3) 1-6-003:081 on the northeast side of an existing 26.762-acre site.

Current plans are for the development of a 36,000 square foot (SF) medical office building, along with a 201-stall off-street parking lot. The conceptual site plan is shown in Figure 2. There are two potential driveway alignments being considered for the development. Alternative 1 Driveway Alignment (see Figure 3) proposes direct access via a driveway off an unnamed frontage road, that would be proposed for improvement, located just offset of the intersection of Old Kea'au-Pāhoa Road and Mamaka Street. Alternative 2 Driveway Alignment (see Figure 4) proposes driveway access to extend from the site as a newly improved road, through the existing unnamed frontage road, and connect to Old Kea'au-Pāhoa Road. The driveway layout shown in Alternative 2 Driveway Alignment is the preferred alternative.

Full construction is expected to be completed by 2027.

This traffic impact analysis report (TIAR) is being prepared to support a Special Permit for the proposed development and will analyze traffic operations and impacts for the AM and PM peak hours. This project will not include a zoning change and, and thus will not require 5-, 10-, and 20-year analysis to satisfy the Hawai'i County Code Chapter 25 zoning concurrency requirements. Analysis will be completed for Existing (2024) Conditions, as well as for the Future Without Project and Future With Project Conditions in 2027 for both alternatives.

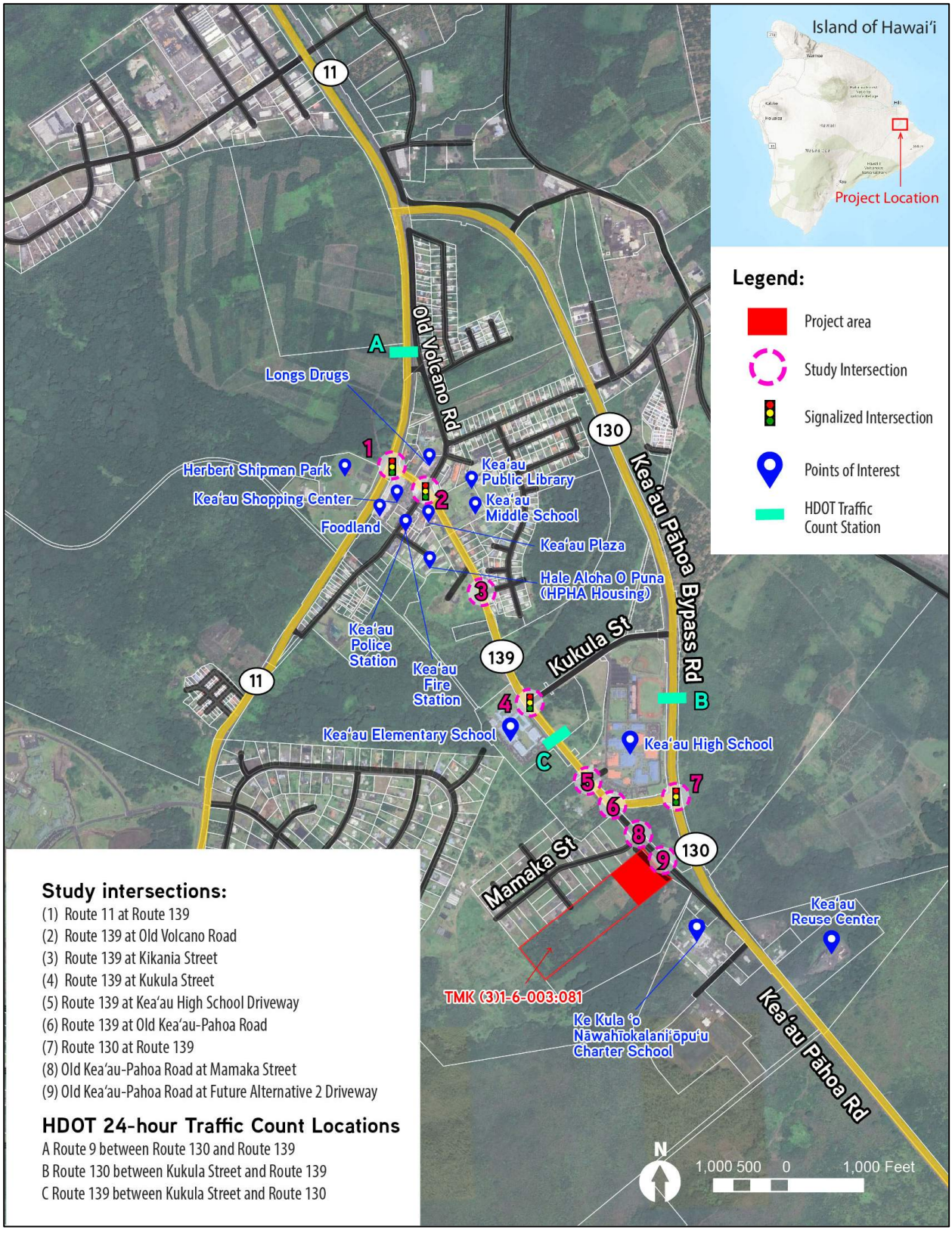

Figure 1: Project Location Map

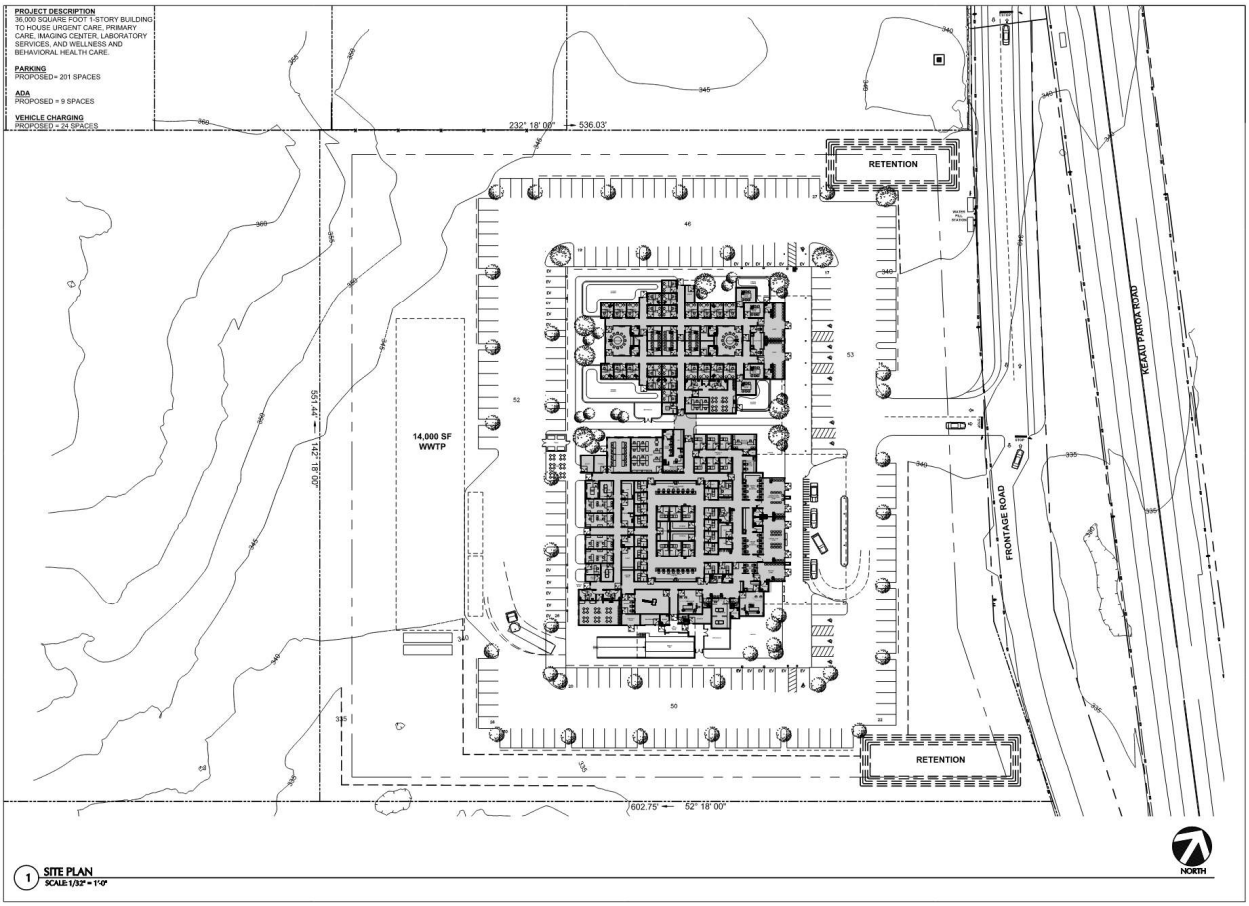

Figure 2: Conceptual Site Plan with Alternative 1 Driveway Alignment

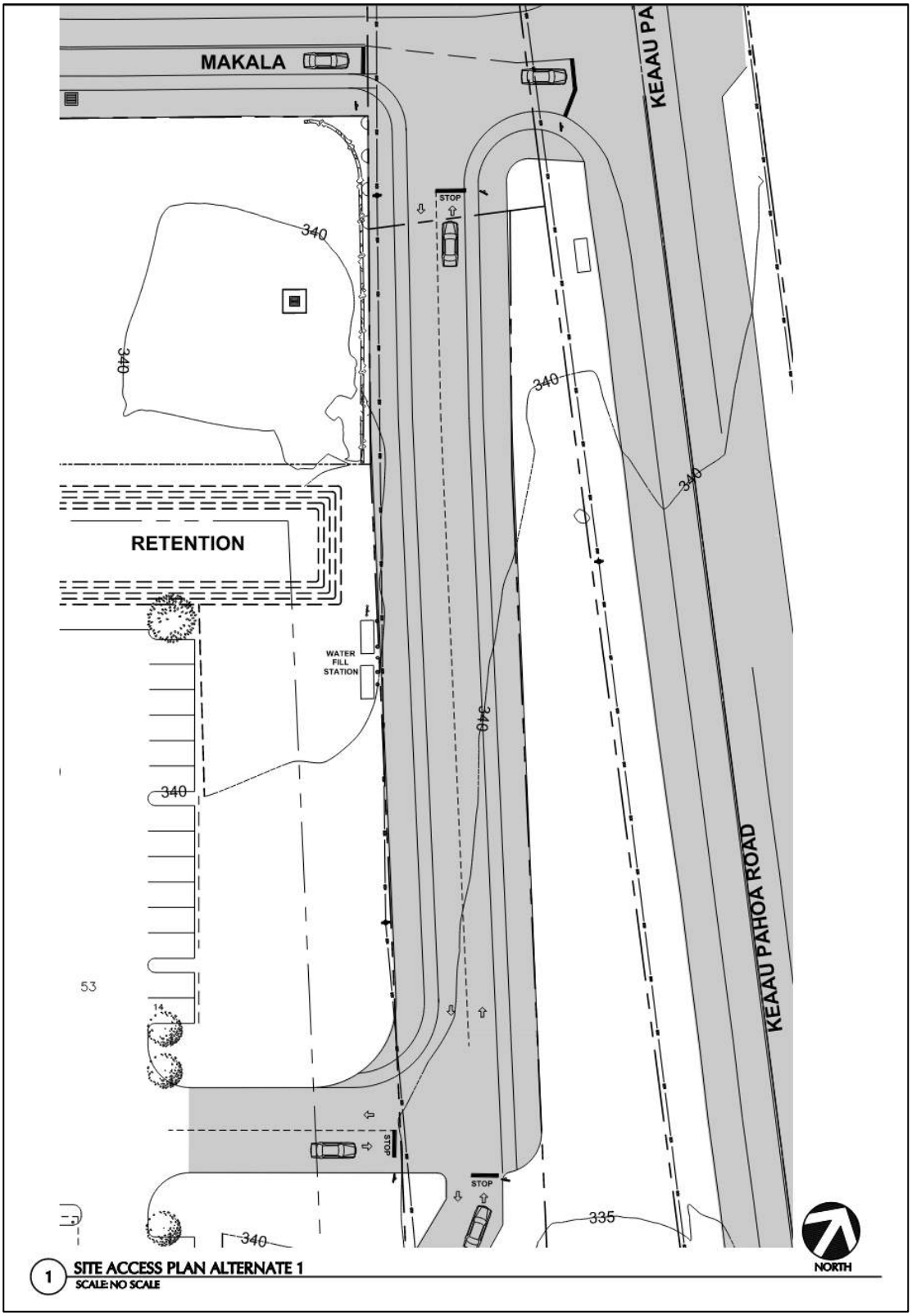

Figure 3: Alternative 1 Driveway Alignment with Connection to Frontage Road

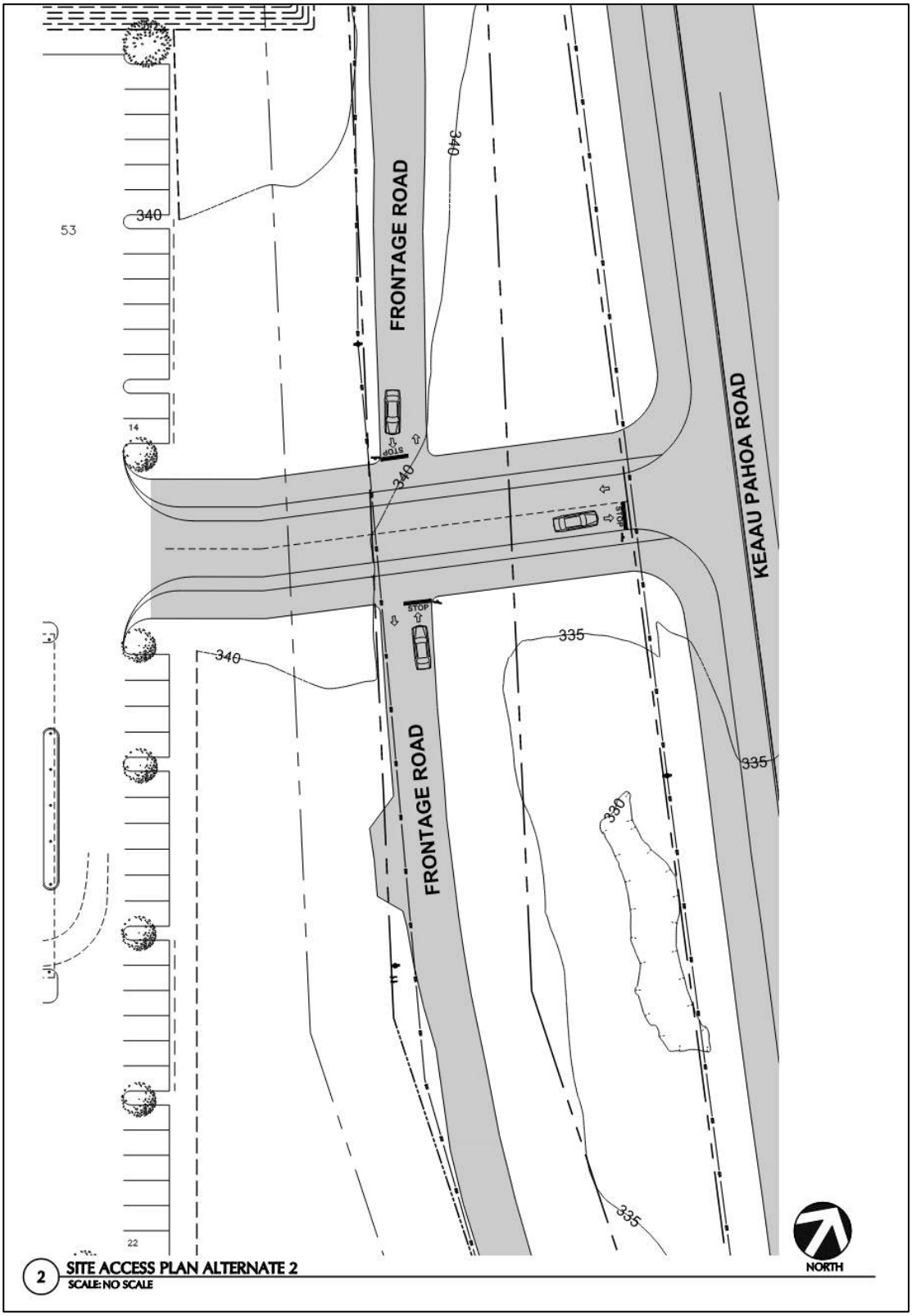

Figure 4: Alternative 2 Driveway Alignment with Connection to Old Kea'au-Pāhoa Road

II. EXISTING CONDITIONS

A. Geometric Configuration

1. Māmalahoa Highway, Hawai'i Belt Road, Volcano Road (State Route 11)

Route 11 goes by numerous names including Māmalahoa Highway, Hawai'i Belt Road, and Volcano Road. For consistency, the name Route 11 will be used throughout this report. Within the project area, Route 11 is oriented in the north-south direction. Route 11 spans between Hilo in the north and circumnavigates the island towards Kailua-Kona in the west. The entirety of Route 11 is state-owned.

In the study area, Route 11 is classified as a small urban principal arterial north of Route 139, and a rural minor arterial south of Route 139. Route 11 is a two-way divided arterial with four-travel lanes in each direction. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor within the study area. Variable width paved and marked shoulders exist along both sides of the corridor. The posted speed limit near Route 139 is 35 MPH and transitions to 45 MPH further from Route 139.

2. Kea'au-Pāhoa Bypass Road, Kea'au-Pāhoa Road, Pāhoa-Kalapana Road, Kaimu-Chain of Craters Road (State Route 130)

Route 130 goes by numerous names including Kea'au-Pāhoa Bypass Road, Kea'au-Pāhoa Road, Pāhoa-Kalapana Road, and Kaimu-Chain of Craters Road. For consistency, the name Route 130 will be used throughout this report. Route 130 extends from its intersection with Route 11 to its terminus near the northeast boundary of Hawai'i Volcano National Park on Kaimu-Chain of Craters Road. In the study area, Route 130 is oriented in the north-south direction, and provides access to Hilo in the north, and to Pāhoa in the south. The entirety of Route 130 is state-owned.

In the study area, Route 130 is classified as a small urban minor arterial. Route 130 is a two-way divided arterial with four-travel lanes in each approach until just south of its intersection with Shower Drive. Between Shower Drive and Kaloli Drive, Route 130 is predominantly a three-lane roadway. South of Kaloli Drive, Route 130 is a two-lane roadway. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor within the study area. Paved and marked shoulders exist along both sides of the corridor. The posted speed limit near the study area is 45 MPH.

3. Kea'au-Pāhoa Road, Old Kea'au-Pāhoa Road (State Route 139)

Route 139 goes by numerous names including Kea'au-Pāhoa Road and Old Kea'au Pāhoa Road. For consistency, the name Route 139 will be used throughout this report. Route 139 is a rural major collector extending between its intersection with Route 11 in the west and Route 130 in the east. Route 139 is oriented in the northwest-southeast direction. For simplicity and

consistency, an east-west orientation will be used to describe the direction and various movements on Route 139. The entirety of Route 139 is state-owned.

Route 139 a two-way roadway with one-travel lane in each direction. Dedicated turn lanes exist at major intersections. Paved sidewalks exist adjacent to the westbound lanes while are absent adjacent to the eastbound lanes of the corridor, with the exception of discontinuous segments fronting Kea'au Elementary School, as well as a portion in the commercial section near the intersection with Route 11. Bike lanes exist in the westbound direction between Kea'au High School and east of the intersection with Old Volcano Road. Additionally, bike lanes exist in the eastbound direction between Route 11 and Kea'au Elementary School. Paved and marked shoulders are present in the eastbound direction from Kea'au Elementary School to Route 139. The posted speed limit is 25 MPH.

4. Old Kea'au-Pāhoa Road

Old Kea'au-Pāhoa Road is a state-owned roadway that extends from its intersection with Route 139 in the north to Opukahaia Street in the south. Old Kea'au-Pāhoa Road provides access to the Ke Kula'o Nāwahiokalani'ōpu'u Charter School and to 35 residential lots in the Ola House Estates subdivision, accessed via Mamaka Street. Old Kea'au-Pāhoa Road is not listed on the Hawai'i Department of Transportation's (HDOT) State Route System Straight Line Diagrams from 2022, however HDOT confirmed that the corridor is state-owned, but may be turned over to the County of Hawai'i (COH) at a later date. Old Kea'au-Pāhoa Road is a two-way roadway with one-travel lane in each direction. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor. Paved and marked shoulders exist along both sides of the corridor. The posted speed limit is 25 MPH.

5. Old Volcano Road

In the project area, Old Volcano Road is a COH-owned local roadway that runs parallel and to the east of Route 11. Old Volcano Road includes transit stops used by COH buses which provide access to Kea'au. Sidewalks exist near the commercial area near Route 139. There are no other pedestrian or bike facilities along Old Volcano Road. The posted speed limit is 25 MPH.

6. Mamaka Street

Mamaka Street is a two lane, undivided, COH-owned, local roadway that extends between Old Kea'au-Pāhoa Road in the east to a dead-end terminus in the west. The construction of Mamaka Street to Old Kea'au-Pāhoa Road was completed in 2018. Mamaka Street provides access to 35 residential lots in the Ola House Estates subdivision. There are no paved sidewalks, curb and gutter, or bike facilities along the corridor. There is no posted speed limit sign on Mamaka Street. The posted speed limit is assumed to be 25 MPH.

7. Kukula Street

Kukula Street is a two-lane, COH-owned, local roadway extending from its intersection with Route 139 in the west to its intersection with Route 130 in the east. Kukula Street is signalized at its intersections with Route 139 and Route 130. Dedicated turn lanes exist at all intersections. The only access on Kukula Street between the two main intersections is at Kea'au High School. Paved and marked shoulders exist along both sides of the corridor. A raised sidewalk exists adjacent to the eastbound lanes of Kukula Street, adjacent to Kea'au High School. Bike lanes exist in both directions along the corridor. The posted speed limit is 25 MPH.

8. Kikania Street

Kikania Street is a two-way, undivided, COH-owned, local roadway extending from Route 130 in the south to a dead-end terminus in the north. There are future plans to extend Kikania Street as part of the Kea'au Village Masterplan. There are no pedestrian or bike facilities along Kikania Street. The posted speed limit is 25 MPH.

9. Kea'au High School West Driveway

The Kea'au High School west driveway extends internally within the school's off-street parking lot between Kukula Street to Route 139. This driveway provides access to the Kea'au High School and athletic fields. Speed humps exist at specific locations on within the school's off-street parking lot to slow down vehicle speeds. There are no pedestrian or bike facilities.

B. Lane Configuration

The existing lane configuration at the eight study intersections are shown in Figure 5.

1. Route 139/Shipman Park Driveway at Route 11

Route 139 at Route 11 is a four-way, signalized intersection. Route 11 northbound and southbound left turns have protected traffic signal phasing, while U-turns are prohibited. The Route 139 eastbound and Shipman Park Driveway westbound approaches operate with concurrent permitted phasing. The Route 11 northbound and southbound approaches have dedicated left turn lanes, a through lane, and a shared through-right lane. Channelized right turns exist for the northbound and westbound approaches. The westbound approach from Route 139 has a shared left-through lane and a right turn lane. The eastbound approach from Shipman Park is a shared left-through-right lane. Crosswalks exist across all approaches.

2. Route 139 at Old Volcano Road

Route 139 at Old Volcano Road is a four-way, signalized intersection. All approaches have permissive phasing. All approaches have dedicated left turn lanes. The westbound approach has dedicated left turn, through, and right turn lanes. All other approaches have shared through-right turn lanes. Crosswalks exist across all approaches, with curb ramps existing at each corner.

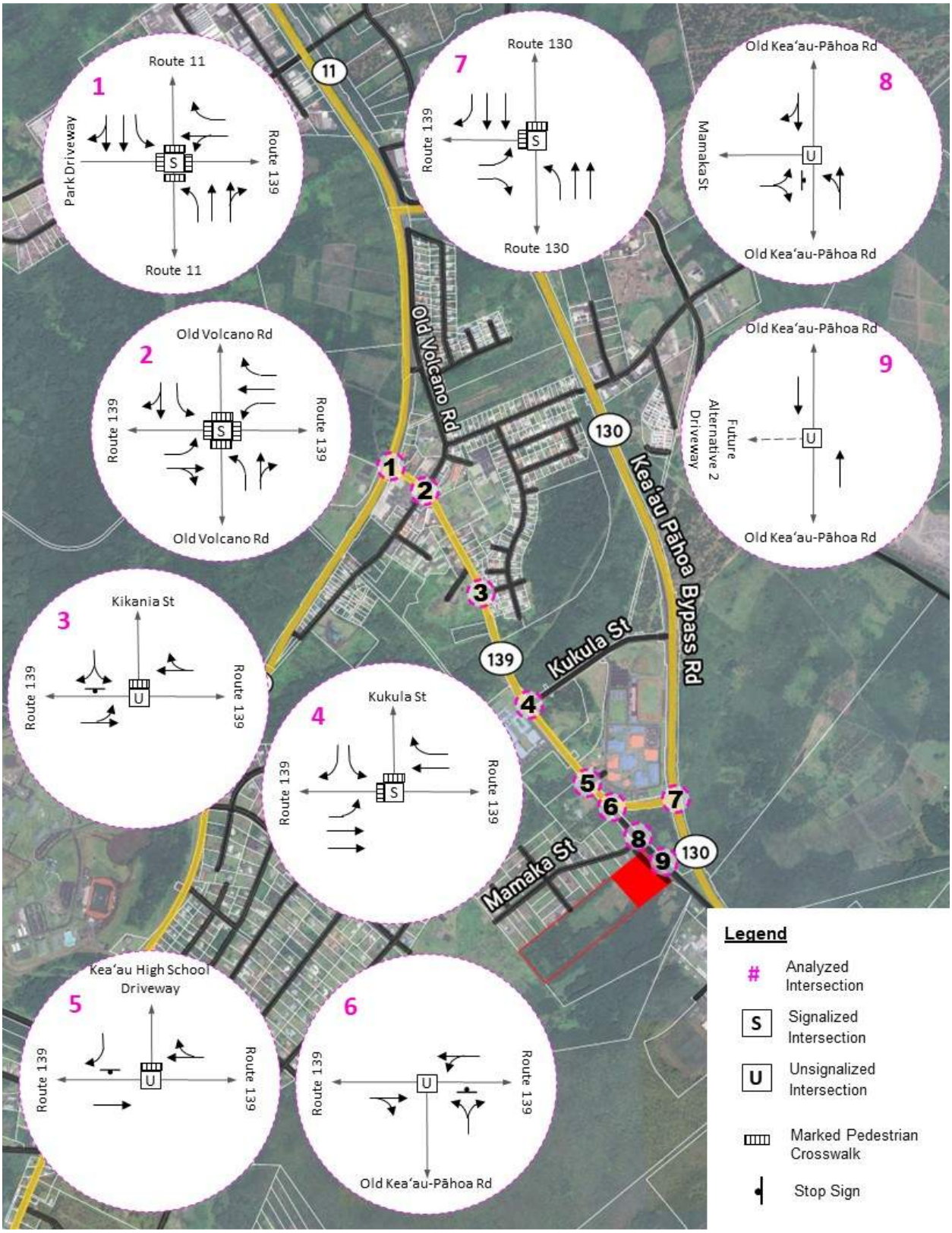

Figure 5: Existing (2024) Lane Configuration

3. Route 139 at Kikania Street

Route 139 is a two-way stop-controlled (TWSC) T-intersection with stop control on the Kikania Street approach. All approach lanes are single shared-movement lanes. A crosswalk with curb ramps exists across the northern leg of the intersection. Vehicles were observed using the wide eastbound Route 139 shoulder to maneuver around eastbound left-turning vehicles.

4. Route 139 at Kukula Street

Route 139 is a signalized T-intersection with protected-permitted left turns for the southbound Kukula Street approach. Dedicated left turn lanes exist for the southbound Kukula Street and eastbound Route 139 approaches. Channelized right turns exist for the westbound Route 139 and southbound Kukula Street approaches. Marked crosswalks with curb ramps exist across the northern and western legs of the intersection. A marked bike lane crosses the north leg of the intersection. There is a crossing guard stationed at the Kukula Street right turn island beginning around 30 minutes prior to school starting in the AM peak to help students cross Route 139 to Kea'au Elementary School. The Kea'au Elementary School entrance is a right-in only in the eastbound direction, and is located along Route 139, 500-feet east of this intersection. All vehicles entering Kea'au Elementary School pass through Route 139 and Kukula Street.

5. Route 139 at Kea'au High School Driveway

The Kea'au High School (KHS) west driveway intersects Kea'au-Pāhoa Road about 450 feet west of Old-Kea'au-Pāhoa Road. Access is limited to right-in right-out (RIRO) only, although vehicles were observed making left turns out. All approach lanes are single shared-movement lanes. A marked crosswalk with curb ramps and a marked bike lane exists on the north leg of the intersection, across the KHS driveway.

6. Route 139 and Old Kea'au-Pāhoa Road

Route 139 and Old Kea'au-Pāhoa Road is a TWSC, T-intersection with stop control on the northbound Old Kea'au-Pāhoa Road approach. There are no marked crosswalks at the intersection. The northbound Old Kea'au-Pāhoa Road approach is striped as a single lane however, vehicles use this approach as if dedicated left turn and right turn lanes exist. All eastbound and westbound approach lanes are single shared-movement lanes. Vehicles were observed using the westbound Old Kea'au-Pāhoa Road shoulder to bypass left-turning vehicles at the intersection. There is a marked bike lane on the north side of the intersection across from Old Kea'au-Pāhoa Road, traveling in the westbound direction. This intersection provides access to 35 residential houses in the Ola House Estates subdivision and to the Ke Kula'o Nāwahiokalani'ōpu'u Charter School. The traffic generated by parents dropping off students in the AM peak hour accounts for most of the traffic volume exiting Old Kea'au-Pāhoa Road onto Route 139.

7. Route 130 and Route 139

Route 130 and Route 139 is a signalized, T-intersection. The northbound Route 130 left turn has protected traffic signal phasing. The eastbound Route 139 right turn is also protected and overlaps with the northbound Route 130 left turn phase. Eastbound right turns on red are prohibited. Two through lanes and dedicated turn lanes exist for the northbound and southbound approaches along Route 130. A dedicated left and a dedicated, channelized right lane exist in the eastbound Route 139 direction. Paved sidewalks and curbs and gutters exist on the north side of Route 139. Signalized crosswalks exist across the northern and western legs of the intersection.

8. Old Kea'au-Pāhoa Road at Mamaka Street

Old Kea'au-Pāhoa Road at Mamaka Street is a TWSC T-intersection with stop control on the Mamaka Street approach. There are no marked crosswalks, marked shoulders, sidewalks, or bike lanes at this intersection. All approach lanes are single shared-movement lanes.

C. Study Intersection Cycle Lengths

Field observations were used to confirm that each of the traffic signals were actuated and uncoordinated. Traffic operations were analyzed in this manner.

D. Multimodal Facilities

Existing pedestrian, bike, and transit facilities are shown in Figure 6.

1. Transit – Hele-On Bus

The COH operates the *Hele-On Bus (COH Bus)* throughout the island, of which three routes operate within Kea'au:

- Route 10 (Hilo to Ocean View)
  - Service provided Mondays through Saturdays, except holidays.
  - Service runs along Route 11.
  - One AM route starting in Ocean View heading northbound to Hilo, scheduled to pass Kea'au at 8:35 AM.
  - One PM route starting in Hilo heading southbound to Ocean View, scheduled to pass Kea'au at 3:56 PM.
- Route 11 (Red Line Hilo to Volcano)
  - Service provided Mondays through Sundays.
  - Service runs along Route 11.
  - Five round trip routes per day are provided, the first of which passes through Kea'au at 5:27 AM headed towards Volcano, and the last which passes through Kea'au at 6:49 PM headed towards Hilo.

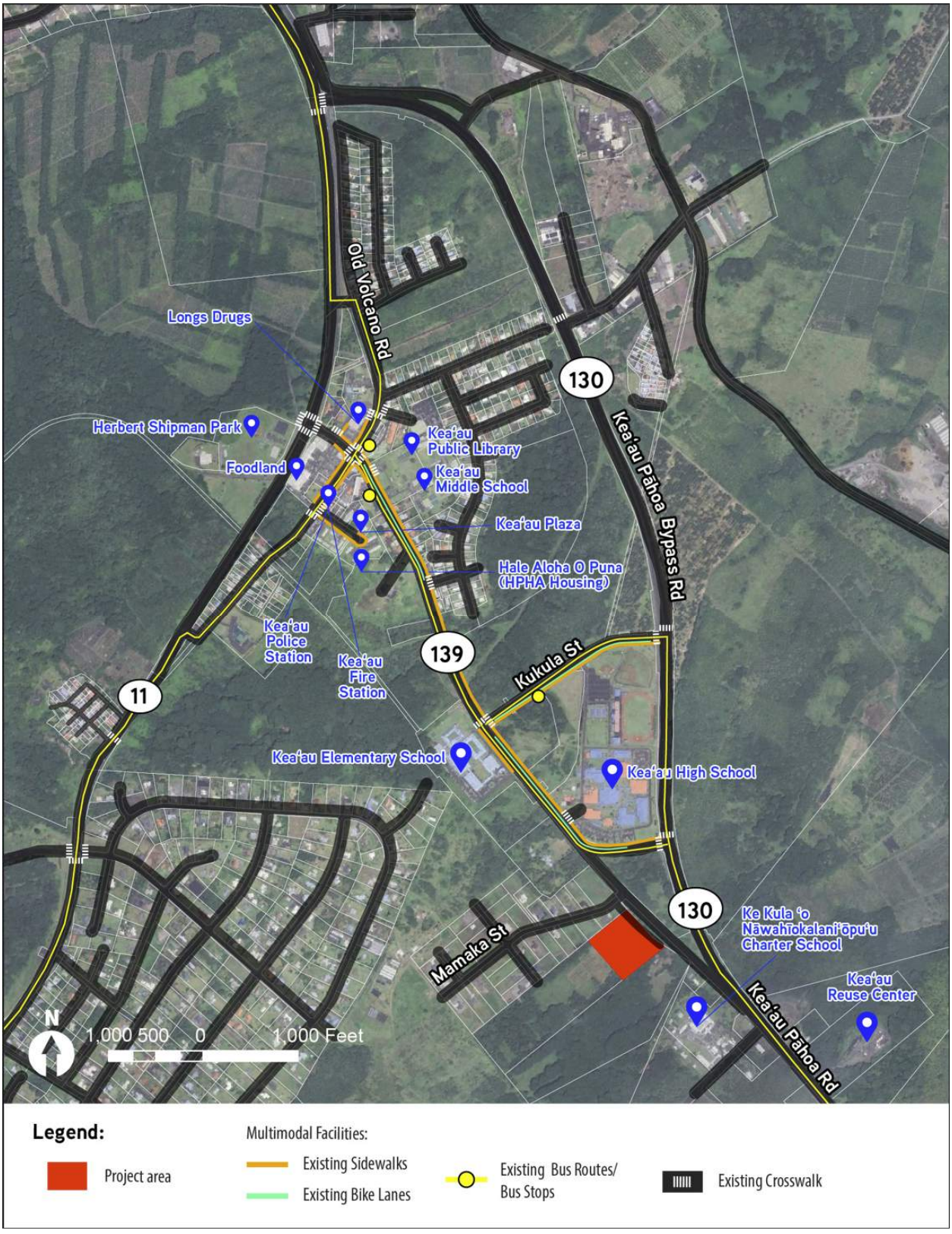

Figure 6: Existing (2024) Multimodal Facilities

- Route 40 (Hilo – Pāhoa)
    - Service provided Mondays through Sundays, with some stops only operating during weekdays.
    - Up to seventeen trips per day run northbound towards Hilo, passing through Kea'au between 5:50 AM and 9:50 PM. Up to fifteen trips per day run southbound towards Pāhoa, passing through Kea'au between 6:52 AM and 8:52 PM.
    - Service runs along Route 11 and Route 130.
- Route 402 (Hawaiian Paradise Park/Orchidland/Hawaiian Acres/Ainaloa)
    - Service provided Mondays through Saturdays, except holidays.
    - Eight round trip routes per day are provided, the first of which passes through Kea'au at 4:35 AM headed towards Pāhoa, and the last which passes through Kea'au at 6:35 PM headed towards Pāhoa.
- Route 403 (Fern Acres/Fern Forest/Eden Roc)
    - Flex Route – this route can flex up to one mile off route with reservations at least one hour in advance.
    - Five round trip routes per day are provided, the first of which begins in Kea'au at 9:00 AM headed towards Fern Forest, and the last which passes through Kea'au at 5:10 PM headed towards Fern Forest.

More detailed bus routes and timetables are included in Appendix A. COH Bus routes and bus stops in the project area are shown in Figure 6. Bus drivers will stop for users that flag down the buses if there is a safe place to pull over. Throughout the entire bus network, riders can transfer to numerous other routes connecting to the rest of the island. Effective February 27th, 2022, COH Bus fares are free through December 31st, 2025.

E. Nearby Attractions and Destinations

1. HDOE Schools

There are three State of Hawai'i Department of Education (HDOE) public schools in the area: Kea'au Elementary School, Kea'au Middle School, and Kea'au High School. Kea'au Elementary School is located just west of the project along Route 139 near the intersection of Kukula Street. Kea'au Middle School is located near the Old Volcano Road and Route 139 intersection. Kea'au High School is located along Route 139 near the intersection of Old Kea'au-Pāhoa Road. Each school has a slightly different bell schedule end-of-day bell schedule. The AM traffic count captures the morning school peak hour. The PM traffic count occurs later in the day and does not capture the after school peak hour.

2. Kea'au Public Library

Kea'au Public Library is located on the northeast corner of the intersection of Old Volcano Road and Route 139, just west of Kea'au Middle School. The current library will be replaced by a 12,000 SF public library and 42-stall parking lot located in the currently empty grassy field closer to Kea'au-Pāhoa Road. The new library is scheduled to be completed by 2027.

3. Kea'au Shopping Center

Kea'au Shopping Center is the main commercial area in Kea'au, located on the southeast corner of the intersection of Route 11 and Route 139.

4. Herbert Shipman Park

Herbert Shipman Park is located west of the intersection of Route 11 and Route 139. The park includes two tennis courts, a baseball field, a basketball court, a playground, a public restroom, and approximately 50 parking stalls.

F. Vehicle Volumes

1. Historic HDOT Volume

Historic Hawai'i Department of Transportation (HDOT) Annual Average Daily Traffic (AADT) counts on Route 11 between Route 130 and Route 139, Route 130 between Kukula Street and Route 139, and Route 139 between Kukula Street and Route 130 were available from 2014 to 2021, except for 2017. The historic HDOT AADT and annual growth rates calculated from 2014-2021 for the three roads range from 2.20-3.89% (see Table 1). The historic HDOT counts and resulting linear trendlines are shown in Figure 7. Despite the calculated growth, the trendlines reflect consistent (no growth) AADT when accounting for annual fluctuations.

The 2021 two-day 24-hour directional average traffic volumes are shown in Figures 8-10. Each figure is graphed with the same scale on the y-axis to show the difference in magnitude between each roadway. Route 11 and Route 139 show similar peak hour times and peak hour directional patterns, with the AM directional peak in the northbound direction at about 6:30-7:30 AM and the PM directional peak in the southbound direction at about 4:45-5:45 PM. Volumes along Route 139 are significantly lower than the volumes on Route 11 and Route 130, and do not show significant directional deviation throughout the day.

2. Intersection Peak Turning Movement Counts

Peak period turning movements counts were taken at the eight study intersections on Thursday, March 7, 2024 based on the peak hours noted for the 24-hour counts. It was found that the AM and PM intersection peak hours occurred between 7:00 to 8:00 AM and 4:00 to 5:00 PM, respectively. Peak hour traffic volumes are shown in Figure 11. The through traffic volumes on Old Kea'au-Pāhoa Road at the future Alternative 2 Driveway were deduced from

the intersection counts at Old Kea'au-Pāhoa Road at Mamaka Street. Intersection turning movement counts can be found in Appendix B.

Table 1: Historic HDOT 2014-2021 AADT

Station	Location	Year	AADT	Growth Rate 2014-2021
B71001100664	Route 11 between Route 130 and Route 139	2014	17,000	2.28%
		2015	23,100	
		2016	19,200	
		2017	-	
		2018	18,200	
		2019	23,600	
		2020	17,100	
		2021	19,900	
B71013000138	Route 130 between Kukula Street and Route 139	2014	20,700	2.20%
		2015	29,600	
		2016	23,400	
		2017	-	
		2018	23,900	
		2019	-	
		2020	21,600	
		2021	24,100	
B71013900070	Route 139 between Kukula Street and Route 130	2014	6,200	3.89%
		2015	8,700	
		2016	7,600	
		2017	-	
		2018	8,600	
		2019	8,600	
		2020	7,000	
		2021	8,100	

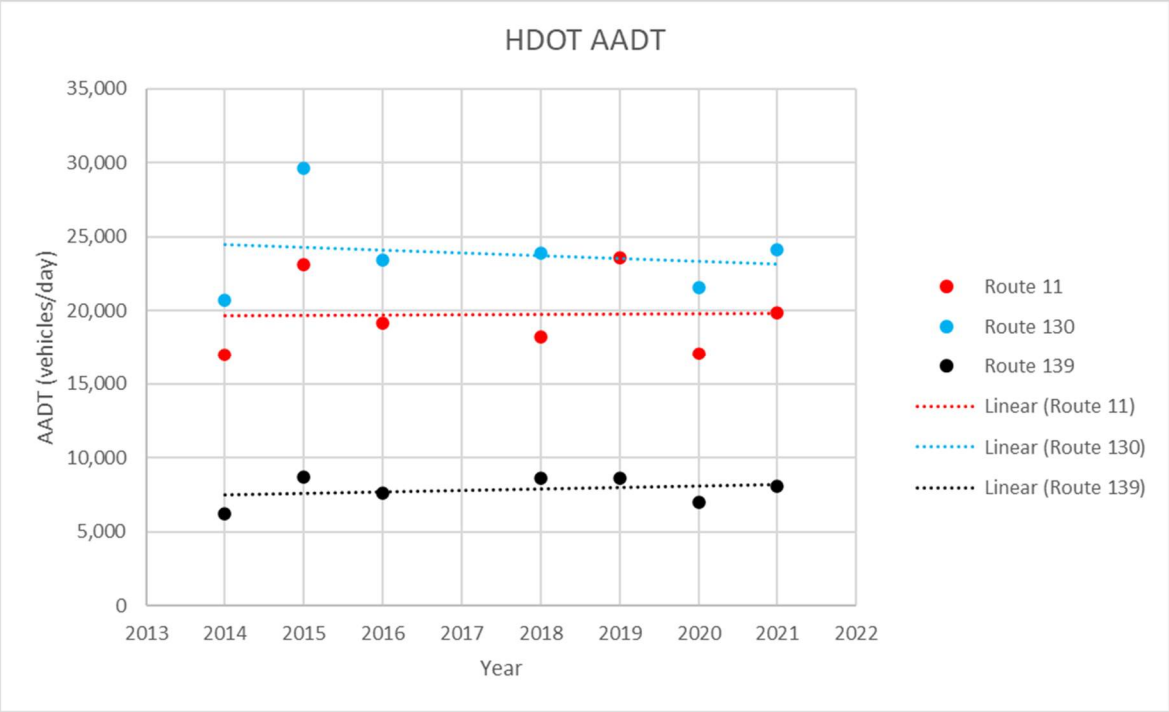

Figure 7: 2014-2021 HDOT Historic AADT and Trendline

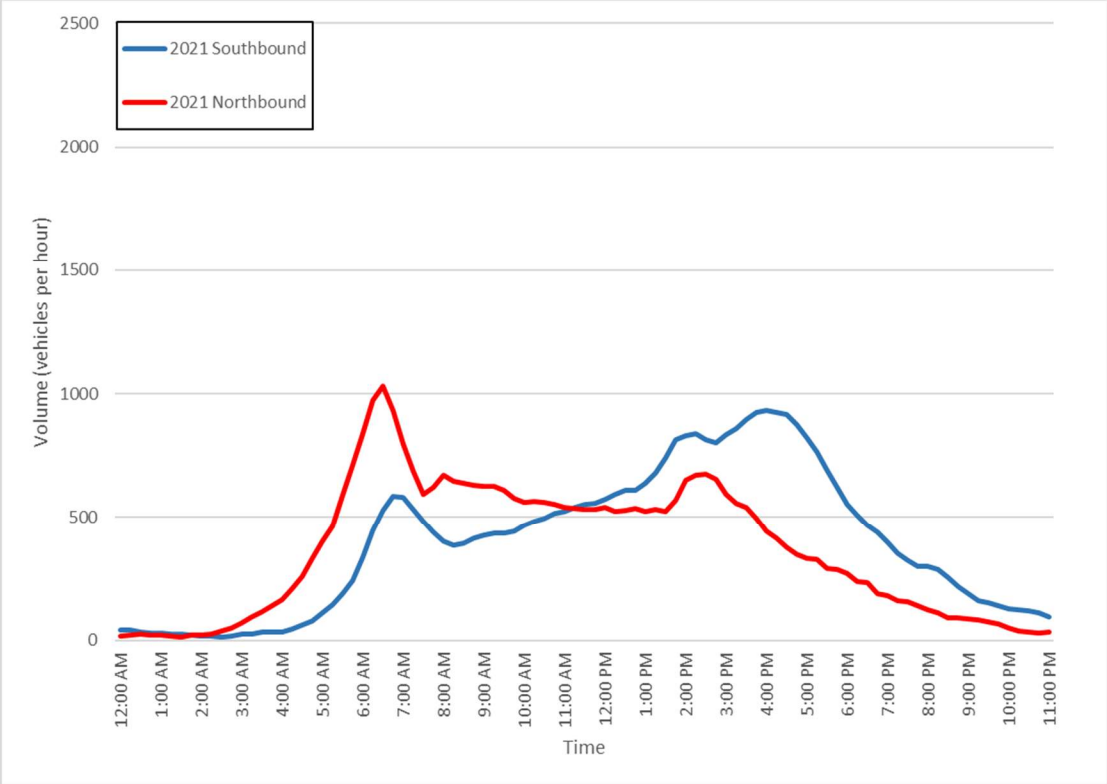

Figure 8: 2021 HDOT 24-Hour Distribution – Route 11 between Route 130 and Route 139

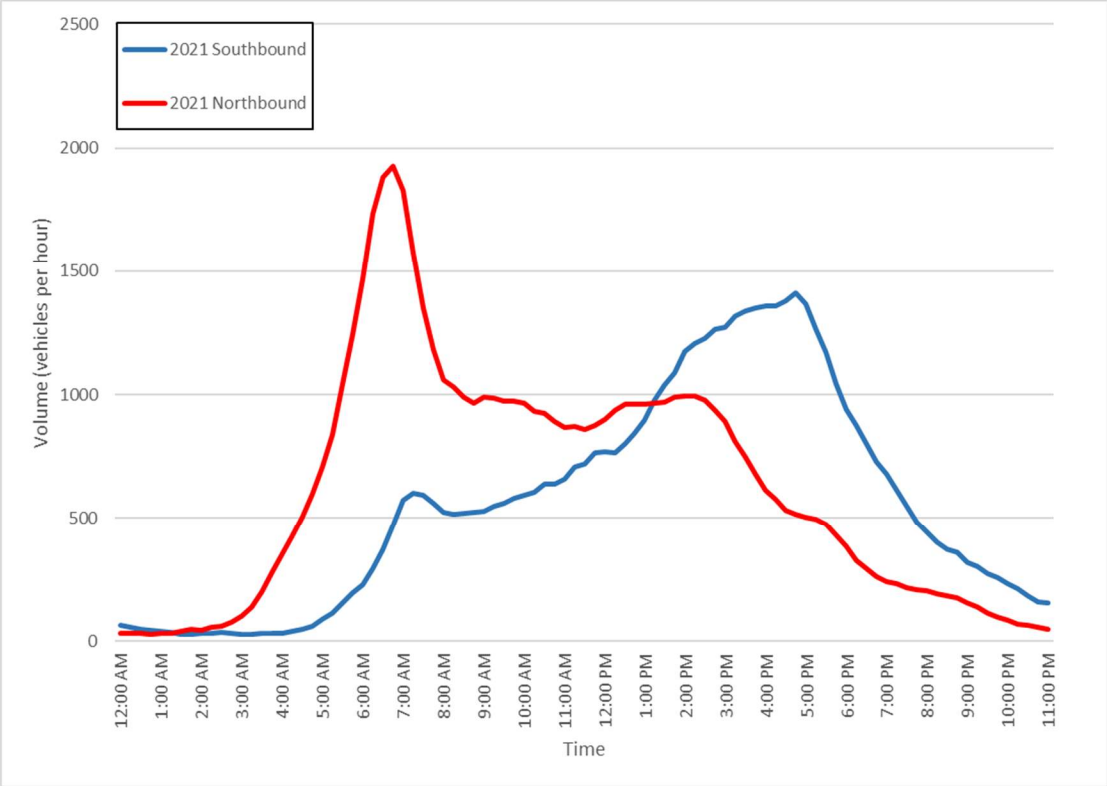

Figure 9: 2021 HDOT 24-Hour Distribution – Route 130 between Kukula Street and Route 139

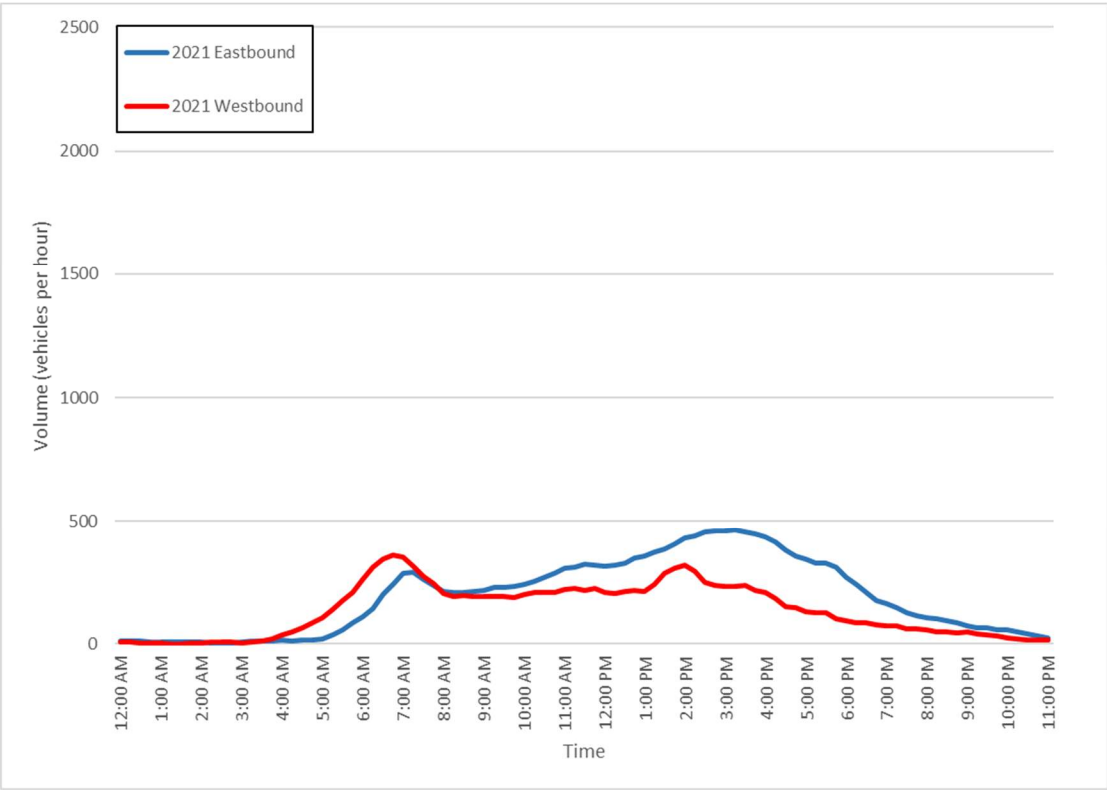

Figure 10: 2021 HDOT 24-Hour Distribution – Route 139 between Kukula Street and Route 130

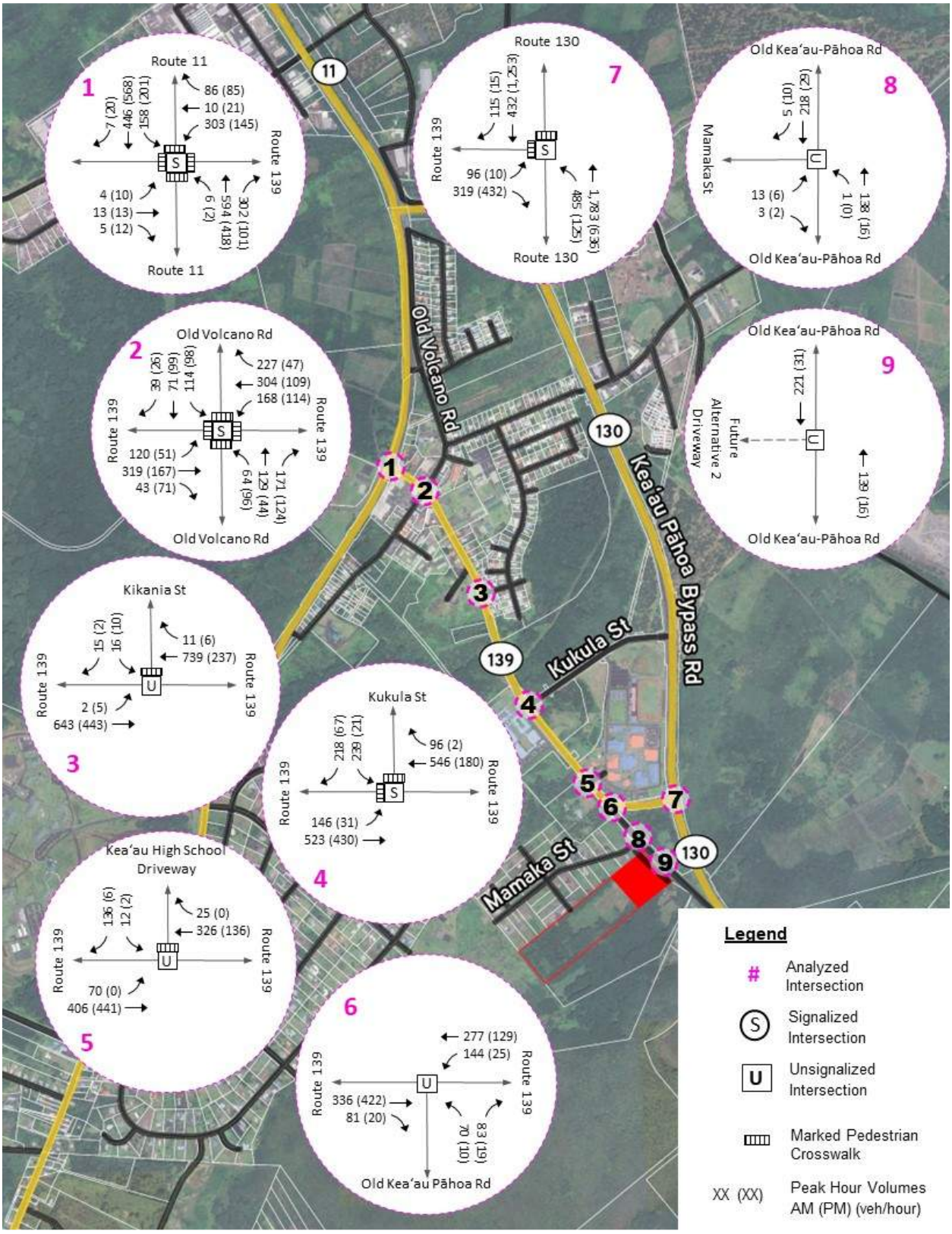

Figure 11: Existing (2024) Intersection Peak Hour Volumes

3. Pedestrian and Bicycle Volumes

Peak hour intersection pedestrian and bicycle volumes were taken at the existing study intersections on Thursday, March 7, 2024. Peak hour intersection multimodal volumes during the AM and PM peak hours are shown in Tables 2 and 3, respectively. During the AM Peak hour, pedestrian activity was highest at the intersection of Route 139 and Kukula Street when students were observed walking to school. During the PM peak hour, pedestrian activity was highest on Route 139 near the intersections with Route 11 and Old Volcano Road, both near the commercial areas. Bike activity was negligible throughout the study area throughout the day.

Table 2: Existing (2024) Peak Hour Pedestrian Volumes

Intersection	AM Peak Hour					PM Peak Hour				
	North Leg	East Leg	South Leg	West Leg	Total	North Leg	East Leg	South Leg	West Leg	Total
Route 11 at Route 139	0	0	0	0	0	0	0	6	0	6
Route 139 at Old Volcano Road	0	7	0	3	10	2	8	4	1	15
Route 139 at Kikania Street	1	0	0	0	1	0	0	1	0	1
Route 139 at Kukula Street	2	0	11	10	23	0	0	1	0	1
Route 139 at Kea'au HS Driveway	0	0	0	0	0	0	0	0	0	0
Route 139 at Old Kea'au-Pāhoa Road	0	0	0	0	0	0	0	0	0	0
Route 130 at Route 139	0	0	0	0	0	0	0	0	0	0
Old Kea'au-Pāhoa Road at Mamaka Street	0	0	0	0	0	0	0	0	0	0

Table 3: Existing (2024) Peak Hour Bicycle Volumes

Intersection	AM Peak Hour					PM Peak Hour				
	NB	SB	EB	WB	Total	NB	SB	EB	WB	Total
Route 11 at Route 139	0	0	0	0	0	0	1	0	0	1
Route 139 at Old Volcano Road	0	0	0	0	0	0	0	0	0	0
Route 139 at Kikania Street	0	0	0	0	0	0	0	0	0	0
Route 139 at Kukula Street	0	0	0	0	0	0	0	0	0	0
Route 139 at Kea'au HS Driveway	0	0	0	0	0	0	0	0	0	0
Route 139 at Old Kea'au-Pāhoa Road	0	0	0	0	0	0	0	0	0	0
Route 130 at Route 139	0	0	0	0	0	0	0	0	0	0
Old Kea'au-Pāhoa Road at Mamaka Street	0	0	0	0	0	0	0	0	0	0

G. Existing Automobile LOS

1. Methodology

Level of service (LOS) is a 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 state that LOS D or better is appropriate for the study intersection and movements. Intersection LOS and delay was determined for the AM and PM peak hours using *Synchro Version 11* traffic analysis software.

As stated in the *HCM6* (TRB, 2016), LOS for a TWSC intersection is determined by the measured control delay (see Table 4). Delay at a TWSC intersection is defined by each minor movement and not for the intersection as a whole. Vehicles traveling along the major, free-flow road of a TWSC intersection, proceed through with minimal delay. Those vehicles approaching the intersection along the minor movement (side-street) are controlled by a stop sign and thus experience delay attributable to the volume of vehicles passing along the free-flow road and the gaps available.

Table 4: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
≤ 10.0	A	F
> 10.0 and ≤ 15.0	B	F
> 15.0 and ≤ 25.0	C	F
> 25.0 and ≤ 35.0	D	F
> 35.0 and ≤ 50.0	E	F
> 50.0	F	F

The LOS analysis for signalized intersections is determined by average total vehicle delay based on the methodologies of the *HCM6* (TRB, 2016), shown in Table 5. High numbers of vehicles passing through the intersection, long cycle lengths, inappropriate signal phasing, or poor signal progression can result in long delays, and consequently poor LOS.

Table 5: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
≤ 10.0	A	F
> 10.0 and ≤ 20.0	B	F
> 20.0 and ≤ 35.0	C	F
> 35.0 and ≤ 55.0	D	F
> 55.0 and ≤ 80.0	E	F
> 80.0	F	F

Another measure of intersection operation is the volume to capacity (v/c) ratio. The v/c ratio compares to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. Any v/c ratio greater than or equal to 1.0 indicates that the intersection is operating at or above capacity which results in a LOS F per the *HCM*. A traffic movement can have a poor LOS but low v/c which suggests that the traffic volumes along that movement are low but have to wait a long time to make the movement. This is common for low volume protected turn movements or side streets that have to wait through a long cycle length for their phase to come up.

2. Existing (2024) Intersection LOS Results

Existing (2024) intersection and movement LOS and delay (seconds/vehicle) were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. Results are shown in Table 6 and Appendix C. Movements that operate at LOS E or worse or v/c greater than 1.0 are highlighted in yellow and discussed below.

(a) Route 139/Shipman Park Driveway at Route 11

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hour, respectively. The Route 11 northbound left turn volume during the AM and PM peak hours is six vehicles and two vehicles per hour, respectively. The delay is due to the cycle length. This minimal volume of vehicles was observed to clear the intersection during each cycle when present. Mitigation for this movement is not recommended.

(b) Route 139 at Kikiana Street

At the intersection of Route 139 and Kikania Street, the Kikania Street southbound approach operates at LOS E (v/c of 0.26) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Kikania Street. The delay is not a result of capacity along the Kikania Street southbound approach. Kikania Street southbound right turn vehicles were observed driving in the shoulder and were less impacted by the volume on Route 139. The Kikania Street southbound left turn volume during the AM peak hour is 16 vehicles per hour. The southbound left turn volume will not satisfy traffic signal warrant thresholds, and therefore, a signal is not recommended. The actual delay observed during the AM peak hour was less than the calculated delay.

(c) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS E (v/c of 0.47) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. The v/c ratio suggests there is sufficient capacity for this movement. The Old Kea'au-Pāhoa Road northbound left turn volume during the AM peak hour is 70 vehicles per hour. The northbound left turn volume is less than 12 vehicles per hour during the other three hours of traffic counts collected on Thursday, March 7, 2024, including the hour before the AM peak hour and the two PM commuter peak hours. The Old Kea'au-Pāhoa Road northbound left turn volume will not satisfy 8-Hour or 4-Hour traffic signal warrant thresholds, and therefore, a signal is not recommended. The actual delay observed during the AM peak hour was less than the calculated delay.

(d) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn operates at LOS E (v/c of 0.87) during the PM peak hour. The Route 130 northbound left turn volume is 125 vehicles per hour, or approximately two vehicles per minute. There were no observed issues with this movement clearing every cycle. Mitigation for this movement is not recommended.

Table 6: Existing (2024) LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**28.0**	**-**	**C**	**24.1**	**-**
Route 11 NB Left	E	61.2	0.44	F	84.4	0.41
Route 11 NB Through-Right	C	31.6	0.77	C	29.1	0.70
Route 11 SB Left	D	51.0	0.83	D	35.8	0.82
Route 11 SB Through-Right	C	20.5	0.39	C	20.1	0.53
Shipman Park EB Left-Through-Right	B	13.8	0.03	B	11.6	0.05
Route 139 WB Left-Through	C	21.1	0.53	B	13.6	0.26
Route 139 & Old Volcano Road	**B**	**14.1**	**-**	**B**	**14.5**	**-**
Old Volcano NB Left	B	16.2	0.15	C	25.0	0.33
Old Volcano NB Through-Right	B	18.0	0.61	C	22.4	0.48
Old Volcano SB left	C	24.6	0.45	C	27.6	0.39
Old Volcano SB Through-Right	B	14.3	0.22	C	21.0	0.32
Route 139 EB Left	B	15.0	0.31	A	6.2	0.07
Route 139 EB Through-Right	B	11.0	0.45	A	6.5	0.25
Route 139 WB Left	B	17.7	0.41	A	8.4	0.18
Route 139 WB Through	B	10.1	0.37	A	5.6	0.11
Route 139 WB Right	A	9.8	0.33	A	5.3	0.05
Route 139 & Kikania Street	**-**	**0.8**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	A	9.9	0.01	A	7.8	0.01
Kikania SB Left-Right	E	37.6	0.26	B	14.5	0.04
Route 139 & Kukula Street	**B**	**17.5**	**-**	**A**	**3.9**	**-**
Route 139 EB Left	A	9.1	0.36	A	2.6	0.04
Route 139 EB Through	A	7.1	0.46	A	2.6	0.34
Route 139 WB Through-Right	B	13.5	0.70	A	4.5	0.18
Kukula SB Left	D	54.8	0.88	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.4**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.3	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.1	0.23	A	9.0	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**5.3**	**-**	**-**	**0.9**	**-**
Route 139 WB Left-Through	A	9.1	0.16	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	41.9	0.47	B	13.5	0.02
Old Kea'au-Pāhoa NB Right	B	12.1	0.17	B	11.1	0.03
Route 130 & Route 139	**C**	**20.1**	**-**	**C**	**26.6**	**-**
Route 130 NB Left	D	52.0	0.93	E	64.3	0.87
Route 130 NB Through	A	8.8	0.69	A	7.3	0.30
Route 130 SB Through	C	24.0	0.31	C	24.7	0.74
Route 139 EB Left	D	44.7	0.35	C	33.4	0.07
Route 139 EB Right	C	21.9	0.45	D	43.5	0.85
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**1.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

III. Future Without Project Conditions

Regional traffic growth, trip generation from any upcoming planned projects, and future surrounding area development's traffic were added to the roadway network and analyzed for a 2027 future analysis year.

A. Background Growth Rate

Historic HDOT AADT on Route 11, Route 130, and Route 139 in the study area from 2014-2021 resulted in annual growth rates between 2.20-3.89%, while the overall trendlines showed consistent (no growth) AADT over that time.

The *Federal-Aid Highways 2035 Transportation Plan for the District of Hawai'i* (CH2M Hill, 2014) forecasts a compounded annual increase of 2.12% in the planning district of Puna between 2020 to 2035 (see Table 7).

Table 7: Traffic Volume Future Forecast – Daily Vehicle Trips in Puna

Year	Daily Vehicle Trops	Growth Rate
2020	92,180	2.12%
2035	126,290	

In the surrounding area, both the *Kea'au Villages Master Plan* (MP) *Phase 1 and Phase 2 TIAR* and the *Kea'au Mountain View Public Library TIAR* used a growth rate of 0.50%, reflective of the consistent linear trendline. For this project, it was determined to use the 2.12% forecasted growth rate when calculating future volumes to account for anticipated future growth and potential developments that are completed but not individually added. Therefore, a 2.12% compounded annual growth rate was applied to the through volumes on Route 11, Route 130, and Route 139, and for turns to/from Route 139 to/from Route 11 and Route 130.

B. Surrounding Projects

Research was completed on the State of Hawaii *Environmental Review Program* (ERP) website, The ERP website provides Environmental Impact Statements (EIS) and Environmental Assessments (EA) available to the public.

The *Kea'au Village Master Plan TIAR* (Wilson Okamoto, Revised July 2017) and *Kea'au Mountain View Public Library* (ATA, 2023) are the latest applicable projects surrounding the project site.

1. Kea'au Villages Master Plan Phase 1 and Phase 2

The *Kea'au Villages Master Plan Phase 1 and Phase 2 TIAR* was written in support of the *Kea'au Village Master Plan Environmental Assessment* (PBR Hawai'i, 2020). The proposed MP was projected to be completed in three construction phases over years 2023, 2028, and 2038 to include:

- 590 single family homes,
- 350 multi-family homes,
- 220,408 SF GFA of commercial space,
- 43,600 SF GFA of office space, and
- 100 hotel rooms.

Construction for the project has not started, and it is unknown when it may commence. However, once it does get under construction, it will take another couple of years before the first units are occupied and generating trips. Therefore, with this ambiguity, individual project-related trips resulting from the *Kea'au Villages MP TIAR* were not included in future analysis. It is assumed that any development that does come online by 2027 will be captured in the 2.12% annual background growth rate.

2. Kea'au Mountain View Public Library

The *Kea'au Mountain View Public Library TIAR* analyzed a proposed 12,000 SF public library northeast of the intersection of Route 139 and Old Volcano Road. The proposed library will replace the existing library at the Kea'au Middle School and Mountain View Elementary School. The project is anticipated to be completed in 2027 and therefore will be included in this project's future year analysis. The peak hour project generated traffic is shown in Figure 12.

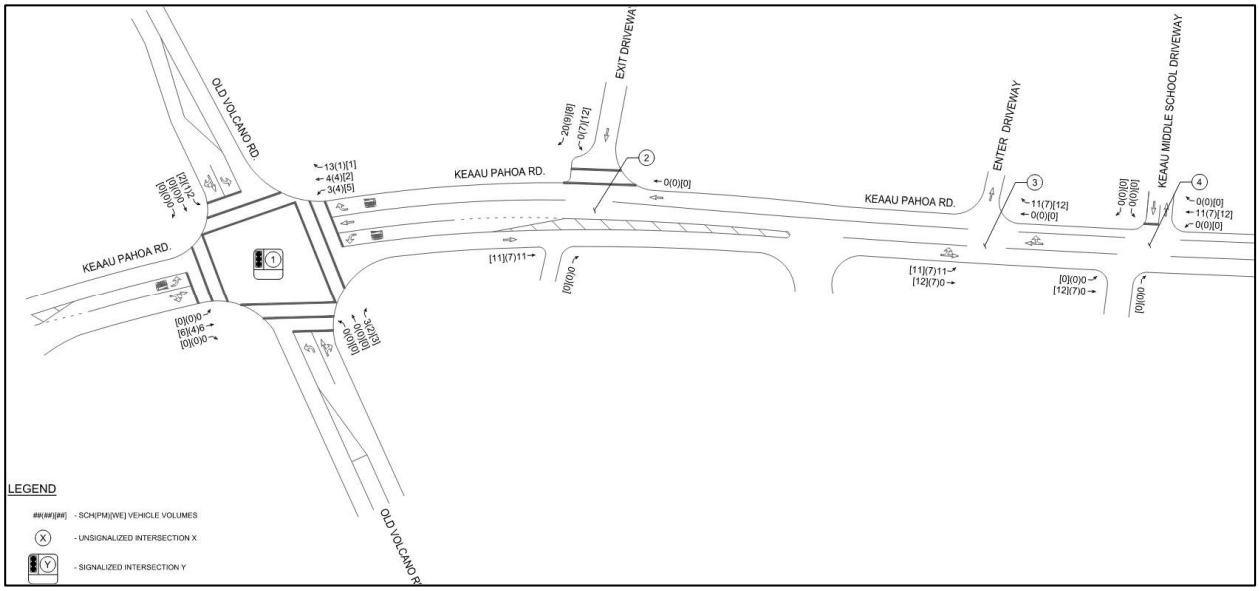

Figure 12: Kea'au Mountain View Public Library TIAR – 2027 Project Generated Trips

C. Master Plans

1. Puna Community Development Plan

The *Puna Community Development Plan* (Puna CDP) (September 2008) includes short-term (2008-2012) and medium-term (2013-2017) improvements recommended to DOT. All short-

term improvements have been implemented. Medium-term transportation improvements include constructing a right exit lane on Route 11 to Kea'au Village using the Old Volcano Road.

2. Statewide Pedestrian Master Plan

The *HDOT Statewide Pedestrian Master Plan* (HDOT, May 2013) does not include any projects in the study area.

3. Bike Plan Hawai'i

The *Bike Plan Hawai'i* (HDOT, September 2003) documents bike projects on state roadways that were planned for completion (see Figure 13). The following projects in the study area include:

- Project 30a: *Railroad Avenue Bikeway Connection to Kea'au Schools Complex*
  - Priority I Project
  - Proposed a 0.5-mile shared use path between the proposed Railroad Avenue shared use path and Route 130.
- Project 30b: *Various local roads and off-road paths*
  - Priority II Project
  - Proposed 2.0 miles of shared use paths.
- Project 31a: *Old Kea'au-Pāhoa Road (Route 139)*
  - Priority II Project
  - Proposed 1.1 miles of signed shared lanes along Route 139.
    - Currently, marked and striped bike lanes exist in the westbound direction between Kea'au High School and east of the intersection with Old Volcano Road. Additionally, bike lanes exist in the eastbound direction between Route 11 and Kea'au Elementary School.
- Project 31b: *Old Kea'au-Pāhoa Road Remnant*
  - Priority II Project
  - Proposed a 0.5-mile signed shared road along the Old Kea'au-Pāhoa Road.
- Project 47: *Volcano Highway*
  - Priority II Project
  - Proposed 23.2-miles of signed shared roadway along Route 11 between Kea'au and Hawai'i Volcanoes National Park.

There are no known construction dates for any of these projects that have yet to be implemented. These projects were not included in the future analysis.

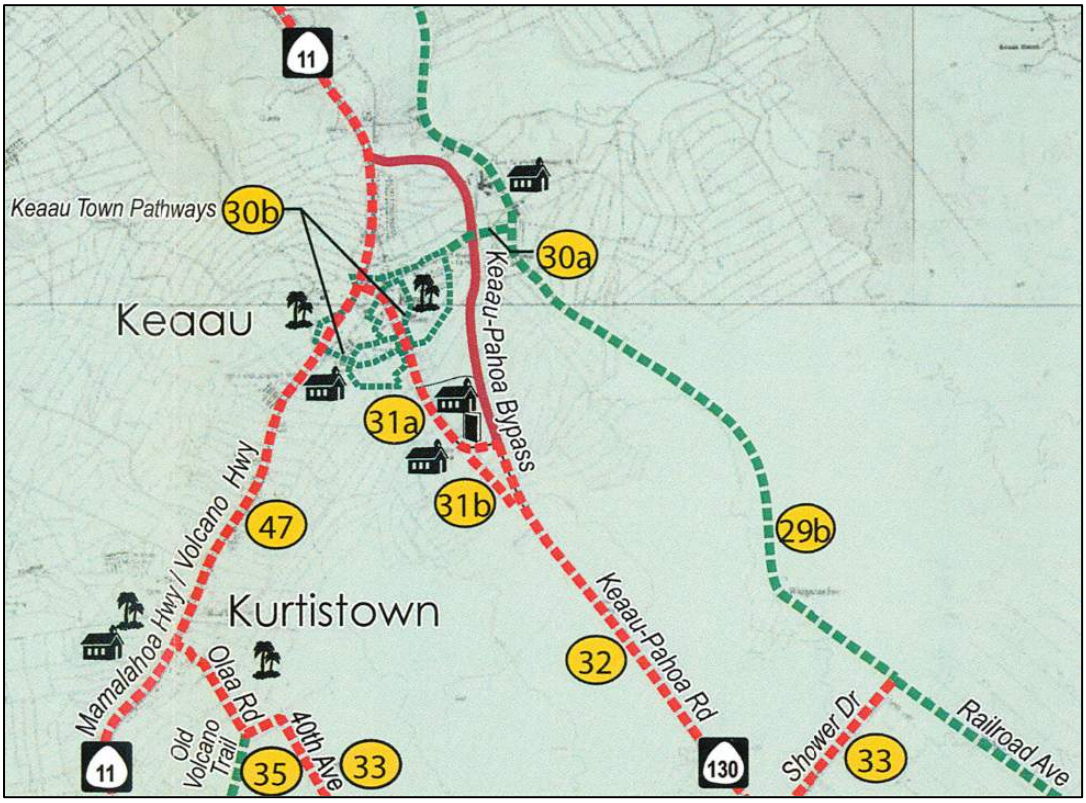

Figure 13: Bike Plan Hawai'i Proposed Improvements

D. 2022-2025 STIP

Research was completed on September 25, 2024, at the State of Hawai'i Office Environmental Review Program (ERP) website. The latest STIP for FY 2022-2025 was revised on August 27, 2024. No significant planned projects are listed in the study area.

E. Hawai'i Island 2025-2028 STIP

Solicitation of comments for the Fiscally Unconstrained 2025-2028 STIP ended in June 2024. Solicitation of comments for the Fiscally Constrained 2025-2028 STIP ended in August 2024. The latest DRAFT Fiscally Constrained 2025-2028 STIP was revised on July 2, 2024. No significant planned projects are listed in the study area. Ongoing Roadwork

1. Route 11 and Route 130

The HDOT Highways Program Status website lists the following three ongoing projects on Route 11 and Route 130:

- Project STP-0100(087)R
    - Asphalt pavement preservation, resurfacing, and reconstruction at various locations, raised crosswalks, Route 11 and Route 130, Hawai'i, WO2.
        - Scope: Pavement preservations, resurfacing, and reconstruction.
- Project HSIP-100(074)

  - Route 11 – Installation and replacement of signs at various locations, Island of Hawai'i (CON) WO1.
    - Scope: Installation and replacement of signs.
- Project HSIP-0100(088)
  - Installation of enhanced pavement marking and new milled rumble strip at various locations on Route 130 from MP 0.00 to MP 2.20, Striping, WO3.
    - Scope: Installation of pavement preservation strategies and surface treatments.

None of these projects are expected to impact or later the study intersections.

F. Future (2027) Without Project Traffic Volumes

Future (2027) Without Project traffic volumes (see Figure 14) were calculated by adding Future (2027) Background volumes and the Kea'au Mountain View Public Library 2027 project generated trips.

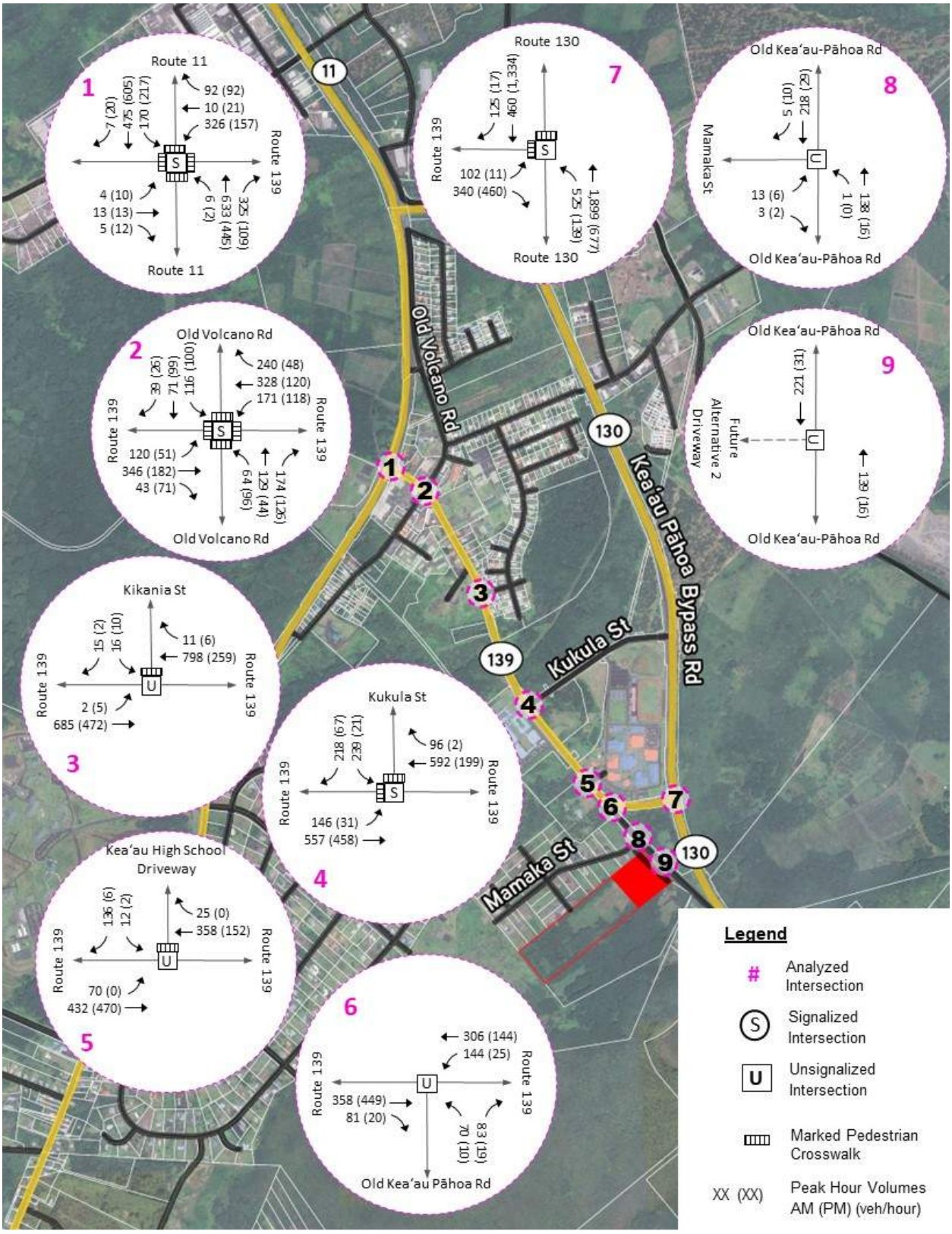

Figure 14: Future (2027) Without Project Intersection Peak Hour Volumes

G. Future Without Project LOS

1. Future (2027) Without Project Conditions

Future (2027) Without Project intersection and movement LOS and delay (seconds/vehicle) were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. Results are shown in Table 8 and Appendix D. Movements that operate at LOS E or worse are highlighted in yellow and discussed below.

(a) Route 139/Shipman Park Driveway at Route 11

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hour, respectively. The Route 11 northbound left turn volume during the AM and PM peak hours was six vehicles and two vehicles per hour, respectively. The delay is due to the cycle length. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours.

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 southbound left turn is projected to operate at LOS E (v/c of 0.85) with a left turn volume of 170 vehicles per hour during the AM peak hour. The signal timing is actuated, and Route 11 southbound left turns are protected only. All other movements are projected to operate at LOS C or better during the AM peak hour. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours. Mitigation for this intersection is not recommended.

(b) Route 139 at Kikania Street

At the intersection of Route 139 and Kikania Street, the Kikania Street southbound approach operates at LOS E (v/c of 0.30) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Kikania Street. The Kikania Street southbound left turn volume during the AM peak hour is 16 vehicles, which will not satisfy traffic signal warrant thresholds. Therefore, a signal is not recommended. Other mitigation such as control type and lane configuration changes will not greatly improve southbound delay. Mitigation for this intersection is not recommended.

(c) Route 139 at Kukula Street

At the intersection of Route 139 and Kukula Street, the Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour. The delay is due to the cycle length and 239 vehicles projected to make the southbound left turn during the AM peak hour. The signal timing is actuated, and the signal is expected to provide sufficient green time to allow for all southbound left turning vehicles to clear the intersection every cycle. Mitigation for this intersection is not recommended.

Table 8: Future (2027) Without Project LOS

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.3**	**-**	**C**	**23.9**	**-**
Route 11 NB Left	E	62.6	0.44	F	84.8	0.41
Route 11 NB Through-Right	C	32.5	0.79	C	29.0	0.71
Route 11 SB Left	E	55.3	0.85	D	35.6	0.83
Route 11 SB Through-Right	C	20.1	0.40	B	19.3	0.54
Shipman Park EB Left-Through-Right	B	15.0	0.03	B	15.5	0.05
Route 139 WB Left-Through	C	24.0	0.58	B	14.9	0.29
Route 139 & Old Volcano Road	**B**	**14.6**	**-**	**B**	**14.6**	**-**
Old Volcano NB Left	B	16.6	0.16	C	25.5	0.33
Old Volcano NB Through-Right	B	18.9	0.62	C	22.8	0.48
Old Volcano SB left	C	25.5	0.47	C	28.3	0.41
Old Volcano SB Through-Right	B	14.6	0.22	C	21.4	0.32
Route 139 EB Left	B	16.0	0.33	A	6.4	0.07
Route 139 EB Through-Right	B	11.5	0.48	A	6.6	0.26
Route 139 WB Left	B	19.2	0.43	A	8.7	0.19
Route 139 WB Through	B	10.5	0.40	A	5.7	0.12
Route 139 WB Right	B	10.1	0.34	A	5.4	0.05
Route 139 & Kikania Street	**-**	**0.9**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	B	10.2	0.01	A	7.9	0.01
Kikania SB Left-Right	E	45.6	0.30	C	15.3	0.04
Route 139 & Kukula Street	**B**	**18.1**	**-**	**A**	**4.0**	**-**
Route 139 EB Left	B	10.0	0.38	A	2.7	0.04
Route 139 EB Through	A	7.4	0.49	A	2.7	0.36
Route 139 WB Through-Right	B	14.3	0.61	A	4.6	0.20
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.4**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.4	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.5	0.25	A	9.1	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**5.5**	**-**	**-**	**0.8**	**-**
Route 139 WB Left-Through	A	9.2	0.17	A	8.4	0.02
Old Kea'au-Pāhoa NB Left	E	48.6	0.52	B	14.1	0.03
Old Kea'au-Pāhoa NB Right	B	12.4	0.17	B	11.3	0.03
Route 130 & Route 139	**C**	**21.1**	**-**	**C**	**26.1**	**-**
Route 130 NB Left	D	52.2	0.93	E	66.3	0.83
Route 130 NB Through	B	10.0	0.73	A	8.1	0.30
Route 130 SB Through	C	26.7	0.35	C	23.3	0.74
Route 139 EB Left	D	44.7	0.36	C	31.5	0.03
Route 139 EB Right	C	20.2	0.45	D	48.6	0.87
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**1.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	7.9	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	12.0	0.04	A	8.9	0.01

(d) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS E (v/c of 0.52) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. The v/c ratio suggests there is sufficient capacity for this movement. The Old Kea'au-Pāhoa Road northbound left turn volume during the AM peak hour is 70 vehicles, which will not satisfy 8-Hour or 4-Hour traffic signal warrant thresholds. Therefore, a signal is not recommended. Mitigation for this intersection is not recommended.

(e) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn operates at LOS E (v/c of 0.83) during the PM peak hour. The traffic signal is fully actuated, with existing cycle lengths varying from 65 seconds to 110 seconds during the 15-minute PM peak. The northbound left turn volume is 139 vehicles during the PM peak hour, or approximately 2.5 vehicles per minute. The traffic signal is expected to provide sufficient green time to allow for all northbound left turning vehicles to clear the intersection every cycle. Mitigation for this movement is not recommended.

IV. Future With Project Conditions

Current plans are for the development of a 36,000 SF medical office building with an associated 201-stall off-street parking lot. There are two alternates being analyzed for accessing the proposed development: one to an unnamed frontage road connecting to Mamaka Street just west of Old Kea'au-Pāhoa Road (Alternative 1 Driveway Alignment), and another through the unnamed frontage road connecting to Old Kea'au-Pāhoa Road (Alternative 2 Driveway Alignment). Trip distribution and traffic analysis will be done for both alternatives. Clinic hours have not been determined at this time. Most of the clinics in the surrounding region, including Hilo, are in operation during the AM peak hour, so it is assumed the project will be open during the AM peak hour.

A. Future With Project Generated Volumes

1. Project Related Volumes

(a) Trip Generation

The trip generation methodology is typically based upon rates developed by the Institute of Transportation Engineers (ITE) and published in the *Trip Generation Manual, 11th Edition* (ITE, 2021). The ITE trip rates are developed by correlating the total vehicle trip generation data with various activity/land use characteristics. Trip generation rates and resulting project generated volumes are shown in Tables 9 and 10, respectively.

Table 9: ITE Trip Generation – Equation and Rates for Medical Clinics

Time Period	ITE Land Use - 630 Clinic		
	Equation	IN %	OUT %
AM Peak Hour of Adjacent Street (7 - 9 AM)	T=2.19(X)+8.68	81	19
PM Peak Hour of Adjacent Street (4 - 6 PM)	T=3.53(X)+2.98	30	70

Table 10: ITE Trip Generation – Project Related Trips

Phase	AM Peak Hour of Adjacent Street			PM Peak Hour of Adjacent Street		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Phase 1 (2027) - 36,000 SF GFA	71	17	88	39	91	130

(b) Trip Distribution/Assignment

Project related trips were distributed using existing volume traffic patterns.

(c) Modal Choice

All project-related external trips were assumed to be by private vehicle. This reflects the worst-case traffic condition with all trips occurring by private vehicle. Trip reduction was not considered for this analysis. The project generated volumes and distribution for Future (2027) Alternative 1 Driveway Alignment and Future (2027) Alternative 2 Driveway Alignment are shown in Figures 15 and 16, respectively.

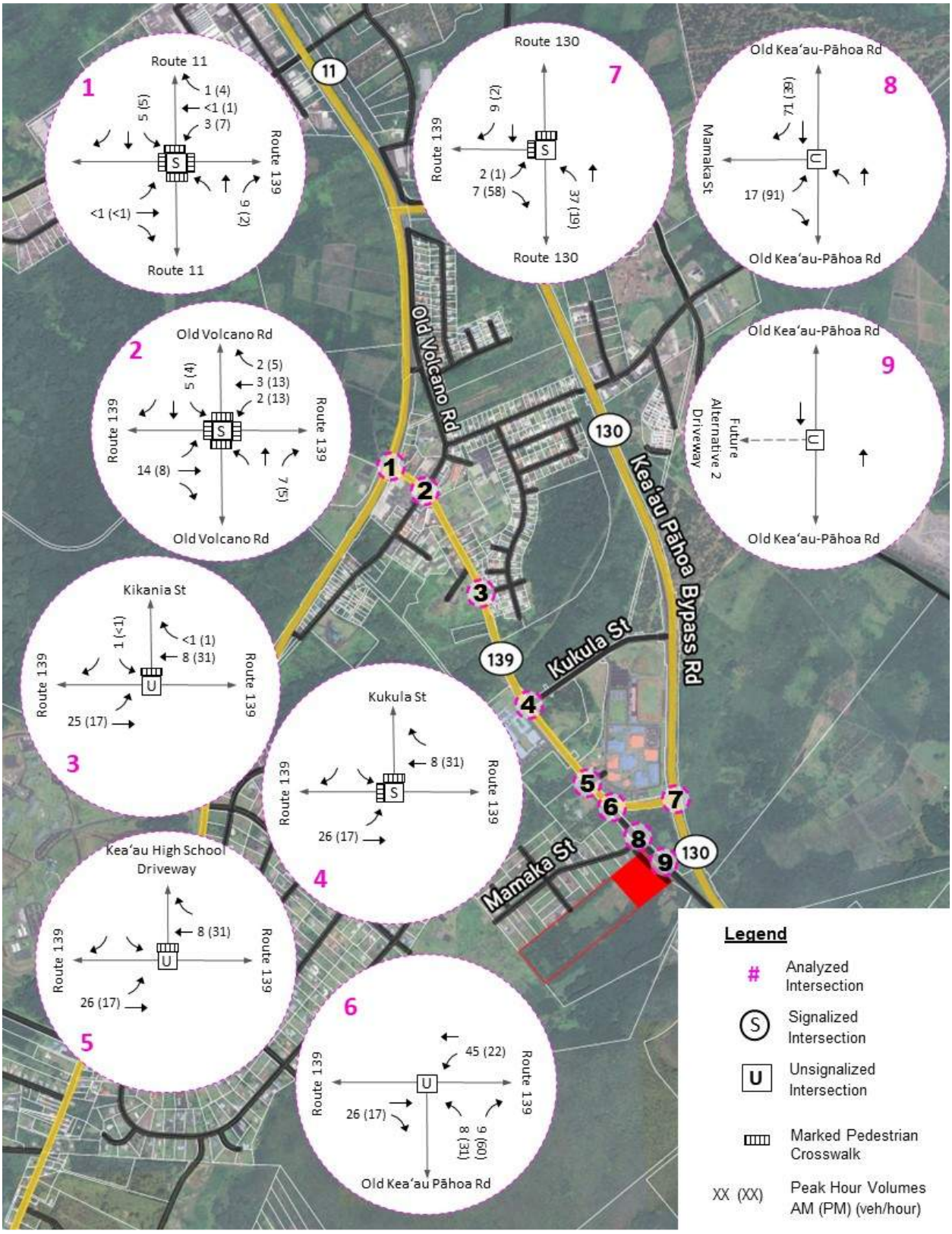

Figure 15: Alternative 1 Driveway Alignment – Project Generated Vehicle Trips and Vehicle Trip Distribution

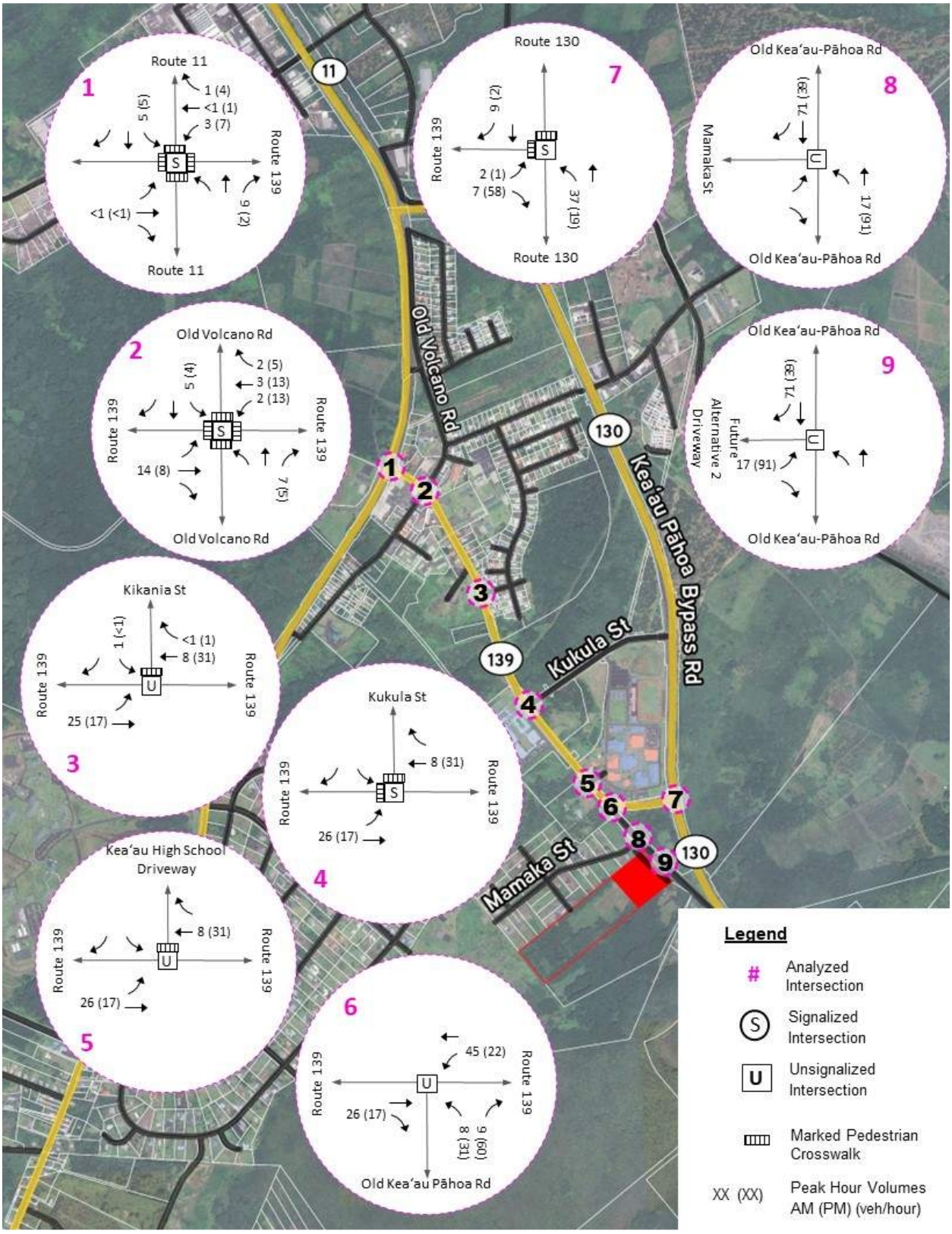

Figure 16: Alternative 2 Driveway Alignment – Project Generated Vehicle Trips and Vehicle Trip Distribution

B. Future With Project Volumes

The Future (2027) With Project Alternative 1 Driveway Alignment (see Figure 17) and Future (2027) With Project Alternative 2 Driveway Alignment volumes (see Figure 18) are a sum of the Future (2027) Without Project volumes (see Figure 14) and the project generated volumes for Alternative 1 Driveway Alignment and Alternative 2 Driveway Alignment (see Figures 15 and 16, respectively).

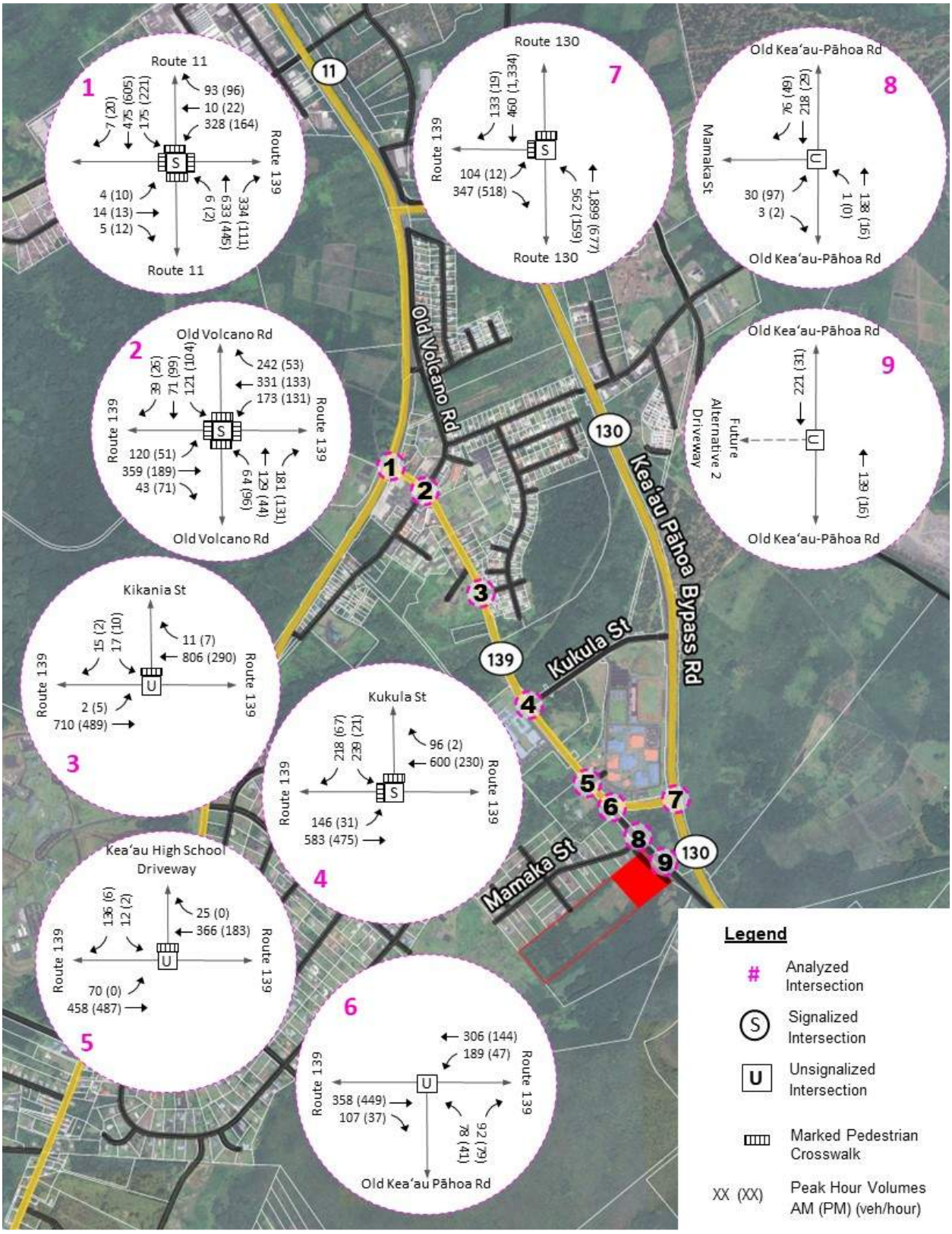

Figure 17: Alternative 1 Driveway Alignment – Future (2027) With Project Intersection Peak Hour Volumes

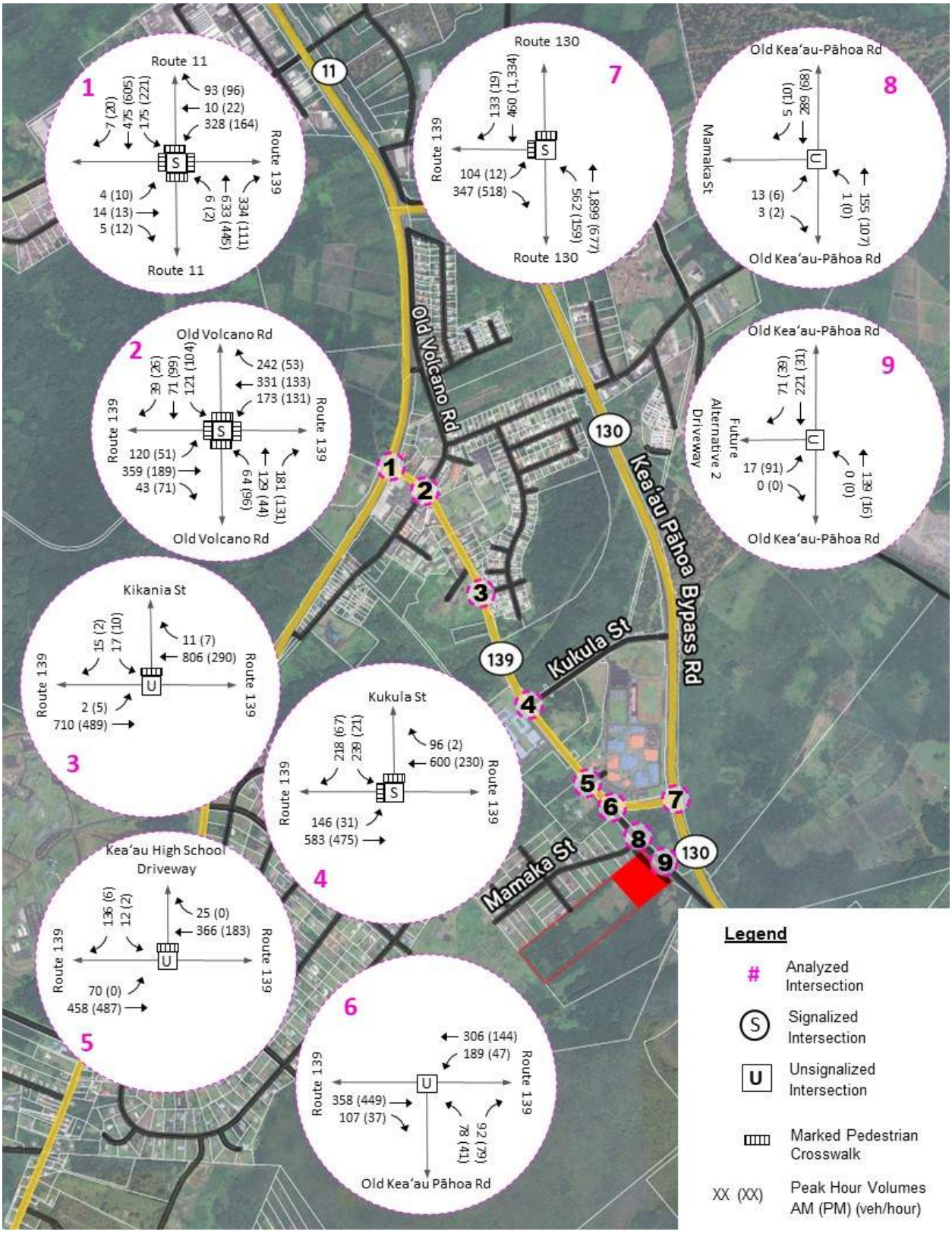

Figure 18: Alternative 2 Driveway Alignment – Future (2027) With Project Intersection Peak Hour Volumes

C. Future With Project LOS

1. Future (2027) With Project Conditions – Alternative 1 Driveway Alignment

Future (2027) With Project intersection and movement LOS and delay (seconds/vehicle) for Alternative 1 Driveway Alignment were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. Results are shown in Table 11 and Appendix E. Movements that operate at LOS E or worse are highlighted in yellow and discussed below.

(a) Route 139/Shipman Park Driveway at Route 11

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 northbound left turn operates at LOS E (v/c of 0.44) and LOS F (v/c of 0.41) during the AM and PM peak hour, respectively. The Route 11 northbound left turn volume during the AM and PM peak hours was six vehicles and two vehicles per hour, respectively. The delay is due to the cycle length. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours. Mitigation for this intersection is not recommended.

At the intersection of Route 11 and Route 139/Shipman Park Driveway, the Route 11 southbound left turn is projected to operate at LOS E (v/c of 0.85) with a left turn volume of 173 vehicles per hour during the AM peak hour. The signal timing is actuated, and Route 11 southbound left turns are protected only. All other movements are projected to operate at LOS C or better during the AM peak hour. The overall intersection is projected to operate at LOS C during both the AM and PM peak hours. Mitigation for this intersection is not recommended.

(b) Route 139 at Kikania Street

At the intersection of Route 139 and Kikania Street, the Kikania Street southbound approach operates at LOS F (v/c of 0.34) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Kikania Street. The Kikania Street southbound left turn volume during the AM peak hour is 16 vehicles per hour, which will not satisfy traffic signal warrant thresholds. Therefore, a signal is not recommended. Other mitigation such as control type and lane configuration changes will not greatly improve southbound delay. Mitigation for this intersection is not recommended.

(c) Route 139 at Kukula Street

At the intersection of Route 139 and Kukula Street, the Kukula Street southbound left turn operates at LOS E (v/c of 0.89) during the AM peak hour. The delay is due to the cycle length and 239 vehicles per hour projected to make the southbound left turn during the AM peak hour. The signal timing is actuated, and the signal is expected to provide sufficient green time to allow for all southbound left turning vehicles to clear the intersection every cycle. Mitigation for this intersection is not recommended.

Table 11: Future (2027) With Project LOS – Alternative 1 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Route 11 & Route 139/Shipman Park Driveway	**C**	**29.7**	**-**	**C**	**24.0**	**-**
Route 11 NB Left	E	62.9	0.44	F	84.9	0.41
Route 11 NB Through-Right	C	32.7	0.79	C	29.2	0.71
Route 11 SB Left	E	56.5	0.85	D	35.7	0.83
Route 11 SB Through-Right	B	20.0	0.40	B	19.2	0.53
Shipman Park EB Left-Through-Right	B	15.2	0.03	B	12.6	0.05
Route 139 WB Left-Through	C	24.4	0.59	B	15.2	0.30
Route 139 & Old Volcano Road	**B**	**14.9**	**-**	**B**	**14.8**	**-**
Old Volcano NB Left	B	16.0	0.15	C	25.8	0.33
Old Volcano NB Through-Right	B	18.1	0.62	C	23.2	0.49
Old Volcano SB left	C	25.0	0.47	C	29.2	0.43
Old Volcano SB Through-Right	B	14.0	0.21	C	21.7	0.32
Route 139 EB Left	B	16.8	0.34	A	6.7	0.07
Route 139 EB Through-Right	B	12.3	0.51	A	6.9	0.27
Route 139 WB Left	C	21.0	0.47	A	9.3	0.21
Route 139 WB Through	B	11.0	0.41	A	5.9	0.13
Route 139 WB Right	B	10.6	0.35	A	5.6	0.06
Route 139 & Kikania Street	**-**	**1.0**	**-**	**-**	**0.3**	**-**
Route 139 EB Left-Through	B	10.3	0.01	A	8.0	0.01
Kikania SB Left-Right	F	50.1	0.34	C	16.1	0.04
Route 139 & Kukula Street	**B**	**18.1**	**-**	**A**	**4.1**	**-**
Route 139 EB Left	B	10.2	0.39	A	2.7	0.04
Route 139 EB Through	A	7.7	0.52	A	2.8	0.37
Route 139 WB Through-Right	B	14.5	0.62	A	4.8	0.23
Kukula SB Left	E	57.3	0.89	C	26.7	0.46
Route 139 & Kea'au HS Driveway	**-**	**2.3**	**-**	**-**	**0.1**	**-**
Route 139 EB Left-Through	A	8.5	0.07	A	0.0	0.00
Kea'au HS SB Right	B	12.6	0.25	A	9.3	0.01
Route 139 & Old Kea'au-Pāhoa Road	**-**	**9.1**	**-**	**-**	**2.5**	**-**
Route 139 WB Left-Through	A	9.6	0.23	A	8.6	0.05
Old Kea'au-Pāhoa NB Left	F	93.0	0.76	C	16.1	0.12
Old Kea'au-Pāhoa NB Right	B	12.8	0.19	B	12.2	0.14
Route 130 & Route 139	**C**	**21.4**	**-**	**C**	**29.8**	**-**
Route 130 NB Left	D	52.3	0.94	E	65.2	0.84
Route 130 NB Through	A	9.6	0.73	A	8.1	0.30
Route 130 SB Through	C	28.2	0.36	C	24.7	0.76
Route 139 EB Left	D	46.1	0.38	C	31.6	0.03
Route 139 EB Right	B	19.4	0.45	E	60.6	0.95
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**1.0**	**-**	**-**	**5.1**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	8.2	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	13.2	0.10	B	10.0	0.18

(d) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS F (v/c of 0.76) during the AM peak hour. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. Mitigation will be analyzed.

(e) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn and eastbound right turn operates at LOS E (v/c of 0.84 and 0.95, respectively) during the PM peak hour. The traffic signal is fully actuated, with existing cycle lengths varying from 65 seconds to 110 seconds during the 15-minute PM peak. The Route 130 northbound left turn volume is 159 vehicles per hour during the PM peak hour, or approximately 2.5 vehicles per minute. The traffic signal is expected to provide sufficient green time to allow for all northbound left turning vehicles to clear the intersection every cycle. The eastbound right turn volume is 518 vehicles per hour. The delay is due to the combination of the high vehicle volume and the green time provided for this movement. Mitigation for this movement will be analyzed.

2. Future (2027) With Project Conditions – Alternative 2 Driveway Alignment

Future (2027) With Project intersection and movement LOS and delay (seconds/vehicle) for Alternative 2 Driveway Alignment were determined for the AM and PM peak hours using *Synchro 11* traffic analysis software. For Alternative 2 Driveway Alignment, the volumes at Old Kea'au-Pāhoa Road at Mamaka Street would be redistributed to Old Kea'au-Pāhoa Road at the Alternative 2 Driveway. The traffic volumes at all other study intersections will remain the same and therefore were not included in this section. Results are shown in Table 12 and Appendix E. All movements at both intersections operate at LOS B or better.

Table 12: Future (2027) With Project LOS – Alternative 2 Driveway Alignment

Intersection	AM Peak			PM Peak		
	LOS	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c
Old Kea'au-Pāhoa Road & Mamaka Street	**-**	**0.5**	**-**	**-**	**0.4**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	8.2	0.01	A	0.0	0.00
Mamaka EB Left-Right	B	13.3	0.05	A	9.9	0.02
Old Kea'au-Pāhoa Road & Alternative 2 Driveway	**-**	**0.4**	**-**	**-**	**4.8**	**-**
Old Kea'au-Pāhoa NB Left-Through	A	0.0	0.00	A	0.0	0.00
Alternative 2 Driveway EB Left-Right	B	11.4	0.03	A	9.3	0.11

3. Future (2027) With Project Mitigation

(a) Route 139 and Old Kea'au-Pāhoa Road

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, the Old Kea'au-Pāhoa Road northbound approach operates at LOS F with a v/c of 0.76 in the AM peak hour for both alternatives. The Old Kea'au-Pāhoa Road northbound left turn volume during the AM peak hour is projected to increase to 78 vehicles per hour, which will not satisfy 8-Hour or 4-Hour traffic signal warrant thresholds. Therefore, a signal is not recommended. A northbound left turn refuge lane from Old Kea'au-Pāhoa Road onto Route 139 was added and analyzed (see Table 13 and Appendix E). The eastbound approach is a free movement and will not experience delay.

Table 13: Future (2027) With Project Mitigation at Route 139 and Old Kea'au-Pāhoa Road

Existing Lane Configuration	AM Peak		
	LOS	Delay (sec/veh)	v/c
Route 139 & Old Kea'au-Pāhoa Road	**-**	**9.1**	**-**
Route 139 WB Left-Through	A	9.6	0.23
Old Kea'au-Pāhoa NB Left	F	93.0	0.76
Old Kea'au-Pāhoa NB Right	B	12.8	0.19
Northbound Left Turn Refuge Lane	**AM Peak**		
	LOS	**Delay (sec/veh)**	**v/c**
Route 139 & Old Kea'au-Pāhoa Road	**-**	**4.8**	**-**
Route 139 WB Left-Through	A	9.6	0.23
Old Kea'au-Pāhoa NB Left	D	30.2	0.40
Old Kea'au-Pāhoa NB Right	B	12.8	0.19

The northbound left turn delay improves from LOS F (v/c of 0.76) to LOS D (v/c of 0.40). As stated earlier, the northbound left turn volume is only significant during the AM peak hour due to the vehicles leaving after dropping off students at the Ke Kula'o Nāwahiokalani'ōpu'u Charter School. The proposed clinic generated trips is projected to increase the northbound left turn volume by 8 vehicles per hour. A northbound left turn refuge lane will require restriping the intersection.

(b) Route 130 and Route 139

At the intersection of Route 130 and Route 139, the Route 130 northbound left turn and eastbound right turn operates at LOS E during the PM peak hour for both alternatives. Data collected during the busiest 15-minute interval during the PM peak hour recorded cycle length of 65 seconds to 110 seconds, which suggests this intersection is actuated. The northbound through and southbound through movements operate at LOS A and LOS C, respectively. Signal timing adjustments were analyzed determine if the eastbound right turn movement could

operate at LOS D or better, while still maintaining acceptable LOS for the Route 130 northbound and southbound through movements (see Table 14 and Appendix E).

Table 14: Future (2027) With Project Mitigation at Route 130 and Route 139

110-Second Cycle Length, Optimized Phasing	PM Peak		
	LOS	Delay (sec/veh)	v/c
Route 130 & Route 139	**C**	**29.8**	**-**
Route 130 NB Left	E	65.2	0.84
Route 130 NB Through	A	8.1	0.30
Route 130 SB Through	C	24.7	0.76
Route 139 EB Left	C	31.6	0.03
Route 139 EB Right	E	60.6	0.95
110-Second Cycle Length, Green Time Distributed to Eastbound Approach	**PM Peak**		
	LOS	**Delay (sec/veh)**	**v/c**
Route 130 & Route 139	**C**	**28.6**	**-**
Route 130 NB Left	E	57.5	0.84
Route 130 NB Through	A	9.4	0.31
Route 130 SB Through	C	28.3	0.80
Route 139 EB Left	C	29.3	0.02
Route 139 EB Right	D	45.7	0.88

The eastbound right turn improves from LOS E (LOS of 0.95) to LOS D (v/c of 0.88), while the northbound and southbound through experience slightly more delay, but still operate at an acceptable LOS. The northbound left turn will continue to operate at LOS E with a traffic volume of about 159 vehicles per hour, or about 2.5 vehicles per minute. This movement is expected to clear the intersection every cycle.

V. Summary and Recommendations

Hilo Medical Center is proposing to develop a new medical office in Kea'au, on the Island of Hawai'i. The project is located on TMK (3) 1-6-003:081 on the northeast side of an existing 26.762-acre site. Current plans are for the development of a 36,000 SF medical office building, along with a 201-stall off-street parking lot. There are two proposed accesses for the project. Alternative 1 Driveway Alignment will have proposed access via a driveway off an unnamed frontage road just off of the intersection of Old Kea'au-Pāhoa Road and Mamaka Street. Alternative 2 Driveway Alignment, the preferred alternative, will pass through the unnamed frontage road and with a connection directly to Old Kea'au-Pāhoa Road. Construction is anticipated to be completed by 2027.

Future (2027) Without Project analysis added a 2.12% annual background growth for major movements, along with projected trips associated with the Kea'au Mountain View Public Library relocation. All signalized intersections are projected to operate at an acceptable LOS. Movements that are projected to operate at LOS E or worse are not significant. There are no recommended improvements for Future (2027) Without Project conditions.

This project is projected to generate up to 88 total trips during the AM peak hour and 130 total trips during the PM peak hour. Project generated trips are based on trip generation rates from the *Trip Generation Manual, 11th Edition* for a clinic. Trips were distributed based on existing traffic distributions.

At the intersection of Route 139 and Old Kea'au-Pāhoa Road, it is projected that the northbound Old Kea'au-Pāhoa Road left-turn at Route 139 will operate at LOS F with a v/c of 0.76 during the AM peak hour in Future (2027) With Project for both alternatives. The delay is due to the high conflicting volume along Route 139, and the resulting difficulties drivers experience when looking to find an acceptable gap to make a left turn from Old Kea'au-Pāhoa Road. A refuge lane for the northbound left turn movement will allow vehicles to make the northbound left turn into the refuge lane without conflicting with the westbound through movement. The resulting northbound left turn will improve from LOS F to LOS D (v/c of 0.76 to 0.40). It is recommended that future conditions be monitored, and a northbound left turn refuge lane be added if necessary.

Future (2027) With Project conditions project that the eastbound Route 139 right turn at the signalized intersection with Route 130 will operate at LOS E and be approaching a v/c ratio of 0.95 during the PM peak hour. The signal timing at this intersection was adjusted to allocate green time from the northbound and southbound through movements to the eastbound approach. The eastbound right turn movement is projected to operate at LOS D (v/c of 0.88) in Future (2027) With Project with the signal timing adjustment. It is recommended that future conditions be monitored, and for the signal timing to be adjusted as needed.

VI. References

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Appendix A
Bus Routes and Maps

Route 10: Hilo / Ocean View

Effective April 4, 2022

Southbound to Oceanview Park and Ride Lot

	Hilo							Kea'au	Kurtistown	Fern Acres	Mountain View	Glenwood	Volcano Village	Hawai'i Volcanoes National Park	Pahala	Punalulu	Naalehu	Waiohinu	Ocean View
	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	Q	R	S	T
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of Lauko Rd (Frankie's Pizza/Gas Station)	Highway 11 @ nearside of N. Glenwood Rd (Hirano Store)	Old Volcano Road @ across Volcano General Store	Crater Rim Drive @ Visitor Center	Kamani St @ Pahala Shopping Center	Punaluu Road @ Punaluu Beach Park	Hwy 11 @ nearside of Ohai Road (across Naalehu Elementary)	Hwy 11 @ farside of Kamaoa Road (across Wong Yuen Store)	Ocean View Park & Ride @ Prince Kuhio Blvd
Bus Stop ID#	100	101	103	105	106	107	110	901	903	TBA	911	912	918	809	808	807	812	814	802
	3:30 PM	3:34 PM	3:36 PM	3:39 PM	3:40 PM	3:41 PM	3:46 PM	3:56 PM	4:01 PM	4:06 PM	4:11 PM	4:21 PM	4:28 PM	4:39 PM	5:14 PM	5:24 PM	5:39 PM	5:44 PM	6:04 PM

Route 10: Hilo / Ocean View

Effective April 4, 2022

Northbound to Hilo

	Ocean View	Waiohinu	Naalehu	Punalulu	Pahala	Hawai'i Volcanoes National Park	Volcano Village	Glenwood	Mountain View	Fern Acres	Kurtistown	Kea'au	Hilo						
	T	S	R	Q	P	O	M	L	K	J	I	H	G	F	E	D	C	B	A
	Ocean View Park & Ride @ Prince Kuhio Blvd	Hwy 11 @ Kamaoa Road (in front Wong Yuen Store)	Hwy 11 @ Ohai Road (Naalehu Elementary School)	Punaluu Road @ Punaluu Beach Park	Kamani St @ Pahala Shopping Center	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kawili Street @ across Hawaii Community College	W. Kawili St @ across from Waiakea High School	Kapiolani St @ Lanikaula St - Across from University of Hawaii-Hilo	Kilauea Avenue @ Kohala Street (Hilo Shopping Center)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	802	803	805	807	808	809	918	919	920	TBA	921	924	110	175	TBA	TBA	180	101	100
	6:40 AM	7:00 AM	7:05 AM	7:07 AM	7:30 AM	8:10 AM	8:12 AM	8:16 AM	8:25 AM	8:27 AM	8:30 AM	8:35 AM	8:45 AM	8:50 AM	8:55 AM	8:56 AM	9:00 AM	9:03 AM	9:08 AM

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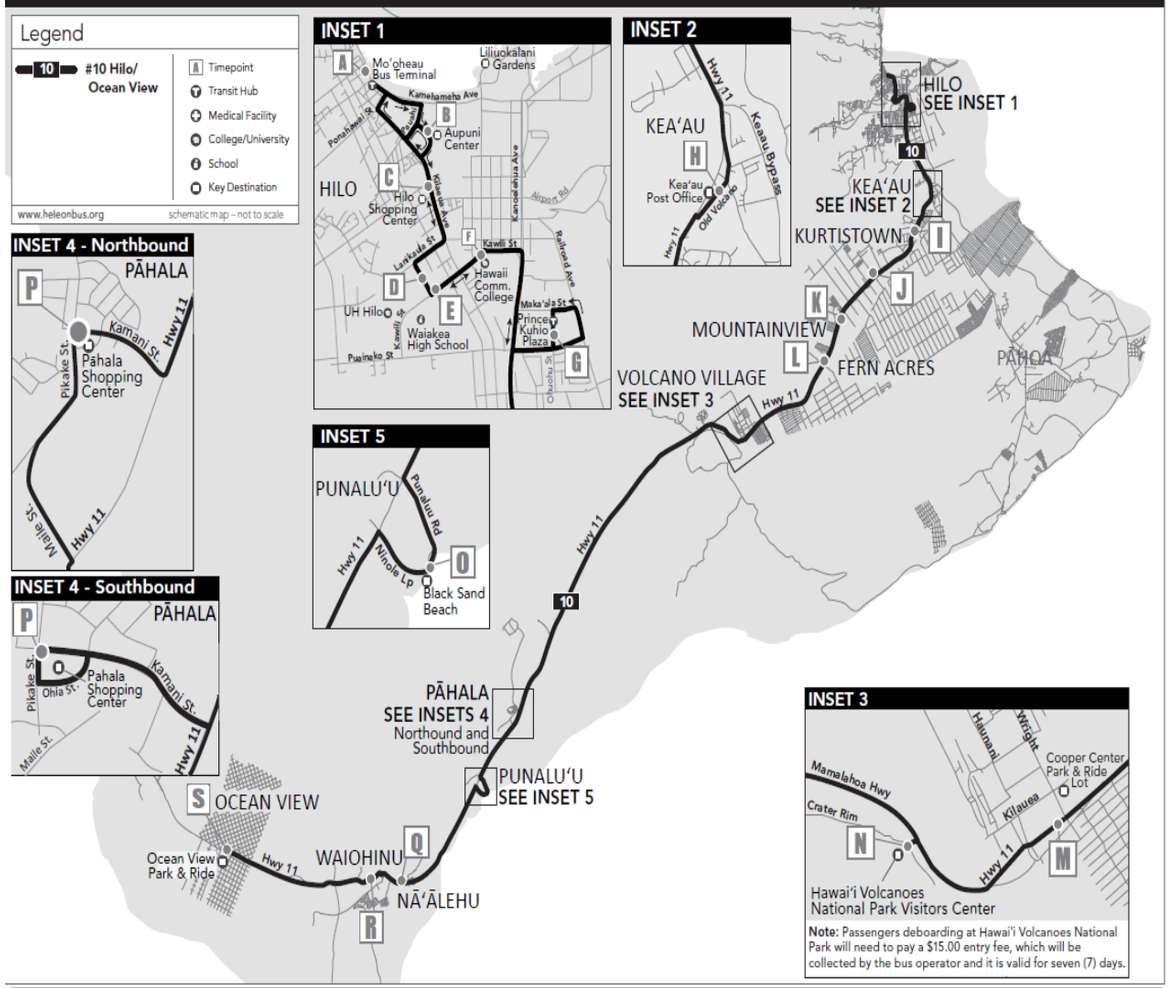
Admission to Hawai'i Volcanoes National Park is $15.00 for a seven day pass and is payable to the bus operator.

Hele-On Bus Route - #10 Hilo to Ocean View



To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

AM times are shown in lightface type. **PM times are in boldface type.**

No Sunday or holiday service.

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- - - means timepoint is not served.

Route 11: Red Line - Hilo / Volcano

Effective April 3, 2022

Southbound to Hawai'i Volcanoes National Park

	Hilo							Kea'au	Kurtistown	Fern Acres	Mountain View	Glenwood	Volcano Village		Hawai'i Volcanoes National Park
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawai'i-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ UH-Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of Lauko Rd (Frankie's Pizza/Gas Station)	Highway 11 @ nearside of N. Glenwood Rd (Hirano Store)	Old Volcano Road @ Volcano General Store	Cooper Center Park & Ride Lot	Crater Rim Drive @ Visitor Center
Bus Stop ID#	100	101	103	105	106	107	110	901	903	**TBA**	911	912	914	**TBA**	809
	5:00 AM	5:04 AM	5:06 AM	5:08 AM	5:11 AM	5:12 AM	5:17 AM	5:27 AM	5:32 AM	5:37 AM	5:42 AM	5:52 AM	5:59 AM	---	6:10 AM
	7:40 AM	7:44 AM	7:46 AM	7:48 AM	7:51 AM	7:52 AM	7:57 AM	8:07 AM	8:12 AM	8:17 AM	8:22 AM	8:32 AM	8:39 AM	---	8:50 AM
	10:40 AM	10:44 AM	10:46 AM	10:48 AM	10:51 AM	10:52 AM	10:57 AM	11:07 AM	11:12 AM	11:17 AM	11:22 AM	11:32 AM	11:39 AM	---	11:50 AM
	1:40 PM	**1:44 PM**	**1:46 PM**	**1:48 PM**	**1:51 PM**	**1:52 PM**	**1:57 PM**	**2:07 PM**	**2:12 PM**	**2:17 PM**	**2:22 PM**	**2:32 PM**	**2:39 PM**	---	2:50 PM
	4:40 PM	**4:44 PM**	**4:46 PM**	**4:48 PM**	**4:51 PM**	**4:52 PM**	**4:57 PM**	**5:07 PM**	**5:12 PM**	**5:17 PM**	**5:22 PM**	**5:32 PM**	---	**5:40 PM**	**5:50 PM**

Monday through Friday only

Everyday service

--- = bus does not serve timepoint.

Route 11: Red Line - Hilo / Volcano

Effective April 3, 2022

Northbound to Hilo

	Hawai'i Volcanoes National Park	Volcano Village		Glenwood	Mountain View	Fern Acres	Kurtistown	Kea'au	Hilo						
	O	M	N	L	K	J	I	H	G	F	E	D	C	B	A
	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kawili Street @ across Hawaii Community College	W. Kawili St @ across from Waiakea High School	Kapiolani St @ Lanikaula St - Across from University of Hawai'i-Hilo	Kilauea Avenue @ Kohala Street (Hilo Shopping Center)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	809	918	**TBA**	919	920	**TBA**	921	924	110	175	**TBA**	**TBA**	180	101	100
	6:15 AM	6:20 AM	6:21 AM	6:27 AM	6:33 AM	6:38 AM	6:43 AM	6:49 AM	7:02 AM	7:07 AM	7:08 AM	7:11 AM	7:15 AM	7:18 AM	7:22 AM
	9:15 AM	9:20 AM	---	9:27 AM	9:33 AM	9:38 AM	9:43 AM	9:49 AM	10:02 AM	10:07 AM	10:08 AM	10:11 AM	10:15 AM	10:18 AM	10:22 AM
	12:15 PM	**12:20 PM**	---	**12:27 PM**	**12:33 PM**	**12:38 PM**	**12:43 PM**	**12:49 PM**	**1:02 PM**	**1:07 PM**	**1:08 PM**	**1:11 PM**	**1:15 PM**	**1:18 PM**	**1:22 PM**
	3:15 PM	**3:20 PM**	---	**3:27 PM**	**3:33 PM**	**3:38 PM**	**3:43 PM**	**3:49 PM**	**4:02 PM**	**4:07 PM**	**4:08 PM**	**4:11 PM**	**4:15 PM**	**4:18 PM**	**4:22 PM**
	6:15 PM	**6:20 PM**	---	**6:27 PM**	**6:33 PM**	**6:38 PM**	**6:43 PM**	**6:49 PM**	**7:02 PM**	**7:07 PM**	**7:08 PM**	**7:11 PM**	**7:15 PM**	**7:18 PM**	**7:22 PM**

Admission to Hawai'i Volcanoes National Park is $15.00 for a seven day pass and is payable to the bus operator.

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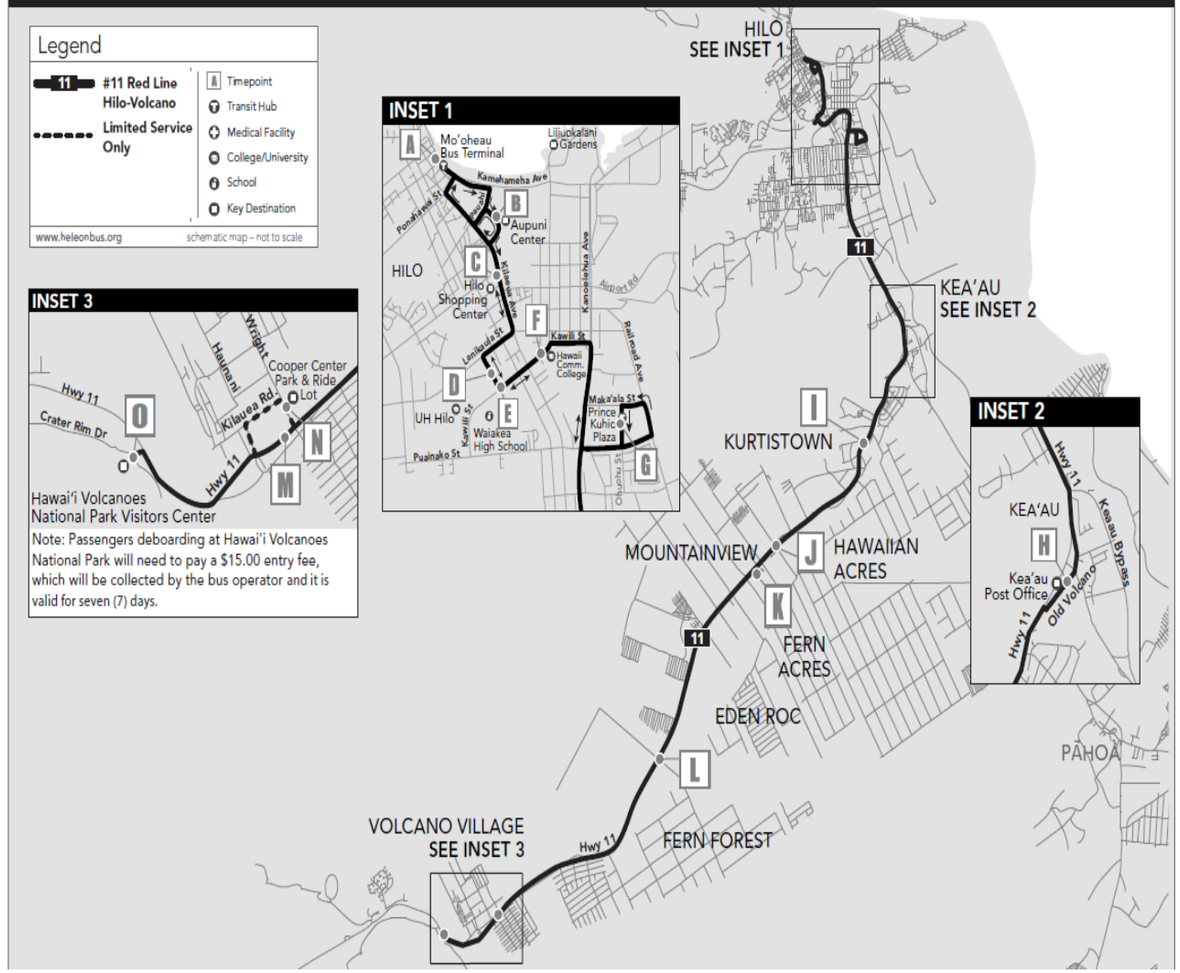
Hele-On Bus Route - #11 Red Line Hilo to Volcano



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Route 40: Hilo / Pahoa

Effective August 28, 2022

Southbound to Pahoa

	Hilo		Kea'au			Maku'u/ Ainaloa	Pahoa
	A	B	C	D	E	F	G
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kea'au Pahoa Rd @ Kea'au Plaza (across Kea'au Middle school)	Kukula Street @ Kea'au Pahoa Rd (3rd lamp post)	Kukula Street @ Keaau High School (back entrance)	Highway 130 @ Ainaloa Boulevard (bus turnout)	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)
Bus Stop ID#	100	110	925	TBA	TBA	TBA	968
	6:30 AM	6:42 AM	6:52 AM	6:53 AM	6:54 AM	7:07 AM	7:22 AM
	7:30 AM	7:42 AM	7:52 AM	7:53 AM	7:54 AM	8:07 AM	8:22 AM
	8:30 AM	8:42 AM	8:52 AM	8:53 AM	8:54 AM	9:07 AM	9:22 AM
	9:30 AM	9:42 AM	9:52 AM	9:53 AM	9:54 AM	10:07 AM	10:22 AM
	10:30 AM	10:42 AM	10:52 AM	10:53 AM	10:54 AM	11:07 AM	11:22 AM
	11:30 AM	11:42 AM	11:52 AM	11:53 AM	11:54 AM	**12:07 PM**	**12:22 PM**
	12:30 PM	**12:42 PM**	**12:52 PM**	**12:53 PM**	**12:54 PM**	**1:07 PM**	**1:22 PM**
	1:30 PM	**1:42 PM**	**1:52 PM**	**1:53 PM**	**1:54 PM**	**2:07 PM**	**2:22 PM**
	2:30 PM	**2:42 PM**	**2:52 PM**	**2:53 PM**	**2:54 PM**	**3:07 PM**	**3:22 PM**
	3:30 PM	**3:42 PM**	**3:52 PM**	**3:53 PM**	**3:54 PM**	**4:07 PM**	**4:22 PM**
	4:30 PM	**4:42 PM**	**4:52 PM**	**4:53 PM**	**4:54 PM**	**5:07 PM**	**5:22 PM**
	5:30 PM	**5:42 PM**	**5:52 PM**	**5:53 PM**	**5:54 PM**	**6:07 PM**	**6:22 PM**
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	8:30 PM	**8:42 PM**	**8:52 PM**	**8:53 PM**	**8:54 PM**	**9:07 PM**	**9:22 PM**

Monday through Friday only

Everyday service

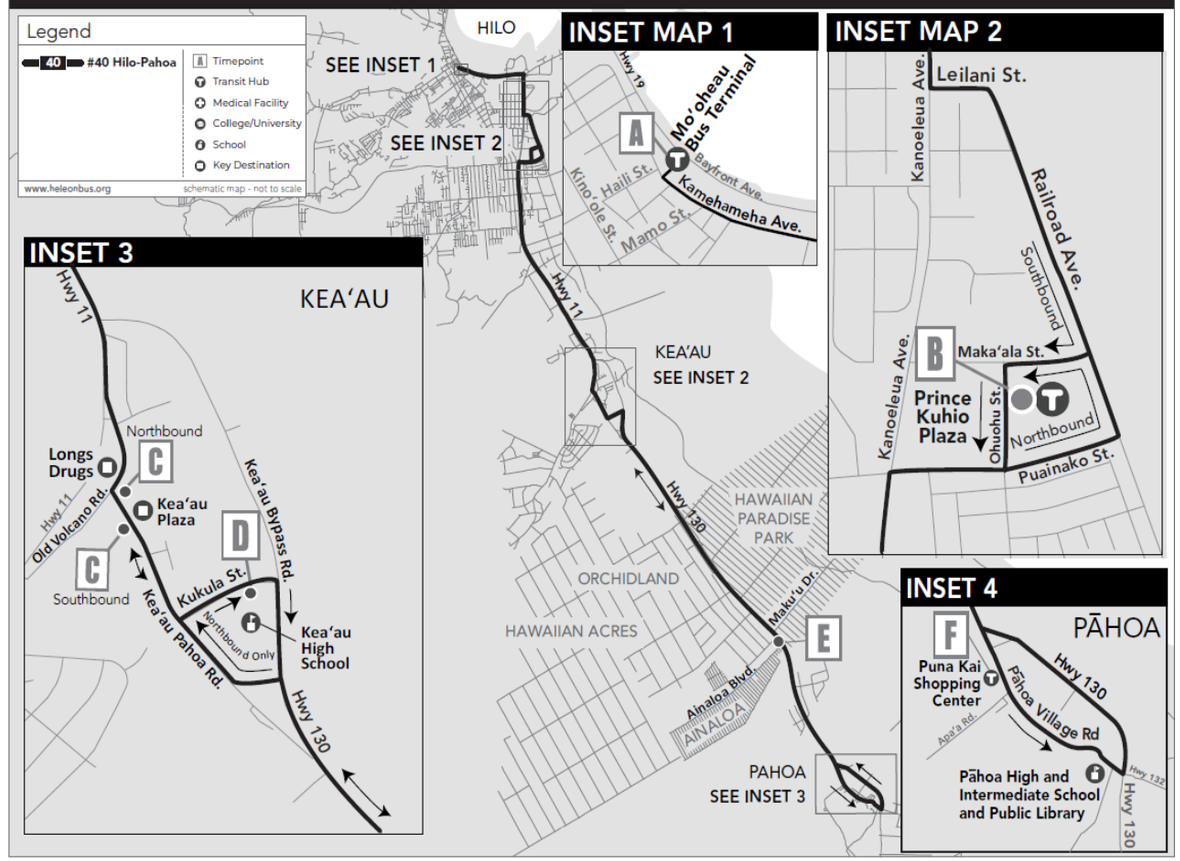
Route 40: Hilo / Pahoa

Effective August 28, 2022

Northbound to Hilo

	Pahoa	Maku'u/ Ainaloa	Kea'au	Hilo	
	G	F	C	B	A
	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)	Highway 130 @ Ainaloa Boulevard (bus turnout)	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	968	TBA	924	110	100
	5:30 AM	5:35 AM	5:50 AM	6:05 AM	6:17 AM
	6:30 AM	6:35 AM	6:50 AM	7:05 AM	7:17 AM
	7:30 AM	7:35 AM	7:50 AM	8:05 AM	8:17 AM
	8:30 AM	8:35 AM	8:50 AM	9:05 AM	9:17 AM
	9:30 AM	9:35 AM	9:50 AM	10:05 AM	10:17 AM
	10:30 AM	10:35 AM	10:50 AM	11:05 AM	11:17 AM
	11:30 AM	11:35 AM	11:50 AM	**12:05 PM**	**12:17 PM**
	12:30 PM	**12:35 PM**	**12:50 PM**	**1:05 PM**	**1:17 PM**
	1:30 PM	**1:35 PM**	**1:50 PM**	**2:05 PM**	**2:17 PM**
	2:30 PM	**2:35 PM**	**2:50 PM**	**3:05 PM**	**3:17 PM**
	3:30 PM	**3:35 PM**	**3:50 PM**	**4:05 PM**	**4:17 PM**
	4:30 PM	**4:35 PM**	**4:50 PM**	**5:05 PM**	**5:17 PM**
	5:30 PM	**5:35 PM**	**5:50 PM**	**6:05 PM**	**6:17 PM**
	6:30 PM	**6:35 PM**	**6:50 PM**	**7:05 PM**	**7:17 PM**
	7:30 PM	**7:35 PM**	**7:50 PM**	**8:05 PM**	**8:17 PM**
	8:30 PM	**8:35 PM**	**8:50 PM**	**9:05 PM**	---
	9:30 PM	**9:35 PM**	**9:50 PM**	**10:05 PM**	---

Hele-On Bus Route - #40 Hilo to Pahoa via Kea'au



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- - - Bus does not serve timepoint.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

Route 402: Hawaiian Paradise Park/ Orchidland/Hawaiian Acres/Ainaloa

Effective April 4, 2022

Northbound to Kea'au

	Pahoa		Hawaiian Paradise Park			Orchidland Estates	Kea'au
	A	B	C	D	E	F	G
	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)	Pahoa Village Road @ Pahoa Elementary School	Makuu Dr @ 1st Avenue	Paradise Dr @ 31st Ave	Showers Dr @ Hwy 130	Pohaku Drive @ 40th Ave	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)
Bus Stop ID#	968	970	TBA	931	927	TBA	TBA
	---	---	---	---	---	---	---
	5:30 AM	5:35 AM	5:50 AM	6:00 AM	6:10 AM	6:15 AM	6:30 AM
	7:30 AM	7:35 AM	7:50 AM	8:00 AM	8:10 AM	8:15 AM	8:30 AM
	9:30 AM	9:35 AM	9:50 AM	10:00 AM	10:10 AM	10:15 AM	10:30 AM
	11:30 AM	11:35 AM	11:50 AM	**12:00 PM**	**12:10 PM**	**12:15 PM**	**12:30 PM**
	1:30 PM	**1:35 PM**	**1:50 PM**	**2:00 PM**	**2:10 PM**	**2:15 PM**	**2:30 PM**
	3:30 PM	**3:35 PM**	**3:50 PM**	**4:00 PM**	**4:10 PM**	**4:15 PM**	**4:30 PM**
	5:30 PM	**5:35 PM**	**5:50 PM**	**6:00 PM**	**6:10 PM**	**6:15 PM**	**6:30 PM**
	7:30 PM	**7:35 PM**	**7:50 PM**	**8:00 PM**	**8:10 PM**	**8:15 PM**	**8:30 PM**

This route operates Monday-Saturday only. There is no Sunday or holiday service.

--- = bus does not serve timepoint.

Monday-Friday only

Route 402: Hawaiian Paradise Park/ Orchidland/Hawaiian Acres/Ainaloa

Effective April 4, 2022

Southbound to Pahoa

Kea'au	Kurtistown	Hawaiian Acres	Ainaloa	Pahoa
G	H	I	J	A
Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Highway 11 @ Across from Kurtistown Park	Moho Rd @ C Rd - Hawaiian Acres Community Center	Ainaloa Blvd @ Ainaloa Community Center	Kea'au Pahoa Road @ Kahakai Blvd (Puna Kai Shopping Center)
TBA	921	**TBA**	941	968
4:35 AM	4:40 AM	4:50 AM	5:05 AM	5:20 AM
6:35 AM	6:40 AM	6:50 AM	7:05 AM	7:20 AM
8:35 AM	8:40 AM	8:50 AM	9:05 AM	9:20 AM
12:35 PM	**12:40 PM**	**12:50 PM**	**1:05 PM**	**1:20 PM**
2:35 PM	**2:40 PM**	**2:50 PM**	**3:05 PM**	**3:20 PM**
4:35 PM	**4:40 PM**	**4:50 PM**	**5:05 PM**	**5:20 PM**
6:35 PM	**6:40 PM**	**6:50 PM**	**7:05 PM**	**7:20 PM**
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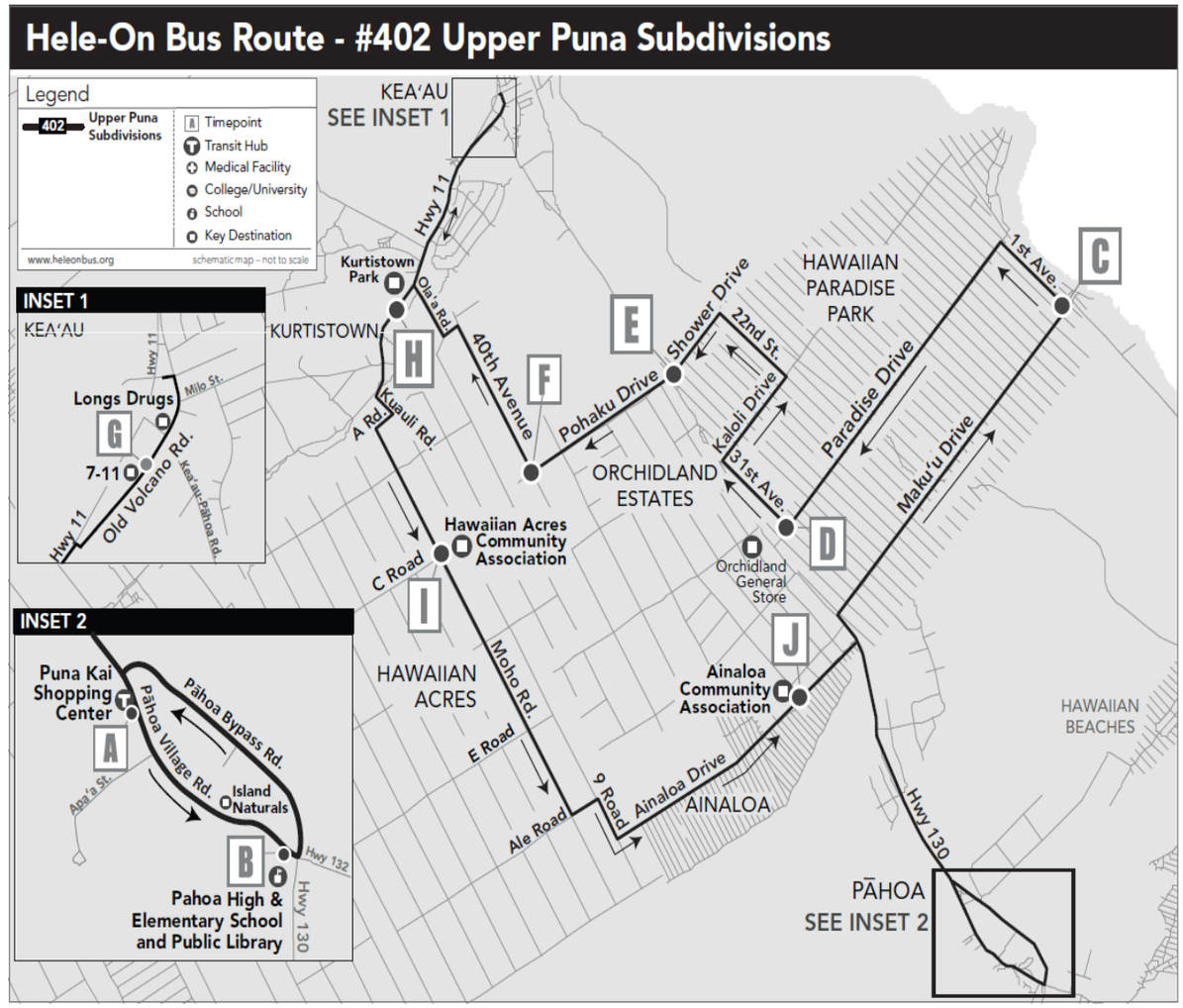
Hele-On Bus Route - #402 Upper Puna Subdivisions



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- - - means timepoint is not served.

Route 403: Fern Acres

Effective September 5, 2021 (Rev)

Southbound to Fern Forest

	Kea'au	Hilo	Kurtistown	Fern Acres	Eden Roc	Fern Forest
	A	B	C	D	E	F
	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Panaewa Rainforest Zoo @ Stainback Hwy	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ Kulani Road	Highway 11 @ Kopua Road	Glenwood Dr @ Kaleponi Rd
Bus Stop ID#	TBA	TBA	903	909	TBA	TBA
	9:00 AM	9:10 AM	9:20 AM	9:29 AM	9:34 AM	9:45 AM
	11:00 AM	11:10 AM	11:20 AM	11:29 AM	11:34 AM	11:45 AM
	1:00 PM	**1:10 PM**	**1:20 PM**	**1:29 PM**	**1:34 PM**	**1:45 PM**
	3:00 PM	**3:10 PM**	**3:20 PM**	**3:29 PM**	**3:34 PM**	**3:45 PM**
	5:10 PM	**---**	**5:20 PM**	**5:29 PM**	**5:34 PM**	**5:45 PM**

Route 403: Fern Acres

Effective September 5, 2021 (Rev)

Northbound to Kea'au

	Fern Forest	Eden Roc	Fern Acres	Kurtistown	Kea'au
	F	H	I	C	A
	Glenwood Dr @ Kaleponi Rd	Kopua Rd @ Ohia Ave	Puhala St @ Lehua St	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)
	TBA	TBA	TBA	921	TBA
	9:45 AM	10:05 AM	10:27 AM	10:37 AM	10:45 AM
	11:45 AM	**12:05 PM**	**12:27 PM**	**12:37 PM**	**12:45 PM**
	1:45 PM	**2:05 PM**	**2:27 PM**	**2:37 PM**	**2:45 PM**
	3:45 PM	**4:05 PM**	**4:27 PM**	**4:37 PM**	**4:45 PM**
	5:45 PM	**6:05 PM**	**6:27 PM**	**6:37 PM**	**6:45 PM**

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Flex Service

Hele-On offers flex route service on Route 403 for everyone! This flexible type services combine ADA paratransit and general public transit into one service providing additional mobility in the Fern Acres/Fern Forest/Eden Roc/Kea'au and South Hilo area if you cannot get to the bus route. The bus can flex up to 1 mile off route and you are required to make a reservation at least one hour in advance. To schedule a flex trip, call (808) 961-8744, option 1. TDD/TTY: 711 through the Relay Service.

The fare for flex service is free for all passengers until December 31, 2025.

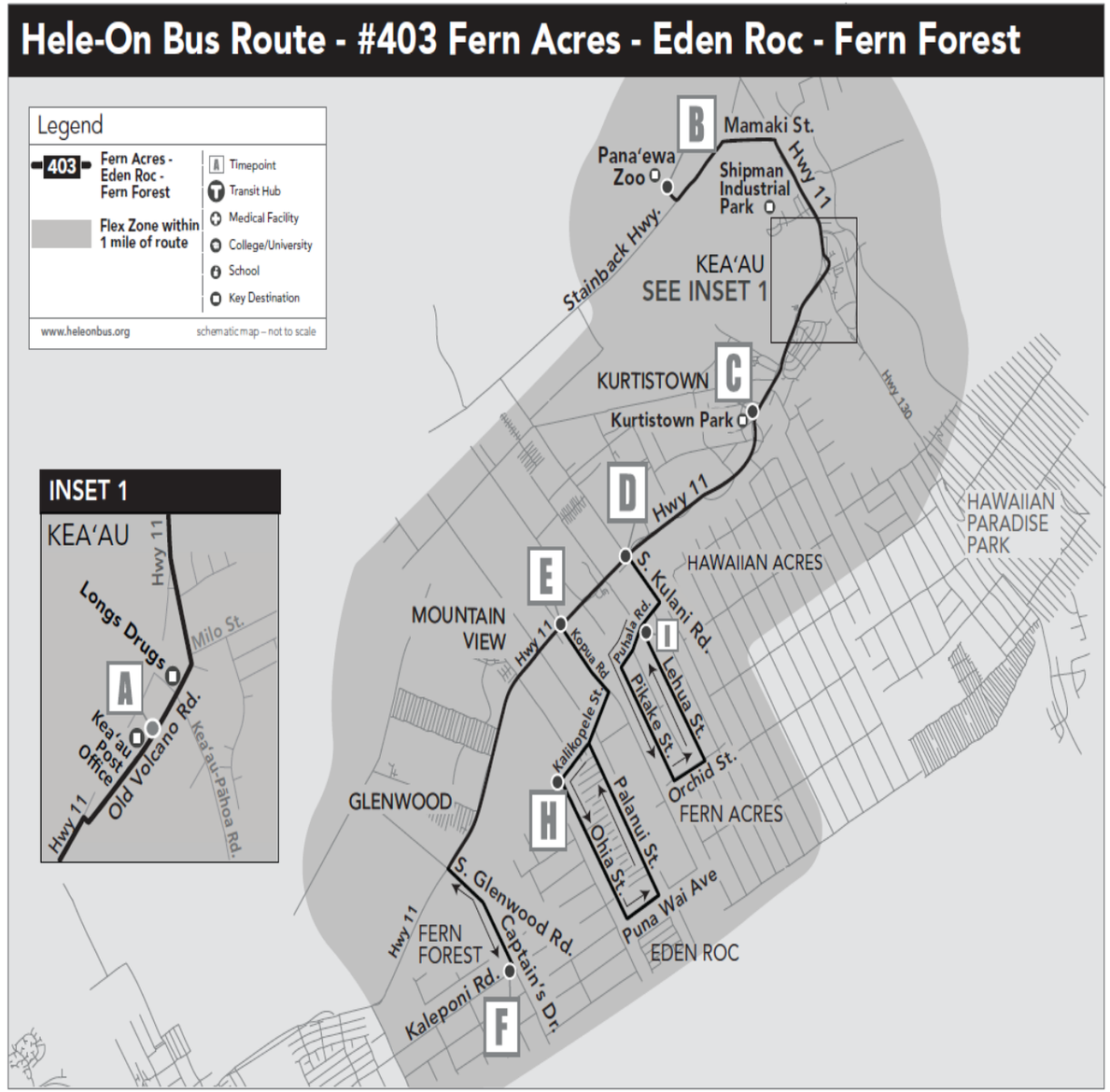
Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

- - - means timepoint is not served.

AM times are shown in lightface type. **PM times are in boldface type.**

Please recycle. Share this bus schedule with someone else if you do not need it.

Hele-On Bus Route - #403 Fern Acres - Eden Roc - Fern Forest



Route 403 will take you to the Panaewa Rainforest Zoo & Gardens! Zoo hours are 10 a.m. to 3 p.m., daily and it is free to enter!

Appendix B
2024 Traffic Count Data and Historic Traffic Data

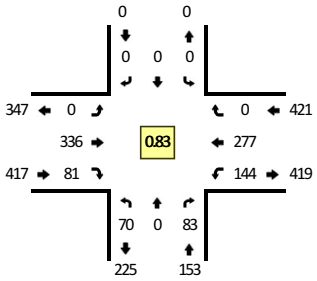
Type of peak hour being reported: Intersection Peak

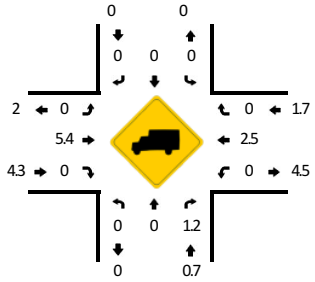
Method for determining peak hour: Total Entering Volume

LOCATION: Old Keaau-Pahoa Rd -- Keaau-Pahoa Rd
CITY/STATE: Keaau, HI

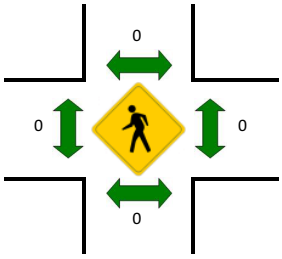
QC JOB #: 16501301
DATE: Thu, Mar 7 2024

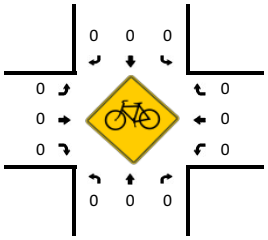
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

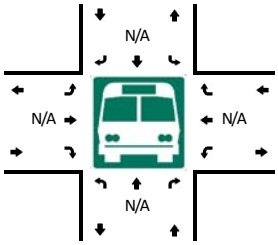


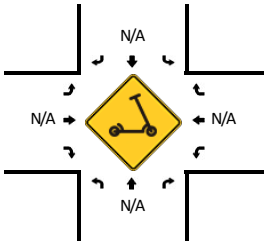


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Old Keaau-Pahoa Rd (Northbound)				Old Keaau-Pahoa Rd (Southbound)				Keaau-Pahoa Rd (Eastbound)				Keaau-Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	1	0	0	0	0	0	0	15	0	0	0	42	0	0	58	
6:15 AM	0	0	1	0	0	0	0	0	0	15	0	0	0	67	0	0	83	
6:30 AM	3	0	2	0	0	0	0	0	0	27	2	0	5	58	0	0	97	
6:45 AM	9	0	9	0	0	0	0	0	0	24	7	0	14	63	0	0	126	364
7:00 AM	14	0	9	0	0	0	0	0	0	65	15	0	26	88	0	0	217	523
7:15 AM	18	0	28	0	0	0	0	0	0	72	21	0	40	76	0	0	255	695
7:30 AM	22	0	25	0	0	0	0	0	0	94	34	0	61	63	0	0	299	897
7:45 AM	16	0	21	0	0	0	0	0	0	105	11	0	17	50	0	0	220	991

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	88	0	100	0	0	0	0	0	0	376	136	0	244	252	0	0	1196
Heavy Trucks	0	0	0		0	0	0		0	16	0		0	4	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

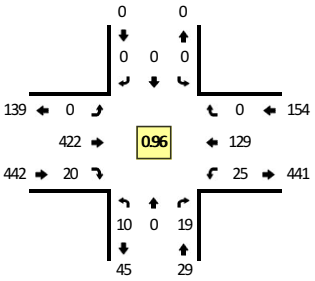
Report generated on 3/14/2024 10:46 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

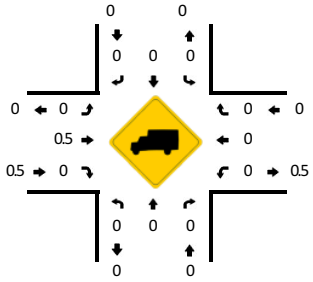
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

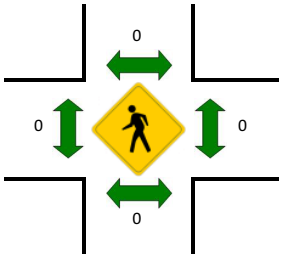
LOCATION: Old Keaau-Pahoa Rd -- Keaau-Pahoa Rd | **QC JOB #:** 16501302
CITY/STATE: Keaau, HI | **DATE:** Thu, Mar 7 2024

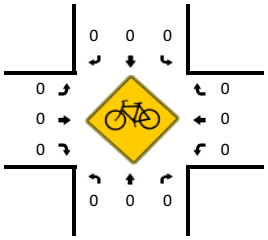
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

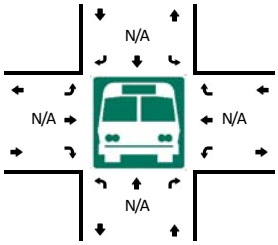


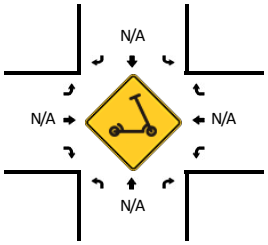
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Old Keaau-Pahoa Rd (Northbound)				Old Keaau-Pahoa Rd (Southbound)				Keaau-Pahoa Rd (Eastbound)				Keaau-Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	9	0	0	0	0	0	0	115	5	0	3	30	0	0	163	
4:15 PM	5	0	2	0	0	0	0	0	0	105	4	0	5	35	0	0	156	
4:30 PM	1	0	4	0	0	0	0	0	0	109	5	0	6	36	0	0	161	
4:45 PM	3	0	4	0	0	0	0	0	0	93	6	0	11	28	0	0	145	625
5:00 PM	1	0	4	0	0	0	0	0	0	97	6	0	4	32	0	0	144	606
5:15 PM	2	0	2	0	0	0	0	0	0	108	3	0	1	42	0	0	158	608
5:30 PM	1	0	4	0	0	0	0	0	0	72	4	0	4	36	0	0	121	568
5:45 PM	0	0	4	0	0	0	0	0	0	82	0	0	4	21	0	0	111	534

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	36	0	0	0	0	0	0	460	20	0	12	120	0	0	652
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	0	0		4
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

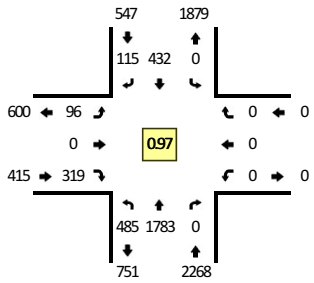
Comments:

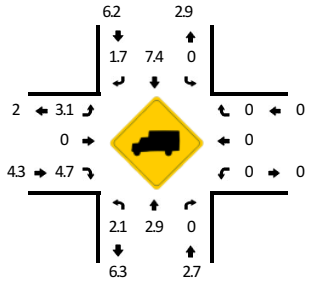
Report generated on 3/14/2024 10:46 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

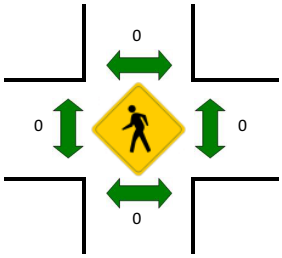
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

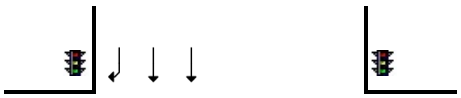
LOCATION: Keaau-Pahoa Rd/State Rte 130 -- Keaau Byp Rd | **QC JOB #:** 16501303
CITY/STATE: Keaau, HI | **DATE:** Thu, Mar 7 2024

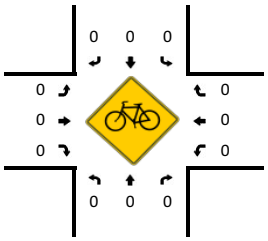
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

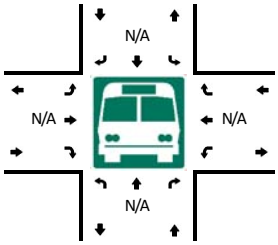


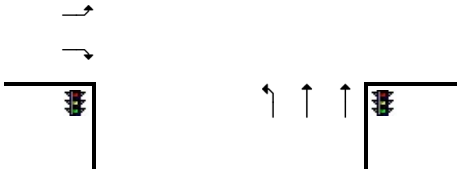


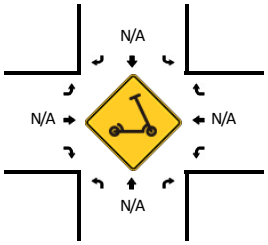












15-Min Count Period Beginning At	Keaau-Pahoa Rd/State Rte 130 (Northbound)				Keaau-Pahoa Rd/State Rte 130 (Southbound)				Keaau Byp Rd (Eastbound)				Keaau Byp Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	38	343	0	0	0	45	1	0	1	0	15	0	0	0	0	0	443	
6:15 AM	73	412	0	0	0	48	0	0	1	0	15	0	0	0	0	0	549	
6:30 AM	74	508	0	0	0	54	3	0	2	0	26	0	0	0	0	0	667	
6:45 AM	88	521	0	0	0	71	8	0	10	0	24	0	0	0	0	0	722	2381
7:00 AM	127	532	0	0	0	89	15	0	11	0	59	0	0	0	0	0	833	2771
7:15 AM	120	491	0	0	0	71	24	0	27	0	74	0	0	0	0	0	807	3029
7:30 AM	130	398	0	0	0	128	46	0	26	0	100	0	0	0	0	0	828	3190
7:45 AM	108	362	0	0	0	144	30	0	32	0	86	0	0	0	0	0	762	3230

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	508	2128	0	0	0	356	60	0	44	0	236	0	0	0	0	0	3332
Heavy Trucks	12	48	0		0	8	0		0	0	8		0	0	0		76
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

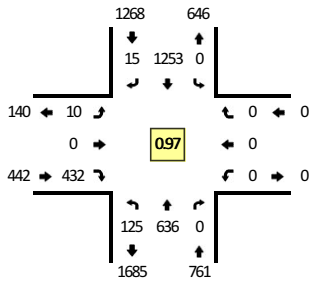
Comments:

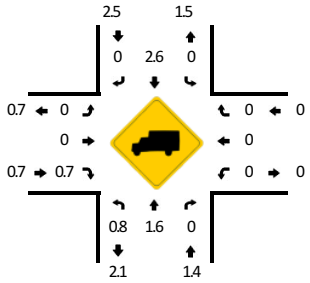
Report generated on 3/14/2024 10:46 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

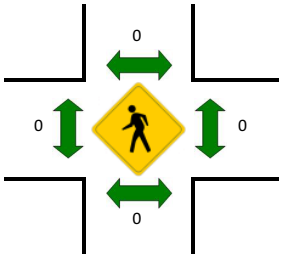
LOCATION: Keaau-Pahoa Rd/State Rte 130 -- Keaau Byp Rd | **QC JOB #:** 16501304
CITY/STATE: Keaau, HI | **DATE:** Thu, Mar 7 2024

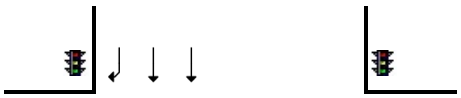
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

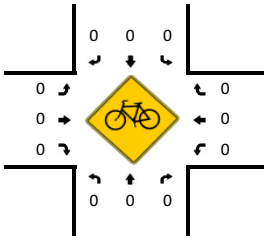


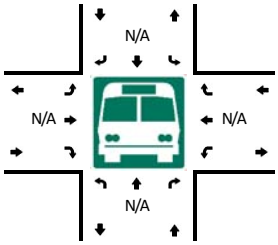


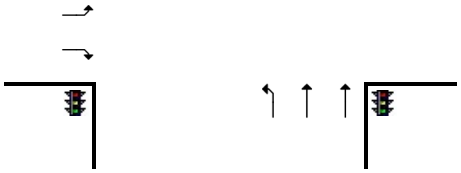
TRUE DATA TO IMPROVE MOBILITY

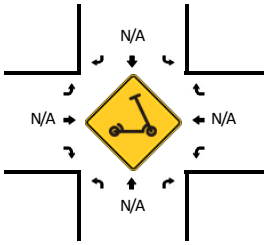












15-Min Count Period Beginning At	Keaau-Pahoa Rd/State Rte 130 (Northbound)				Keaau-Pahoa Rd/State Rte 130 (Southbound)				Keaau Byp Rd (Eastbound)				Keaau Byp Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	31	178	0	0	0	300	3	0	4	0	120	0	0	0	0	0	636	
4:15 PM	30	170	0	0	0	309	3	0	1	0	99	0	0	0	0	0	612	
4:30 PM	33	149	0	0	0	334	4	0	3	0	114	0	0	0	0	0	637	
4:45 PM	31	139	0	0	0	310	5	0	2	0	99	0	0	0	0	0	586	2471
5:00 PM	32	119	0	0	0	315	3	0	3	0	98	0	0	0	0	0	570	2405
5:15 PM	42	132	0	0	0	336	1	0	1	0	105	0	0	0	0	0	617	2410
5:30 PM	37	131	0	0	0	352	2	0	1	0	76	0	0	0	0	0	599	2372
5:45 PM	22	121	0	0	0	338	2	0	1	0	81	0	0	0	0	0	565	2351

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	132	596	0	0	0	1336	16	0	12	0	456	0	0	0	0	0	2548
Heavy Trucks	0	8	0		0	64	0		0	0	4		0	0	0		76
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

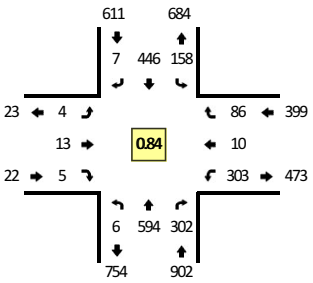
Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

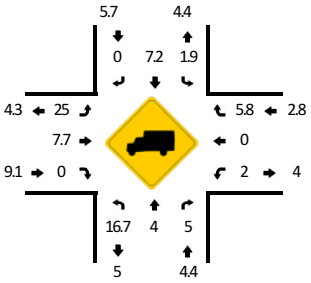
LOCATION: Volcano Rd/Hawaii Belt Rd -- Keaau Pahoa Rd
CITY/STATE: Keaau, HI

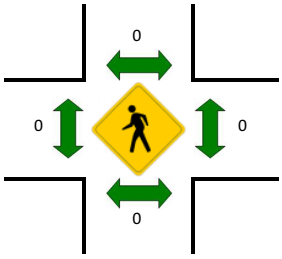
QC JOB #: 16501305
DATE: Thu, Mar 7 2024

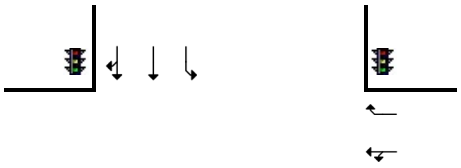
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

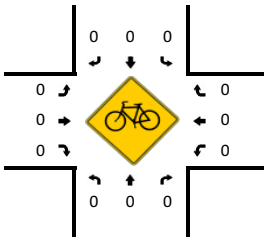


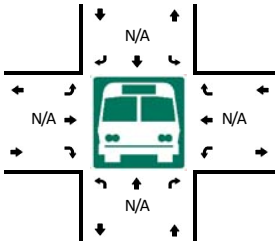
TRUE DATA TO IMPROVE MOBILITY

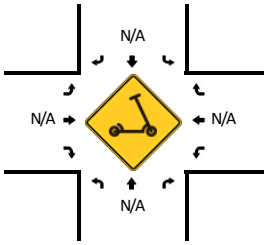












15-Min Count Period Beginning At	Volcano Rd/Hawaii Belt Rd (Northbound)				Volcano Rd/Hawaii Belt Rd (Southbound)				Keaau Pahoa Rd (Eastbound)				Keaau Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	170	16	0	8	40	2	0	0	1	1	0	21	1	15	1	276	
6:15 AM	0	264	17	0	12	52	0	0	0	0	0	0	37	1	19	0	402	
6:30 AM	4	269	29	0	20	83	1	0	0	1	0	0	28	7	26	0	468	
6:45 AM	6	272	34	0	24	93	1	0	5	4	3	0	36	6	32	0	516	1662
7:00 AM	2	253	63	0	28	110	0	0	3	7	3	0	78	3	28	0	578	1964
7:15 AM	2	140	97	0	45	134	1	0	0	2	0	0	93	2	24	0	540	2102
7:30 AM	0	96	107	0	42	113	2	0	1	1	0	0	76	1	12	0	451	2085
7:45 AM	2	105	35	0	43	89	4	0	0	3	2	0	56	4	22	0	365	1934

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	1012	252	0	112	440	0	0	12	28	12	0	312	12	112	0	2312
Heavy Trucks	4	24	4		0	28	0		4	0	0		16	0	4		84
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 4:45 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

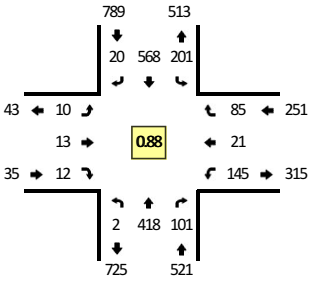
Type of peak hour being reported: User-Defined

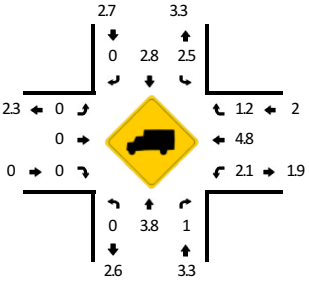
Method for determining peak hour: Total Entering Volume

LOCATION: Volcano Rd/Hawaii Belt Rd -- Keaau Pahoa Rd
CITY/STATE: Keaau, HI

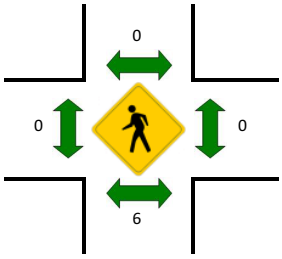
QC JOB #: 16501306
DATE: Thu, Mar 7 2024

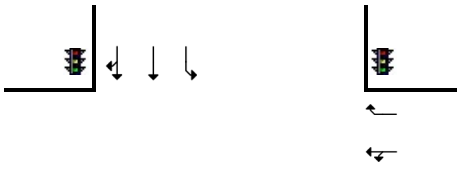
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

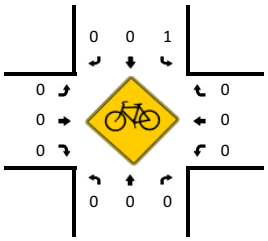


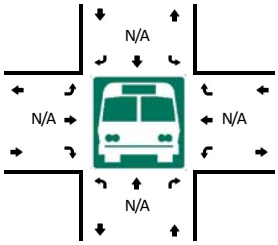


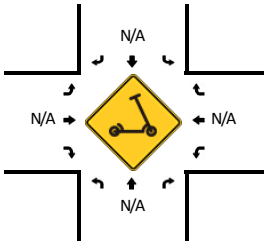
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Volcano Rd/Hawaii Belt Rd (Northbound)				Volcano Rd/Hawaii Belt Rd (Southbound)				Keaau Pahoa Rd (Eastbound)				Keaau Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	134	21	0	63	152	3	0	4	5	2	0	37	8	22	0	451	
4:15 PM	0	97	34	0	54	147	6	0	5	3	3	0	34	5	19	0	407	
4:30 PM	2	93	31	0	40	137	6	0	0	3	2	0	43	2	25	0	384	
4:45 PM	0	94	15	0	44	132	5	0	1	2	5	0	31	6	19	0	354	1596
5:00 PM	1	72	26	0	57	177	1	0	0	2	5	0	46	2	19	0	408	1553
5:15 PM	1	108	31	0	33	184	5	0	0	2	2	0	45	4	15	0	430	1576
5:30 PM	0	92	30	0	30	150	1	0	1	7	2	0	37	3	15	0	368	1560
5:45 PM	1	109	29	0	31	163	5	0	2	3	1	0	33	1	20	0	398	1604

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	536	84	0	252	608	12	0	16	20	8	0	148	32	88	0	1804
Heavy Trucks	0	24	4		8	8	0		0	0	0		4	0	0		48
Buses																	
Pedestrians		12				0				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

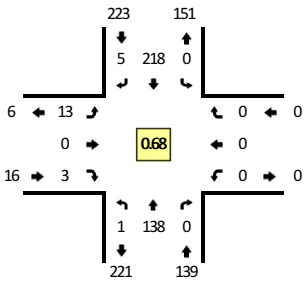
Report generated on 3/14/2024 4:44 PM

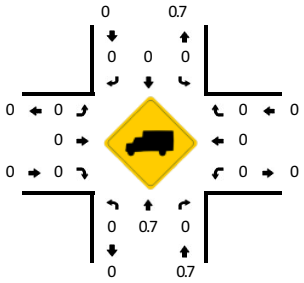
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

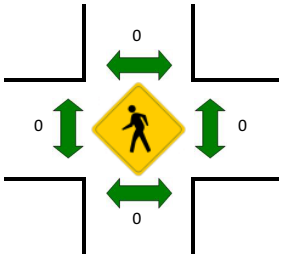
LOCATION: Old Keaau-Pahoa Rd -- Mamaka St | **QC JOB #:** 16501307
CITY/STATE: Keaau, HI | **DATE:** Thu, Mar 7 2024

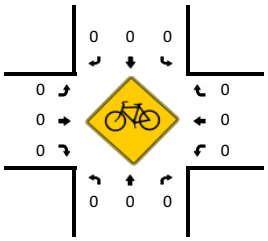
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

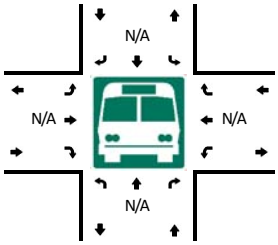


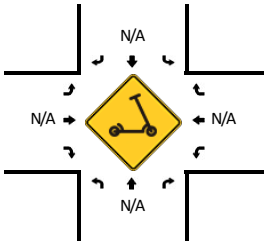


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Old Keaau-Pahoa Rd (Northbound)				Old Keaau-Pahoa Rd (Southbound)				Mamaka St (Eastbound)				Mamaka St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
6:15 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
6:30 AM	0	5	0	0	0	6	1	0	1	0	0	0	0	0	0	0	13	
6:45 AM	0	14	0	0	0	17	3	0	3	0	0	0	0	0	0	0	37	52
7:00 AM	0	22	0	0	0	38	2	0	5	0	0	0	0	0	0	0	67	118
7:15 AM	0	41	0	0	0	61	1	0	3	0	1	0	0	0	0	0	107	224
7:30 AM	0	43	0	0	0	92	2	0	1	0	1	0	0	0	0	0	139	350
7:45 AM	1	32	0	0	0	27	0	0	4	0	1	0	0	0	0	0	65	378

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	172	0	0	0	368	8	0	4	0	4	0	0	0	0	0	556
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

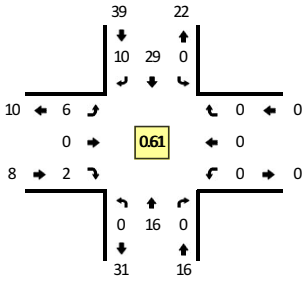
Type of peak hour being reported: User-Defined

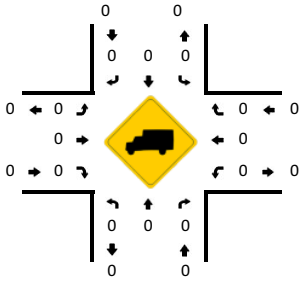
Method for determining peak hour: Total Entering Volume

LOCATION: Old Keaau-Pahoa Rd -- Mamaka St
CITY/STATE: Keaau, HI

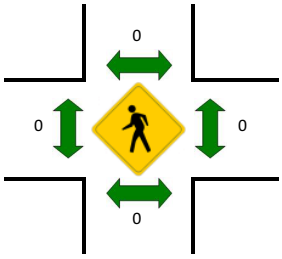
QC JOB #: 16501308
DATE: Thu, Mar 7 2024

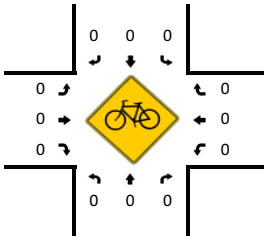
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

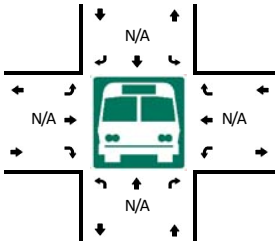


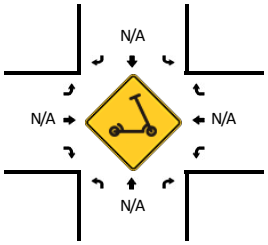


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Old Keaau-Pahoa Rd (Northbound)				Old Keaau-Pahoa Rd (Southbound)				Mamaka St (Eastbound)				Mamaka St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	6	0	0	0	4	2	0	2	0	0	0	0	0	0	0	14	
4:15 PM	0	4	0	0	0	4	3	0	1	0	0	0	0	0	0	0	12	
4:30 PM	0	0	0	0	0	7	2	0	2	0	0	0	0	0	0	0	11	
4:45 PM	0	6	0	0	0	14	3	0	1	0	2	0	0	0	0	0	26	63
5:00 PM	0	3	0	0	0	7	3	0	2	0	1	0	0	0	0	0	16	65
5:15 PM	1	2	0	0	0	3	1	0	2	0	0	0	0	0	0	0	9	62
5:30 PM	0	2	0	0	0	4	2	2	0	0	0	0	0	0	0	0	10	61
5:45 PM	0	3	0	0	0	2	1	0	0	0	0	0	0	0	0	0	6	41

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	24	0	0	0	56	12	0	4	0	8	0	0	0	0	0	104
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 4:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

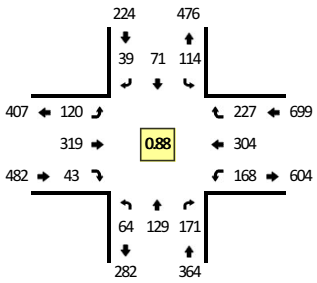
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

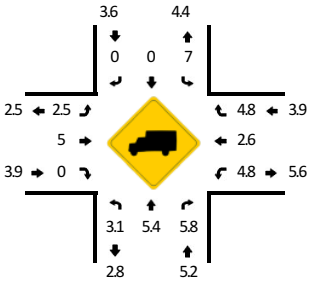
LOCATION: Old Volcano Rd -- Keaau Pahoa Rd
CITY/STATE: Keaau, HI

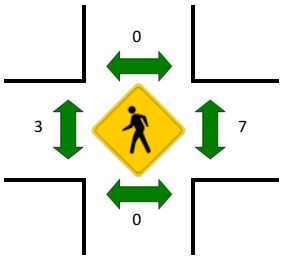
QC JOB #: 16501309
DATE: Thu, Mar 7 2024

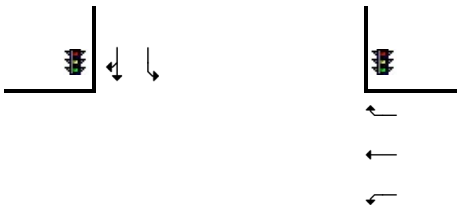
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

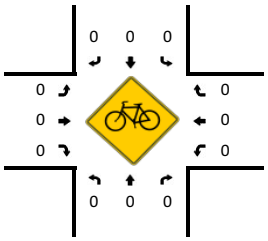


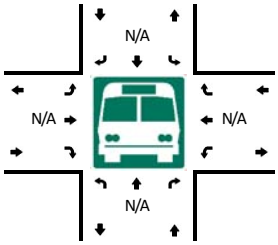
TRUE DATA TO IMPROVE MOBILITY

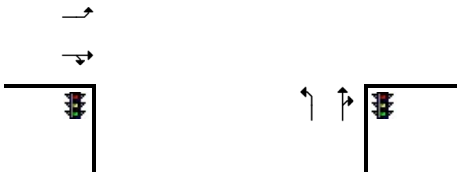


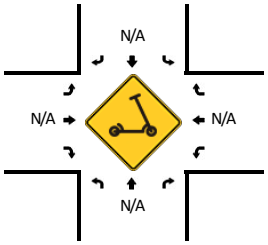












15-Min Count Period Beginning At	Old Volcano Rd (Northbound)				Old Volcano Rd (Southbound)				Keaau Pahoa Rd (Eastbound)				Keaau Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	16	4	5	0	1	6	4	0	8	13	5	0	29	18	6	0	115	
6:15 AM	19	8	9	0	4	5	2	0	11	15	3	0	32	41	13	0	162	
6:30 AM	25	19	11	0	7	6	1	0	10	32	6	0	25	32	23	0	197	
6:45 AM	22	13	11	0	10	7	6	0	13	41	8	0	23	53	23	0	230	704
7:00 AM	18	19	25	0	22	11	9	0	23	65	10	0	33	89	41	0	365	954
7:15 AM	17	38	31	0	22	11	10	0	36	95	13	0	36	87	53	0	449	1241
7:30 AM	12	29	54	0	36	26	6	0	32	115	9	0	39	75	72	0	505	1549
7:45 AM	17	43	61	0	34	23	14	0	29	44	11	0	60	53	61	0	450	1769

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	116	216	0	144	104	24	0	128	460	36	0	156	300	288	0	2020
Heavy Trucks	0	4	4		24	0	0		0	24	0		0	4	16		76
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

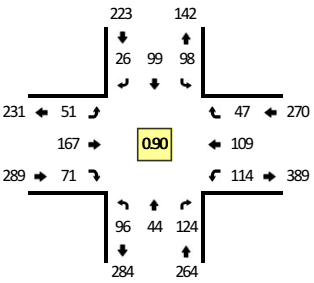
Type of peak hour being reported: User-Defined

Method for determining peak hour: Total Entering Volume

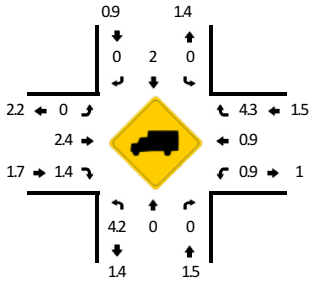
LOCATION: Old Volcano Rd -- Keaau Pahoa Rd
CITY/STATE: Keaau, HI

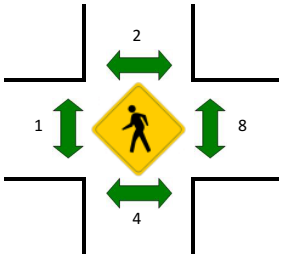
QC JOB #: 16501310
DATE: Thu, Mar 7 2024

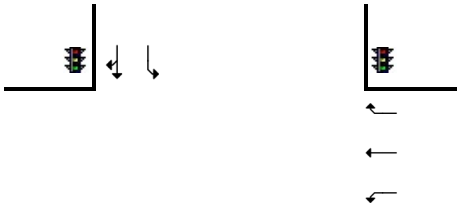
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

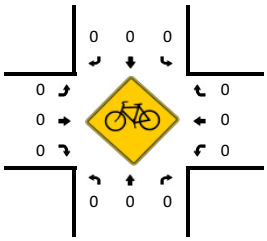


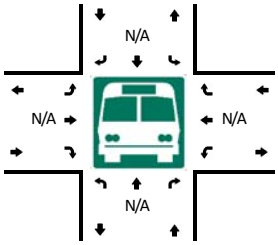
TRUE DATA TO IMPROVE MOBILITY

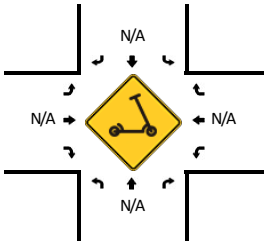












15-Min Count Period Beginning At	Old Volcano Rd (Northbound)				Old Volcano Rd (Southbound)				Keaau Pahoa Rd (Eastbound)				Keaau Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	20	12	37	0	19	21	8	0	6	41	17	0	37	29	10	0	257	
4:15 PM	20	16	29	0	31	28	2	0	22	52	17	0	29	27	16	0	289	
4:30 PM	25	7	28	0	23	24	9	0	13	38	17	0	27	32	15	0	258	
4:45 PM	31	9	30	0	25	26	7	0	10	36	20	0	21	21	6	0	242	1046
5:00 PM	24	15	27	0	25	36	8	0	8	49	29	0	30	23	12	0	286	1075
5:15 PM	22	10	36	0	24	27	4	0	12	36	15	0	38	32	13	0	269	1055
5:30 PM	18	9	23	0	18	29	1	0	12	39	13	0	23	34	5	0	224	1021
5:45 PM	30	13	18	0	17	13	2	0	8	42	15	0	22	17	6	0	203	982

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	80	64	116	0	124	112	8	0	88	208	68	0	116	108	64	0	1156
Heavy Trucks	4	0	0		0	0	0		0	0	4		0	0	4		12
Buses																	
Pedestrians		0				4				0				24			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 4:45 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

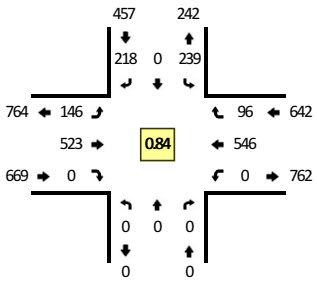
Type of peak hour being reported: Intersection Peak

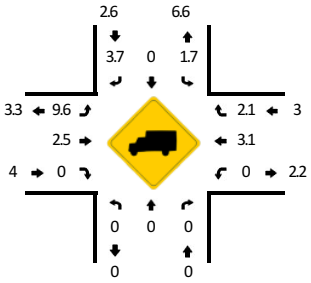
Method for determining peak hour: Total Entering Volume

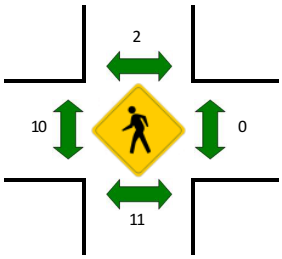
LOCATION: Kukula St -- Keaau Pahoa Rd
CITY/STATE: Keaau, HI

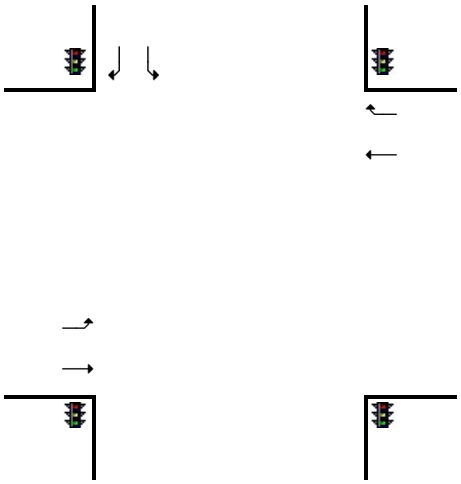
QC JOB #: 16501311
DATE: Thu, Mar 7 2024

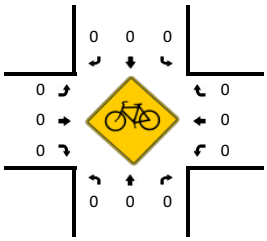
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

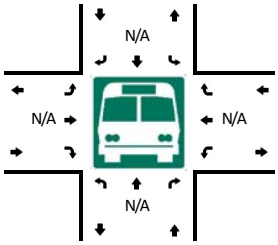


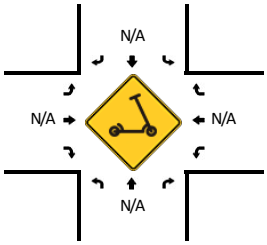












15-Min Count Period Beginning At	Kukula St (Northbound)				Kukula St (Southbound)				Keaau Pahoa Rd (Eastbound)				Keaau Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	1	0	4	0	5	20	0	0	0	40	2	0	72	
6:15 AM	0	0	0	0	2	0	11	0	6	20	0	0	0	70	0	0	109	
6:30 AM	0	0	0	0	7	0	12	0	11	47	0	0	0	72	3	0	152	
6:45 AM	0	0	0	0	19	0	22	0	15	56	0	0	0	81	7	0	200	533
7:00 AM	0	0	0	0	45	0	33	0	19	93	0	0	0	135	20	0	345	806
7:15 AM	0	0	0	0	66	0	49	0	32	108	0	0	0	148	16	0	419	1116
7:30 AM	0	0	0	0	67	0	69	0	47	189	0	0	0	125	29	0	526	1490
7:45 AM	0	0	0	0	61	0	67	0	48	133	0	0	0	138	31	0	478	1768

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	268	0	276	0	188	756	0	0	0	500	116	0	2104
Heavy Trucks	0	0	0		0	0	12		16	20	0		0	8	4		60
Buses																	
Pedestrians		24				0				24				0			48
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

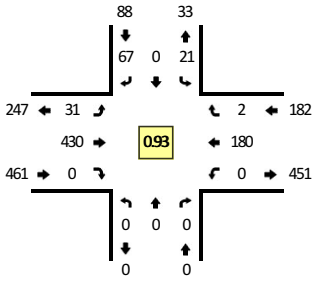
Type of peak hour being reported: Intersection Peak

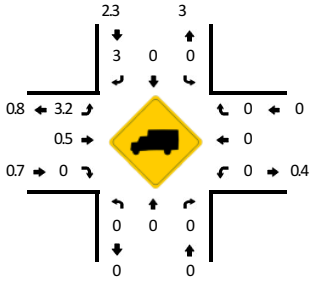
Method for determining peak hour: Total Entering Volume

LOCATION: Kukula St -- Keaau Pahoa Rd
CITY/STATE: Keaau, HI

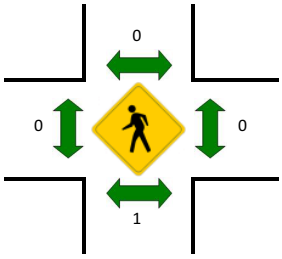
QC JOB #: 16501312
DATE: Thu, Mar 7 2024

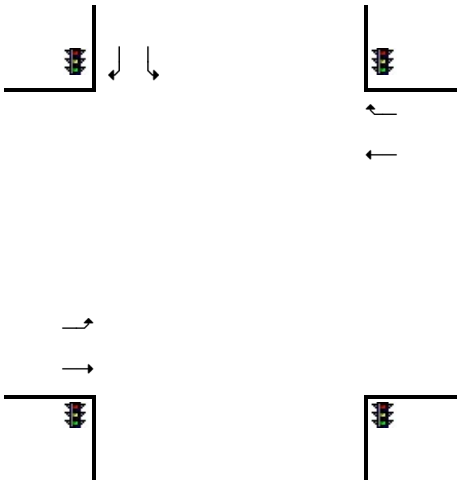
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

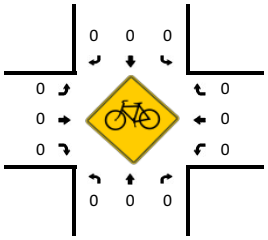


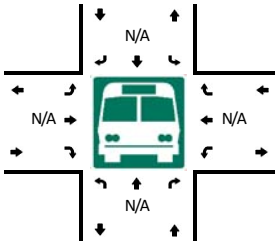


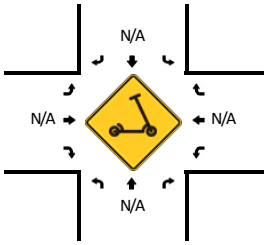
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Kukula St (Northbound)				Kukula St (Southbound)				Keaau Pahoa Rd (Eastbound)				Keaau Pahoa Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	4	0	15	0	13	112	0	0	0	49	0	0	193	
4:15 PM	0	0	0	0	8	0	20	0	4	111	0	0	0	53	0	0	196	
4:30 PM	0	0	0	0	4	0	19	0	10	115	0	0	0	41	2	0	191	
4:45 PM	0	0	0	0	5	0	13	0	4	92	0	0	0	37	0	0	151	731
5:00 PM	0	0	0	0	7	0	19	0	7	103	0	0	0	40	1	0	177	715
5:15 PM	0	0	0	0	1	0	23	0	8	101	0	0	0	43	2	0	178	697
5:30 PM	0	0	0	0	0	0	21	0	10	79	0	0	0	42	0	0	152	658
5:45 PM	0	0	0	0	1	0	10	0	6	79	0	0	0	21	3	0	120	627

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	32	0	80	0	16	444	0	0	0	212	0	0	784
Heavy Trucks	0	0	0		0	0	4		0	0	0		0	0	0		4
Buses																	
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

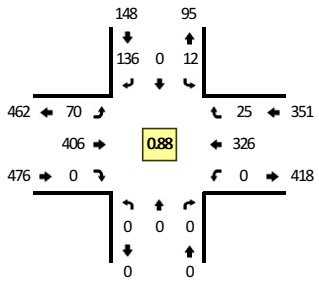
Report generated on 3/14/2024 10:46 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

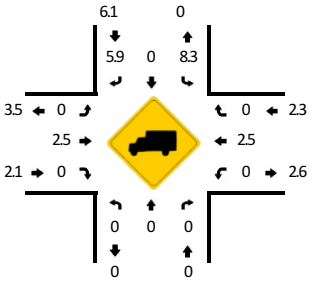
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

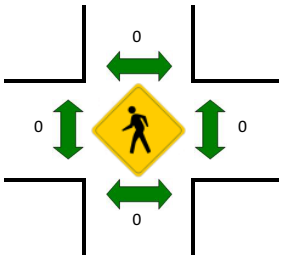
LOCATION: High School Dwy -- Keaau Pahua Rd | **QC JOB #:** 16501313
CITY/STATE: Keaau, HI | **DATE:** Thu, Mar 7 2024

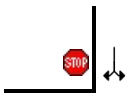
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

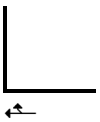


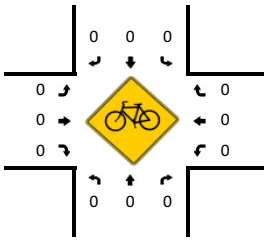
TRUE DATA TO IMPROVE MOBILITY

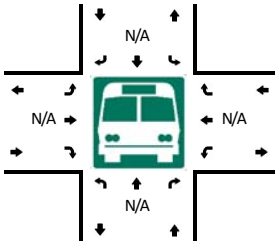


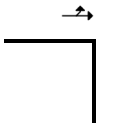


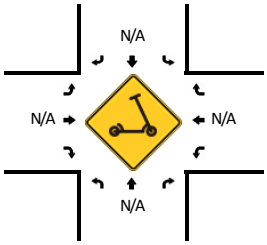












15-Min Count Period Beginning At	High School Dwy (Northbound)				High School Dwy (Southbound)				Keaau Pahua Rd (Eastbound)				Keaau Pahua Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	0	1	0	3	16	0	0	0	38	1	0	59	
6:15 AM	0	0	0	0	1	0	4	0	3	13	0	0	0	65	0	0	86	
6:30 AM	0	0	0	0	1	0	9	0	3	27	0	0	0	61	1	0	102	
6:45 AM	0	0	0	0	1	0	14	0	1	30	0	0	0	74	0	0	120	367
7:00 AM	0	0	0	0	1	0	21	0	11	84	0	0	0	103	1	0	221	529
7:15 AM	0	0	0	0	0	0	22	0	9	88	0	0	0	91	2	0	212	655
7:30 AM	0	0	0	0	3	0	38	0	23	124	0	0	0	79	9	0	276	829
7:45 AM	0	0	0	0	8	0	55	0	27	110	0	0	0	53	13	0	266	975

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	12	0	152	0	92	496	0	0	0	316	36	0	1104
Heavy Trucks	0	0	0		0	0	8		0	12	0		0	4	0		24
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

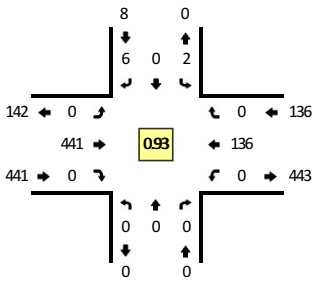
Comments:

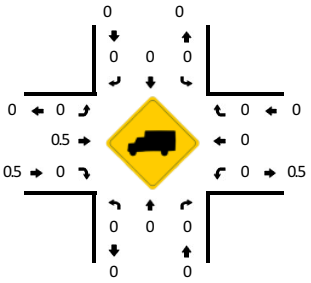
Report generated on 3/14/2024 10:46 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

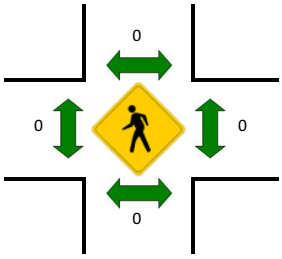
LOCATION: High School Dwy -- Keaau Pahua Rd | **QC JOB #:** 16501314
CITY/STATE: Keaau, HI | **DATE:** Thu, Mar 7 2024

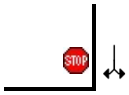
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

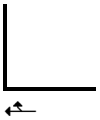


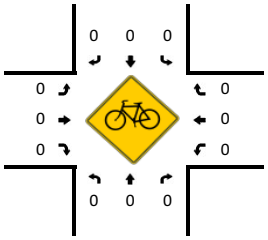


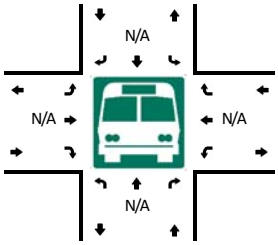
TRUE DATA TO IMPROVE MOBILITY

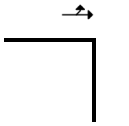


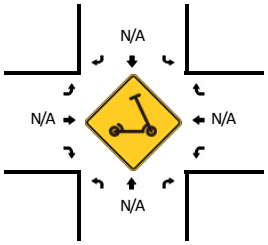












15-Min Count Period Beginning At	High School Dwy (Northbound)				High School Dwy (Southbound)				Keaau Pahua Rd (Eastbound)				Keaau Pahua Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	2	0	6	0	0	119	0	0	0	31	0	0	158	
4:15 PM	0	0	0	0	0	0	0	0	0	110	0	0	0	40	0	0	150	
4:30 PM	0	0	0	0	0	0	0	0	0	113	0	0	0	35	0	0	148	
4:45 PM	0	0	0	0	0	0	0	0	0	99	0	0	0	30	0	0	129	585
5:00 PM	0	0	0	0	0	0	0	0	0	105	0	0	0	34	0	0	139	566
5:15 PM	0	0	0	0	0	0	0	0	0	108	0	0	0	43	0	0	151	567
5:30 PM	0	0	0	0	0	0	0	0	0	79	0	0	0	37	0	0	116	535
5:45 PM	0	0	0	0	0	0	0	0	0	80	0	0	0	20	0	0	100	506

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	8	0	24	0	0	476	0	0	0	124	0	0	632
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	0	0		4
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

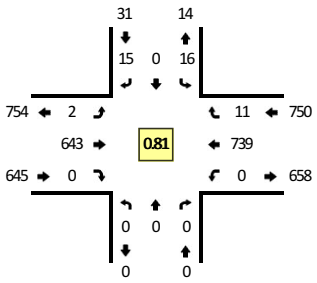
Type of peak hour being reported: Intersection Peak

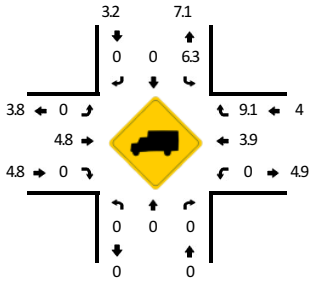
Method for determining peak hour: Total Entering Volume

LOCATION: Kikania St -- Keaau Pahua Rd
CITY/STATE: Keaau, HI

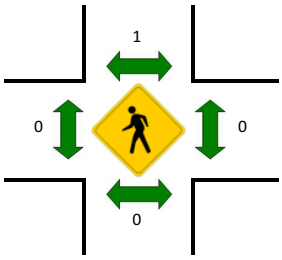
QC JOB #: 16501315
DATE: Thu, Mar 7 2024

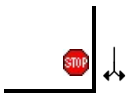
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

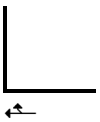


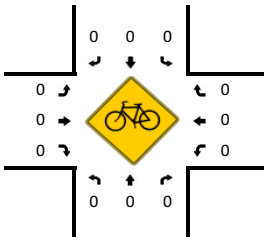


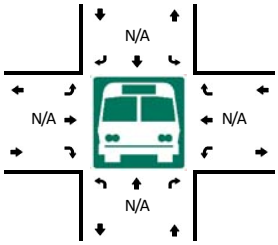
TRUE DATA TO IMPROVE MOBILITY

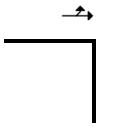


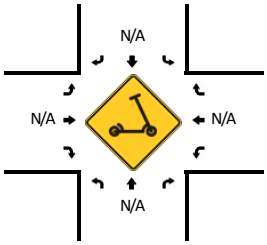












15-Min Count Period Beginning At	Kikania St (Northbound)				Kikania St (Southbound)				Keaau Pahua Rd (Eastbound)				Keaau Pahua Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	0	0	1	0	0	23	0	0	0	52	0	0	76	
6:15 AM	0	0	0	0	0	0	2	0	0	31	0	0	0	83	0	0	116	
6:30 AM	0	0	0	0	0	0	2	0	1	53	0	0	0	83	0	0	139	
6:45 AM	0	0	0	0	4	0	4	0	0	68	0	0	0	92	1	0	169	500
7:00 AM	0	0	0	0	4	0	4	0	1	108	0	0	0	171	4	0	292	716
7:15 AM	0	0	0	0	3	0	3	1	0	145	0	0	0	181	2	0	335	935
7:30 AM	0	0	0	0	2	0	4	0	0	232	0	0	0	200	1	0	439	1235
7:45 AM	0	0	0	0	6	0	4	0	1	158	0	0	0	187	4	0	360	1426

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	8	0	16	0	0	928	0	0	0	800	4	0	1756
Heavy Trucks	0	0	0		0	0	0		0	44	0		0	16	4		64
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

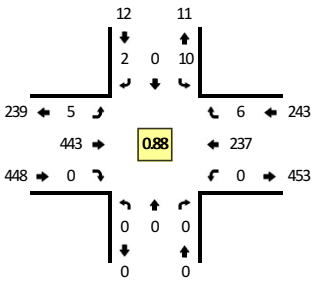
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

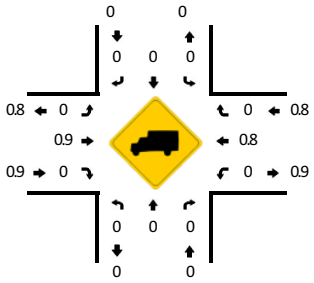
LOCATION: Kikania St -- Keaau Pahua Rd
CITY/STATE: Keaau, HI

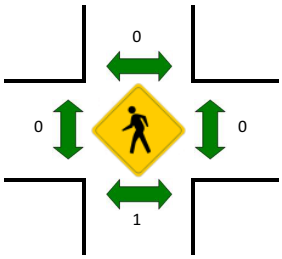
QC JOB #: 16501316
DATE: Thu, Mar 7 2024

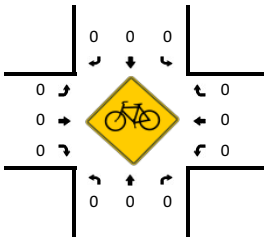
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

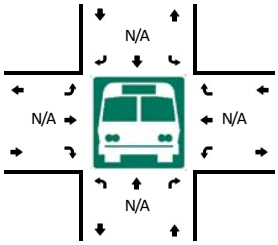


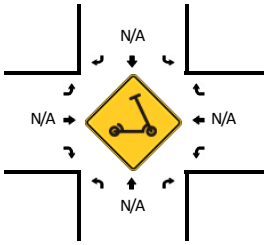
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Kikania St (Northbound)				Kikania St (Southbound)				Keaau Pahua Rd (Eastbound)				Keaau Pahua Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	2	0	1	0	1	112	0	0	0	58	1	0	175	
4:15 PM	0	0	0	0	5	0	0	0	2	117	0	0	0	74	2	0	200	
4:30 PM	0	0	0	0	3	0	1	0	1	116	0	0	0	57	2	0	180	
4:45 PM	0	0	0	0	0	0	0	0	1	98	0	0	0	48	1	0	148	703
5:00 PM	0	0	0	0	2	0	4	0	1	108	0	0	0	55	3	0	173	701
5:15 PM	0	0	0	0	3	0	5	0	1	105	0	0	0	68	2	0	184	685
5:30 PM	0	0	0	0	4	0	2	0	3	84	0	0	0	61	1	0	155	660
5:45 PM	0	0	0	0	4	0	1	0	3	82	0	0	0	31	1	0	122	634

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	20	0	0	0	8	468	0	0	0	296	8	0	800
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Buses																	
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 3/14/2024 10:46 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

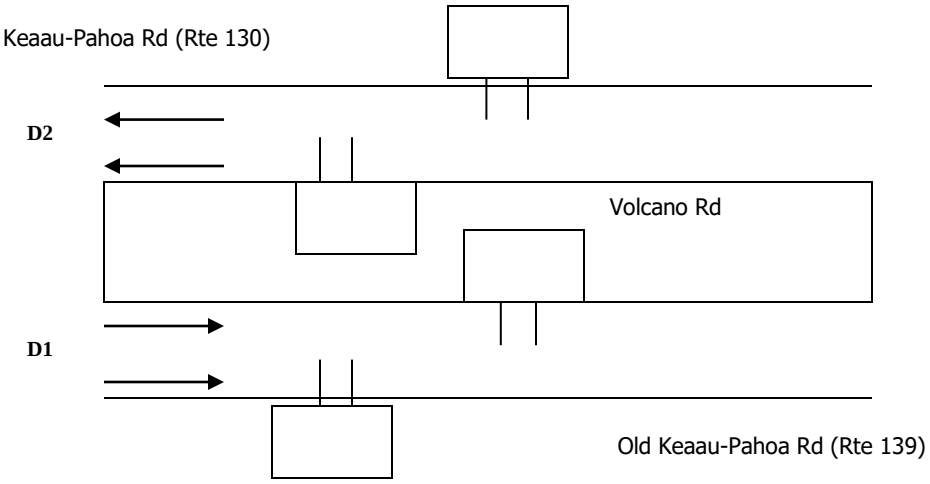
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii

Section ID/Station: B71001100664



	Meter #	File Name	GPS
1.	MK33	D1214069_B71001100664	19.624638, -155.04007
2.	KY72	D1214070_B71001100664	

Station Description: Volcano Rd: Keaau-Pahoa Rd (Rte 130) to Old Keaau-Pahoa Rd (Rte 139)					
Survey Beginning Date/Time: 8/31/2021			Survey Ending Date/Time: 9/1/2021		
Survey Method:	Road Tube		Data Type:	Class	
Survey Crew:	LM			C4	
Sketch Updated:			By:	SR	
Remarks:	1350 E=S				
FACILITY NAME	JURI		AREA TYPE	ROUTE NO.	ROUTE MILE
Volcano Rd				11	
D1= Direction to End D2= Direction to Begin	D1: Old Keaau-Pahoa Rd (Rte 139) D2: Keaau-Pahoa Rd (Rte 130)				

Run Date: 29-JUN-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71001100664
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER
Location:
Town: Hawaii
Count Type: CLASS
DATE: 31-AUG-21
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP
Final AADT: 19900
Route No: 11

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM		
AM - PEAK HR VOLUME	570	1,069	1,639
AM - K FACTOR(%)			9.05
AM - D(%)	34.78	65.22	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM	06:45 to 07:45 AM	
AM - PEAK HR VOLUME	570	1,069	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:45 to 04:45 PM		
PM - PEAK HR VOLUME	973	488	1,461
PM - K FACTOR(%)			8.06
PM -D(%)	66.6	33.4	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 to 05:00 PM	03:00 to 04:00 PM	
PM - PEAK HR VOLUME	980	577	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM		
AM - PEAK HR VOLUME	570	1,069	1,639
AM - K FACTOR(%)			9.05
AM - D(%)	34.78	65.22	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	02:15 to 03:15 PM		
PM - PEAK HR VOLUME	870	649	1,519
PM - K FACTOR(%)			8.38
PM -D(%)	66.6	33.4	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:15 to 03:15 PM		
PEAK HR VOLUME	870	649	1,519
DIRECTIONAL PEAK			
PEAK HR TIME	02:00 to 03:00 PM	02:30 to 03:30 PM	
PEAK HR VOLUME	873	656	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,662	4,230	6,892
AM 12-HR PERIOD (00:00-12:00)	2,926	4,961	7,887
PM 6-HR PERIOD (12:00-18:00)	4,770	3,095	7,865
PM 12-HR PERIOD (12:00-24:00)	6,396	3,833	10,229
24-HR PERIOD (12:00-24:00)	9,322	8,794	18,116
D%	51.46	48.54	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	8	3	11
12:15 - 12:30	12	6	18
12:30 - 12:45	16	6	22
12:45 - 01:00	7	3	10
01:00 - 01:15	7	8	15
01:15 - 01:30	5	11	16
01:30 - 01:45	6	3	9
01:45 - 02:00	7	3	10
02:00 - 02:15	4	8	12
02:15 - 02:30	9	6	15
02:30 - 02:45	5	10	15
02:45 - 03:00	6	6	12
03:00 - 03:15	3	14	17
03:15 - 03:30	2	16	18
03:30 - 03:45	8	23	31
03:45 - 04:00	11	33	44
04:00 - 04:15	10	37	47
04:15 - 04:30	8	34	42
04:30 - 04:45	14	53	67
04:45 - 05:00	10	49	59
05:00 - 05:15	12	82	94
05:15 - 05:30	25	90	115
05:30 - 05:45	25	115	140
05:45 - 06:00	44	112	156

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	57	155	212
06:15 - 06:30	68	212	280
06:30 - 06:45	79	231	310
06:45 - 07:00	126	265	391
07:00 - 07:15	172	271	443
07:15 - 07:30	158	285	443
07:30 - 07:45	114	248	362
07:45 - 08:00	115	191	306
08:00 - 08:15	94	140	234
08:15 - 08:30	97	173	270
08:30 - 08:45	74	159	233
08:45 - 09:00	88	155	243
09:00 - 09:15	116	154	270
09:15 - 09:30	102	161	263
09:30 - 09:45	112	180	292
09:45 - 10:00	97	152	249
10:00 - 10:15	111	133	244
10:15 - 10:30	115	141	256
10:30 - 10:45	116	129	245
10:45 - 11:00	123	129	252
11:00 - 11:15	112	161	273
11:15 - 11:30	132	131	263
11:30 - 11:45	146	141	287
11:45 - 12:00	138	133	271

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	144	146	290
12:15 - 12:30	140	145	285
12:30 - 12:45	146	125	271
12:45 - 01:00	157	148	305
01:00 - 01:15	150	128	278
01:15 - 01:30	165	145	310
01:30 - 01:45	156	133	289
01:45 - 02:00	176	109	285
02:00 - 02:15	206	135	341
02:15 - 02:30	239	120	359
02:30 - 02:45	221	175	396
02:45 - 03:00	207	199	406
03:00 - 03:15	203	155	358
03:15 - 03:30	191	127	318
03:30 - 03:45	193	171	364
03:45 - 04:00	237	124	361
04:00 - 04:15	243	124	367
04:15 - 04:30	243	114	357
04:30 - 04:45	250	126	376
04:45 - 05:00	244	103	347
05:00 - 05:15	230	83	313
05:15 - 05:30	249	86	335
05:30 - 05:45	209	91	300
05:45 - 06:00	171	83	254

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	151	80	231
06:15 - 06:30	150	52	202
06:30 - 06:45	124	81	205
06:45 - 07:00	99	48	147
07:00 - 07:15	103	49	152
07:15 - 07:30	100	40	140
07:30 - 07:45	104	45	149
07:45 - 08:00	67	37	104
08:00 - 08:15	77	38	115
08:15 - 08:30	86	35	121
08:30 - 08:45	78	28	106
08:45 - 09:00	77	22	99
09:00 - 09:15	57	25	82
09:15 - 09:30	48	20	68
09:30 - 09:45	43	24	67
09:45 - 10:00	44	18	62
10:00 - 10:15	31	21	52
10:15 - 10:30	36	18	54
10:30 - 10:45	30	15	45
10:45 - 11:00	34	3	37
11:00 - 11:15	27	6	33
11:15 - 11:30	26	10	36
11:30 - 11:45	22	9	31
11:45 - 12:00	12	14	26

Run Date: 29-JUN-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71001100664
Functional Class: URBAN:PRINCIPAL ARTERIAL - OTHER
Location:
Town: Hawaii
Count Type: CLASS
DATE: 01-SEP-21
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP
Final AADT: 19900
Route No: 11

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:30 to 07:30 AM		
AM - PEAK HR VOLUME	525	1,012	1,537
AM - K FACTOR(%)			8.76
AM - D(%)	34.16	65.84	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM	06:30 to 07:30 AM	
AM - PEAK HR VOLUME	607	1,012	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:00 to 04:00 PM		
PM - PEAK HR VOLUME	846	608	1,454
PM - K FACTOR(%)			8.28
PM -D(%)	58.18	41.82	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:00 to 05:00 PM	03:00 to 04:00 PM	
PM - PEAK HR VOLUME	887	608	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:30 to 07:30 AM		
AM - PEAK HR VOLUME	525	1,012	1,537
AM - K FACTOR(%)			8.76
AM - D(%)	34.16	65.84	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	02:30 to 03:30 PM		
PM - PEAK HR VOLUME	807	697	1,504
PM - K FACTOR(%)			8.57
PM -D(%)	58.18	41.82	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:30 to 03:30 PM		
PEAK HR VOLUME	807	697	1,504
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	02:30 to 03:30 PM	
PEAK HR VOLUME	811	697	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	2,813	3,852	6,665
AM 12-HR PERIOD (00:00-12:00)	3,051	4,507	7,558
PM 6-HR PERIOD (12:00-18:00)	4,491	3,065	7,556
PM 12-HR PERIOD (12:00-24:00)	6,194	3,803	9,997
24-HR PERIOD (12:00-24:00)	9,245	8,310	17,555
D%	52.66	47.34	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	9	2	11
12:15 - 12:30	11	4	15
12:30 - 12:45	6	7	13
12:45 - 01:00	12	4	16
01:00 - 01:15	8	3	11
01:15 - 01:30	7	4	11
01:30 - 01:45	5	2	7
01:45 - 02:00	10	4	14
02:00 - 02:15	4	0	4
02:15 - 02:30	3	3	6
02:30 - 02:45	1	4	5
02:45 - 03:00	4	3	7
03:00 - 03:15	3	5	8
03:15 - 03:30	2	14	16
03:30 - 03:45	7	20	27
03:45 - 04:00	10	19	29
04:00 - 04:15	0	29	29
04:15 - 04:30	9	36	45
04:30 - 04:45	8	37	45
04:45 - 05:00	6	51	57
05:00 - 05:15	20	76	96
05:15 - 05:30	25	82	107
05:30 - 05:45	30	122	152
05:45 - 06:00	38	124	162

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	46	129	175
06:15 - 06:30	70	209	279
06:30 - 06:45	83	253	336
06:45 - 07:00	141	224	365
07:00 - 07:15	151	286	437
07:15 - 07:30	150	249	399
07:30 - 07:45	162	41	203
07:45 - 08:00	144	29	173
08:00 - 08:15	131	192	323
08:15 - 08:30	110	173	283
08:30 - 08:45	108	189	297
08:45 - 09:00	97	164	261
09:00 - 09:15	77	129	206
09:15 - 09:30	128	163	291
09:30 - 09:45	111	156	267
09:45 - 10:00	112	159	271
10:00 - 10:15	92	151	243
10:15 - 10:30	115	144	259
10:30 - 10:45	128	143	271
10:45 - 11:00	135	151	286
11:00 - 11:15	120	132	252
11:15 - 11:30	126	145	271
11:30 - 11:45	137	117	254
11:45 - 12:00	139	124	263

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	119	134	253
12:15 - 12:30	143	122	265
12:30 - 12:45	147	139	286
12:45 - 01:00	147	120	267
01:00 - 01:15	160	122	282
01:15 - 01:30	149	133	282
01:30 - 01:45	138	145	283
01:45 - 02:00	182	131	313
02:00 - 02:15	189	131	320
02:15 - 02:30	199	143	342
02:30 - 02:45	218	195	413
02:45 - 03:00	180	204	384
03:00 - 03:15	207	150	357
03:15 - 03:30	202	148	350
03:30 - 03:45	222	152	374
03:45 - 04:00	215	158	373
04:00 - 04:15	216	111	327
04:15 - 04:30	223	124	347
04:30 - 04:45	223	108	331
04:45 - 05:00	225	78	303
05:00 - 05:15	210	95	305
05:15 - 05:30	201	77	278
05:30 - 05:45	186	85	271
05:45 - 06:00	190	60	250

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	173	90	263
06:15 - 06:30	153	41	194
06:30 - 06:45	136	90	226
06:45 - 07:00	122	57	179
07:00 - 07:15	128	61	189
07:15 - 07:30	118	39	157
07:30 - 07:45	99	38	137
07:45 - 08:00	79	48	127
08:00 - 08:15	64	32	96
08:15 - 08:30	68	41	109
08:30 - 08:45	83	21	104
08:45 - 09:00	67	30	97
09:00 - 09:15	61	16	77
09:15 - 09:30	40	22	62
09:30 - 09:45	38	21	59
09:45 - 10:00	46	26	72
10:00 - 10:15	32	11	43
10:15 - 10:30	35	11	46
10:30 - 10:45	29	8	37
10:45 - 11:00	26	8	34
11:00 - 11:15	31	6	37
11:15 - 11:30	37	8	45
11:30 - 11:45	19	7	26
11:45 - 12:00	19	6	25

Run Date: 2022/06/24

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2021

Site ID: B71001100664 **Route No:** 11 **Date From:** 2021/08/31 0:00
Town: Hawaii **Direction:** +MP **Date To:** 2021/09/01 23:45
Location: Volcano Rd - Keaau-Pahoa Rd (Rte 130) to Old Keaau-Pahoa Rd (Rte 139)

Functional Classification: 14 URBAN:PRINCIPAL ARTERIAL - OTHER

REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	367	1.03%	735
PC	28743	80.58%	57486
2A-4T	4010	11.24%	8020
LIGHT VEHICLE TOTALS	33120	92.85%	66241
HEAVY VEHICLES			
Bus	1187	3.33%	2967
SINGLE UNIT TRUCK			
2A-6T	530	1.49%	1060
3A-SU	163	0.46%	489
4A-SU	0	0.00%	0
SINGLE-TRAILER TRUCKS			
4A-ST	544	1.53%	2176
5A-ST	54	0.15%	270
6A-ST	2	0.01%	12
MULTI-TRAILER TRUCKS			
5A-MT	58	0.16%	290
6A-MT	3	0.01%	18
7A-MT	11	0.03%	77
HEAVY VEHICLE TOTALS	2552	7.15%	7359
CLASSIFIED VEHICLES TOTALS	35672 (A)	100.00%	73600 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.969

ROADTUBE EQUIVALENT(B/2) = 36800 (C)

PEAK HOUR VOLUME : 1554 2021/08/31 07:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7)	144	(65A-1) 9.27%	940	19900	(65A-2) 4.72%	7.81%
COMBINATION (TYPE 8-13)	54	(65B-1) 3.47%	336		(65B-2) 1.69%	7.81%

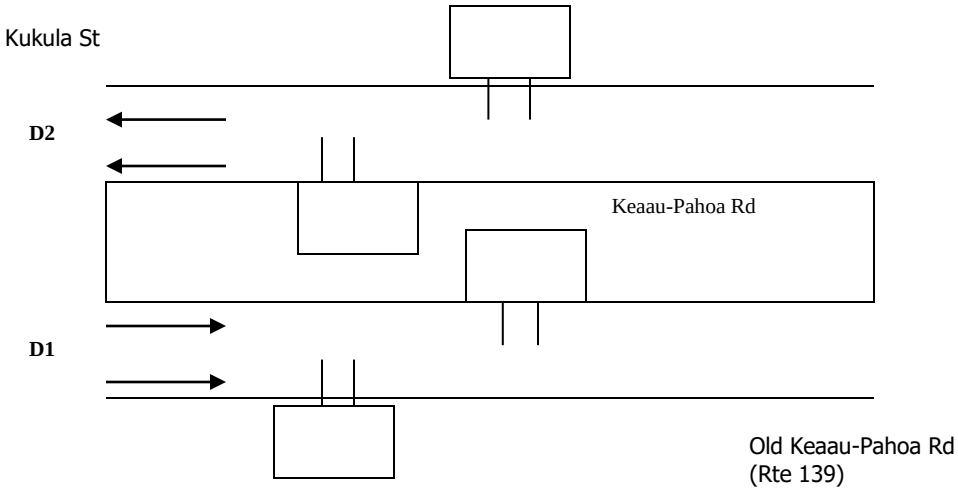
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii

Section ID/Station: B71013000138



Meter #	File Name	GPS
	D1221097_B71013000138 D1221098_B71013000138	19.6123, -155.03

Station Description: Keaau-Pahoa Rd: Kukula St to Old Keaau-Pahoa Rd (Rte 139)					
Survey Beginning Date/Time: 12/14/21 0:00			Survey Ending Date/Time: 12/15/21 24:00		
Survey Method:	Road Tube		Data Type:	Class	
Survey Crew:	LM			C4	
Sketch Updated:			By:	SR	
Remarks:	E = S 1300				
FACILITY NAME	JURI		AREA TYPE	ROUTE NO.	MILE
Keaau-Pahoa Rd				0130	
D1= Direction to End D2= Direction to Begin	D1: Old Keaau-Pahoa Rd (Rte 139) D2: Kukula St				

Run Date: 29-AUG-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71013000138
Functional Class: URBAN:MINOR ARTERIAL
Location:
Town: Hawaii
Count Type: VOLUME
DATE: 14-DEC-21
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP
Final AADT: 24100
Route No: 130

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	590	1,854	2,444
AM - K FACTOR(%)			8.82
AM - D(%)	24.14	75.86	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:30 to 08:30 AM	06:45 to 07:45 AM	
AM - PEAK HR VOLUME	621	1,942	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:00 to 04:00 PM		
PM - PEAK HR VOLUME	1,243	1,013	2,256
PM - K FACTOR(%)			8.14
PM -D(%)	55.1	44.9	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	05:00 to 06:00 PM	03:00 to 04:00 PM	
PM - PEAK HR VOLUME	1,436	1,013	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	590	1,854	2,444
AM - K FACTOR(%)			8.82
AM - D(%)	24.14	75.86	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	02:45 to 03:45 PM		
PM - PEAK HR VOLUME	1,230	1,047	2,277
PM - K FACTOR(%)			8.22
PM -D(%)	54.02	45.98	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	1,230	1,047	2,277
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	12:45 to 01:45 PM	
PEAK HR VOLUME	1,230	1,076	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,094	7,165	10,259
AM 12-HR PERIOD (00:00-12:00)	3,385	8,431	11,816
PM 6-HR PERIOD (12:00-18:00)	6,935	5,146	12,081
PM 12-HR PERIOD (12:00-24:00)	9,626	6,258	15,884
24-HR PERIOD (12:00-24:00)	13,011	14,689	27,700
D%	46.97	53.03	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	16	7	23
12:15 - 12:30	27	7	34
12:30 - 12:45	16	9	25
12:45 - 01:00	9	8	17
01:00 - 01:15	8	8	16
01:15 - 01:30	17	5	22
01:30 - 01:45	10	10	20
01:45 - 02:00	8	7	15
02:00 - 02:15	2	7	9
02:15 - 02:30	3	16	19
02:30 - 02:45	10	14	24
02:45 - 03:00	9	11	20
03:00 - 03:15	7	18	25
03:15 - 03:30	9	18	27
03:30 - 03:45	8	31	39
03:45 - 04:00	3	40	43
04:00 - 04:15	5	58	63
04:15 - 04:30	11	77	88
04:30 - 04:45	10	105	115
04:45 - 05:00	8	111	119
05:00 - 05:15	15	125	140
05:15 - 05:30	16	164	180
05:30 - 05:45	23	188	211
05:45 - 06:00	41	222	263

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	41	266	307
06:15 - 06:30	53	369	422
06:30 - 06:45	70	373	443
06:45 - 07:00	66	445	511
07:00 - 07:15	111	515	626
07:15 - 07:30	133	531	664
07:30 - 07:45	175	451	626
07:45 - 08:00	171	357	528
08:00 - 08:15	136	275	411
08:15 - 08:30	139	290	429
08:30 - 08:45	122	271	393
08:45 - 09:00	110	240	350
09:00 - 09:15	129	243	372
09:15 - 09:30	127	254	381
09:30 - 09:45	135	253	388
09:45 - 10:00	135	239	374
10:00 - 10:15	137	234	371
10:15 - 10:30	131	223	354
10:30 - 10:45	149	249	398
10:45 - 11:00	150	243	393
11:00 - 11:15	175	189	364
11:15 - 11:30	176	213	389
11:30 - 11:45	159	236	395
11:45 - 12:00	164	206	370

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	196	206	402
12:15 - 12:30	198	207	405
12:30 - 12:45	216	255	471
12:45 - 01:00	173	276	449
01:00 - 01:15	182	272	454
01:15 - 01:30	285	270	555
01:30 - 01:45	284	258	542
01:45 - 02:00	238	254	492
02:00 - 02:15	270	256	526
02:15 - 02:30	286	240	526
02:30 - 02:45	281	250	531
02:45 - 03:00	304	272	576
03:00 - 03:15	294	276	570
03:15 - 03:30	315	246	561
03:30 - 03:45	317	253	570
03:45 - 04:00	317	238	555
04:00 - 04:15	357	179	536
04:15 - 04:30	347	153	500
04:30 - 04:45	326	152	478
04:45 - 05:00	313	125	438
05:00 - 05:15	371	126	497
05:15 - 05:30	384	123	507
05:30 - 05:45	367	125	492
05:45 - 06:00	314	134	448

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	245	115	360
06:15 - 06:30	269	98	367
06:30 - 06:45	222	96	318
06:45 - 07:00	177	73	250
07:00 - 07:15	176	61	237
07:15 - 07:30	184	74	258
07:30 - 07:45	157	56	213
07:45 - 08:00	161	60	221
08:00 - 08:15	123	48	171
08:15 - 08:30	136	59	195
08:30 - 08:45	79	48	127
08:45 - 09:00	95	38	133
09:00 - 09:15	65	48	113
09:15 - 09:30	94	40	134
09:30 - 09:45	73	33	106
09:45 - 10:00	61	28	89
10:00 - 10:15	57	29	86
10:15 - 10:30	70	19	89
10:30 - 10:45	62	22	84
10:45 - 11:00	34	18	52
11:00 - 11:15	40	13	53
11:15 - 11:30	40	17	57
11:30 - 11:45	32	8	40
11:45 - 12:00	39	11	50

Run Date: 29-AUG-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71013000138
Functional Class: URBAN:MINOR ARTERIAL
Location:
Town: Hawaii
Count Type: VOLUME
DATE: 15-DEC-21
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP
Final AADT: 24100
Route No: 130

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM		
AM - PEAK HR VOLUME	458	1,911	2,369
AM - K FACTOR(%)			8.72
AM - D(%)	19.33	80.67	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM	06:45 to 07:45 AM	
AM - PEAK HR VOLUME	586	1,911	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:00 to 04:00 PM		
PM - PEAK HR VOLUME	1,304	772	2,076
PM - K FACTOR(%)			7.65
PM -D(%)	62.81	37.19	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	04:45 to 05:45 PM	03:00 to 04:00 PM	
PM - PEAK HR VOLUME	1,384	772	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 to 07:45 AM		
AM - PEAK HR VOLUME	458	1,911	2,369
AM - K FACTOR(%)			8.72
AM - D(%)	19.33	80.67	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	02:15 to 03:15 PM		
PM - PEAK HR VOLUME	1,248	949	2,197
PM - K FACTOR(%)			8.09
PM -D(%)	56.8	43.2	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:15 to 03:15 PM		
PEAK HR VOLUME	1,248	949	2,197
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	09:45 to 10:45 AM	
PEAK HR VOLUME	1,296	1,000	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	3,118	7,186	10,304
AM 12-HR PERIOD (00:00-12:00)	3,408	8,470	11,878
PM 6-HR PERIOD (12:00-18:00)	6,736	4,573	11,309
PM 12-HR PERIOD (12:00-24:00)	9,577	5,700	15,277
24-HR PERIOD (12:00-24:00)	12,985	14,170	27,155
D%	47.82	52.18	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	19	11	30
12:15 - 12:30	17	5	22
12:30 - 12:45	10	10	20
12:45 - 01:00	17	8	25
01:00 - 01:15	12	7	19
01:15 - 01:30	9	9	18
01:30 - 01:45	8	3	11
01:45 - 02:00	7	17	24
02:00 - 02:15	10	6	16
02:15 - 02:30	7	12	19
02:30 - 02:45	7	15	22
02:45 - 03:00	16	12	28
03:00 - 03:15	7	18	25
03:15 - 03:30	7	20	27
03:30 - 03:45	6	26	32
03:45 - 04:00	9	37	46
04:00 - 04:15	10	50	60
04:15 - 04:30	12	85	97
04:30 - 04:45	7	106	113
04:45 - 05:00	5	115	120
05:00 - 05:15	17	125	142
05:15 - 05:30	16	158	174
05:30 - 05:45	26	211	237
05:45 - 06:00	29	218	247

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	37	246	283
06:15 - 06:30	60	362	422
06:30 - 06:45	65	433	498
06:45 - 07:00	70	443	513
07:00 - 07:15	97	529	626
07:15 - 07:30	130	492	622
07:30 - 07:45	161	447	608
07:45 - 08:00	166	332	498
08:00 - 08:15	129	262	391
08:15 - 08:30	109	285	394
08:30 - 08:45	147	288	435
08:45 - 09:00	153	206	359
09:00 - 09:15	119	236	355
09:15 - 09:30	128	243	371
09:30 - 09:45	147	254	401
09:45 - 10:00	136	256	392
10:00 - 10:15	150	238	388
10:15 - 10:30	153	246	399
10:30 - 10:45	169	260	429
10:45 - 11:00	147	234	381
11:00 - 11:15	137	220	357
11:15 - 11:30	175	240	415
11:30 - 11:45	155	208	363
11:45 - 12:00	178	226	404

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	209	206	415
12:15 - 12:30	182	223	405
12:30 - 12:45	184	218	402
12:45 - 01:00	177	206	383
01:00 - 01:15	219	218	437
01:15 - 01:30	170	205	375
01:30 - 01:45	192	215	407
01:45 - 02:00	225	231	456
02:00 - 02:15	287	240	527
02:15 - 02:30	296	248	544
02:30 - 02:45	292	257	549
02:45 - 03:00	329	223	552
03:00 - 03:15	331	221	552
03:15 - 03:30	311	210	521
03:30 - 03:45	325	176	501
03:45 - 04:00	337	165	502
04:00 - 04:15	356	152	508
04:15 - 04:30	321	180	501
04:30 - 04:45	335	142	477
04:45 - 05:00	364	140	504
05:00 - 05:15	337	132	469
05:15 - 05:30	323	121	444
05:30 - 05:45	360	138	498
05:45 - 06:00	274	106	380

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	264	125	389
06:15 - 06:30	249	104	353
06:30 - 06:45	250	80	330
06:45 - 07:00	206	76	282
07:00 - 07:15	205	65	270
07:15 - 07:30	187	64	251
07:30 - 07:45	160	57	217
07:45 - 08:00	128	42	170
08:00 - 08:15	126	66	192
08:15 - 08:30	107	49	156
08:30 - 08:45	108	44	152
08:45 - 09:00	106	60	166
09:00 - 09:15	102	39	141
09:15 - 09:30	97	50	147
09:30 - 09:45	86	40	126
09:45 - 10:00	62	34	96
10:00 - 10:15	72	25	97
10:15 - 10:30	70	19	89
10:30 - 10:45	59	22	81
10:45 - 11:00	40	18	58
11:00 - 11:15	52	10	62
11:15 - 11:30	41	14	55
11:30 - 11:45	37	15	52
11:45 - 12:00	27	9	36

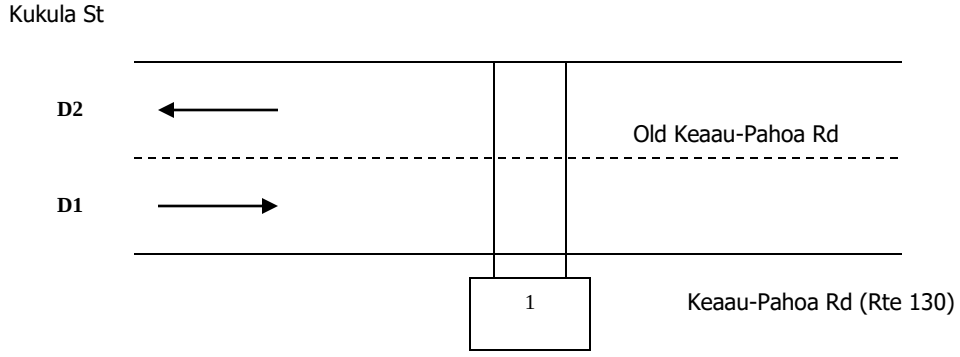
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii

Section ID/Station #: B71013900070



	Meter #	File Name	GPS
1.	BW59	D1214047_B71013900070 D1214048_B71013900070	19.612261, -155.033691

Station Description:

Old Keaau-Pahoa Rd: Kukula St to Keaau-Pahoa Rd (Rte 130)

Survey Beginning Date/Time:		Survey Ending Date/Time:
4/27/2021		4/28/2021

Survey Method:	Road Tube	Data Type:	Class
Survey Crew:	LM		C1B
Sketch Updated:		By:	SR

Remarks:	E = SE 1299

FACILITY NAME	JURI		AREA TYPE	ROUTE NO.	ROUTE MILE
Old Keaau-Pahoa Rd				0139	

D1= Direction to End
D2= Direction to Begin

D1: Keaau-Pahoa Rd (Rte 130)
D2: Kukula St

Run Date: 11-JUL-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71013900070 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 8100
Functional Class: URBAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 139
Location: **DATE: 27-APR-21**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	303	372	675
AM - K FACTOR(%)			8.56
AM - D(%)	44.89	55.11	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM	06:45 to 07:45 AM	
AM - PEAK HR VOLUME	315	381	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:15 to 04:15 PM		
PM - PEAK HR VOLUME	484	214	698
PM - K FACTOR(%)			8.85
PM -D(%)	69.34	30.66	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:15 to 04:15 PM	03:00 to 04:00 PM	
PM - PEAK HR VOLUME	484	227	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	303	372	675
AM - K FACTOR(%)			8.56
AM - D(%)	44.89	55.11	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	02:00 to 03:00 PM		
PM - PEAK HR VOLUME	459	361	820
PM - K FACTOR(%)			10.4
PM -D(%)	69.34	30.66	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:00 to 03:00 PM		
PEAK HR VOLUME	459	361	820
DIRECTIONAL PEAK			
PEAK HR TIME	02:00 to 03:00 PM	02:00 to 03:00 PM	
PEAK HR VOLUME	459	361	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	1,462	1,503	2,965
AM 12-HR PERIOD (00:00-12:00)	1,525	1,649	3,174
PM 6-HR PERIOD (12:00-18:00)	2,396	1,342	3,738
PM 12-HR PERIOD (12:00-24:00)	3,081	1,633	4,714
24-HR PERIOD (12:00-24:00)	4,606	3,282	7,888
D%	58.39	41.61	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	3	1	4
12:15 - 12:30	2	4	6
12:30 - 12:45	3	0	3
12:45 - 01:00	2	4	6
01:00 - 01:15	2	2	4
01:15 - 01:30	2	1	3
01:30 - 01:45	4	0	4
01:45 - 02:00	2	0	2
02:00 - 02:15	0	0	0
02:15 - 02:30	3	0	3
02:30 - 02:45	3	0	3
02:45 - 03:00	0	0	0
03:00 - 03:15	1	0	1
03:15 - 03:30	1	0	1
03:30 - 03:45	2	0	2
03:45 - 04:00	0	0	0
04:00 - 04:15	4	1	5
04:15 - 04:30	2	4	6
04:30 - 04:45	5	9	14
04:45 - 05:00	5	11	16
05:00 - 05:15	1	24	25
05:15 - 05:30	4	17	21
05:30 - 05:45	4	35	39
05:45 - 06:00	8	33	41

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	14	46	60
06:15 - 06:30	28	64	92
06:30 - 06:45	34	65	99
06:45 - 07:00	35	101	136
07:00 - 07:15	56	104	160
07:15 - 07:30	76	92	168
07:30 - 07:45	80	84	164
07:45 - 08:00	91	92	183
08:00 - 08:15	68	73	141
08:15 - 08:30	58	59	117
08:30 - 08:45	60	55	115
08:45 - 09:00	49	41	90
09:00 - 09:15	52	47	99
09:15 - 09:30	64	55	119
09:30 - 09:45	68	41	109
09:45 - 10:00	54	46	100
10:00 - 10:15	63	50	113
10:15 - 10:30	63	66	129
10:30 - 10:45	62	47	109
10:45 - 11:00	55	50	105
11:00 - 11:15	78	61	139
11:15 - 11:30	76	50	126
11:30 - 11:45	87	46	133
11:45 - 12:00	91	68	159

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	74	60	134
12:15 - 12:30	79	38	117
12:30 - 12:45	82	63	145
12:45 - 01:00	77	61	138
01:00 - 01:15	86	48	134
01:15 - 01:30	100	52	152
01:30 - 01:45	97	49	146
01:45 - 02:00	91	48	139
02:00 - 02:15	113	87	200
02:15 - 02:30	117	117	234
02:30 - 02:45	120	86	206
02:45 - 03:00	109	71	180
03:00 - 03:15	91	54	145
03:15 - 03:30	128	54	182
03:30 - 03:45	120	61	181
03:45 - 04:00	128	58	186
04:00 - 04:15	108	41	149
04:15 - 04:30	112	62	174
04:30 - 04:45	115	40	155
04:45 - 05:00	102	49	151
05:00 - 05:15	87	25	112
05:15 - 05:30	75	30	105
05:30 - 05:45	99	51	150
05:45 - 06:00	86	37	123

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	68	23	91
06:15 - 06:30	72	34	106
06:30 - 06:45	68	24	92
06:45 - 07:00	51	20	71
07:00 - 07:15	30	18	48
07:15 - 07:30	40	25	65
07:30 - 07:45	51	11	62
07:45 - 08:00	28	13	41
08:00 - 08:15	32	17	49
08:15 - 08:30	30	8	38
08:30 - 08:45	21	10	31
08:45 - 09:00	28	6	34
09:00 - 09:15	23	12	35
09:15 - 09:30	20	11	31
09:30 - 09:45	18	8	26
09:45 - 10:00	11	17	28
10:00 - 10:15	14	4	18
10:15 - 10:30	23	6	29
10:30 - 10:45	13	4	17
10:45 - 11:00	17	3	20
11:00 - 11:15	10	2	12
11:15 - 11:30	8	6	14
11:30 - 11:45	4	5	9
11:45 - 12:00	5	4	9

Run Date: 11-JUL-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71013900070 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 8100
Functional Class: URBAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 139
Location: **DATE: 28-APR-21**

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	267	334	601
AM - K FACTOR(%)			8.02
AM - D(%)	44.43	55.57	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM	06:45 to 07:45 AM	
AM - PEAK HR VOLUME	267	341	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:30 to 04:30 PM		
PM - PEAK HR VOLUME	441	253	694
PM - K FACTOR(%)			9.26
PM -D(%)	63.54	36.46	100
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:00 to 04:00 PM	03:30 to 04:30 PM	
PM - PEAK HR VOLUME	446	253	

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:00 to 08:00 AM		
AM - PEAK HR VOLUME	267	334	601
AM - K FACTOR(%)			8.02
AM - D(%)	44.43	55.57	100

PM PERIOD (12:00-24:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	02:45 to 03:45 PM		
PM - PEAK HR VOLUME	471	232	703
PM - K FACTOR(%)			9.38
PM -D(%)	63.54	36.46	100

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	471	232	703
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	02:00 to 03:00 PM	
PEAK HR VOLUME	471	276	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	TOTAL
AM 6-HR PERIOD (06:00-12:00)	1,284	1,362	2,646
AM 12-HR PERIOD (00:00-12:00)	1,362	1,544	2,906
PM 6-HR PERIOD (12:00-18:00)	2,277	1,284	3,561
PM 12-HR PERIOD (12:00-24:00)	2,979	1,609	4,588
24-HR PERIOD (12:00-24:00)	4,341	3,153	7,494
D%	57.93	42.07	100

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	6	3	9
12:15 - 12:30	1	2	3
12:30 - 12:45	7	0	7
12:45 - 01:00	0	2	2
01:00 - 01:15	4	0	4
01:15 - 01:30	1	0	1
01:30 - 01:45	0	1	1
01:45 - 02:00	1	0	1
02:00 - 02:15	5	1	6
02:15 - 02:30	2	0	2
02:30 - 02:45	0	3	3
02:45 - 03:00	0	6	6
03:00 - 03:15	1	4	5
03:15 - 03:30	0	1	1
03:30 - 03:45	4	3	7
03:45 - 04:00	6	4	10
04:00 - 04:15	5	7	12
04:15 - 04:30	1	9	10
04:30 - 04:45	4	9	13
04:45 - 05:00	3	21	24
05:00 - 05:15	4	14	18
05:15 - 05:30	7	22	29
05:30 - 05:45	4	26	30
05:45 - 06:00	12	44	56

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	19	51	70
06:15 - 06:30	24	51	75
06:30 - 06:45	36	63	99
06:45 - 07:00	29	82	111
07:00 - 07:15	47	93	140
07:15 - 07:30	85	89	174
07:30 - 07:45	78	77	155
07:45 - 08:00	57	75	132
08:00 - 08:15	45	48	93
08:15 - 08:30	46	42	88
08:30 - 08:45	49	48	97
08:45 - 09:00	50	45	95
09:00 - 09:15	50	45	95
09:15 - 09:30	46	57	103
09:30 - 09:45	49	52	101
09:45 - 10:00	52	38	90
10:00 - 10:15	62	42	104
10:15 - 10:30	51	47	98
10:30 - 10:45	60	44	104
10:45 - 11:00	70	57	127
11:00 - 11:15	69	45	114
11:15 - 11:30	67	59	126
11:30 - 11:45	70	49	119
11:45 - 12:00	73	63	136

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	80	53	133
12:15 - 12:30	90	53	143
12:30 - 12:45	65	52	117
12:45 - 01:00	85	41	126
01:00 - 01:15	74	55	129
01:15 - 01:30	87	54	141
01:30 - 01:45	92	70	162
01:45 - 02:00	86	52	138
02:00 - 02:15	81	69	150
02:15 - 02:30	92	81	173
02:30 - 02:45	108	73	181
02:45 - 03:00	121	53	174
03:00 - 03:15	119	50	169
03:15 - 03:30	114	56	170
03:30 - 03:45	117	73	190
03:45 - 04:00	96	60	156
04:00 - 04:15	111	62	173
04:15 - 04:30	117	58	175
04:30 - 04:45	101	56	157
04:45 - 05:00	99	45	144
05:00 - 05:15	91	29	120
05:15 - 05:30	87	30	117
05:30 - 05:45	72	34	106
05:45 - 06:00	92	25	117

TIME - PM	DIR1	DIR 2	TOTAL
06:00 - 06:15	75	24	99
06:15 - 06:30	89	23	112
06:30 - 06:45	71	18	89
06:45 - 07:00	45	21	66
07:00 - 07:15	57	17	74
07:15 - 07:30	53	30	83
07:30 - 07:45	27	16	43
07:45 - 08:00	41	16	57
08:00 - 08:15	21	19	40
08:15 - 08:30	27	21	48
08:30 - 08:45	32	16	48
08:45 - 09:00	20	15	35
09:00 - 09:15	21	10	31
09:15 - 09:30	20	14	34
09:30 - 09:45	18	11	29
09:45 - 10:00	19	12	31
10:00 - 10:15	14	6	20
10:15 - 10:30	11	13	24
10:30 - 10:45	9	5	14
10:45 - 11:00	11	4	15
11:00 - 11:15	6	4	10
11:15 - 11:30	9	4	13
11:30 - 11:45	4	3	7
11:45 - 12:00	2	3	5

Run Date: 2022/06/27

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2021

Site ID: B71013900070 **Route No:** 139 **Date From:** 2021/04/27 0:00

Town: Hawaii **Direction:** +MP **Date To:** 2021/04/28 23:45

Location: Old Keaau-Pahoa Rd - Kukula St to Keaau-Pahoa Rd (Rte 130)

Functional Classification: 17 URBAN:COLLECTOR

REPORT TOTALS - 48 HOURS RECORDED

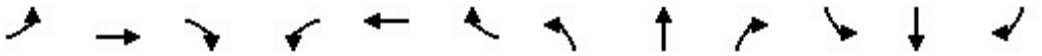
	VOLUME	%	NUMBER OF AXLES
Cycles	42	0.27%	83
PC	9826	63.88%	19652
2A-4T	5339	34.71%	10678
LIGHT VEHICLE TOTALS	15207	98.86%	30413
	HEAVY VEHICLES		
Bus	48	0.31%	120
SINGLE UNIT TRUCK			
2A-6T	53	0.34%	106
3A-SU	45	0.29%	135
4A-SU	13	0.08%	52
SINGLE-TRAILER TRUCKS			
4A-ST	8	0.05%	32
5A-ST	3	0.02%	15
6A-ST	0	0.00%	0
MULTI-TRAILER TRUCKS			
5A-MT	6	0.04%	30
6A-MT	0	0.00%	0
7A-MT	0	0.00%	0
HEAVY VEHICLE TOTALS	176	1.14%	490
CLASSIFIED VEHICLES TOTALS	15383 (A)	100.00%	30903 (B)
UNCLASSIFIED VEHICLES TOTALS	-1	-0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.996

ROADTUBE EQUIVALENT(B/2) = 15452 (C)

PEAK HOUR VOLUME : 820 **2021/04/27 14:00**	**PEAK HOUR TRUCK VOLUME**	**% TOTAL PEAK HOUR VOLUME**	**24 HOUR TRUCK VOLUME**	**AADT**	**% OF AADT**	**HPMS K-FACTOR (PEAK/AADT) (ITEM 66)**
SINGLE UNIT TRUCKS (TYPE 4-7)	**10**	**(65A-1) 1.22%**	**79**	**8100**	**(65A-2) 0.98%**	**10.12%**
COMBINATION (TYPE 8-13)	**0**	**(65B-1) 0.00%**	**8**		**(65B-2) 0.10%**	**10.12%**

Appendix C
Analysis Reports – Existing (2024) Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	5	303	10	86	6	594	302	158	446	7
Future Volume (veh/h)	4	13	5	303	10	86	6	594	302	158	446	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	15	6	361	12	0	7	707	0	188	531	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	482	180	687	20		16	917		225	1346	20
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.00	0.01	0.26	0.00	0.13	0.38	0.38
Sat Flow, veh/h	264	1084	404	1364	45	1585	1781	3647	0	1781	3584	54
Grp Volume(v), veh/h	26	0	0	373	0	0	7	707	0	188	263	276
Grp Sat Flow(s),veh/h/ln	1751	0	0	1409	0	1585	1781	1777	0	1781	1777	1861
Q Serve(g_s), s	0.0	0.0	0.0	16.7	0.0	0.0	0.3	16.2	0.0	9.0	9.5	9.5
Cycle Q Clear(g_c), s	0.7	0.0	0.0	17.4	0.0	0.0	0.3	16.2	0.0	9.0	9.5	9.5
Prop In Lane	0.19		0.23	0.97		1.00	1.00		0.00	1.00		0.03
Lane Grp Cap(c), veh/h	827	0	0	707	0		16	917		225	667	699
V/C Ratio(X)	0.03	0.00	0.00	0.53	0.00		0.44	0.77		0.83	0.39	0.39
Avail Cap(c_a), veh/h	827	0	0	707	0		122	1458		305	911	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.7	0.0	0.0	18.3	0.0	0.0	43.3	30.2	0.0	37.4	20.1	20.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	2.8	0.0	0.0	17.9	1.4	0.0	13.6	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	6.1	0.0	0.0	0.2	6.8	0.0	4.7	3.8	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.8	0.0	0.0	21.1	0.0	0.0	61.2	31.6	0.0	51.0	20.5	20.4
LnGrp LOS	B	A	A	C	A		E	C		D	C	C
Approach Vol, veh/h		26			373			714			727	
Approach Delay, s/veh		13.8			21.1			31.9			28.3	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	44.0	16.1	27.6	44.0	5.8	38.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	39.0	15.0	36.0	39.0	6.0	45.0
Max Q Clear Time (g_c+I1), s	19.4	11.0	18.2	2.7	2.3	11.5
Green Ext Time (p_c), s	2.3	0.2	4.5	0.1	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	319	43	168	304	227	64	129	171	114	71	39
Future Volume (veh/h)	120	319	43	168	304	227	64	129	171	114	71	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	362	49	191	345	258	73	147	194	130	81	44
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	438	804	109	468	932	790	473	240	316	289	374	203
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	816	1613	218	975	1870	1585	1256	727	959	1035	1135	617
Grp Volume(v), veh/h	136	0	411	191	345	258	73	0	341	130	0	125
Grp Sat Flow(s),veh/h/ln	816	0	1831	975	1870	1585	1256	0	1686	1035	0	1752
Q Serve(g_s), s	7.1	0.0	8.4	9.2	6.6	5.7	2.6	0.0	9.9	7.0	0.0	3.0
Cycle Q Clear(g_c), s	13.7	0.0	8.4	17.6	6.6	5.7	5.6	0.0	9.9	16.9	0.0	3.0
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.57	1.00		0.35
Lane Grp Cap(c), veh/h	438	0	913	468	932	790	473	0	556	289	0	577
V/C Ratio(X)	0.31	0.00	0.45	0.41	0.37	0.33	0.15	0.00	0.61	0.45	0.00	0.22
Avail Cap(c_a), veh/h	438	0	913	468	932	790	512	0	608	321	0	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	9.4	15.1	9.0	8.7	16.1	0.0	16.4	23.5	0.0	14.1
Incr Delay (d2), s/veh	1.8	0.0	1.6	2.6	1.1	1.1	0.2	0.0	1.6	1.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	3.3	2.2	2.6	1.9	0.7	0.0	3.7	1.7	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	11.0	17.7	10.1	9.8	16.2	0.0	18.0	24.6	0.0	14.3
LnGrp LOS	B	A	B	B	B	A	B	A	B	C	A	B
Approach Vol, veh/h		547			794			414			255	
Approach Delay, s/veh		12.0			11.9			17.7			19.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.0	24.2	34.0	24.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	29.0	21.0	29.0	21.0
Max Q Clear Time (g_c+I1), s	19.6	11.9	15.7	18.9
Green Ext Time (p_c), s	2.9	1.7	3.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

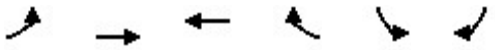
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	643	739	11	16	15
Future Vol, veh/h	2	643	739	11	16	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	794	912	14	20	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	927	0	-	0	1718	920
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	798	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	737	-	-	-	99	328
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	443	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	736	-	-	-	98	328
Mov Cap-2 Maneuver	-	-	-	-	98	-
Stage 1	-	-	-	-	386	-
Stage 2	-	-	-	-	443	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	37.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	736	-	-	-	148
HCM Lane V/C Ratio	0.003	-	-	-	0.259
HCM Control Delay (s)	9.9	0	-	-	37.6
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	523	546	96	239	218
Future Volume (veh/h)	146	523	546	96	239	218
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	623	650	0	285	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	488	1343	1144		322	
Arrive On Green	0.06	0.72	0.61	0.00	0.18	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	174	623	650	0	285	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	3.3	13.9	20.4	0.0	15.4	0.0
Cycle Q Clear(g_c), s	3.3	13.9	20.4	0.0	15.4	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	488	1343	1144		322	
V/C Ratio(X)	0.36	0.46	0.57		0.88	
Avail Cap(c_a), veh/h	570	1343	1144		432	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	5.9	11.4	0.0	39.5	0.0
Incr Delay (d2), s/veh	0.4	1.2	2.0	0.0	15.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.2	8.6	0.0	8.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.1	7.1	13.5	0.0	54.8	0.0
LnGrp LOS	A	A	B		D	
Approach Vol, veh/h		797	650		285	
Approach Delay, s/veh		7.5	13.5		54.8	
Approach LOS		A	B		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		76.0		22.9	10.5	65.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		71.0		24.0	10.0	56.0
Max Q Clear Time (g_c+I1), s		15.9		17.4	5.3	22.4
Green Ext Time (p_c), s		5.3		0.5	0.2	5.4

Intersection Summary	
HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	406	326	25	12	136
Future Vol, veh/h	70	406	326	25	12	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	461	370	28	14	155

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	398	0	-	0	1005	384
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	621	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1161	-	-	-	268	664
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1161	-	-	-	243	664
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	536	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1161	-	-	-	664
HCM Lane V/C Ratio	0.069	-	-	-	0.233
HCM Control Delay (s)	8.3	0	-	-	12.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9

Intersection	
Int Delay, s/veh	5.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	336	81	144	277	70	83
Future Vol, veh/h	336	81	144	277	70	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	405	98	173	334	84	100

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	503	0	1134	454
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	680	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1061	-	224	606
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	503	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1061	-	179	606
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	402	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.1	25.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	179	606	-	-	1061	-
HCM Lane V/C Ratio	0.471	0.165	-	-	0.164	-
HCM Control Delay (s)	41.9	12.1	-	-	9.1	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	2.2	0.6	-	-	0.6	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	319	485	1783	432	115
Future Volume (veh/h)	96	319	485	1783	432	115
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	329	500	1838	445	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	287	734	538	2680	1456	
Arrive On Green	0.16	0.16	0.30	0.75	0.41	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	99	329	500	1838	445	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	5.8	16.6	32.1	31.1	10.0	0.0
Cycle Q Clear(g_c), s	5.8	16.6	32.1	31.1	10.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	287	734	538	2680	1456	
V/C Ratio(X)	0.35	0.45	0.93	0.69	0.31	
Avail Cap(c_a), veh/h	317	761	830	2680	1456	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.0	21.5	40.0	7.4	23.5	0.0
Incr Delay (d2), s/veh	0.7	0.4	12.0	1.5	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.1	15.2	9.1	4.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.7	21.9	52.0	8.8	24.0	0.0
LnGrp LOS	D	C	D	A	C	
Approach Vol, veh/h	428			2338	445	
Approach Delay, s/veh	27.2			18.1	24.0	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		94.0		24.0	40.6	53.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		89.0		21.0	55.0	29.0
Max Q Clear Time (g_c+I1), s		33.1		18.6	34.1	12.0
Green Ext Time (p_c), s		23.4		0.4	1.5	2.4

Intersection Summary		
HCM 6th Ctrl Delay		20.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

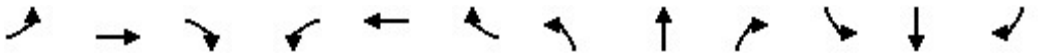
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	3	1	138	218	5
Future Vol, veh/h	13	3	1	138	218	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	4	1	203	321	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	530	325	328	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	510	716	1232	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	509	716	1232	-	-	-
Mov Cap-2 Maneuver	509	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1232	-	538	-	-
HCM Lane V/C Ratio	0.001	-	0.044	-	-
HCM Control Delay (s)	7.9	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



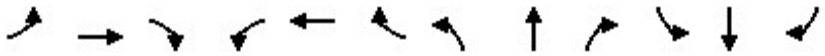
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	13	12	145	21	85	2	418	101	201	568	20
Future Volume (veh/h)	10	13	12	145	21	85	2	418	101	201	568	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	15	14	165	24	0	2	475	0	228	645	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	310	258	648	88		5	679		280	1209	43
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.00	0.00	0.19	0.00	0.16	0.35	0.35
Sat Flow, veh/h	375	693	575	1242	197	1585	1781	3647	0	1781	3500	125
Grp Volume(v), veh/h	40	0	0	189	0	0	2	475	0	228	327	341
Grp Sat Flow(s),veh/h/ln	1642	0	0	1439	0	1585	1781	1777	0	1781	1777	1848
Q Serve(g_s), s	0.0	0.0	0.0	5.0	0.0	0.0	0.1	9.2	0.0	9.1	10.9	10.9
Cycle Q Clear(g_c), s	0.9	0.0	0.0	5.9	0.0	0.0	0.1	9.2	0.0	9.1	10.9	10.9
Prop In Lane	0.27		0.35	0.87		1.00	1.00		0.00	1.00		0.07
Lane Grp Cap(c), veh/h	798	0	0	737	0		5	679		280	614	638
V/C Ratio(X)	0.05	0.00	0.00	0.26	0.00		0.41	0.70		0.82	0.53	0.53
Avail Cap(c_a), veh/h	798	0	0	737	0		145	1448		653	1231	1280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.5	0.0	0.0	12.8	0.0	0.0	36.7	27.8	0.0	30.0	19.3	19.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.8	0.0	0.0	47.7	1.3	0.0	5.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.0	0.0	0.0	0.1	3.8	0.0	4.1	4.3	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.6	0.0	0.0	13.6	0.0	0.0	84.4	29.1	0.0	35.8	20.1	20.0
LnGrp LOS	B	A	A	B	A		F	C		D	C	C
Approach Vol, veh/h		40			189			477			896	
Approach Delay, s/veh		11.6			13.6			29.3			24.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		38.0	16.6	19.1		38.0	5.2	30.4				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		33.0	27.0	30.0		33.0	6.0	51.0				
Max Q Clear Time (g_c+I1), s		7.9	11.1	11.2		2.9	2.1	12.9				
Green Ext Time (p_c), s		1.1	0.6	2.9		0.2	0.0	4.4				

Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	167	71	114	109	47	96	44	124	98	99	26
Future Volume (veh/h)	51	167	71	114	109	47	96	44	124	98	99	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	186	79	127	121	52	107	49	138	109	110	29
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	813	757	322	710	1138	961	326	102	288	276	340	90
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1209	1245	529	1112	1870	1580	1235	427	1203	1184	1421	375
Grp Volume(v), veh/h	57	0	265	127	121	52	107	0	187	109	0	139
Grp Sat Flow(s),veh/h/ln	1209	0	1773	1112	1870	1580	1235	0	1630	1184	0	1795
Q Serve(g_s), s	1.4	0.0	4.5	3.9	1.8	0.9	5.1	0.0	6.5	5.7	0.0	4.2
Cycle Q Clear(g_c), s	3.1	0.0	4.5	8.4	1.8	0.9	9.3	0.0	6.5	12.2	0.0	4.2
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.74	1.00		0.21
Lane Grp Cap(c), veh/h	813	0	1079	710	1138	961	326	0	390	276	0	430
V/C Ratio(X)	0.07	0.00	0.25	0.18	0.11	0.05	0.33	0.00	0.48	0.39	0.00	0.32
Avail Cap(c_a), veh/h	813	0	1079	710	1138	961	688	0	868	623	0	956
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.0	0.0	5.9	7.9	5.4	5.2	24.5	0.0	21.5	26.7	0.0	20.6
Incr Delay (d2), s/veh	0.2	0.0	0.5	0.6	0.2	0.1	0.6	0.0	0.9	0.9	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.6	0.9	0.6	0.3	1.5	0.0	2.5	1.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.2	0.0	6.5	8.4	5.6	5.3	25.0	0.0	22.4	27.6	0.0	21.0
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		322			300			294			248	
Approach Delay, s/veh		6.4			6.7			23.4			23.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	45.0	20.7	45.0	20.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	40.0	35.0	40.0	35.0
Max Q Clear Time (g_c+I1), s	10.4	11.3	6.5	14.2
Green Ext Time (p_c), s	1.4	1.6	2.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

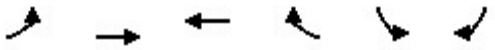
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	443	237	6	10	2
Future Vol, veh/h	5	443	237	6	10	2
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	503	269	7	11	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	277	0	-	0	789	274
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	515	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1286	-	-	-	359	765
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	600	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1285	-	-	-	356	764
Mov Cap-2 Maneuver	-	-	-	-	356	-
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	599	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1285	-	-	-	391
HCM Lane V/C Ratio	0.004	-	-	-	0.035
HCM Control Delay (s)	7.8	0	-	-	14.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	430	180	2	21	67
Future Volume (veh/h)	31	430	180	2	21	67
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	462	194	0	23	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	868	1375	1082		50	
Arrive On Green	0.04	0.73	0.58	0.00	0.03	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	33	462	194	0	23	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.3	3.7	2.1	0.0	0.5	0.0
Cycle Q Clear(g_c), s	0.3	3.7	2.1	0.0	0.5	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	868	1375	1082		50	
V/C Ratio(X)	0.04	0.34	0.18		0.46	
Avail Cap(c_a), veh/h	1054	1375	1082		802	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	2.6	2.0	4.2	0.0	20.2	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.4	0.0	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.6	0.0	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.6	2.6	4.5	0.0	26.7	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h		495	194		23	
Approach Delay, s/veh		2.6	4.5		26.7	
Approach LOS		A	A		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.0		6.2	6.6	29.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		31.0		19.0	6.0	20.0
Max Q Clear Time (g_c+I1), s		5.7		2.5	2.3	4.1
Green Ext Time (p_c), s		3.2		0.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	3.9
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	441	136	0	2	6
Future Vol, veh/h	0	441	136	0	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	474	146	0	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	146	0	-	0	620	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	474	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1436	-	-	-	452	901
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1436	-	-	-	452	901
Mov Cap-2 Maneuver	-	-	-	-	452	-
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1436	-	-	-	901
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	422	20	25	129	10	19
Future Vol, veh/h	422	20	25	129	10	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	440	21	26	134	10	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	461	0	637	451
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1100	-	441	608
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1100	-	430	608
Mov Cap-2 Maneuver	-	-	-	-	430	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	824	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	430	608	-	-	1100	-
HCM Lane V/C Ratio	0.024	0.033	-	-	0.024	-
HCM Control Delay (s)	13.6	11.1	-	-	8.4	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	477	209	703	1265	31
Future Volume (veh/h)	27	477	209	703	1265	31
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	28	492	215	725	1304	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	405	580	247	2423	1769	
Arrive On Green	0.23	0.23	0.14	0.68	0.50	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	28	492	215	725	1304	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	1.4	25.0	13.0	9.0	32.0	0.0
Cycle Q Clear(g_c), s	1.4	25.0	13.0	9.0	32.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	405	580	247	2423	1769	
V/C Ratio(X)	0.07	0.85	0.87	0.30	0.74	
Avail Cap(c_a), veh/h	405	580	324	2423	1769	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.4	32.1	46.4	7.0	21.9	0.0
Incr Delay (d2), s/veh	0.1	11.4	17.9	0.3	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	26.4	6.8	2.9	12.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.4	43.5	64.3	7.3	24.7	0.0
LnGrp LOS	C	D	E	A	C	
Approach Vol, veh/h	520			940	1304	
Approach Delay, s/veh	42.9			20.3	24.7	
Approach LOS	D			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		80.0		30.0	20.2	59.8
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		75.0		25.0	20.0	50.0
Max Q Clear Time (g_c+I1), s		11.0		27.0	15.0	34.0
Green Ext Time (p_c), s		5.2		0.0	0.2	7.9

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.1

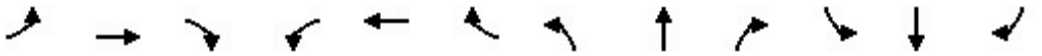
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	2	0	16	29	10
Future Vol, veh/h	6	2	0	16	29	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	3	0	26	48	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	82	56	64	0	-	0
Stage 1	56	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	920	1011	1538	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1011	1538	-	-	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1538	-	941	-	-
HCM Lane V/C Ratio	-	-	0.014	-	-
HCM Control Delay (s)	0	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Appendix D
Analysis Reports – Future Without Project and Mitigation



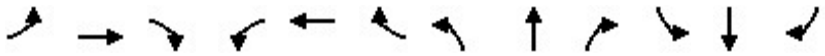
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	5	326	10	92	6	633	325	170	475	7
Future Volume (veh/h)	4	13	5	326	10	92	6	633	325	170	475	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	15	6	388	12	0	7	754	0	202	565	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	470	175	667	18		16	958		238	1415	20
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.00	0.01	0.27	0.00	0.13	0.39	0.39
Sat Flow, veh/h	266	1090	407	1367	42	1585	1781	3647	0	1781	3587	51
Grp Volume(v), veh/h	26	0	0	400	0	0	7	754	0	202	280	293
Grp Sat Flow(s),veh/h/ln	1763	0	0	1409	0	1585	1781	1777	0	1781	1777	1861
Q Serve(g_s), s	0.0	0.0	0.0	19.5	0.0	0.0	0.4	17.8	0.0	10.0	10.2	10.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	20.3	0.0	0.0	0.4	17.8	0.0	10.0	10.2	10.3
Prop In Lane	0.19		0.23	0.97		1.00	1.00		0.00	1.00		0.03
Lane Grp Cap(c), veh/h	807	0	0	685	0		16	958		238	701	734
V/C Ratio(X)	0.03	0.00	0.00	0.58	0.00		0.44	0.79		0.85	0.40	0.40
Avail Cap(c_a), veh/h	807	0	0	685	0		118	1413		295	883	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	20.4	0.0	0.0	44.6	30.6	0.0	38.3	19.7	19.7
Incr Delay (d2), s/veh	0.1	0.0	0.0	3.6	0.0	0.0	18.0	1.8	0.0	17.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	7.2	0.0	0.0	0.2	7.6	0.0	5.4	4.1	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	0.0	24.0	0.0	0.0	62.6	32.5	0.0	55.3	20.1	20.0
LnGrp LOS	B	A	A	C	A		E	C		E	C	C
Approach Vol, veh/h		26			400			761			775	
Approach Delay, s/veh		15.0			24.0			32.7			29.2	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		44.0	17.1	29.4		44.0	5.8	40.7				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		39.0	15.0	36.0		39.0	6.0	45.0				
Max Q Clear Time (g_c+I1), s		22.3	12.0	19.8		2.8	2.4	12.3				
Green Ext Time (p_c), s		2.4	0.2	4.6		0.1	0.0	3.6				

Intersection Summary												
HCM 6th Ctrl Delay			29.3									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	346	43	171	328	240	64	129	174	116	71	39
Future Volume (veh/h)	120	346	43	171	328	240	64	129	174	116	71	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	393	49	194	373	273	73	147	198	132	81	44
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	417	819	102	447	939	796	471	237	319	283	375	204
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	785	1630	203	947	1870	1585	1256	718	967	1031	1135	617
Grp Volume(v), veh/h	136	0	442	194	373	273	73	0	345	132	0	125
Grp Sat Flow(s),veh/h/ln	785	0	1834	947	1870	1585	1256	0	1684	1031	0	1752
Q Serve(g_s), s	7.8	0.0	9.4	10.1	7.4	6.2	2.7	0.0	10.3	7.4	0.0	3.1
Cycle Q Clear(g_c), s	15.2	0.0	9.4	19.5	7.4	6.2	5.7	0.0	10.3	17.7	0.0	3.1
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.57	1.00		0.35
Lane Grp Cap(c), veh/h	417	0	921	447	939	796	471	0	556	283	0	579
V/C Ratio(X)	0.33	0.00	0.48	0.43	0.40	0.34	0.16	0.00	0.62	0.47	0.00	0.22
Avail Cap(c_a), veh/h	417	0	921	447	939	796	476	0	564	288	0	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	0.0	9.7	16.2	9.2	8.9	16.5	0.0	16.8	24.3	0.0	14.4
Incr Delay (d2), s/veh	2.1	0.0	1.8	3.1	1.3	1.2	0.2	0.0	2.0	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	3.7	2.4	2.9	2.1	0.7	0.0	4.0	1.8	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	0.0	11.5	19.2	10.5	10.1	16.6	0.0	18.9	25.5	0.0	14.6
LnGrp LOS	B	A	B	B	B	B	B	A	B	C	A	B
Approach Vol, veh/h		578			840			418			257	
Approach Delay, s/veh		12.6			12.4			18.5			20.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	24.7	35.0	24.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	20.0	30.0	20.0
Max Q Clear Time (g_c+I1), s	21.5	12.3	17.2	19.7
Green Ext Time (p_c), s	3.0	1.5	3.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

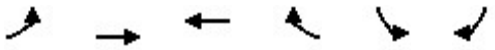
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	685	798	11	16	15
Future Vol, veh/h	2	685	798	11	16	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	846	985	14	20	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1000	0	-	0	1843	993
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	850	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	692	-	-	-	83	298
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	691	-	-	-	82	298
Mov Cap-2 Maneuver	-	-	-	-	82	-
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	419	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	45.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	691	-	-	-	126
HCM Lane V/C Ratio	0.004	-	-	-	0.304
HCM Control Delay (s)	10.2	0	-	-	45.6
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	557	592	96	239	218
Future Volume (veh/h)	146	557	592	96	239	218
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	663	705	0	285	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	453	1346	1150		321	
Arrive On Green	0.05	0.72	0.62	0.00	0.18	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	174	663	705	0	285	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	3.4	15.4	23.3	0.0	15.6	0.0
Cycle Q Clear(g_c), s	3.4	15.4	23.3	0.0	15.6	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	453	1346	1150		321	
V/C Ratio(X)	0.38	0.49	0.61		0.89	
Avail Cap(c_a), veh/h	516	1346	1150		410	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.5	6.1	11.9	0.0	40.0	0.0
Incr Delay (d2), s/veh	0.5	1.3	2.4	0.0	17.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.7	9.9	0.0	8.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.0	7.4	14.3	0.0	57.3	0.0
LnGrp LOS	B	A	B		E	
Approach Vol, veh/h		837	705		285	
Approach Delay, s/veh		7.9	14.3		57.3	
Approach LOS		A	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		77.0		23.0	10.5	66.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		72.0		23.0	9.0	58.0
Max Q Clear Time (g_c+I1), s		17.4		17.6	5.4	25.3
Green Ext Time (p_c), s		5.9		0.4	0.2	6.1

Intersection Summary		
HCM 6th Ctrl Delay	18.1	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	432	358	25	12	136
Future Vol, veh/h	70	432	358	25	12	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	491	407	28	14	155

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	435	0	-	0	1072	421
Stage 1	-	-	-	-	421	-
Stage 2	-	-	-	-	651	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1125	-	-	-	244	632
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	519	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1125	-	-	-	220	632
Mov Cap-2 Maneuver	-	-	-	-	220	-
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	519	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1125	-	-	-	632
HCM Lane V/C Ratio	0.071	-	-	-	0.245
HCM Control Delay (s)	8.4	0	-	-	12.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	358	81	144	306	70	83
Future Vol, veh/h	358	81	144	306	70	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	431	98	173	369	84	100

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	529	0	1195	480
Stage 1	-	-	-	-	480	-
Stage 2	-	-	-	-	715	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1038	-	206	586
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	485	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1038	-	163	586
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	29
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	163	586	-	-	1038	-
HCM Lane V/C Ratio	0.517	0.171	-	-	0.167	-
HCM Control Delay (s)	48.6	12.4	-	-	9.2	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	2.6	0.6	-	-	0.6	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	340	525	1899	460	125
Future Volume (veh/h)	102	340	525	1899	460	125
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	105	351	541	1958	474	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	294	776	579	2668	1363	
Arrive On Green	0.16	0.16	0.33	0.75	0.38	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	105	351	541	1958	474	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	6.2	17.2	34.9	36.2	11.2	0.0
Cycle Q Clear(g_c), s	6.2	17.2	34.9	36.2	11.2	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	294	776	579	2668	1363	
V/C Ratio(X)	0.36	0.45	0.93	0.73	0.35	
Avail Cap(c_a), veh/h	316	796	842	2668	1363	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.9	19.8	38.8	8.2	26.0	0.0
Incr Delay (d2), s/veh	0.7	0.4	13.4	1.8	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.1	16.7	10.8	4.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.7	20.2	52.2	10.0	26.7	0.0
LnGrp LOS	D	C	D	B	C	
Approach Vol, veh/h	456			2499	474	
Approach Delay, s/veh	25.9			19.2	26.7	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		94.0		24.5	43.5	50.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		89.0		21.0	56.0	28.0
Max Q Clear Time (g_c+I1), s		38.2		19.2	36.9	13.2
Green Ext Time (p_c), s		25.3		0.3	1.6	2.4

Intersection Summary		
HCM 6th Ctrl Delay		21.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

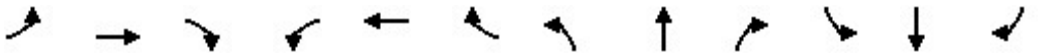
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	3	1	138	218	5
Future Vol, veh/h	13	3	1	138	218	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	4	1	203	321	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	530	325	328	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	510	716	1232	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	509	716	1232	-	-	-
Mov Cap-2 Maneuver	509	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1232	-	538	-	-
HCM Lane V/C Ratio	0.001	-	0.044	-	-
HCM Control Delay (s)	7.9	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



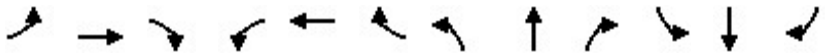
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	13	12	157	21	92	2	445	109	217	605	20
Future Volume (veh/h)	10	13	12	157	21	92	2	445	109	217	605	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	15	14	178	24	0	2	506	0	247	688	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	300	248	629	79		5	713		299	1284	43
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.00	0.00	0.20	0.00	0.17	0.37	0.37
Sat Flow, veh/h	374	697	577	1253	185	1585	1781	3647	0	1781	3509	117
Grp Volume(v), veh/h	40	0	0	202	0	0	2	506	0	247	348	363
Grp Sat Flow(s),veh/h/ln	1648	0	0	1437	0	1585	1781	1777	0	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	5.7	0.0	0.0	0.1	9.9	0.0	10.0	11.5	11.5
Cycle Q Clear(g_c), s	1.0	0.0	0.0	6.7	0.0	0.0	0.1	9.9	0.0	10.0	11.5	11.5
Prop In Lane	0.27		0.35	0.88		1.00	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	770	0	0	709	0		5	713		299	650	677
V/C Ratio(X)	0.05	0.00	0.00	0.29	0.00		0.41	0.71		0.83	0.54	0.54
Avail Cap(c_a), veh/h	770	0	0	709	0		144	1432		670	1241	1292
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	0.0	13.9	0.0	0.0	37.1	27.7	0.0	29.9	18.6	18.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.0	0.0	0.0	47.7	1.3	0.0	5.7	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.3	0.0	0.0	0.1	4.1	0.0	4.5	4.5	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.5	0.0	0.0	14.9	0.0	0.0	84.8	29.0	0.0	35.6	19.3	19.3
LnGrp LOS	B	A	A	B	A		F	C		D	B	B
Approach Vol, veh/h		40			202			508			958	
Approach Delay, s/veh		12.5			14.9			29.3			23.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		37.0	17.5	19.9		37.0	5.2	32.2				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		32.0	28.0	30.0		32.0	6.0	52.0				
Max Q Clear Time (g_c+I1), s		8.7	12.0	11.9		3.0	2.1	13.5				
Green Ext Time (p_c), s		1.2	0.6	3.1		0.2	0.0	4.8				

Intersection Summary	
HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	182	71	118	120	48	96	44	126	100	99	26
Future Volume (veh/h)	51	182	71	118	120	48	96	44	126	100	99	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	202	79	131	133	53	107	49	140	111	110	29
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	802	781	305	697	1142	965	325	101	290	273	341	90
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1195	1278	500	1096	1870	1580	1235	422	1207	1182	1421	375
Grp Volume(v), veh/h	57	0	281	131	133	53	107	0	189	111	0	139
Grp Sat Flow(s),veh/h/ln	1195	0	1778	1096	1870	1580	1235	0	1629	1182	0	1795
Q Serve(g_s), s	1.4	0.0	4.9	4.2	2.0	0.9	5.2	0.0	6.7	6.0	0.0	4.3
Cycle Q Clear(g_c), s	3.4	0.0	4.9	9.1	2.0	0.9	9.5	0.0	6.7	12.7	0.0	4.3
Prop In Lane	1.00		0.28	1.00		1.00	1.00		0.74	1.00		0.21
Lane Grp Cap(c), veh/h	802	0	1086	697	1142	965	325	0	391	273	0	431
V/C Ratio(X)	0.07	0.00	0.26	0.19	0.12	0.05	0.33	0.00	0.48	0.41	0.00	0.32
Avail Cap(c_a), veh/h	802	0	1086	697	1142	965	654	0	825	588	0	909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.2	0.0	6.0	8.1	5.5	5.3	24.9	0.0	21.9	27.4	0.0	21.0
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.6	0.2	0.1	0.6	0.0	0.9	1.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.7	1.0	0.7	0.3	1.5	0.0	2.6	1.7	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	0.0	6.6	8.7	5.7	5.4	25.5	0.0	22.8	28.3	0.0	21.4
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		338			317			296			250	
Approach Delay, s/veh		6.6			6.9			23.8			24.5	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	46.0	21.1	46.0	21.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	41.0	34.0	41.0	34.0
Max Q Clear Time (g_c+I1), s	11.1	11.5	6.9	14.7
Green Ext Time (p_c), s	1.6	1.6	2.2	1.1

Intersection Summary	
HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

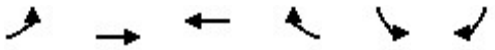
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	472	259	6	10	2
Future Vol, veh/h	5	472	259	6	10	2
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	536	294	7	11	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	302	0	-	0	847	299
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	548	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1259	-	-	-	332	741
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	579	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1258	-	-	-	329	740
Mov Cap-2 Maneuver	-	-	-	-	329	-
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	578	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	15.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1258	-	-	-	363
HCM Lane V/C Ratio	0.005	-	-	-	0.038
HCM Control Delay (s)	7.9	0	-	-	15.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	458	199	2	21	67
Future Volume (veh/h)	31	458	199	2	21	67
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	492	214	0	23	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	850	1375	1082		50	
Arrive On Green	0.04	0.73	0.58	0.00	0.03	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	33	492	214	0	23	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.3	4.0	2.3	0.0	0.5	0.0
Cycle Q Clear(g_c), s	0.3	4.0	2.3	0.0	0.5	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	850	1375	1082		50	
V/C Ratio(X)	0.04	0.36	0.20		0.46	
Avail Cap(c_a), veh/h	1036	1375	1082		802	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	2.7	2.0	4.2	0.0	20.2	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.4	0.0	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.7	0.0	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.7	2.7	4.6	0.0	26.7	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h		525	214		23	
Approach Delay, s/veh		2.7	4.6		26.7	
Approach LOS		A	A		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.0		6.2	6.6	29.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		31.0		19.0	6.0	20.0
Max Q Clear Time (g_c+I1), s		6.0		2.5	2.3	4.3
Green Ext Time (p_c), s		3.5		0.0	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	4.0
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	470	152	0	2	6
Future Vol, veh/h	0	470	152	0	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	505	163	0	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	163	0	-	0	668	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	505	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1416	-	-	-	423	882
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	606	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1416	-	-	-	423	882
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	606	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1416	-	-	-	882
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	9.1
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	449	20	25	144	10	19
Future Vol, veh/h	449	20	25	144	10	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	468	21	26	150	10	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	489	0	681	479
Stage 1	-	-	-	-	479	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1074	-	416	587
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	832	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1074	-	405	587
Mov Cap-2 Maneuver	-	-	-	-	405	-
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	810	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	405	587	-	-	1074	-
HCM Lane V/C Ratio	0.026	0.034	-	-	0.024	-
HCM Control Delay (s)	14.1	11.3	-	-	8.4	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	460	139	677	1334	17
Future Volume (veh/h)	11	460	139	677	1334	17
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	474	143	698	1375	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	437	542	172	2358	1853	
Arrive On Green	0.25	0.25	0.10	0.66	0.52	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	11	474	143	698	1375	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	0.5	27.0	8.7	9.0	33.2	0.0
Cycle Q Clear(g_c), s	0.5	27.0	8.7	9.0	33.2	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	437	542	172	2358	1853	
V/C Ratio(X)	0.03	0.87	0.83	0.30	0.74	
Avail Cap(c_a), veh/h	437	542	227	2358	1853	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.5	34.0	48.8	7.7	20.5	0.0
Incr Delay (d2), s/veh	0.0	14.7	17.5	0.3	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	26.2	4.6	3.0	13.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.5	48.6	66.3	8.1	23.3	0.0
LnGrp LOS	C	D	E	A	C	
Approach Vol, veh/h	485			841	1375	
Approach Delay, s/veh	48.3			18.0	23.3	
Approach LOS	D			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		78.0		32.0	15.6	62.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		73.0		27.0	14.0	54.0
Max Q Clear Time (g_c+I1), s		11.0		29.0	10.7	35.2
Green Ext Time (p_c), s		5.0		0.0	0.1	9.3

Intersection Summary		
HCM 6th Ctrl Delay		26.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

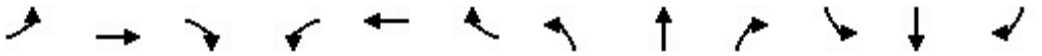
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	2	0	16	29	10
Future Vol, veh/h	6	2	0	16	29	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	3	0	26	48	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	82	56	64	0	-	0
Stage 1	56	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	920	1011	1538	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1011	1538	-	-	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1538	-	941	-	-
HCM Lane V/C Ratio	-	-	0.014	-	-
HCM Control Delay (s)	0	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



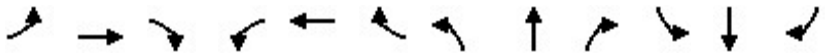
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	5	347	10	98	6	674	346	181	506	7
Future Volume (veh/h)	4	13	5	347	10	98	6	674	346	181	506	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	15	6	413	12	0	7	802	0	215	602	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	158	458	171	648	17		16	1003		249	1483	20
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.00	0.01	0.28	0.00	0.14	0.41	0.41
Sat Flow, veh/h	268	1098	410	1369	40	1585	1781	3647	0	1781	3591	48
Grp Volume(v), veh/h	26	0	0	425	0	0	7	802	0	215	298	312
Grp Sat Flow(s),veh/h/ln	1776	0	0	1409	0	1585	1781	1777	0	1781	1777	1862
Q Serve(g_s), s	0.0	0.0	0.0	22.6	0.0	0.0	0.4	19.5	0.0	11.0	11.0	11.0
Cycle Q Clear(g_c), s	0.8	0.0	0.0	23.4	0.0	0.0	0.4	19.5	0.0	11.0	11.0	11.0
Prop In Lane	0.19		0.23	0.97		1.00	1.00		0.00	1.00		0.03
Lane Grp Cap(c), veh/h	787	0	0	664	0		16	1003		249	734	769
V/C Ratio(X)	0.03	0.00	0.00	0.64	0.00		0.44	0.80		0.86	0.41	0.41
Avail Cap(c_a), veh/h	787	0	0	664	0		114	1407		267	856	897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	0.0	22.6	0.0	0.0	46.1	31.1	0.0	39.3	19.3	19.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	4.7	0.0	0.0	18.1	2.3	0.0	23.2	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	8.4	0.0	0.0	0.2	8.3	0.0	6.3	4.4	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	0.0	0.0	27.3	0.0	0.0	64.2	33.3	0.0	62.5	19.7	19.7
LnGrp LOS	B	A	A	C	A		E	C		E	B	B
Approach Vol, veh/h		26			425			809			825	
Approach Delay, s/veh		16.2			27.3			33.6			30.9	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		44.0	18.0	31.4		44.0	5.8	43.6				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		39.0	14.0	37.0		39.0	6.0	45.0				
Max Q Clear Time (g_c+I1), s		25.4	13.0	21.5		2.8	2.4	13.0				
Green Ext Time (p_c), s		2.3	0.1	4.8		0.1	0.0	3.9				

Intersection Summary												
HCM 6th Ctrl Delay			31.0									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	368	43	171	349	240	64	129	174	116	71	39
Future Volume (veh/h)	120	368	43	171	349	240	64	129	174	116	71	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	418	49	194	397	273	73	147	198	132	81	44
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	825	97	428	939	796	471	237	319	283	375	204
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	767	1643	193	926	1870	1585	1256	718	967	1031	1135	617
Grp Volume(v), veh/h	136	0	467	194	397	273	73	0	345	132	0	125
Grp Sat Flow(s),veh/h/ln	767	0	1836	926	1870	1585	1256	0	1684	1031	0	1752
Q Serve(g_s), s	8.1	0.0	10.1	10.6	8.0	6.2	2.7	0.0	10.3	7.4	0.0	3.1
Cycle Q Clear(g_c), s	16.1	0.0	10.1	20.7	8.0	6.2	5.7	0.0	10.3	17.7	0.0	3.1
Prop In Lane	1.00		0.10	1.00		1.00	1.00		0.57	1.00		0.35
Lane Grp Cap(c), veh/h	403	0	922	428	939	796	471	0	556	283	0	579
V/C Ratio(X)	0.34	0.00	0.51	0.45	0.42	0.34	0.16	0.00	0.62	0.47	0.00	0.22
Avail Cap(c_a), veh/h	403	0	922	428	939	796	476	0	564	288	0	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	9.9	16.8	9.4	8.9	16.5	0.0	16.8	24.3	0.0	14.4
Incr Delay (d2), s/veh	2.3	0.0	2.0	3.4	1.4	1.2	0.2	0.0	2.0	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	4.0	2.5	3.2	2.1	0.7	0.0	4.0	1.8	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.8	0.0	11.9	20.3	10.8	10.1	16.6	0.0	18.9	25.5	0.0	14.6
LnGrp LOS	B	A	B	C	B	B	B	A	B	C	A	B
Approach Vol, veh/h		603			864			418			257	
Approach Delay, s/veh		13.0			12.7			18.5			20.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	24.7	35.0	24.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	20.0	30.0	20.0
Max Q Clear Time (g_c+I1), s	22.7	12.3	18.1	19.7
Green Ext Time (p_c), s	2.8	1.5	3.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

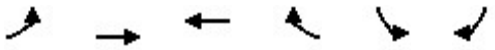
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	729	849	11	16	15
Future Vol, veh/h	2	729	849	11	16	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	900	1048	14	20	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1063	0	-	0	1960	1056
Stage 1	-	-	-	-	1056	-
Stage 2	-	-	-	-	904	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	655	-	-	-	70	274
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	395	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	654	-	-	-	69	274
Mov Cap-2 Maneuver	-	-	-	-	69	-
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	395	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	55.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	654	-	-	-	108
HCM Lane V/C Ratio	0.004	-	-	-	0.354
HCM Control Delay (s)	10.5	0	-	-	55.6
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	1.4



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	593	630	96	239	218
Future Volume (veh/h)	146	593	630	96	239	218
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	706	750	0	285	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	428	1353	1161		318	
Arrive On Green	0.05	0.72	0.62	0.00	0.18	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	174	706	750	0	285	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	3.4	17.1	25.9	0.0	16.0	0.0
Cycle Q Clear(g_c), s	3.4	17.1	25.9	0.0	16.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	428	1353	1161		318	
V/C Ratio(X)	0.41	0.52	0.65		0.90	
Avail Cap(c_a), veh/h	489	1353	1161		366	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	10.3	6.3	12.3	0.0	41.1	0.0
Incr Delay (d2), s/veh	0.6	1.4	2.8	0.0	21.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.4	11.0	0.0	8.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.0	7.7	15.0	0.0	62.8	0.0
LnGrp LOS	B	A	B		E	
Approach Vol, veh/h		880	750		285	
Approach Delay, s/veh		8.4	15.0		62.8	
Approach LOS		A	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		79.0		23.3	10.5	68.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		74.0		21.0	9.0	60.0
Max Q Clear Time (g_c+I1), s		19.1		18.0	5.4	27.9
Green Ext Time (p_c), s		6.5		0.3	0.2	6.7

Intersection Summary		
HCM 6th Ctrl Delay	19.1	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	460	381	25	12	136
Future Vol, veh/h	70	460	381	25	12	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	523	433	28	14	155

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	461	0	-	0	1130	447
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	683	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1100	-	-	-	225	612
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	502	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1100	-	-	-	202	612
Mov Cap-2 Maneuver	-	-	-	-	202	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	502	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1100	-	-	-	612
HCM Lane V/C Ratio	0.072	-	-	-	0.253
HCM Control Delay (s)	8.5	0	-	-	12.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1

Intersection	
Int Delay, s/veh	5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	381	81	144	325	70	83
Future Vol, veh/h	381	81	144	325	70	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	459	98	173	392	84	100

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	557	0	1246	508
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	738	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1014	-	192	565
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1014	-	150	565
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	370	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.8	32.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	150	565	-	-	1014	-
HCM Lane V/C Ratio	0.562	0.177	-	-	0.171	-
HCM Control Delay (s)	56.1	12.7	-	-	9.3	0
HCM Lane LOS	F	B	-	-	A	A
HCM 95th %tile Q(veh)	2.9	0.6	-	-	0.6	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	109	362	559	2022	490	133
Future Volume (veh/h)	109	362	559	2022	490	133
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	112	373	576	2085	505	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	282	797	613	2695	1323	
Arrive On Green	0.16	0.16	0.34	0.76	0.37	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	112	373	576	2085	505	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	6.8	18.4	37.6	41.2	12.5	0.0
Cycle Q Clear(g_c), s	6.8	18.4	37.6	41.2	12.5	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	282	797	613	2695	1323	
V/C Ratio(X)	0.40	0.47	0.94	0.77	0.38	
Avail Cap(c_a), veh/h	282	797	831	2695	1323	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.4	19.4	38.1	8.5	27.5	0.0
Incr Delay (d2), s/veh	0.9	0.4	15.1	2.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	18.7	18.1	12.2	5.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	46.3	19.8	53.3	10.7	28.4	0.0
LnGrp LOS	D	B	D	B	C	
Approach Vol, veh/h	485			2661	505	
Approach Delay, s/veh	25.9			19.9	28.4	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.0		24.0	46.3	49.7
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		91.0		19.0	56.0	30.0
Max Q Clear Time (g_c+I1), s		43.2		20.4	39.6	14.5
Green Ext Time (p_c), s		27.4		0.0	1.7	2.7

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

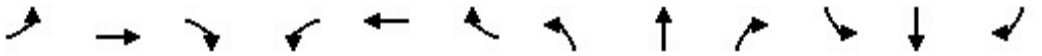
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	3	1	138	218	5
Future Vol, veh/h	13	3	1	138	218	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	4	1	203	321	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	530	325	328	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	510	716	1232	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	509	716	1232	-	-	-
Mov Cap-2 Maneuver	509	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1232	-	538	-	-
HCM Lane V/C Ratio	0.001	-	0.044	-	-
HCM Control Delay (s)	7.9	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



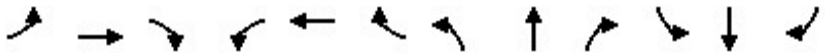
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	13	12	167	21	98	2	474	116	231	644	20
Future Volume (veh/h)	10	13	12	167	21	98	2	474	116	231	644	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	15	14	190	24	0	2	539	0	262	732	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	219	295	245	622	74		5	741		312	1340	42
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.00	0.00	0.21	0.00	0.18	0.38	0.38
Sat Flow, veh/h	378	697	579	1261	174	1585	1781	3647	0	1781	3517	110
Grp Volume(v), veh/h	40	0	0	214	0	0	2	539	0	262	370	385
Grp Sat Flow(s),veh/h/ln	1654	0	0	1435	0	1585	1781	1777	0	1781	1777	1850
Q Serve(g_s), s	0.0	0.0	0.0	6.6	0.0	0.0	0.1	11.0	0.0	11.1	12.7	12.7
Cycle Q Clear(g_c), s	1.0	0.0	0.0	7.6	0.0	0.0	0.1	11.0	0.0	11.1	12.7	12.7
Prop In Lane	0.27		0.35	0.89		1.00	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	760	0	0	695	0		5	741		312	677	705
V/C Ratio(X)	0.05	0.00	0.00	0.31	0.00		0.41	0.73		0.84	0.55	0.55
Avail Cap(c_a), veh/h	760	0	0	695	0		137	1369		617	1163	1212
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	15.0	0.0	0.0	38.8	28.8	0.0	31.1	18.8	18.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.1	0.0	0.0	47.8	1.4	0.0	6.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.7	0.0	0.0	0.1	4.6	0.0	5.0	4.9	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.4	0.0	0.0	16.2	0.0	0.0	86.6	30.2	0.0	37.0	19.5	19.5
LnGrp LOS	B	A	A	B	A		F	C		D	B	B
Approach Vol, veh/h		40			214			541			1017	
Approach Delay, s/veh		13.4			16.2			30.4			24.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		38.0	18.7	21.2		38.0	5.2	34.7				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		33.0	27.0	30.0		33.0	6.0	51.0				
Max Q Clear Time (g_c+I1), s		9.6	13.1	13.0		3.0	2.1	14.7				
Green Ext Time (p_c), s		1.3	0.6	3.2		0.2	0.0	5.1				

Intersection Summary	
HCM 6th Ctrl Delay	24.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	193	71	118	128	48	96	44	126	100	99	26
Future Volume (veh/h)	51	193	71	118	128	48	96	44	126	100	99	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	214	79	131	142	53	107	49	140	111	110	29
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	797	800	295	690	1150	971	321	101	288	270	339	89
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1185	1302	480	1085	1870	1580	1235	422	1207	1182	1421	375
Grp Volume(v), veh/h	57	0	293	131	142	53	107	0	189	111	0	139
Grp Sat Flow(s),veh/h/ln	1185	0	1782	1085	1870	1580	1235	0	1629	1182	0	1795
Q Serve(g_s), s	1.4	0.0	5.2	4.3	2.2	0.9	5.3	0.0	6.8	6.1	0.0	4.4
Cycle Q Clear(g_c), s	3.6	0.0	5.2	9.5	2.2	0.9	9.7	0.0	6.8	12.9	0.0	4.4
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.74	1.00		0.21
Lane Grp Cap(c), veh/h	797	0	1096	690	1150	971	321	0	389	270	0	429
V/C Ratio(X)	0.07	0.00	0.27	0.19	0.12	0.05	0.33	0.00	0.49	0.41	0.00	0.32
Avail Cap(c_a), veh/h	797	0	1096	690	1150	971	623	0	787	558	0	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.2	0.0	6.1	8.3	5.5	5.2	25.5	0.0	22.4	28.0	0.0	21.5
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.6	0.2	0.1	0.6	0.0	0.9	1.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	1.8	1.0	0.8	0.3	1.6	0.0	2.6	1.8	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	0.0	6.7	8.9	5.7	5.4	26.1	0.0	23.3	29.0	0.0	21.9
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		350			326			296			250	
Approach Delay, s/veh		6.6			6.9			24.3			25.0	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	47.0	21.3	47.0	21.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	42.0	33.0	42.0	33.0
Max Q Clear Time (g_c+I1), s	11.5	11.7	7.2	14.9
Green Ext Time (p_c), s	1.6	1.5	2.3	1.1

Intersection Summary	
HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

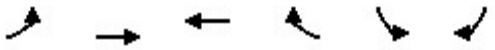
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	502	276	6	10	2
Future Vol, veh/h	5	502	276	6	10	2
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	570	314	7	11	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	322	0	-	0	901	319
Stage 1	-	-	-	-	319	-
Stage 2	-	-	-	-	582	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1238	-	-	-	309	722
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	559	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1237	-	-	-	306	721
Mov Cap-2 Maneuver	-	-	-	-	306	-
Stage 1	-	-	-	-	731	-
Stage 2	-	-	-	-	558	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1237	-	-	-	338
HCM Lane V/C Ratio	0.005	-	-	-	0.04
HCM Control Delay (s)	7.9	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	488	211	2	21	67
Future Volume (veh/h)	31	488	211	2	21	67
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	525	227	0	23	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	838	1375	1082		50	
Arrive On Green	0.04	0.73	0.58	0.00	0.03	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	33	525	227	0	23	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.3	4.4	2.5	0.0	0.5	0.0
Cycle Q Clear(g_c), s	0.3	4.4	2.5	0.0	0.5	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	838	1375	1082		50	
V/C Ratio(X)	0.04	0.38	0.21		0.46	
Avail Cap(c_a), veh/h	1024	1375	1082		802	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	2.7	2.1	4.3	0.0	20.2	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.4	0.0	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.7	0.0	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.7	2.9	4.7	0.0	26.7	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h		558	227		23	
Approach Delay, s/veh		2.9	4.7		26.7	
Approach LOS		A	A		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.0		6.2	6.6	29.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		31.0		19.0	6.0	20.0
Max Q Clear Time (g_c+I1), s		6.4		2.5	2.3	4.5
Green Ext Time (p_c), s		3.8		0.0	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	4.1
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	500	161	0	2	6
Future Vol, veh/h	0	500	161	0	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	538	173	0	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	173	0	-	0	711	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	538	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1404	-	-	-	400	871
Stage 1	-	-	-	-	857	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1404	-	-	-	400	871
Mov Cap-2 Maneuver	-	-	-	-	400	-
Stage 1	-	-	-	-	857	-
Stage 2	-	-	-	-	585	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1404	-	-	-	871
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s)	0	-	-	-	9.2
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	20	25	153	20	19
Future Vol, veh/h	479	20	25	153	20	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	499	21	26	159	21	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	520	0	721	510
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	211	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1046	-	394	563
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	824	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1046	-	383	563
Mov Cap-2 Maneuver	-	-	-	-	383	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	802	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	383	563	-	-	1046	-
HCM Lane V/C Ratio	0.054	0.035	-	-	0.025	-
HCM Control Delay (s)	14.9	11.6	-	-	8.5	0
HCM Lane LOS	B	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	490	148	721	1421	18
Future Volume (veh/h)	11	490	148	721	1421	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	505	153	743	1465	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	421	537	183	2391	1864	
Arrive On Green	0.24	0.24	0.10	0.67	0.52	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	11	505	153	743	1465	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	0.5	26.0	9.3	9.5	36.7	0.0
Cycle Q Clear(g_c), s	0.5	26.0	9.3	9.5	36.7	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	421	537	183	2391	1864	
V/C Ratio(X)	0.03	0.94	0.84	0.31	0.79	
Avail Cap(c_a), veh/h	421	537	243	2391	1864	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.3	35.3	48.5	7.4	21.1	0.0
Incr Delay (d2), s/veh	0.0	24.8	17.2	0.3	3.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	29.3	4.9	3.1	14.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.3	60.0	65.6	7.8	24.6	0.0
LnGrp LOS	C	E	E	A	C	
Approach Vol, veh/h	516			896	1465	
Approach Delay, s/veh	59.4			17.7	24.6	
Approach LOS	E			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		79.0		31.0	16.3	62.7
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		74.0		26.0	15.0	54.0
Max Q Clear Time (g_c+I1), s		11.5		28.0	11.3	38.7
Green Ext Time (p_c), s		5.4		0.0	0.1	8.8

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	2	0	16	29	10
Future Vol, veh/h	6	2	0	16	29	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	3	0	26	48	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	82	56	64	0	-	0
Stage 1	56	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	920	1011	1538	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	920	1011	1538	-	-	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1538	-	941	-	-
HCM Lane V/C Ratio	-	-	0.014	-	-
HCM Control Delay (s)	0	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	490	148	721	1421	18
Future Volume (veh/h)	11	490	148	721	1421	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	505	153	743	1465	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	308	769	184	2617	2089	
Arrive On Green	0.17	0.17	0.10	0.74	0.59	0.00
Sat Flow, veh/h	1781	2790	1781	3647	3647	1585
Grp Volume(v), veh/h	11	505	153	743	1465	0
Grp Sat Flow(s),veh/h/ln	1781	1395	1781	1777	1777	1585
Q Serve(g_s), s	0.6	17.6	9.3	7.7	31.8	0.0
Cycle Q Clear(g_c), s	0.6	17.6	9.3	7.7	31.8	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	308	769	184	2617	2089	
V/C Ratio(X)	0.04	0.66	0.83	0.28	0.70	
Avail Cap(c_a), veh/h	308	769	275	2617	2089	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.9	35.2	48.4	4.8	15.9	0.0
Incr Delay (d2), s/veh	0.0	2.0	12.7	0.3	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	13.5	4.6	2.2	11.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.9	37.3	61.2	5.1	17.9	0.0
LnGrp LOS	D	D	E	A	B	
Approach Vol, veh/h	516			896	1465	
Approach Delay, s/veh	37.3			14.7	17.9	
Approach LOS	D			B	B	

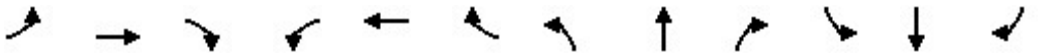
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		86.0		24.0	16.3	69.7
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		81.0		19.0	17.0	59.0
Max Q Clear Time (g_c+I1), s		9.7		19.6	11.3	33.8
Green Ext Time (p_c), s		5.4		0.0	0.2	11.7

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Appendix E
Analysis Reports – Future With Project and Mitigation



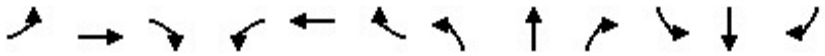
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	13	5	327	10	93	6	633	331	173	475	7
Future Volume (veh/h)	4	13	5	327	10	93	6	633	331	173	475	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	15	6	389	12	0	7	754	0	206	565	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	469	175	665	18		16	958		242	1422	20
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.00	0.01	0.27	0.00	0.14	0.40	0.40
Sat Flow, veh/h	266	1091	407	1367	42	1585	1781	3647	0	1781	3587	51
Grp Volume(v), veh/h	26	0	0	401	0	0	7	754	0	206	280	293
Grp Sat Flow(s),veh/h/ln	1764	0	0	1409	0	1585	1781	1777	0	1781	1777	1861
Q Serve(g_s), s	0.0	0.0	0.0	19.7	0.0	0.0	0.4	17.9	0.0	10.3	10.2	10.3
Cycle Q Clear(g_c), s	0.8	0.0	0.0	20.5	0.0	0.0	0.4	17.9	0.0	10.3	10.2	10.3
Prop In Lane	0.19		0.23	0.97		1.00	1.00		0.00	1.00		0.03
Lane Grp Cap(c), veh/h	805	0	0	683	0		16	958		242	704	738
V/C Ratio(X)	0.03	0.00	0.00	0.59	0.00		0.44	0.79		0.85	0.40	0.40
Avail Cap(c_a), veh/h	805	0	0	683	0		118	1409		294	881	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	0.0	20.5	0.0	0.0	44.8	30.8	0.0	38.3	19.6	19.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	3.7	0.0	0.0	18.0	1.9	0.0	17.8	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	7.3	0.0	0.0	0.2	7.6	0.0	5.6	4.1	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	0.0	0.0	24.2	0.0	0.0	62.8	32.6	0.0	56.1	20.0	20.0
LnGrp LOS	B	A	A	C	A		E	C		E	B	B
Approach Vol, veh/h		26			401			761			779	
Approach Delay, s/veh		15.1			24.2			32.9			29.5	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		44.0	17.3	29.5		44.0	5.8	41.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		39.0	15.0	36.0		39.0	6.0	45.0				
Max Q Clear Time (g_c+I1), s		22.5	12.3	19.9		2.8	2.4	12.3				
Green Ext Time (p_c), s		2.4	0.1	4.6		0.1	0.0	3.6				

Intersection Summary			
HCM 6th Ctrl Delay		29.6	
HCM 6th LOS		C	

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	354	43	172	330	241	64	129	178	119	71	39
Future Volume (veh/h)	120	354	43	172	330	241	64	129	178	119	71	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	402	49	195	375	274	73	147	202	135	81	44
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	806	98	430	922	781	482	239	328	290	383	208
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	782	1635	199	940	1870	1585	1256	709	974	1028	1135	617
Grp Volume(v), veh/h	136	0	451	195	375	274	73	0	349	135	0	125
Grp Sat Flow(s),veh/h/ln	782	0	1834	940	1870	1585	1256	0	1683	1028	0	1752
Q Serve(g_s), s	7.8	0.0	9.7	10.4	7.5	6.2	2.6	0.0	10.2	7.4	0.0	3.0
Cycle Q Clear(g_c), s	15.3	0.0	9.7	20.1	7.5	6.2	5.6	0.0	10.2	17.6	0.0	3.0
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.58	1.00		0.35
Lane Grp Cap(c), veh/h	409	0	904	430	922	781	482	0	567	290	0	590
V/C Ratio(X)	0.33	0.00	0.50	0.45	0.41	0.35	0.15	0.00	0.62	0.46	0.00	0.21
Avail Cap(c_a), veh/h	409	0	904	430	922	781	507	0	601	311	0	625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	10.0	16.8	9.5	9.1	15.9	0.0	16.3	23.7	0.0	13.9
Incr Delay (d2), s/veh	2.2	0.0	2.0	3.4	1.3	1.2	0.1	0.0	1.7	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	3.9	2.5	3.0	2.1	0.7	0.0	3.9	1.8	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.5	0.0	12.0	20.2	10.8	10.4	16.1	0.0	18.0	24.8	0.0	14.1
LnGrp LOS	B	A	B	C	B	B	B	A	B	C	A	B
Approach Vol, veh/h		587			844			422			260	
Approach Delay, s/veh		13.0			12.8			17.7			19.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.0	24.8	34.0	24.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	29.0	21.0	29.0	21.0
Max Q Clear Time (g_c+I1), s	22.1	12.2	17.3	19.6
Green Ext Time (p_c), s	2.6	1.7	3.1	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

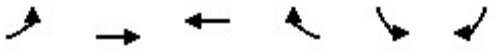
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	700	802	11	16	15
Future Vol, veh/h	2	700	802	11	16	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	864	990	14	20	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1005	0	-	0	1866	998
Stage 1	-	-	-	-	998	-
Stage 2	-	-	-	-	868	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	689	-	-	-	80	296
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	411	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	688	-	-	-	79	296
Mov Cap-2 Maneuver	-	-	-	-	79	-
Stage 1	-	-	-	-	355	-
Stage 2	-	-	-	-	411	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	47.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	688	-	-	-	122
HCM Lane V/C Ratio	0.004	-	-	-	0.314
HCM Control Delay (s)	10.3	0	-	-	47.5
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	572	597	96	239	218
Future Volume (veh/h)	146	572	597	96	239	218
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	681	711	0	285	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	449	1346	1150		321	
Arrive On Green	0.05	0.72	0.62	0.00	0.18	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	174	681	711	0	285	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	3.4	16.1	23.6	0.0	15.6	0.0
Cycle Q Clear(g_c), s	3.4	16.1	23.6	0.0	15.6	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	449	1346	1150		321	
V/C Ratio(X)	0.39	0.51	0.62		0.89	
Avail Cap(c_a), veh/h	512	1346	1150		410	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	9.6	6.2	12.0	0.0	40.0	0.0
Incr Delay (d2), s/veh	0.5	1.4	2.5	0.0	17.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.0	10.0	0.0	8.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.2	7.5	14.4	0.0	57.3	0.0
LnGrp LOS	B	A	B		E	
Approach Vol, veh/h		855	711		285	
Approach Delay, s/veh		8.1	14.4		57.3	
Approach LOS		A	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		77.0		23.0	10.5	66.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		72.0		23.0	9.0	58.0
Max Q Clear Time (g_c+I1), s		18.1		17.6	5.4	25.6
Green Ext Time (p_c), s		6.1		0.4	0.2	6.1

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	448	362	25	12	136
Future Vol, veh/h	70	448	362	25	12	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	509	411	28	14	155

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	439	0	-	0	1094	425
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	669	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1121	-	-	-	237	629
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	509	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1121	-	-	-	213	629
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	509	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1121	-	-	-	629
HCM Lane V/C Ratio	0.071	-	-	-	0.246
HCM Control Delay (s)	8.5	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1

Intersection	
Int Delay, s/veh	7.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	358	96	172	306	74	88
Future Vol, veh/h	358	96	172	306	74	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	431	116	207	369	89	106

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	547	0	1272	489
Stage 1	-	-	-	-	489	-
Stage 2	-	-	-	-	783	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1022	-	185	579
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1022	-	138	579
Mov Cap-2 Maneuver	-	-	-	-	138	-
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	335	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	38.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	138	579	-	-	1022	-
HCM Lane V/C Ratio	0.646	0.183	-	-	0.203	-
HCM Control Delay (s)	69.5	12.6	-	-	9.4	0
HCM Lane LOS	F	B	-	-	A	A
HCM 95th %tile Q(veh)	3.5	0.7	-	-	0.8	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	103	343	548	1899	460	130
Future Volume (veh/h)	103	343	548	1899	460	130
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	106	354	565	1958	474	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	291	796	603	2673	1319	
Arrive On Green	0.16	0.16	0.34	0.75	0.37	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	106	354	565	1958	474	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	6.3	16.9	36.3	36.0	11.5	0.0
Cycle Q Clear(g_c), s	6.3	16.9	36.3	36.0	11.5	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	291	796	603	2673	1319	
V/C Ratio(X)	0.36	0.44	0.94	0.73	0.36	
Avail Cap(c_a), veh/h	316	818	873	2673	1319	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.0	18.9	37.9	8.1	27.0	0.0
Incr Delay (d2), s/veh	0.8	0.4	13.4	1.8	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.1	17.3	10.7	4.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.8	19.3	51.3	9.9	27.8	0.0
LnGrp LOS	D	B	D	A	C	
Approach Vol, veh/h	460			2523	474	
Approach Delay, s/veh	25.2			19.2	27.8	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		94.0		24.3	45.1	48.9
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		89.0		21.0	58.0	26.0
Max Q Clear Time (g_c+I1), s		38.0		18.9	38.3	13.5
Green Ext Time (p_c), s		25.4		0.4	1.7	2.2

Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

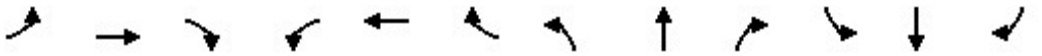
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	3	1	138	218	48
Future Vol, veh/h	22	3	1	138	218	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	4	1	203	321	71

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	562	357	392	0	-	0
Stage 1	357	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	488	687	1167	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	488	687	1167	-	-	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1167	-	506	-	-
HCM Lane V/C Ratio	0.001	-	0.073	-	-
HCM Control Delay (s)	8.1	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-



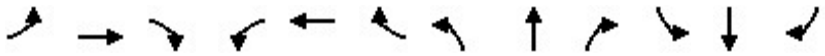
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	13	12	161	22	94	2	445	110	219	605	20
Future Volume (veh/h)	10	13	12	161	22	94	2	445	110	219	605	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	15	14	183	25	0	2	506	0	249	688	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	300	248	628	80		5	713		301	1288	43
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.00	0.00	0.20	0.00	0.17	0.37	0.37
Sat Flow, veh/h	374	698	577	1251	187	1585	1781	3647	0	1781	3509	117
Grp Volume(v), veh/h	40	0	0	208	0	0	2	506	0	249	348	363
Grp Sat Flow(s),veh/h/ln	1650	0	0	1438	0	1585	1781	1777	0	1781	1777	1849
Q Serve(g_s), s	0.0	0.0	0.0	6.0	0.0	0.0	0.1	9.9	0.0	10.1	11.5	11.5
Cycle Q Clear(g_c), s	1.0	0.0	0.0	7.0	0.0	0.0	0.1	9.9	0.0	10.1	11.5	11.5
Prop In Lane	0.27		0.35	0.88		1.00	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	770	0	0	708	0		5	713		301	652	679
V/C Ratio(X)	0.05	0.00	0.00	0.29	0.00		0.41	0.71		0.83	0.53	0.53
Avail Cap(c_a), veh/h	770	0	0	708	0		143	1430		669	1239	1289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	0.0	14.1	0.0	0.0	37.1	27.8	0.0	29.9	18.6	18.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.1	0.0	0.0	47.7	1.3	0.0	5.7	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	2.4	0.0	0.0	0.1	4.1	0.0	4.6	4.5	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.6	0.0	0.0	15.1	0.0	0.0	84.9	29.1	0.0	35.6	19.3	19.2
LnGrp LOS	B	A	A	B	A		F	C		D	B	B
Approach Vol, veh/h		40			208			508			960	
Approach Delay, s/veh		12.6			15.1			29.3			23.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	37.0	17.6	20.0	37.0	5.2	32.4
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	32.0	28.0	30.0	32.0	6.0	52.0
Max Q Clear Time (g_c+I1), s	9.0	12.1	11.9	3.0	2.1	13.5
Green Ext Time (p_c), s	1.2	0.6	3.1	0.2	0.0	4.8

Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	186	71	125	127	51	96	44	129	102	99	26
Future Volume (veh/h)	51	186	71	125	127	51	96	44	129	102	99	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	207	79	139	141	57	107	49	143	113	110	29
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	792	789	301	693	1146	968	325	100	293	270	343	90
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1182	1288	492	1091	1870	1580	1235	415	1213	1179	1421	375
Grp Volume(v), veh/h	57	0	286	139	141	57	107	0	192	113	0	139
Grp Sat Flow(s),veh/h/ln	1182	0	1780	1091	1870	1580	1235	0	1628	1179	0	1795
Q Serve(g_s), s	1.5	0.0	5.1	4.6	2.2	1.0	5.3	0.0	7.0	6.2	0.0	4.4
Cycle Q Clear(g_c), s	3.6	0.0	5.1	9.7	2.2	1.0	9.7	0.0	7.0	13.2	0.0	4.4
Prop In Lane	1.00		0.28	1.00		1.00	1.00		0.74	1.00		0.21
Lane Grp Cap(c), veh/h	792	0	1090	693	1146	968	325	0	393	270	0	434
V/C Ratio(X)	0.07	0.00	0.26	0.20	0.12	0.06	0.33	0.00	0.49	0.42	0.00	0.32
Avail Cap(c_a), veh/h	792	0	1090	693	1146	968	621	0	784	553	0	864
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.3	0.0	6.1	8.4	5.6	5.3	25.4	0.0	22.4	28.0	0.0	21.4
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.7	0.2	0.1	0.6	0.0	0.9	1.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	1.8	1.1	0.8	0.3	1.6	0.0	2.7	1.8	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	0.0	6.7	9.0	5.8	5.5	26.0	0.0	23.3	29.1	0.0	21.8
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		343			337			299			252	
Approach Delay, s/veh		6.7			7.1			24.2			25.1	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	47.0	21.6	47.0	21.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	42.0	33.0	42.0	33.0
Max Q Clear Time (g_c+I1), s	11.7	11.7	7.1	15.2
Green Ext Time (p_c), s	1.7	1.6	2.2	1.1

Intersection Summary	
HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

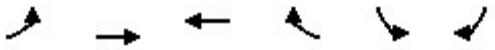
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	481	277	6	10	2
Future Vol, veh/h	5	481	277	6	10	2
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	547	315	7	11	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	323	0	-	0	879	320
Stage 1	-	-	-	-	320	-
Stage 2	-	-	-	-	559	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1237	-	-	-	318	721
Stage 1	-	-	-	-	736	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1236	-	-	-	315	720
Mov Cap-2 Maneuver	-	-	-	-	315	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	571	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	15.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1236	-	-	-	348
HCM Lane V/C Ratio	0.005	-	-	-	0.039
HCM Control Delay (s)	7.9	0	-	-	15.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	468	217	2	21	67
Future Volume (veh/h)	31	468	217	2	21	67
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	503	233	0	23	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	833	1375	1082		50	
Arrive On Green	0.04	0.73	0.58	0.00	0.03	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	33	503	233	0	23	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.3	4.1	2.5	0.0	0.5	0.0
Cycle Q Clear(g_c), s	0.3	4.1	2.5	0.0	0.5	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	833	1375	1082		50	
V/C Ratio(X)	0.04	0.37	0.22		0.46	
Avail Cap(c_a), veh/h	1019	1375	1082		802	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	2.7	2.0	4.3	0.0	20.2	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.5	0.0	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.7	0.0	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.7	2.8	4.7	0.0	26.7	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h		536	233		23	
Approach Delay, s/veh		2.8	4.7		26.7	
Approach LOS		A	A		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.0		6.2	6.6	29.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		31.0		19.0	6.0	20.0
Max Q Clear Time (g_c+I1), s		6.1		2.5	2.3	4.5
Green Ext Time (p_c), s		3.6		0.0	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	4.0
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	479	170	0	2	6
Future Vol, veh/h	0	479	170	0	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	515	183	0	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	183	0	-	0	698	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	515	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1392	-	-	-	407	859
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	600	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1392	-	-	-	407	859
Mov Cap-2 Maneuver	-	-	-	-	407	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	600	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1392	-	-	-	859
HCM Lane V/C Ratio	-	-	-	-	0.008
HCM Control Delay (s)	0	-	-	-	9.2
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	449	30	37	144	28	53
Future Vol, veh/h	449	30	37	144	28	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	468	31	39	150	29	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	499	0	712	484
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	228	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1065	-	399	583
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	810	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1065	-	383	583
Mov Cap-2 Maneuver	-	-	-	-	383	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	778	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	383	583	-	-	1065	-
HCM Lane V/C Ratio	0.076	0.095	-	-	0.036	-
HCM Control Delay (s)	15.2	11.8	-	-	8.5	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0.1	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	493	150	677	1334	18
Future Volume (veh/h)	11	493	150	677	1334	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	508	155	698	1375	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	437	554	185	2358	1828	
Arrive On Green	0.25	0.25	0.10	0.66	0.51	0.00
Sat Flow, veh/h	1781	1585	1781	3647	3647	1585
Grp Volume(v), veh/h	11	508	155	698	1375	0
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1777	1777	1585
Q Serve(g_s), s	0.5	27.0	9.4	9.0	33.7	0.0
Cycle Q Clear(g_c), s	0.5	27.0	9.4	9.0	33.7	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	437	554	185	2358	1828	
V/C Ratio(X)	0.03	0.92	0.84	0.30	0.75	
Avail Cap(c_a), veh/h	437	554	243	2358	1828	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.5	34.3	48.4	7.7	21.2	0.0
Incr Delay (d2), s/veh	0.0	20.4	17.6	0.3	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	28.7	4.9	3.0	13.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.5	54.7	66.0	8.1	24.1	0.0
LnGrp LOS	C	D	E	A	C	
Approach Vol, veh/h	519			853	1375	
Approach Delay, s/veh	54.2			18.6	24.1	
Approach LOS	D			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		78.0		32.0	16.4	61.6
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		73.0		27.0	15.0	53.0
Max Q Clear Time (g_c+I1), s		11.0		29.0	11.4	35.7
Green Ext Time (p_c), s		5.0		0.0	0.1	8.8

Intersection Summary		
HCM 6th Ctrl Delay		28.1
HCM 6th LOS		C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

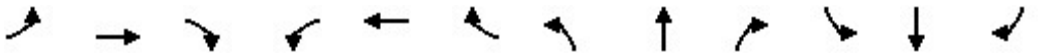
Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	58	2	0	16	29	32
Future Vol, veh/h	58	2	0	16	29	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	95	3	0	26	48	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	100	74	100	0	-	0
Stage 1	74	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	899	988	1493	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	899	988	1493	-	-	-
Mov Cap-2 Maneuver	899	-	-	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1493	-	902	-	-
HCM Lane V/C Ratio	-	-	0.109	-	-
HCM Control Delay (s)	0	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-



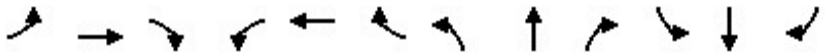
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	14	5	351	10	100	6	674	361	189	506	7
Future Volume (veh/h)	4	14	5	351	10	100	6	674	361	189	506	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	17	6	418	12	0	7	802	0	225	602	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	484	160	648	16		16	992		257	1489	20
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.00	0.01	0.28	0.00	0.14	0.41	0.41
Sat Flow, veh/h	246	1155	382	1368	39	1585	1781	3647	0	1781	3591	48
Grp Volume(v), veh/h	28	0	0	430	0	0	7	802	0	225	298	312
Grp Sat Flow(s),veh/h/ln	1783	0	0	1407	0	1585	1781	1777	0	1781	1777	1862
Q Serve(g_s), s	0.0	0.0	0.0	23.4	0.0	0.0	0.4	20.0	0.0	11.8	11.2	11.3
Cycle Q Clear(g_c), s	0.9	0.0	0.0	24.3	0.0	0.0	0.4	20.0	0.0	11.8	11.2	11.3
Prop In Lane	0.18		0.21	0.97		1.00	1.00		0.00	1.00		0.03
Lane Grp Cap(c), veh/h	792	0	0	664	0		16	992		257	737	772
V/C Ratio(X)	0.04	0.00	0.00	0.65	0.00		0.44	0.81		0.87	0.40	0.40
Avail Cap(c_a), veh/h	792	0	0	664	0		112	1341		261	819	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.3	0.0	0.0	23.0	0.0	0.0	47.1	32.0	0.0	40.0	19.6	19.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	4.8	0.0	0.0	18.2	2.7	0.0	26.1	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	8.8	0.0	0.0	0.2	8.7	0.0	6.9	4.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	0.0	27.9	0.0	0.0	65.3	34.8	0.0	66.1	20.0	20.0
LnGrp LOS	B	A	A	C	A		E	C		E	B	B
Approach Vol, veh/h		28			430			809			835	
Approach Delay, s/veh		16.4			27.9			35.0			32.4	
Approach LOS		B			C			D			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		45.0	18.8	31.6		45.0	5.8	44.6				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		40.0	14.0	36.0		40.0	6.0	44.0				
Max Q Clear Time (g_c+I1), s		26.3	13.8	22.0		2.9	2.4	13.3				
Green Ext Time (p_c), s		2.4	0.0	4.6		0.1	0.0	3.8				

Intersection Summary												
HCM 6th Ctrl Delay			32.3									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	391	43	174	354	244	64	129	185	124	71	39
Future Volume (veh/h)	120	391	43	174	354	244	64	129	185	124	71	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	136	444	49	198	402	277	73	147	210	141	81	44
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	827	91	406	935	793	474	231	329	277	378	206
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	761	1655	183	904	1870	1585	1256	692	988	1020	1135	617
Grp Volume(v), veh/h	136	0	493	198	402	277	73	0	357	141	0	125
Grp Sat Flow(s),veh/h/ln	761	0	1837	904	1870	1585	1256	0	1680	1020	0	1752
Q Serve(g_s), s	8.3	0.0	11.0	11.5	8.2	6.4	2.7	0.0	10.8	8.1	0.0	3.1
Cycle Q Clear(g_c), s	16.5	0.0	11.0	22.5	8.2	6.4	5.7	0.0	10.8	18.9	0.0	3.1
Prop In Lane	1.00		0.10	1.00		1.00	1.00		0.59	1.00		0.35
Lane Grp Cap(c), veh/h	396	0	919	406	935	793	474	0	560	277	0	584
V/C Ratio(X)	0.34	0.00	0.54	0.49	0.43	0.35	0.15	0.00	0.64	0.51	0.00	0.21
Avail Cap(c_a), veh/h	396	0	919	406	935	793	474	0	560	277	0	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	10.3	17.9	9.6	9.1	16.4	0.0	16.9	24.9	0.0	14.4
Incr Delay (d2), s/veh	2.4	0.0	2.2	4.1	1.4	1.2	0.1	0.0	2.4	1.6	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	4.4	2.7	3.3	2.2	0.7	0.0	4.2	2.0	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	12.5	22.1	11.0	10.3	16.6	0.0	19.3	26.5	0.0	14.5
LnGrp LOS	B	A	B	C	B	B	B	A	B	C	A	B
Approach Vol, veh/h		629			877			430			266	
Approach Delay, s/veh		13.5			13.3			18.9			20.9	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	35.0	25.0	35.0	25.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	30.0	20.0	30.0	20.0
Max Q Clear Time (g_c+I1), s	24.5	12.8	18.5	20.9
Green Ext Time (p_c), s	2.3	1.5	3.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

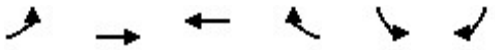
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	772	861	11	17	15
Future Vol, veh/h	2	772	861	11	17	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	953	1063	14	21	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1078	0	-	0	2028	1071
Stage 1	-	-	-	-	1071	-
Stage 2	-	-	-	-	957	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	647	-	-	-	63	268
Stage 1	-	-	-	-	329	-
Stage 2	-	-	-	-	373	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	646	-	-	-	62	268
Mov Cap-2 Maneuver	-	-	-	-	62	-
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	373	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	65.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	646	-	-	-	97
HCM Lane V/C Ratio	0.004	-	-	-	0.407
HCM Control Delay (s)	10.6	0	-	-	65.6
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	1.7



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	637	643	96	239	218
Future Volume (veh/h)	146	637	643	96	239	218
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	758	765	0	285	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	418	1353	1162		318	
Arrive On Green	0.05	0.72	0.62	0.00	0.18	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	174	758	765	0	285	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	3.4	19.3	26.8	0.0	16.0	0.0
Cycle Q Clear(g_c), s	3.4	19.3	26.8	0.0	16.0	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	418	1353	1162		318	
V/C Ratio(X)	0.42	0.56	0.66		0.90	
Avail Cap(c_a), veh/h	462	1353	1162		366	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	10.7	6.6	12.4	0.0	41.1	0.0
Incr Delay (d2), s/veh	0.7	1.7	2.9	0.0	21.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	7.2	11.4	0.0	8.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.3	8.2	15.3	0.0	62.8	0.0
LnGrp LOS	B	A	B		E	
Approach Vol, veh/h		932	765		285	
Approach Delay, s/veh		8.8	15.3		62.8	
Approach LOS		A	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		79.0		23.3	10.5	68.5
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		74.0		21.0	8.0	61.0
Max Q Clear Time (g_c+I1), s		21.3		18.0	5.4	28.8
Green Ext Time (p_c), s		7.3		0.3	0.1	6.9

Intersection Summary	
HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	504	393	25	12	136
Future Vol, veh/h	70	504	393	25	12	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	573	447	28	14	155

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	475	0	-	0	1194	461
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	733	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1087	-	-	-	206	600
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	475	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1087	-	-	-	184	600
Mov Cap-2 Maneuver	-	-	-	-	184	-
Stage 1	-	-	-	-	566	-
Stage 2	-	-	-	-	475	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1087	-	-	-	600
HCM Lane V/C Ratio	0.073	-	-	-	0.258
HCM Control Delay (s)	8.6	0	-	-	13.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	1

Intersection	
Int Delay, s/veh	16.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	381	125	221	325	82	98
Future Vol, veh/h	381	125	221	325	82	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	459	151	266	392	99	118

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	610	0	1459	535
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	924	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	969	-	142	545
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	387	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	969	-	~ 92	545
Mov Cap-2 Maneuver	-	-	-	-	~ 92	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	251	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	98.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	92	545	-	-	969	-
HCM Lane V/C Ratio	1.074	0.217	-	-	0.275	-
HCM Control Delay (s)	199.3	13.4	-	-	10.1	0
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	6.5	0.8	-	-	1.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	373	622	2022	490	147
Future Volume (veh/h)	112	373	622	2022	490	147
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	115	385	641	2085	505	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	196	1374	681	2849	1333	
Arrive On Green	0.11	0.11	0.38	0.80	0.38	0.00
Sat Flow, veh/h	1781	2790	1781	3647	3647	1585
Grp Volume(v), veh/h	115	385	641	2085	505	0
Grp Sat Flow(s),veh/h/ln	1781	1395	1781	1777	1777	1585
Q Serve(g_s), s	7.0	9.2	39.4	31.9	11.7	0.0
Cycle Q Clear(g_c), s	7.0	9.2	39.4	31.9	11.7	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	196	1374	681	2849	1333	
V/C Ratio(X)	0.59	0.28	0.94	0.73	0.38	
Avail Cap(c_a), veh/h	298	1534	942	2849	1333	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	48.0	16.9	33.8	5.4	25.8	0.0
Incr Delay (d2), s/veh	2.8	0.1	13.8	1.7	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	9.2	18.5	7.4	4.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	50.8	17.1	47.6	7.1	26.6	0.0
LnGrp LOS	D	B	D	A	C	
Approach Vol, veh/h	500			2726	505	
Approach Delay, s/veh	24.8			16.6	26.6	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.0		17.5	48.4	47.6
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		91.0		19.0	60.0	26.0
Max Q Clear Time (g_c+I1), s		33.9		11.2	41.4	13.7
Green Ext Time (p_c), s		30.0		1.3	2.0	2.4

Intersection Summary		
HCM 6th Ctrl Delay	19.1	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

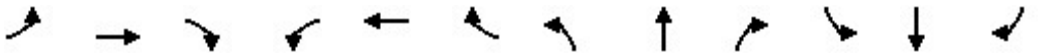
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	3	1	138	218	126
Future Vol, veh/h	40	3	1	138	218	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	4	1	203	321	185

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	619	414	506	0	-	0
Stage 1	414	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	452	638	1059	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	452	638	1059	-	-	-
Mov Cap-2 Maneuver	452	-	-	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1059	-	461	-	-
HCM Lane V/C Ratio	0.001	-	0.137	-	-
HCM Control Delay (s)	8.4	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-



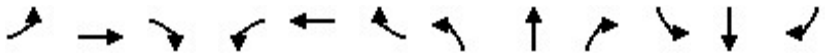
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	14	12	184	24	108	2	474	120	239	644	20
Future Volume (veh/h)	10	14	12	184	24	108	2	474	120	239	644	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	16	14	209	27	0	2	539	0	272	732	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	306	239	616	75		5	736		323	1355	43
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.00	0.00	0.21	0.00	0.18	0.39	0.39
Sat Flow, veh/h	369	727	568	1258	177	1585	1781	3647	0	1781	3517	110
Grp Volume(v), veh/h	41	0	0	236	0	0	2	539	0	272	370	385
Grp Sat Flow(s),veh/h/ln	1664	0	0	1435	0	1585	1781	1777	0	1781	1777	1850
Q Serve(g_s), s	0.0	0.0	0.0	7.6	0.0	0.0	0.1	11.1	0.0	11.6	12.7	12.7
Cycle Q Clear(g_c), s	1.1	0.0	0.0	8.7	0.0	0.0	0.1	11.1	0.0	11.6	12.7	12.7
Prop In Lane	0.27		0.34	0.89		1.00	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	758	0	0	690	0		5	736		323	685	713
V/C Ratio(X)	0.05	0.00	0.00	0.34	0.00		0.41	0.73		0.84	0.54	0.54
Avail Cap(c_a), veh/h	758	0	0	690	0		136	1314		636	1155	1203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	0.0	15.6	0.0	0.0	39.1	29.1	0.0	31.0	18.7	18.7
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.3	0.0	0.0	47.9	1.4	0.0	6.0	0.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	3.1	0.0	0.0	0.1	4.7	0.0	5.3	4.9	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	0.0	0.0	16.9	0.0	0.0	86.9	30.5	0.0	37.0	19.4	19.4
LnGrp LOS	B	A	A	B	A		F	C		D	B	B
Approach Vol, veh/h		41			236			541			1027	
Approach Delay, s/veh		13.6			16.9			30.7			24.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	38.0	19.2	21.2	38.0	5.2	35.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	33.0	28.0	29.0	33.0	6.0	51.0
Max Q Clear Time (g_c+I1), s	10.7	13.6	13.1	3.1	2.1	14.7
Green Ext Time (p_c), s	1.4	0.7	3.1	0.2	0.0	5.1

Intersection Summary	
HCM 6th Ctrl Delay	24.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	206	71	146	157	59	96	44	135	107	99	26
Future Volume (veh/h)	51	206	71	146	157	59	96	44	135	107	99	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	229	79	162	174	66	107	49	150	119	110	29
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	755	816	282	672	1149	971	326	98	301	265	349	92
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1138	1328	458	1070	1870	1580	1235	400	1226	1172	1421	375
Grp Volume(v), veh/h	57	0	308	162	174	66	107	0	199	119	0	139
Grp Sat Flow(s),veh/h/ln	1138	0	1786	1070	1870	1580	1235	0	1626	1172	0	1796
Q Serve(g_s), s	1.6	0.0	5.8	6.0	2.8	1.2	5.6	0.0	7.5	7.0	0.0	4.5
Cycle Q Clear(g_c), s	4.4	0.0	5.8	11.7	2.8	1.2	10.1	0.0	7.5	14.5	0.0	4.5
Prop In Lane	1.00		0.26	1.00		1.00	1.00		0.75	1.00		0.21
Lane Grp Cap(c), veh/h	755	0	1098	672	1149	971	326	0	400	265	0	441
V/C Ratio(X)	0.08	0.00	0.28	0.24	0.15	0.07	0.33	0.00	0.50	0.45	0.00	0.31
Avail Cap(c_a), veh/h	755	0	1098	672	1149	971	557	0	704	485	0	777
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.8	0.0	6.4	9.2	5.9	5.6	26.2	0.0	23.2	29.4	0.0	22.1
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.8	0.3	0.1	0.6	0.0	1.0	1.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	2.1	1.4	1.1	0.4	1.6	0.0	2.9	2.0	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.0	0.0	7.1	10.0	6.1	5.7	26.8	0.0	24.2	30.6	0.0	22.5
LnGrp LOS	A	A	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h		365			402			306			258	
Approach Delay, s/veh		7.1			7.6			25.1			26.2	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	49.0	22.6	49.0	22.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	44.0	31.0	44.0	31.0
Max Q Clear Time (g_c+I1), s	13.7	12.1	7.8	16.5
Green Ext Time (p_c), s	2.1	1.6	2.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

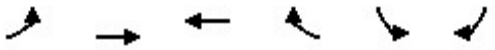
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	531	344	8	11	2
Future Vol, veh/h	5	531	344	8	11	2
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	603	391	9	13	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	401	0	-	0	1012	397
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	615	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1158	-	-	-	265	652
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1157	-	-	-	262	651
Mov Cap-2 Maneuver	-	-	-	-	262	-
Stage 1	-	-	-	-	673	-
Stage 2	-	-	-	-	538	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	18.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1157	-	-	-	289
HCM Lane V/C Ratio	0.005	-	-	-	0.051
HCM Control Delay (s)	8.1	0	-	-	18.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	517	281	2	21	67
Future Volume (veh/h)	31	517	281	2	21	67
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	556	302	0	23	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	774	1375	1082		50	
Arrive On Green	0.04	0.73	0.58	0.00	0.03	0.00
Sat Flow, veh/h	1781	1870	1870	0	1781	1585
Grp Volume(v), veh/h	33	556	302	0	23	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585
Q Serve(g_s), s	0.3	4.7	3.4	0.0	0.5	0.0
Cycle Q Clear(g_c), s	0.3	4.7	3.4	0.0	0.5	0.0
Prop In Lane	1.00			0.00	1.00	1.00
Lane Grp Cap(c), veh/h	774	1375	1082		50	
V/C Ratio(X)	0.04	0.40	0.28		0.46	
Avail Cap(c_a), veh/h	960	1375	1082		802	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	2.8	2.1	4.5	0.0	20.2	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.6	0.0	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	1.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	2.8	3.0	5.1	0.0	26.7	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h		589	302		23	
Approach Delay, s/veh		3.0	5.1		26.7	
Approach LOS		A	A		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.0		6.2	6.6	29.4
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		31.0		19.0	6.0	20.0
Max Q Clear Time (g_c+I1), s		6.7		2.5	2.3	5.4
Green Ext Time (p_c), s		4.1		0.0	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	4.3
HCM 6th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	529	231	0	2	6
Future Vol, veh/h	0	529	231	0	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	569	248	0	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	248	0	-	0	817	248
Stage 1	-	-	-	-	248	-
Stage 2	-	-	-	-	569	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1318	-	-	-	346	791
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	566	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1318	-	-	-	346	791
Mov Cap-2 Maneuver	-	-	-	-	346	-
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	566	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1318	-	-	-	791
HCM Lane V/C Ratio	-	-	-	-	0.008
HCM Control Delay (s)	0	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	49	61	153	90	102
Future Vol, veh/h	479	49	61	153	90	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	499	51	64	159	94	106

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	550	0	812	525
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	287	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1020	-	348	552
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	762	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1020	-	324	552
Mov Cap-2 Maneuver	-	-	-	-	324	-
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	709	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	552	-	-	1020	-
HCM Lane V/C Ratio	0.289	0.192	-	-	0.062	-
HCM Control Delay (s)	20.6	13.1	-	-	8.8	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	1.2	0.7	-	-	0.2	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	571	180	721	1421	22
Future Volume (veh/h)	13	571	180	721	1421	22
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	13	589	186	743	1465	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	308	823	218	2617	2021	
Arrive On Green	0.17	0.17	0.12	0.74	0.57	0.00
Sat Flow, veh/h	1781	2790	1781	3647	3647	1585
Grp Volume(v), veh/h	13	589	186	743	1465	0
Grp Sat Flow(s),veh/h/ln	1781	1395	1781	1777	1777	1585
Q Serve(g_s), s	0.7	19.0	11.3	7.7	33.3	0.0
Cycle Q Clear(g_c), s	0.7	19.0	11.3	7.7	33.3	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	308	823	218	2617	2021	
V/C Ratio(X)	0.04	0.72	0.85	0.28	0.72	
Avail Cap(c_a), veh/h	308	823	308	2617	2021	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.9	34.7	47.3	4.8	17.4	0.0
Incr Delay (d2), s/veh	0.1	3.0	15.0	0.3	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	15.7	5.7	2.2	12.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	38.0	37.7	62.4	5.1	19.7	0.0
LnGrp LOS	D	D	E	A	B	
Approach Vol, veh/h	602			929	1465	
Approach Delay, s/veh	37.7			16.6	19.7	
Approach LOS	D			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		86.0		24.0	18.4	67.6
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		81.0		19.0	19.0	57.0
Max Q Clear Time (g_c+I1), s		9.7		21.0	13.3	35.3
Green Ext Time (p_c), s		5.4		0.0	0.2	10.8

Intersection Summary	
HCM 6th Ctrl Delay	22.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	159	2	0	16	29	75
Future Vol, veh/h	159	2	0	16	29	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	261	3	0	26	48	123

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	136	110	171	0	-	0
Stage 1	110	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	857	943	1406	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	857	943	1406	-	-	-
Mov Cap-2 Maneuver	857	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1406	-	858	-	-
HCM Lane V/C Ratio	-	-	0.308	-	-
HCM Control Delay (s)	0	-	11	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	1.3	-	-

Intersection	
Int Delay, s/veh	5.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	381	125	221	325	82	98
Future Vol, veh/h	381	125	221	325	82	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	25
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	459	151	266	392	99	118

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	610	0	1459	535
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	924	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	969	-	142	545
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	387	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	969	-	103	545
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	281	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	23.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	213	545	-	-	969	-
HCM Lane V/C Ratio	0.464	0.217	-	-	0.275	-
HCM Control Delay (s)	35.7	13.4	-	-	10.1	-
HCM Lane LOS	E	B	-	-	B	-
HCM 95th %tile Q(veh)	2.2	0.8	-	-	1.1	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	479	49	61	153	90	102
Future Vol, veh/h	479	49	61	153	90	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	25
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	499	51	64	159	94	106

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	550	0	812	525
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	287	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1020	-	348	552
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	762	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1020	-	326	552
Mov Cap-2 Maneuver	-	-	-	-	442	-
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	714	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	442	552	-	-	1020	-
HCM Lane V/C Ratio	0.212	0.192	-	-	0.062	-
HCM Control Delay (s)	15.3	13.1	-	-	8.8	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.8	0.7	-	-	0.2	-

APPENDIX B - COMMENTS IN RESPONSE TO EARLY CONSULTATION

Mitchell D. Roth
Mayor

Deanna S. Sako
Managing Director

West Hawai'i Office
74-5044 Ane Keohokālole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

Zendo Kern
Director

Jeffrey W. Darrow
Deputy Director

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

April 26, 2024

John Pipan, Planning Consultant
Land Planning Hawaii LLC
194 Wiwo'ole Street
Hilo, HI 96720
info@landplanninghawaii.com

Dear Mr. Pipan:

SUBJECT: Early Consultation for Draft Environmental Assessment (PL-INT-2024-007426)
Applicant: Hilo Medical Center (HMC)
Project: Construction of a New Medical Clinic Facility
Location: (3)1-6-003:081 Kea'au, Puna District, Island of Hawai'i

This is in response to your letter dated March 24, 2024, requesting early consultation comments for an environmental assessment being prepared for the construction of a new medical clinic facility on the above referenced property. The applicant is proposing to construct three (3) 20,000 square-foot buildings over two (2) phases on a 7.013-acre property.

As described in the letter, Phase 1 is proposed to include the construction of one (1) 2-story building spanning 20,000 square feet, with each floor covering 10,000 square feet. In addition, (71) parking stalls including (8) ADA accessible stalls and a 12' x 50' loading zone would be established. Phase 1 would include roughly (2) acres. During Phase 2, the remaining two (2) 20,000 square foot buildings would be constructed with (235) parking stalls including (24) ADA accessible stalls, and three (3) loading areas. Phase 2 would include approximately (4) acres.

1. The subject property is 7.013 acres in size. The property is zoned Agricultural-20 acre (A-20a) by County of Hawai'i and designated as Agricultural by the State Land Use Commission.

2. The General Plan Land Use Pattern Allocation Guide (LUPAG) map designation for the property is Important Agricultural Lands (ial) and Medium Density Urban (mdu).

3. The property is not located within the Special Management Area (SMA) and is approximately 3.8 miles from the nearest coastline.

4. The property is in an area affected by the Puna Community Development Plan, which was adopted by the Hawai‘i County Council by Ordinance No. 08-116 and amended by several ordinances.

5. As the property is situated within the State Land Use Agricultural district, a Special Permit would need approval from the Windward Planning Commission to construct the proposed new medical clinic facility.

We have no further comments at this time. Please forward us a copy of the draft EA for review. If you have any questions, please feel free to contact me at (808) 961-8158.

Sincerely,

Jeffrey W. Darrow
Jeffrey W. Darrow (Apr 26, 2024 18:45 HST)

JEFFREY W. DARROW
Deputy Planning Director

cc w/copy of letter: Jean Campbell, Deputy Corporation Counsel

JOSH GREEN, M.D.
GOVERNOR | KE KIAʻĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 24, 2024

Land Planning Hawaii
Attention: Mr. John Pipan
Planning Administrator
194 Wiwoole Street
Hilo, Hawaii 96720

via email: info@landplanninghawaii.com

Dear Mr. Pipan:

SUBJECT: Early Request for Comment for an Environmental Assessment for the Construction of a **New Medical Clinic Facility** located at Kea'au, Island of Hawaii; TMK: (3) 1-6-003:081 on behalf of **Hilo Medical Center**

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

At this time, enclosed are comments from the Land Division-Hawaii District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 1, 2024

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_Engineering Division (DLNR.ENGR@hawaii.gov)
_X_Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
_X_Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Request for Comment for an Environmental Assessment for the Construction of a **New Medical Clinic Facility**
LOCATION: Kea'au, Island of Hawaii; TMK: (3) 1-6-003:081
APPLICANT: Land Planning Hawaii LLC on behalf of **Hilo Medical Center**

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **April 22, 2024.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
(✓) We have no comments.
( ) We have no additional comments.
( ) Comments are included/attached.

Signed: *Gordon Heit*
Print Name: Gordon Heit
Division: Land Division
Date: April 15, 2024

Attachments
cc: Central Files

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 1, 2024

MEMORANDUM

FROM: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
___Div. of State Parks
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
___Office of Conservation & Coastal Lands
_X_ Land Division – Hawaii District (gordon.c.heit@hawaii.gov)
_X_ Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: Early Request for Comment for an Environmental Assessment for the Construction of a **New Medical Clinic Facility**
LOCATION: Kea'au, Island of Hawaii; TMK: (3) 1-6-003:081
APPLICANT: Land Planning Hawaii LLC on behalf of **Hilo Medical Center**

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **April 22, 2024.**

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(☑) Comments are included/attached.

Signed: JDO
Print Name: Jason D. Omick, Acting Wildlife Prog. Mgr.
Division: Forestry and Wildlife
Date: Apr 25, 2024

Attachments
cc: Central Files

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

April 24, 2024

Log no. 4496

MEMORANDUM

TO: RUSSELL Y. TSUJI, Administrator
Land Division

FROM: JASON D. OMICK, Acting Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: **Early Request for Comment for an Environmental Assessment for the Construction of a New Medical Clinic Facility, Hawai'i**

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your request for comment regarding the new medical clinic facility located in Kea'au, on the island of Hawai'i; TMK: (3) 1-6-003:081. Hilo Medical Center intends to construct three 20,000 square foot buildings on a 7-acre portion of the 26.762 acres of land zoned *Agricultural 20-acres* (A-20a). The proposed project is located to the west of Highway 130 at 16-790 Kea'au Pahoa Road, approximately 780 feet south from its convergence with Kea'au-Pahoa Bypass Road. The project will be completed in two construction phases. Included in the construction of the three buildings, parking stalls and loading areas will also be constructed.

DOFAW provides the following comments regarding the potential for the proposed work to affect listed species in the vicinity of the project area.

The State listed 'ōpe'ape'a or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided in any construction as bats can become ensnared and killed by such fencing material during flight.

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season, from September 15 through December 15, when young seabirds make their maiden voyage to sea.

If nighttime construction is required during the seabird fledgling season (September 15 to December 15), we recommend that a qualified biologist be present at the project site to monitor and assess the risk of seabirds being attracted or grounded due to the lighting. If seabirds are seen circling around the area, lights should then be turned off. If a downed seabird is detected, please follow DOFAW's recommended response protocol by visiting https://dlnr.hawaii.gov/wildlife/seabird-fallout-season/

Permanent lighting also poses a risk of seabird attraction, and as such should be minimized or eliminated to protect seabird flyways and preserve the night sky. For illustrations and guidance related to seabird-friendly light styles that also protect seabirds and the dark starry skies of Hawai'i please visit https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf.

The State listed nēnē or Hawaiian Goose (*Branta sandvicensis*) could potentially occur in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any are present during construction, all activities within 100 feet (30 meters) should cease and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please contact the Hawai'i Island Branch DOFAW Office at (808) 974-4221 and establish a buffer zone around the nest.

The endemic pueo or Hawaiian Short-Eared Owl (*Asio flammeus sandwichensis*) could potentially nest in the project area. Pueo nest on the ground and active nests have been found year-round. Before any potential vegetative alteration, especially ground-based disturbance, we recommend that line transect surveys are conducted during crepuscular hours through the project area. If a pueo nest is discovered, a minimum buffer distance of 100 meters from the nest should be established until chicks are capable of flight.

The State listed 'io or Hawaiian Hawk (*Buteo solitarius*) may occur in the project vicinity. Prior to undertaking vegetation clearing, DOFAW recommends that pre-construction surveys of the area be conducted by a qualified biologist following appropriate survey methods (Gorressen et al., 2008) to ensure no Hawaiian Hawk nests are present, which may occur during the breeding season from March to September. The survey should be conducted at least 10 days prior to the start of construction. If an 'io nest is detected, a buffer zone of 100 meters (330 feet) should be established around it where no construction shall occur until the chick or chicks have fledged, or the nest is

Gorresen, P. M., R. J. Camp, J. L. Klavitter, and T. K. Pratt. 2008. Abundance, distribution and population trend of the Hawaiian Hawk: 1998-2007. Hawai`i Cooperative Studies Unit Technical Report HCSU-009. University of Hawai`i at Hilo. 53 pp., incl. 8 figures, 3 tables & 1 appendix.

abandoned andDOFAW staff should be immediately notified. If adult individuals are detected in the area during construction, all activities within 30 meters (100 feet) of the bird should cease. Work may continue when the bird has left the area on its own.

DOFAW recommends using native plant species for landscaping that are appropriate for the area, i.e., plants for which climate conditions are suitable for them to thrive, plants that historically occurred there, etc. Please do not plant invasive species. DOFAW also recommends referring to www.plantpono.org for guidance on the selection and evaluation of landscaping plants and to determine the potential invasiveness of plants proposed for use in the project.

DOFAW recommends minimizing the movement of plant or soil material between worksites. Soil and plant material may contain detrimental fungal pathogens (e.g., Rapid ʻŌhiʻa Death), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coqui Frogs, etc.), or invasive plant parts (e.g., African Tulip, Octopus Tree, Trumpet Tree, etc.) that could harm our native species and ecosystems. We recommend consulting the Big Island Invasive Species Committee (BIISC) at (808) 933-3340 to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

The invasive Coconut Rhinoceros Beetle (CRB) or *Oryctes rhinoceros* is found on the islands of O'ahu, Hawai'i Island, Maui and Kaua'i. On July 1, 2022, the Hawai'i Department of Agriculture (HDOA) approved Plant Quarantine Interim Rule 22-1. This rule restricts the movement of CRB-host material within or to and from the island of O'ahu, which is defined as the Quarantine Area. Regulated material (host material or host plants) is considered a risk for potential CRB infestation. Host material for the beetle specifically includes a) entire dead trees, b) mulch, compost, trimmings, fruit and vegetative scraps, and c) decaying stumps. CRB host plants include the live palm plants in the following genera: *Washingtonia*, *Livistona*, and *Pritchardia* (all commonly known as fan palms), *Cocos* (coconut palms), *Phoenix* (date palms), and *Roystonea* (royal palms). When such material or these specific plants are moved there is a risk of spreading CRB because they may contain CRB in any life stage. For more information regarding CRB, please visit https://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/coconut-rhinoceros-beetle/.

We recommend that Best Management Practices are employed during and after construction to contain any soils and sediment with the purpose of preventing damage to near-shore waters and marine ecosystems.

We appreciate your efforts to work with our office for the conservation of our native species. These comments are general guidelines and should not be considered comprehensive for this site or project. It is the responsibility of the applicant to do their own due diligence to avoid any negative environmental impacts. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If

you have any questions, please contact Kate Cullison, Protected Species Habitat Conservation Planning Coordinator via email at katherine.cullison@hawaii.gov.

Sincerely,

JASON D. OMICK
Acting Wildlife Program Manager

Gorresen, P. M., R. J. Camp, J. L. Klavitter, and T. K. Pratt. 2008. Abundance, distribution and population trend of the Hawaiian Hawk: 1998-2007. Hawai`i Cooperative Studies Unit Technical Report HCSU-009. University of Hawai`i at Hilo. 53 pp., incl. 8 figures, 3 tables & 1 appendix.

JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA

EDWIN H. SNIFFEN
DIRECTOR
KA LUNA HO'OKELE

Deputy Directors
Nā Hope Luna Ho'okele
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF TRANSPORTATION | KA ʻOIHANA ALAKAU
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

DIR0000263
HWY-PL 24-2.35075

April 24, 2024

Mr. John Pipan
Planning Administrator
Land Planning Hawaii LLC
194 Wiwoole Street
Hilo, Hawaii 96720

Dear Mr. Pipan:

Subject: Early Consultation for Draft Environmental Assessment (DEA)
Construction of a New Medical Clinic Facility
Keaau, Hawaii
Tax Map Key No. (3) 1-6-003: 081

Thank you for your letter dated March 24, 2024, requesting our early consultation for a DEA under Hawaii Revised Statutes (HRS) Chapter 343.

The Hawaii Department of Transportation (HDOT) has reviewed the project description and has the following comments:

1. Based on a review of the project information provided, the HDOT anticipates a potential adverse impact to state-owned highways. Submit a Traffic Impact Analysis Report (TIAR) prepared and stamped by a licensed engineer. The TIAR and Environmental Assessment should include:

    a. A description of existing trip generation at the site, existing traffic conditions and multimodal routes in the study area.

    b. Forecasted traffic and multimodal conditions in the horizon year (year at full project build-out) without the project and with the project. If the project construction is phased over multiple years, interim horizon years should be analyzed for the completion of each phase.

    c. Analyze existing and future safety conditions for all roadway users.

    d. Recommended mitigation.

2. Determine the applicability for the following permits:

    a. Permit to Perform Work Upon State Highways is required for any work within the state highway right-of-way (ROW), (HRS Chapter 264). The application includes the review and approval of construction drawings and a Traffic Management Plan.

    b. Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Over State Highways (HRS Chapter 291, Section 36).

    c. Permit for the Occupancy and Use of State Highways (HRS Chapter 264). This is applicable to underground and overhead power lines and utility pipelines within the state highway ROW.

    d. Permit applications and instructions are available at the following link:

        https://hidot.hawaii.gov/highways/home/doing-business/guide-to-permits

If you have any questions, please contact Jeyan Thirugnanam, Land Use Planning Engineer, Planning Branch at (808) 587-6336 or by email at jeyan.thirugnanam@hawaii.gov. Please reference file review number PL 2024-032.

Sincerely,

EDWIN H. SNIFFEN
Director of Transportation

STATE OF HAWAIʻI
OFFICE OF PLANNING
& SUSTAINABLE DEVELOPMENT

235 South Beretania Street, 6th Floor, Honolulu, Hawaiʻi 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaiʻi 96804

JOSH GREEN, M.D.
GOVERNOR

SYLVIA LUKE
LT. GOVERNOR

MARY ALICE EVANS
DIRECTOR

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: https://planning.hawaii.gov/

DTS202403271214NA

Coastal Zone Management Program

Environmental Review Program

Land Use Commission

Land Use Division

Special Plans Branch

State Transit-Oriented Development

Statewide Geographic Information System

Statewide Sustainability Branch

May 17, 2024

John Pipan, Planning Administrator
Land Planning Hawaiʻi LLC
194 Wiwoʻole Street
Hilo, Hawaiʻi 96720

Dear Mr. Pipan:

Subject: Request for Comments for Preparation of an Environmental Assessment (EA) for Proposed Medical Clinic Facility, Hilo Medical Center, Keaʻau, Hawaiʻi
Tax Map Key No. (3) 1-6-003: 081 (Parcel 081, Lot 1-A)

The Office of Planning and Sustainable Development (OPSD) has reviewed the materials submitted with the request for comments for the preparation of a Draft Environmental Assessment (DEA) for the subject project.

The applicant, Hilo Medical Center, a Hawaiʻi Health Systems Corporation unit, proposes to develop a new medical clinic on a seven-acre parcel, Parcel 081 (Lot 1-A), that is being created through a public utility subdivision application filed with the County. The parcel is situated in the State Agricultural Land Use District and zoned by the County as Agricultural 20-acres (A-20a).

The proposed project will entail the construction of three 20,000-square-foot buildings over two construction phases, with 306 parking stalls and four loading zones when fully built out. Onsite infrastructure will include driveways, water supply, stormwater management, electric power, and an onsite wastewater system in compliance with State Department of Health rules. The applicant anticipates seeking a Special Use Permit to allow the development of the proposed facility within the State Agricultural District.

Shortly after receiving the EA Preparation Notice, OPSD was asked to comment on a Change of Zone Application (PL-REZ-2024-000057) to rezone Parcel 081 (Lot 1-A) and the remainder portion of Parcel 081 (Lot 1-B) (Parcel 189) from A-20a to Family Agricultural-1 acre (FA-1a) into 23 one-acre lots for residential purposes. If the proposed medical clinic moves forward, the subdivision yield would be adjusted to exclude the seven-acre parcel.

COMMENT RECEIVED LATE

The property is situated off the Kea‘au-Pahoa Road within a mile of the Kea‘au Town Center, in proximity to several public schools and the site of a proposed public library. The property lies just outside the Kea‘au Regional Town Center boundary as designated in the County’s Puna Community Development Plan (PCDP).

OPSD notes that the State *Strategic Plan for Transit-Oriented Development* issued by the Hawai‘i Interagency Council for Transit-Oriented Development in 2017 includes proposals for a County transit hub and a new wastewater system for Kea‘au in support of transit-oriented development (TOD) at this regional center. In addition, the Kea‘au Regional Town Center area has been identified by OPSD as one of the areas in the County for joint State-County TOD planning and implementation (See *Toward a Transit-Oriented Development Housing Investment Strategy*, issued in December 2023 in response to Senate Concurrent Resolution 162 and House Resolution 188, 2023 Legislative Session; posted at https://files.hawaii.gov/dbedt/op/lud/Reports/OPSD_SCR162_Report_20231228.pdf). These areas serve to direct State and County efforts toward facilitating smaller lot sizes, increased density, and mixed-use development in areas served by County bus transit to achieve greater walkability, more affordable housing with greater accessibility to bus transit and goods and services, increased economic development opportunities, compact town development, and County General Plan policy objectives related to containment of County infrastructure and costs.

The boundary for the TOD area generally coincides with the Regional Town Center boundary in the PCDP and the property lies just outside the TOD area boundary. While Kea‘au could use a medical clinic and the ideal location for the proposed clinic would be within the town proper, the proposed clinic still provides a unique opportunity to make health services more accessible to pedestrians, cyclists, and County bus riders.

OPSD offers the following comments related to the preparation of the DEA and final project design and implementation for your consideration.

1. Hawai‘i Coastal Zone Management (CZM) Program Issues

   The CZM area for the State of Hawai‘i is defined as “all lands of the State and the area extending seaward from the shoreline to the limit of the State’s police power and management authority, including the U.S. territorial sea” under Hawai‘i Revised Statutes (HRS) § 205A-1.

   Pursuant to HRS § 205A-4, in implementing the objectives of the CZM program, agencies shall consider ecological, cultural, historic, esthetic, recreational, scenic, open space values, coastal hazards, and economic development. Therefore, the DEA should include a discussion of the project’s consistency with the policies of the Hawai‘i CZM Program, HRS § 205A-2, as amended.

Disclosure of the impacts on CZM objectives and supporting policies, as it relates to HRS Chapter 343 requirements, will aid the State in determining impacts to the resources of the coastal zone and the evaluation of mitigation measures if needed, including:

a. Wastewater. The County is currently preparing a programmatic Environmental Impact Statement for wastewater system improvements in the Puna District. The DEA should discuss the County's plans and identify the facility design and development measures that could be taken to enable it to connect to Kea'au's planned wastewater collection and treatment system; and

b. Stormwater and drainage. The DEA should discuss compliance with Kea'au's stormwater drainage system and what onsite low impact development practices will be integrated into site design to manage onsite retention and treatment of stormwater runoff quantity and quality.

2. Sustainability Objectives in the *Hawai'i 2050 Sustainability Plan*

As a public capital investment, the proposed project should be resilient and advance the attainment of sustainability goals and objectives over the long term. To this end, the DEA should generally discuss the technologies, best practices and other mitigation measures, including use of renewable energy systems for the project that would advance implementation of the Recommended Actions in the 2021-2030 Focus Areas on pages 100-107 of the *Hawai'i 2050 Sustainability Plan*.

3. TOD-related Issues

The County Mass Transit Agency (MTA) plans to locate a transit hub in Kea'au to expand and improve its hub and bus system in Puna area. While the specific location is yet to be determined, enhanced transit services at or near the existing commercial center is likely. This will promote an increase in pedestrian traffic in and around the commercial core and enable ready access by foot or other non-vehicular modes to the proposed medical clinic. OPSD recommends the DEA discuss MTA transit services and routes in the vicinity and how existing and planned transit service might impact or promote clinic usage.

Facility site design and building orientation will be critical to providing safe, convenient, and attractive pedestrian and bike connections to the proposed clinic to and from the Kea'au Town Center and transit service. For this reason, OPSD recommends the applicant consult with relevant State and County agencies and that the DEA discuss the potential for:

a. Moving the parking from the front of the facility/ies to the rear and reorienting the building footprints toward the frontage road to create a more welcoming and attractive connection to the primary access road and incorporate pedestrian and bike travelways/facilities to provide a safe pedestrian environment for those walking to and from the town center.

b. Modifying the site design to cluster or connect buildings and delivery/loading areas for a more compact facility footprint that enables shared use of facility elements and the potential for creating and activating shared public or open space for facility staff and clients.

c. Redesigning the health clinic driveway into a roadway that could be dedicated to the County to provide access to the proposed residential subdivision behind the clinic. The proposed subdivision currently has only one way in and out through another subdivision, which increases the distance that residents will need to drive, walk, or bicycle to access the clinic itself as well as schools, bus services, and other establishments in the town core.

d. Having the facility site accommodate transit service, such as a bus stop, or staff housing since co-location with the clinic facility will provide multiple benefits to staff, clients, and the community at large.

4. Entitlement Process. While OPSD understands that the Land Use Pattern Allocation Guide (LUPAG) map component of the General Plan identifies this property as Important Agricultural Lands, we recommend that the DEA discuss the potential for seeking a concurrent LUPAG amendment and County district boundary amendment to the State Rural Land Use District that includes this project site and extends to the nearby Rural area. Under HRS § 205-3.1(c), counties are able to consolidate district boundary amendments with other county proceedings for parcels less than 15 acres. This would eliminate the need and cost of renewing the Special Permit on a periodic basis.

Thank you for the opportunity to provide input to the draft EA. If you have any questions, please contact Ruby Edwards, ruby.m.edwards@hawaii.gov, (808) 587-2817. If you wish to respond to this comment letter, please include DTS 202403271214NA in the subject line.

Mahalo,

Mary Alice Evans

Mary Alice Evans
Director

APPENDIX C - PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

16-790 Keaau-Pahoa Road
Keaau, HI 96749
Tax Map Key (3) 1-6-003: Parcel 081

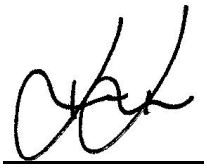
September 2023

Prepared by:
Lehua Environmental Inc.

Environmental Professional Certification

I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professional as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess the environmental condition of the target property. I have developed and performed all appropriate inquires in conformance with the standards and practices set forth in 40 CFR Part 312.



Kamalana Kobayashi
Lehua Environmental Inc.

September 8, 2023

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List of Acronyms

%	percent
ASTM	American Society for Testing and Materials
AUL	activity and use limitation
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CORRACTS	Corrective action report
DLNR	State of Hawai‘i Department of Land and Natural Resources
DOH	State of Hawai‘i Department of Health
DOT	Department of Transportation
EDR	Environmental Data Resources, Inc.
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
ft	feet
HCC	Hawaii County Code
HEER	Hazard Evaluation and Emergency Response
LEI	Lehua Environmental Inc.
LUST	leaking underground storage tank
Ma	millions of years ago
mi	miles
mg/L	milligrams per liter
msl	mean sea level
N/A	Not available
NFA	no further action
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRCS	Natural Resource Conservation Service
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
SHWS	State Hazardous Waste Site
TMK	tax map key
TSD	treatment, storage, and disposal
UIC	underground injection control
USGS	United States Geological Survey
U.S.	United States
UST	underground storage tank

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Executive Summary

This report presents the results of the Phase I Environmental Site Assessment (ESA) performed by Lehua Environmental Inc. (LEI) for the property located at 16-790 Keaau-Pahoa Road in Keaau, Hawaii Island, Tax Map Key (TMK) (3) 1-6-003: Parcel 081 (Portion) (Subject Property [SP]); (Figures 1 & 2). The SP includes a total of approximately 7 acres of land, which is part of a larger 26.76 acre parcel. The SP includes mostly undeveloped open land, and has one permitted warehouse onsite used as the SP caretaker residence.

The purpose of a Phase I ESA is to determine if Recognized Environmental Conditions (RECs), Historical RECs, or other de minimis environmental conditions of significance, as defined by the ASTM E1527 – 21: *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM, 2023)* exist at the SP. KES followed the required due diligence efforts in compliance with the ASTM E1527 – 21 Standard, as well as with 40 CFR 312: All Appropriate Inquiry (AAI) rule.

Tasks included in performing the Phase I ESA of SP included the following:

1. Environmental State and Federal database records search for listed spills and/or other environmental citations/permits that may affect the SP.

2. Search of State of Hawaii Department of Health, Hazard Evaluation and Emergency Response and Solid and Hazardous Waste Branch Divisions records for any spills or environmental records relevant to the SP environmental condition.

3. Search of County of Hawaii building permit records.

4. Site inspection of all accessible areas of the SP. The purpose of the site inspection is to search the property for readily visible evidence of Recognized Environmental Conditions (RECs) as defined by the ASTM E1527 – 21 Standard, as well as de minimis and other environmental conditions that could impact the SP.

5. Interview knowledgeable parties about the history of the SP in order to determine if previous land use may have impacted the environmental condition of the SP.

6. Review historical photos and topographic maps, city directories and Sanborn Maps to determine previous land use at and surrounding the SP that may have impacted the environmental condition of the SP.

7. Provide an opinion regarding the presence/absence of Recognized Environmental Conditions (RECs), Controlled RECs (CRECs), Historical RECs and/or other de minimis environmental conditions of significance within a Phase I ESA report.

A REC is defined as *"(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property under*

conditions that pose a material threat of a future release to the environment (ASTM, 2021).

A Historic REC is defined as "*a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls*" (ASTM, 2021).

A Controlled REC (CREC) is "*a recognized environmental condition affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls"* (ASTM, 2021).

Summary of Investigation Findings

This assessment has not revealed any current, historical, or controlled RECs.

The following items of environmental concern are noted for the SP:

- Several discarded kitchen appliances, construction materials and a pesticide sprayer in poor condition, near, and at the onsite warehouse/caretaker residence were observed during the site inspection. It is recommended that these solid waste items be properly recycled / disposed in accordance with County and State DOH rules.

- The SP has been used for commercial agricultural lands from at least as far back as 1954. Former commercial agricultural lands in Hawaii have been shown to contain elevated of pesticides and metals in soil. Further, elevated levels of arsenic in soil have been detected in the area. Therefore, it is recommended that SP soil is tested for these target compounds prior to any disturbance/construction, if not done previously.

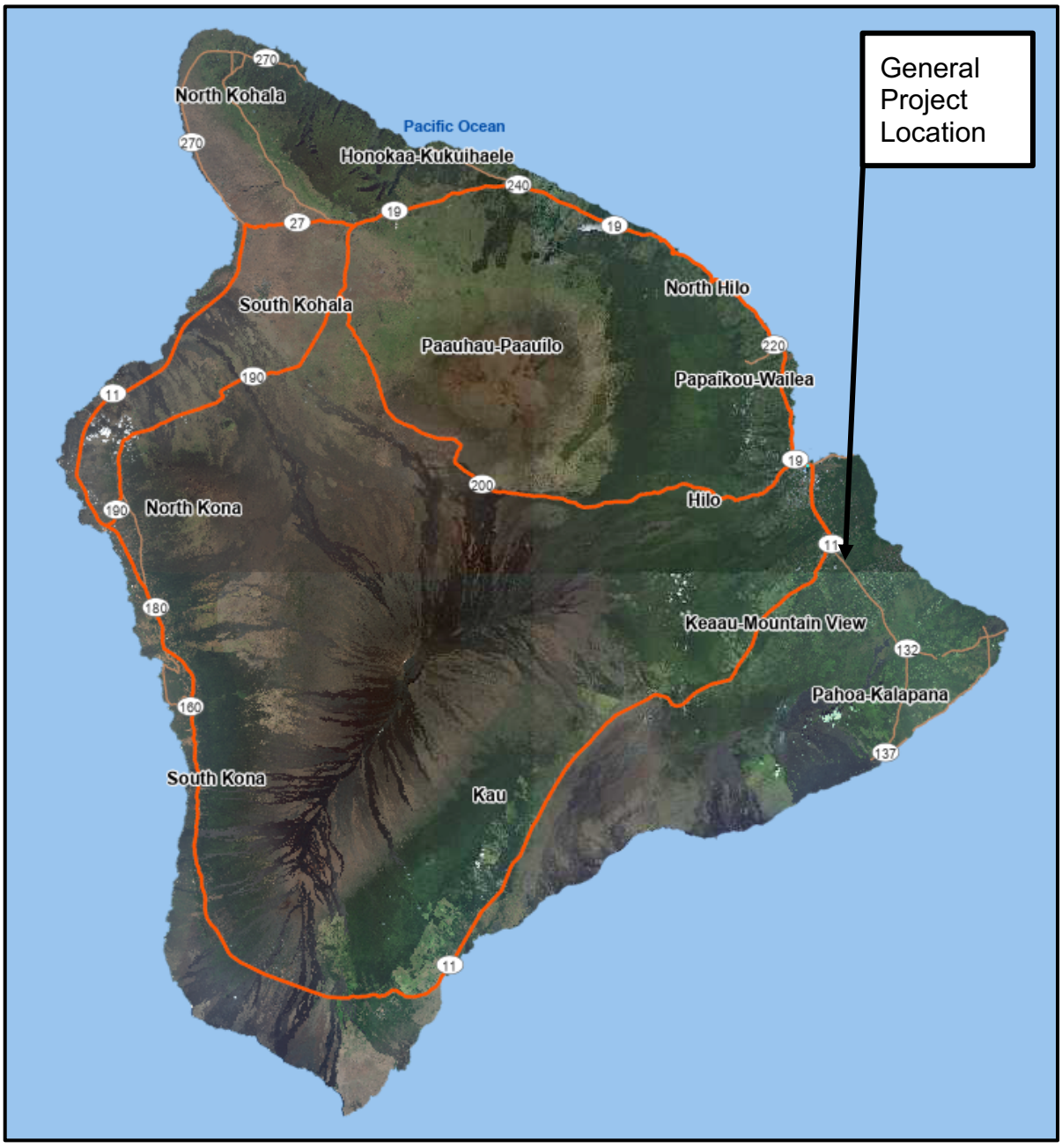
No other items of environmental significance are noted for the SP.

Section 1 Introduction

This report presents the results of the Phase I Environmental Site Assessment (ESA) performed by Lehua Environmental Inc. (LEI) for the property located at 16-790 Keaau-Pahoa Road in Keaau, Hawaii Island, Tax Map Key (TMK) (3) 1-6-003: Parcel 081 (Portion) (Subject Property [SP]); (Figures 1 & 2). The SP includes a total of approximately 7 acres of land, which is part of a larger 26.76 acre parcel of land. The SP includes mostly undeveloped open land, and has one permitted warehouse onsite used as the SP caretaker residence.

The purpose of this assessment was to evaluate the presence of RECs at the SP. The assessment of the SP has been performed by a qualified environmental professional as defined by, and in general accordance, with the EPA "All Appropriate Inquiry" (40 CFR Part 312), as well as the ASTM E 1527-021 Standard. This Phase I ESA includes a review of relevant geology and hydrogeology, federal, state, and local databases of known or potential hazardous waste sites, landfills, and sites currently under investigation for environmental violations within the ASTM recommended search distance of SP. It also includes a site inspection and interviews with applicable persons that have knowledge of the site to check for evidence of RECs.

Figure 1: General Location Map



Section 2 Site Description

Figure 2 depicts the SP layout. The SP includes mostly undeveloped open land, and has one permitted warehouse onsite used as the SP caretaker residence. The SP is bordered to the north and northeast by Keaau-Pahoa Road, to the southeast by agricultural and residential use, and to the west by open / agricultural lands.

According to Chapter 25 of the Hawaii County Code (HCC), the SP parcel is zoned for Agricultural use (HCC, 2005).

2.1.1 Topography and Surface Water Flow

The topography of the SP is slightly sloping at an elevation of approximately 338 feet above mean sea level. The topography slopes/directs surface flow to the northeast towards lower elevations (EDR, 2023).

2.1.2 Geology

Published geologic and hydrogeologic reports and maps were reviewed to obtain available information regarding subsurface conditions in the general area of the SP.

The Island of Hawaii comprises five coalesced shield volcanoes: Kohala, Mauna Kea, Hualalai, Mauna Loa, and Kilauea. The SP is located on a lower eastern flank of Kilauea.

Kilauea is still active and is the youngest of the five shield volcanoes on Hawaii Island. Estimates for the age of Kilauea's first-erupted lavas continue to evolve as more samples are collected and various dating methods are used. The Hilina Basalt formation, exposed in Hilina fault scarps on Kilauea's central south flank, includes the oldest lava flows found above sea level. (Macdonald et al., 1983).

2.1.3 Soil

Soil in the SP area includes Olaa silty clam loam, which is characterized as a Class B soil with moderate infiltration rates, well drained with moderately coarse textures (EDR, 2023).

Figure 2: Project Site Layout Map

2.1.4 Groundwater

According to Mink and Lau (1990), the entire SP is located above one aquifer, status code 80801111(11111). This type of aquifer is Basal (fresh water in contact with sea water), unconfined (where the water table is the upper surface of saturated aquifer), and composed of flank (aquifer in dike compartments) type geological units (Mink and Lau, 1990). This aquifer is currently used as a drinking water source, is fresh (< 250 milligrams per liter (mg/L) chloride), irreplaceable, and is highly vulnerable to contamination (Mink and Lau, 1990).

Groundwater resources in the area are listed as being in the Pahoa aquifer system of the Kilauea aquifer sector. The groundwater gradient in the vicinity of the SP is likely to the northeast. Annual average rainfall for the SP area is approximately 138 inches (Giambelluca et al., 2013). Depth to groundwater is approximately 300 feet below ground surface.

2.1.5 Wells and Drinking Water Sources

The SP is located up-gradient of the underground injection control (UIC) line. The UIC line was established by the State of Hawai'i Department of Health (DOH) to protect groundwater resources. Groundwater up-gradient of the UIC line is considered a potential drinking water source. Groundwater down-gradient of the UIC line is considered as non-potable and saline. Injection wells are prohibited *mauka* of the UIC line.

Results of the EDR report indicated no records of any wells within a 1.0 mile distance to the SP, and none at the SP (EDR, 2023).

2.2 Historic Land Use

2.2.1 County Building Permit Search

The County of Hawaii Planning Department website was examined for review of building permits for the SP. Permit records are examined in order to identify any associated uses that may have resulted in RECs or other environmental items of significance. Building permit records for the SP parcel with the County Planning Department include a permit for the warehouse/caretaker residence that was built in 1986. There were also permits for one shed and one greenhouse; both constructed in 1985. According to County records, the SP parcel is zoned for Agricultural use (COH, 2023).

2.2.2 Aerial Photographs and Topographic Maps

Past land use was evaluated by reviewing historical topographic maps and photos. Representative documents were selected to show the evolution of the SP and the surrounding area.

The years available with historical topographic maps of the SP are 1914, 1917, 1932, 1963, 1981, 1994, 1995, 2013, and 2017. The earliest available topographic map from 1914 shows the SP and surrounding area as undeveloped, besides the alignment of the Keaau-Pahoa Road bordering the SP similar to present day. The 1917 map shows the development of Keaau town, a network of railroad tracks, and the Olaa Sugar Mill to the north of the SP. The 1963 map shows increased development to the north around Keaau town. The 1981 map shows the development of subdivision roadways around the SP. The subsequent maps show little change over time (EDR, 2023).

Historical aerial photos of the SP available were published during the years 1954, 1961, 1974, and 1992. The 1954 through 1974 photos shows the SP and surrounding area as commercial agricultural croplands. The 1992 photo shows a reconfiguration of croplands to what appear to be smaller private agricultural farming plots. The current warehouse/caretaker residence is present in the 1992 photo (EDR, 2023).

2.2.3 Sanborn Fire Insurance Maps

The complete holdings of the Sanborn Library, LLC collection were searched by EDR. The Sanborn Library includes more than 1.2 million fire insurance maps which track historical property usage in approximately 12,000 American cities and towns.

The SP was in an unmapped area; therefore, Sanborn Maps are not available for the SP and surrounding area (EDR, 2023).

2.3 Previous Environmental Reports

No previous environmental reports were found for the SP.

Section 3 User Provided Information

ASTM E1527-21 outlines the responsibilities of the user (i.e., the user of this Phase I ESA report, in context of completing a Phase I ESA). A user is defined as *the party seeking to use the Phase I ESA to complete an ESA of a property. A user may include a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager* (ASTM, 2021). In line with this definition, the user is the person/organization requesting this Phase I ESA. As part of completing a Phase I ESA, the user has the following duties:

- Communicate in advance of the SP reconnaissance, any specialized knowledge or experience of the user that is material to RECs.
- Communicate in advance of the SP reconnaissance, any actual knowledge or any environmental lien or AULs encumbering the property or in connection with the property.
- Consider the relationship of the purchase price of the property to the fair market value of the property if the property was not affected by hazardous substances or petroleum products.
- Communicate in advance of the SP reconnaissance, any commonly known or reasonably ascertainable information within the local community about the property that is material to RECs in connection with the property.
- Make known the reason why the user wants to have the Phase I ESA performed.

Mr. Sam Nelson, with Hilo Medical Center; the prospective buyer of the SP, and User of this Phase I ESA was interviewed in compliance with ASTM E1527-21. Mr. Nelson stated that he has knowledge of historical agricultural use / likely application of pesticides and herbicides at the SP. Aside from potential soil impacts from historical pesticide use, which was already obtained from other records search, there was no additional information gleaned from the user interview that represents an environmental concern for the SP. Mr. Nelson satisfied user responsibilities under ASTM E1527-21.

No seller / Site Contact interview was able to be conducted as part of this Phase I ESA. This is not considered a data gap since the historical use at the SP has been obtained from other historical records that were reviewed.

Section 4 Records Review

The purpose of the records review is to obtain and review records that will help identify current, historical or controlled RECs, and/or other items of environmental concern in connection with the SP. The following records and lists were reviewed for sites within the ASTM specified minimum search distances from the Site.

4.1 Environmental Lien and Activity Use Limitations (AUL) Search

An Environmental Lien and AUL search was conducted as part of this Phase I ESA. No environmental liens or AULs were found for the SP parcel. The Environmental Lien / AUL search documentation is included as part of Appendix B: EDR Report.

Sites Within One Mile of the Site

- EPA National Priority List (NPL)
- EPA Resource Conservation and Recovery Act (RCRA) Corrective Action Site (CORRACTS) List
- DOH State Hazardous Waste Site (SHWS)
- EPA National Pollutant Discharge Elimination System (NPDES)

Sites Within 0.5 Mile of the Site

- EPA Delisted NPL
- Federal Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List
- CERCLIS No Further Remedial Action Planned (NFRAP) List
- EPA RCRA Treatment, Storage, and/or Disposal (TSD) Facilities List
- DOH Landfill and/or Solid Waste Disposal Site Lists
- DOH leaking underground storage tanks (LUSTs) List

On the Site and Adjoining Properties

- DOH Registered underground storage tank (UST) List
- RCRA Generators List

On the Site

- Federal Emergency Response Notification System (ERNS) List
- EPA Institutional Controls and Engineering Controls Lists
- DOH Institutional Control and Engineering Control Lists
- DOH Voluntary Response Program List
- DOH Brownfields List

Explanations of each federal record or list are provided in the EDR report (Appendix B). DOH records that may not be included in the EDR are included in this report.

4.2 Federal NPL Site List

The Federal NPL includes those sites listed and proposed to be listed on the NPL (Superfund), as well those which have had a Superfund Liens notice filed. The NPL is a subset of the CERCLIS, and identifies over 1,200 sites for priority cleanup under the Superfund Program.

There are no NPL sites listed on or within one mile of the SP (EDR, 2023), and the SP is not listed (EDR, 2023).

4.3 Federal Delisted NPL Site List

There are no delisted NPL sites listed on or within one mile of the SP (EDR, 2023), and the SP is not listed (EDR, 2023).

4.4 Federal CERCLIS List

CERCLIS contains data on potentially hazardous waste sites that are either proposed to or on the NPL, as well as sites which are in the screening and assessment phase for possible inclusion on the NPL. Additionally, all EPA Federal Facilities Restoration and Reuse Office involved in cleanup activities are listed in this database. There are no SEMS sites witihin one mile of the SP and the SP is not listed (EDR, 2023).

4.5 Federal CERCLIS NFRAP Site List

There were no CERCLIS-NFRAP sites listed within one-mile of the SP, and the SP is not listed (EDR, 2023).

4.6 Federal RCRA CORRACTS Facilities List

Hazardous waste handlers with RCRA CORRACTS activity are listed in this database.

There are no RCRA CORRACTS facilities located within a mile of the SP, and the SP is not listed (EDR, 2023).

4.7 Federal RCRA non-CORRACTS TSD Facilities List

Information on RCRA defined hazardous waste TSD activities are listed in this database.

There are no RCRA non-CORRACTS TSD facilities listed within one-half mile of the SP, and the SP is not listed (EDR, 2023).

4.8 Federal RCRA Generators List

The Federal RCRA generators list includes large, small and conditionally exempt small quantity hazardous waste generators.

There are no RCRA generator listed within one-half mile of the SP, and the SP is not listed as a very small quantity generator. There are no active violations with the listed generators, including the SP (EDR, 2023).

4.9 Federal Institutional Controls/Engineering Controls Registries

This database includes a listing of engineering and institutional controls in place in order to create pathway elimination for regulated substances to enter environmental media or effect human health.

There are no federal institutional controls or engineering controls listed within one-quarter mile of the SP, and the SP is not listed (EDR, 2023).

4.10 Federal ERNS List

The Federal ERNS List records and stores information on reported releases of oil and hazardous substances.

There are no federal ERNS records reported for the SP or surrounding properties (EDR, 2023).

4.11 DOH SHWS

The SHWS records are the state's equivalent to CERCLIS. These sites may or may not be listed on the federal CERCLIS list. The SHWS list contains information on sites identified by the State of Hawai‘i as abandoned, inactive, or uncontrolled hazardous waste sites that may require cleanup.

There are five SHWS within one mile from the SP, and the SP is not listed. The 5 SHWS are low priority SHWS relating to elevated levels of arsenic in soil. The listed SHWS are

not a concern for the SP since there is no likely contamination pathway from the listed SHWS. However, if there be area-wide elevated arsenic levels in soil from former treatment of croplands in the area. It is recommended that soil at the SP is tested for the presence of arsenic, as well as other target metals and pesticides prior to disturbance (EDR, 2023).

4.12 State Landfill and/or Solid Waste Disposal Site Lists

Records in this database typically contain an inventory of solid waste disposal facilities or landfills in a particular state.

There are no state or tribal landfill and/or solid waste disposal sites listed within one-half mile of the SP, and the SP is not listed (EDR, 2023).

4.13 State Leaking Underground Storage Tank Lists

This database includes an inventory of reported LUSTs.

There are no state LUST sites listed within one-half mile of the SP, and the SP is not listed (EDR, 2023).

4.14 State Registered Underground Storage Tank Lists

This database includes an inventory of reported USTs.

There are no registered state UST listings within one-quarter mile of the SP, and the SP is not listed. (EDR, 2023).

4.15 State Institutional Control/Engineering Control Registries

This database includes a listing of sites with engineering and/or institutional controls in place.

There were no state engineering controls sites, and no institutional controls site registered within one-half mile of the SP, and the SP is not registered. (EDR, 2023).

4.16 State Voluntary Cleanup Sites

This database includes a listing of voluntary cleanup priority sites.

There are no state or tribal voluntary cleanup priority sites recorded within one-half mile of the Site, and the SP is not listed (EDR, 2023).

4.17 State Brownfields Sites

This database includes an inventory of state and tribal "Brownfield sites" which are defined as: any real property where the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (EDR, 2023).

There were no state or tribal Brownfield site within one-half mile of the SP, and the SP is not listed (EDR, 2023).

4.18 State Land Records

These records include the CERCLA Lien Information, which indicate where the EPA has spent Superfund monies to investigate releases and threatened releases of contamination. Additionally, records of land use control information pertaining to former Navy Base Realignment and Closure properties, is included.

There are no records of CERCLA Liens found in the EDR search for the SP, and there are no records of land use control information within one-half mile of the SP (EDR, 2023).

4.19 Records of Emergency Release Reports

This database includes the Hazardous Materials Incident Report System, which incorporates spills reported to the DOT.

There are no records of Emergency Release Reports on the SP (EDR, 2023).

4.20 Other Ascertainable Records

These records include inventories from a variety of select environmental databases; the full list of which is available in the EDR (EDR, 2023).

There are no other Ascertainable Records found within one-quarter mile of the SP and the SP is not listed (EDR, 2023).

4.21 EDR Proprietary Records

The EDR Proprietary Manufactured Gas Plant Database includes an inventory of coal gas plants compiled by EDR researchers. There are no Manufactured Gas Plants found within a mile of the SP (EDR, 2023).

Section 5 Subject Property Reconnaissance

The SP visit was conducted on September 6, 2023 by LEI personnel. All observations were based on the SP's conditions at the time of LEI's reconnaissance. Photographs taken during the site visit are included in Appendix A.

5.1.1 USTs, Aboveground Storage Tanks (ASTs), Oil/Water Separators, Pipelines

There were no USTs, ASTs, oil/water separators, sumps or pipelines observed at the SP.

5.1.2 Site Utilities

The warehouse at the SP that was being used as a residence at the time of the inspection, was connected to a private cesspool or septic tank, and was connected to municipal County water lines, as well as overhead electric service from HELCO.

5.1.3 Drains

There were no floor drains observed at the SP.

5.1.4 Indication of Polychlorinated Biphenyl (PCB) Containing Materials

No indication of PCB containing materials were observed at the SP.

5.1.5 Mercury

There was no indication of mercury-containing materials at the SP during the time of the SP reconnaissance.

5.1.6 Chlorofluorocarbons (CFCs)

There was one refrigerator within the warehouse/residence. Refrigerators are potential CFC-containing materials and need to be handled and disposed in accordance with County rules once their service life is complete.

5.1.7 Stains and Chemical Odors Pools, Ponds, Pits

There were no staining, pools, ponds, pits, stressed vegetation, or unnatural fill observed at the SP.

5.1.8 Discarded Solid Waste

There were several discarded old stoves, PVC pipes, and construction lumber observed near the warehouse/caretaker residence.

5.1.9 Adjacent Properties

Adjacent properties included open land and agricultural / residential properties.

Section 6 Data Gaps

A data gap is a lack of or inability to obtain information required by ASTM E 1527-13 despite good faith efforts by the environmental professional to gather such information. Data gaps may result from incompleteness in any of the activities required by this practice (ASTM, 2013). In performing this Phase I ESA, no data gaps were found.

Section 7 Conclusions and Opinions

This Phase I ESA has been performed in conformance with the scope and limitations of ASTM E 1527-21 for the SP. Any exceptions to, or deletions from this practice are described in Section 9 of this report.

This assessment has not revealed any current, historical, or controlled RECs.

The following items of environmental concern are noted for the SP:

- Several discarded kitchen appliances, construction materials and a pesticide sprayer in poor condition, near, and at the onsite warehouse/caretaker residence were observed. It is recommended that these solid waste items be properly recycled / disposed in accordance with County and State DOH rules.

- The SP has been used for commercial agricultural lands from at least as far back as 1954. Former commercial agricultural lands in Hawaii have been shown to contain elevated of pesticides and metals in soil. Further, elevated levels of arsenic in soil have been detected in the area. Therefore, it is recommended that SP soil is tested for these target compounds prior to any disturbance/construction, if not done previously.

No other items of environmental significance are noted for the SP.

Section 8 Limitations

The conclusions and recommendations of this ESA have been based on interpretation of the available historical and regulatory information, and a visual SP reconnaissance. No guarantee or warrant is made that the SP is free of contamination. This Phase I ESA was performed with the usual competence and thoroughness of the consulting profession, in accordance with the standard operating procedures of this time. LEI does not provide any other guarantee or warranty.

This Phase I ESA is not a comprehensive site characterization and should not be construed as such. The opinions presented in this report are based on findings derived from a site reconnaissance and a review of specified regulatory records and historical sources. This Phase I ESA did not include any investigation with respect to lead, asbestos, arsenic, radon, methane, regulatory compliance, cultural and historical resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, or site geotechnical concerns. All information on UST and LUST sites are based on information reported to the DOH Solid and Hazardous Waste Branch. All information on DOH Hazard Evaluation and Emergency Response (HEER) listed sites and release sites are based on information reported to the DOH HEER Office.

There are no exceptions or deletions to ASTM practice in this Phase I ESA.

Section 9 References

ASTM, 2021. Standard Practice for ESAs: Phase I ESA Process. ASTM, E 1527-21.

COH, 2023. County of Hawaii Planning Department website. Accessed at http://www.cohplanningdept.com/.

EDR, 2023. The EDR Radius Map Report with GeoCheck, 16-790 Keaau-Pahoa Rad, Keaau, Hawaii 96749. Inquiry Number: 7426412.2s. August 24, 2023.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.

Google, 2023. Google Earth Imagery.

HCC, 2005. Hawai'i County Code 1983 (2005 Edition, as amended).

Macdonald, G.; Abbott, A.; and Peterson, F., 1983. Volcanoes in the Sea, University of Hawai'i Press, Honolulu, Hawai'i.

Mink, J. F. and Lau, S., 1990. Aquifer Identification and Classification for *Hawaii*: Groundwater Protection Strategy for Hawai'i. Water Resources Research Center, University of Hawai'i, Technical Report 179. Februar

Appendix A: Site Inspection Photographs

Pic-1
Old household appliances located behind warehouse/caretaker residence.

Pic-2
Old water heater located behind warehouse/caretaker residence

Pic-3
Old stove located near southeast corner of the SP.

Pic-4
Warehouse/caretaker residence located in the southeast portion of the SP.

Pic-5

Old ironwood lumber stockpile area located west of warehouse/caretaker residence.

Pic-6
Old injector shed located southwest of warehouse/caretaker residence.

Pic-7
Old sprayer and lawn mower attachment located southwest of warehouse/caretaker residence.

Pic-8
Pile of PVC pipes located west of warehouse/caretaker residence.

Pic-9
View of western SP boundary.

Pic-10
View of northern SP boundary.

Pic-11
View of eastern SP boundary.

Pic-12
View of southern SP boundary.

Pic-13
View of neighboring houses, north of SP.

Pic-14
Wetland area located near northeast corner of SP.

Pic-15
View of SP facing southeast.

Appendix B: EDR Database Search

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749

Inquiry Number: 7426412.7
August 25, 2023

EDR Environmental Lien and AUL Search

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Environmental Lien and AUL Search

The EDR Environmental Lien and AUL Search Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR Environmental Lien and AUL Search

TARGET PROPERTY INFORMATION

ADDRESS

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

AULs: Found ☐ Not Found ☒

RESEARCH SOURCE

Source 1:

Bureau of Conveyances
Hawaii, HI

PROPERTY INFORMATION

Deed 1:

Type of Deed:	Warranty Deed
Title is vested in:	GRAPHIC IMAGES HAWAII INC
Title received from:	PCN INC
Deed Dated	3/16/2023
Deed Recorded:	3/21/2023
Book:	NA
Page:	NA
Volume:	NA
Instrument:	84800183
Docket:	NA
Land Record Comments:	
Miscellaneous Comments:	
Legal Description:	See Exhibit
Legal Current Owner:	GRAPHIC IMAGES HAWAII INC
Parcel # / Property Identifier:	160030810000
Comments:	See Exhibit

Deed Exhibit 1

STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED
March 21, 2023 8:01 AM
Doc No(s) A - 84800183

Doc 2 of 2
Pkg 12174809 SKC

/s/ LESLIE T KOBATA
REGISTRAR

Conveyance Tax: $2,437.50

LAND COURT REGULAR SYSTEM

(AREA ABOVE RESERVED FOR RECORDING INFORMATION)

After Recordation, Return by ☒ Mail or ☐ Pick-up Phone#: _____

FILL IN NAME AND ADDRESS BELOW:

RS-2

Graphic Images Hawaii, Inc.
32 Poko Pl
Hilo, HI 96720

TG: 7311398514-S
TGE: 2327322363290
Tracy Yamaguchi

DOCUMENT CONTAINS 6 PAGES

TITLE OF DOCUMENT: WARRANTY DEED

PARTIES TO DOCUMENT

GRANTOR: **PCN INC., a Hawaii corporation**
P.O. Box 771
Hilo, HI 96720

GRANTEE: **GRAPHIC IMAGES HAWAII, INC., a Hawaii corporation**
32 Poko Pl.
Hilo, HI 96720

AFFECTS TAX MAP KEY NO.: (3) 1-6-003-081-0000

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS:

That **PCN Inc.**, a Hawaii corporation, whose mailing address is P.O. Box 771, Hilo, HI 96720, hereinafter called the "Grantor", for and in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00) and other valuable consideration paid to it by **Graphic Images Hawaii, Inc.**, a Hawaii corporation, whose mailing address is 32 Poko Pl., Hilo, HI 96720, hereinafter called the "Grantee", the receipt of which will be acknowledged upon closing, does hereby grant, bargain, sell and convey unto the Grantee, its successors and assigns, in fee simple, forever, all of Grantor's right, title and interest in the following real property situated at Keaau, District of Puna, Island and County of Hawaii, State of Hawaii, identified by Tax Map Key No.: (3) 1-6-003-081-0000, as more particularly described in Exhibit "A" attached hereto and made a part hereof by reference, subject to the encumbrances also described in Exhibit "A" and any unpaid real property taxes or assessments which are not yet due.

TO HAVE AND TO HOLD the same, together with all buildings, rights, improvements, easements, privileges and appurtenances thereon and thereto belonging or in anywise appertaining, or held and enjoyed therewith, unto the Grantee, its successors and assigns, in fee simple, forever, as Tenant in Severalty.

AND the Grantor, for itself, its successors and assigns, does hereby covenant with the Grantee, its successors and assigns, that the Grantor is seised in fee simple of the above-described premises; that the same is free and clear of and from all encumbrances suffered by the Grantor and except as aforesaid; that the Grantor has good right to sell and convey the same as aforesaid; and that the Grantor will, and its successors and assigns will, WARRANT AND DEFEND the same unto the

Grantee, its successors and assigns, forever, against the lawful claims and demands of all persons whomsoever.

IN WITNESS WHEREOF, the said Grantor has caused this **Warranty Deed** to be executed on this 16 day of March, 2023.

GRANTOR:

PCN INC.

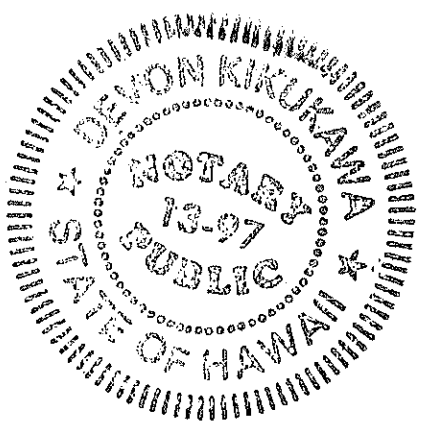
By: _____
Name: Malcolm R. Saxby
Its: President

STATE OF HAWAII)
) ss.
COUNTY OF HAWAII)

On this 16 day of March, 2023, before me personally appeared Malcolm R. Saxby, to me known or who has proven to me on the basis of satisfactory evidence to be the person described in and who executed the foregoing instrument, who, being duly sworn, did say that (he)~~(she)~~ is the President of **PCN Inc.**, a Hawaii corporation, that said instrument was signed on behalf of said corporation by authority of its Board of Directors, and that said officer(s) acknowledged said instrument to be the free act and deed of said corporation.

Said instrument, entitled "Warranty Deed", consists of 6 pages and is (not dated) (dated March 16, 2023) at the time of this notary certification.

In witness whereof, I have hereunto set my hand and affixed my official seal on the day and year above written.



[Stamp or Seal]

(Signature) _____

(Print name) DEVON KIKUKAWA
EXPIRATION: March 17, 2025

Notary Public
Third Judicial Circuit
State of Hawaii

My commission expires: _____

EXHIBIT "A"

All of that certain parcel of land (being portion(s) of the land(s) described in and covered by Royal Patent Number 7223, Land Commission Award Number 8559-B:16 to Wm. C. Lunalilo) situate, lying and being at Keaau, District of Puna, Island and County of Hawaii, State of Hawaii, consisting of **LOT 1**, as referenced on Subdivision map prepared by Donald James Murray, Land Surveyor, dated May 3, 1972, revised November 13, 1972 and approved by the County of Hawaii on December 19, 1972 (Subdivision No. 3207), and thus bounded and described as follows:

Beginning at the east corner of this parcel of land and on the southwesterly side of Pahoa Government Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "OLAA", being 2,855.65 feet north and 9,034.13 feet east, and running by azimuths measured clockwise from true South:

1.	52°	18'	2162.75	feet along Lot 2;
2.	142°	18'	551.44	feet along Lot A-18-A2, Land Court Application 1053 (Map 119);
3.	232°	18'	2096.03	feet along the remainder of R.P. 7223, L.C. Aw. 8559-B:16 to Wm. C. Lunalilo to a point on the southwesterly side of Pahoa Government Road;
4.	319°	44'	404.27	feet along the southwesterly side of Pahoa Government Road;
5.	304°	04'	155.38	feet along the southwesterly side of Pahoa Government Road to the point of beginning and containing an area of 26.7623 acres, more or less.

BEING THE PREMISES ACQUIRED BY WARRANTY DEED

GRANTOR : JULES J. GERVAIS, JR. and SOONTAREE GERVAIS, husband and wife

GRANTEE : PUNA CERTIFIED NURSERY, INC., a Hawaii corporation

DATED : January 21, 1993
RECORDED : Document No. 93-013249

NOTE: *Filed with the Business Registration division of the Department of Commerce and Consumer Affairs of the State of Hawaii is the name change of Puna Certified Nursery, Inc. to PCN Inc. on June 4, 2014.*

SUBJECT, HOWEVER, to the following:

1. Mineral and water rights of any nature.

2. Claims arising out of customary and traditional rights and practices, including without limitation those exercised for subsistence, cultural, religious, access or gathering purposes, as provided for in the Hawaii Constitution or the Hawaii Revised Statutes.

END OF EXHIBIT A

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749

Inquiry Number: 7426412.2s
August 24, 2023

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527 - 21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E2247 - 16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E1528 - 22) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

16-790 KEAAU PAHOA ROAD
KEAAU, HI 96749

COORDINATES

Latitude (North):	19.6080200 - 19° 36' 28.87''
Longitude (West):	155.0312460 - 155° 1' 52.48''
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	286962.0
UTM Y (Meters):	2169244.0
Elevation:	338 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	9372267 MOUNTAIN VIEW, HI
Version Date:	2017
North Map:	9757551 HILO, HI
Version Date:	2017

MAPPED SITES SUMMARY

Target Property Address:
16-790 KEAAU PAHOA ROAD
KEAAU, HI 96749

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	KEAAU HIGH SCHOOL EX	16-725 KEAAU-PAHOA R	SHWS	Lower	2355, 0.446, NNW
2	KEAAU VILLAGE		SHWS	Higher	4102, 0.777, NNW
3	KEAAU PROPOSED AFFOR	PAHOA RD	SHWS	Lower	4298, 0.814, NNW
4	HILO RESEARCH SITE		FUDS	Higher	4342, 0.822, SSW
5	KEAAU MIDDLE SCHOOL	16-565 KEAAU-PAHOA R	SHWS	Lower	5012, 0.949, NNW
6	KEAAU MIDDLE SCHOOL	16-565 KEAAU-PAHOA R	SHWS, INST CONTROL	Lower	5251, 0.995, NNW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Lists of Federal Delisted NPL sites

Delisted NPL ---------- National Priority List Deletions

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS ---------- Corrective Action Report

Lists of Federal RCRA TSD facilities

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Lists of Federal RCRA generators

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-VSQG ---------- RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROLS..... Institutional Controls Sites List

Federal ERNS list

ERNS..... Emergency Response Notification System

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF..... Permitted Landfills in the State of Hawaii

Lists of state and tribal leaking storage tanks

LUST..... Leaking Underground Storage Tank Database
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

Lists of state and tribal registered storage tanks

FEMA UST..... Underground Storage Tank Listing
UST..... Underground Storage Tank Database
INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS..... Engineering Control Sites
INST CONTROL..... Sites with Institutional Controls

Lists of state and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing
VCP..... Voluntary Response Program Sites

Lists of state and tribal brownfield sites

BROWNFIELDS..... Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY..... Solid Waste Recycling Information
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory
IHS OPEN DUMPS..... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL..... Delisted National Clandestine Laboratory Register
CDL..... Clandestine Drug Lab Listing

US CDL ..... National Clandestine Laboratory Register

Local Land Records

LIENS 2 ..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ..... Hazardous Materials Information Reporting System
SPILLS ..... Release Notifications
SPILLS 90 ..... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ..... RCRA - Non Generators / No Longer Regulated
DOD ..... Department of Defense Sites
SCRD DRYCLEANERS ..... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ..... Financial Assurance Information
EPA WATCH LIST ..... EPA WATCH LIST
2020 COR ACTION ..... 2020 Corrective Action Program List
TSCA ..... Toxic Substances Control Act
TRIS ..... Toxic Chemical Release Inventory System
SSTS ..... Section 7 Tracking Systems
ROD ..... Records Of Decision
RMP ..... Risk Management Plans
RAATS ..... RCRA Administrative Action Tracking System
PRP ..... Potentially Responsible Parties
PADS ..... PCB Activity Database System
ICIS ..... Integrated Compliance Information System
FTTS ..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ..... Material Licensing Tracking System
COAL ASH DOE ..... Steam-Electric Plant Operation Data
COAL ASH EPA ..... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ..... PCB Transformer Registration Database
RADINFO ..... Radiation Information Database
HIST FTTS ..... FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ..... Incident and Accident Data
CONSENT ..... Superfund (CERCLA) Consent Decrees
INDIAN RESERV ..... Indian Reservations
FUSRAP ..... Formerly Utilized Sites Remedial Action Program
UMTRA ..... Uranium Mill Tailings Sites
LEAD SMELTERS ..... Lead Smelter Sites
US AIRS ..... Aerometric Information Retrieval System Facility Subsystem
US MINES ..... Mines Master Index File
ABANDONED MINES ..... Abandoned Mines
FINDS ..... Facility Index System/Facility Registry System
UXO ..... Unexploded Ordnance Sites
DOCKET HWC ..... Hazardous Waste Compliance Docket Listing
ECHO ..... Enforcement & Compliance History Information
FUELS PROGRAM ..... EPA Fuels Program Registered Listing
PFAS NPL ..... Superfund Sites with PFAS Detections Information
PFAS FEDERAL SITES ..... Federal Sites PFAS Information
PFAS TSCA ..... PFAS Manufacture and Imports Information
PFAS RCRA MANIFEST ..... PFAS Transfers Identified In the RCRA Database Listing

PFAS ATSDR ---- PFAS Contamination Site Location Listing
PFAS WQP ---- Ambient Environmental Sampling for PFAS
PFAS NPDES ---- Clean Water Act Discharge Monitoring Information
PFAS ECHO ---- Facilities in Industries that May Be Handling PFAS Listing
PFAS ECHO FIRE TRAINING Facilities in Industries that May Be Handling PFAS Listing
PFAS PART 139 AIRPORT ---- All Certified Part 139 Airports PFAS Information Listing
AQUEOUS FOAM NRC ---- Aqueous Foam Related Incidents Listing
PFAS ---- PFAS Contamination Site Listing
AIRS ---- List of Permitted Facilities
DRYCLEANERS ---- Permitted Drycleaner Facility Listing
Financial Assurance ---- Financial Assurance Information Listing
LEAD ---- LEAD
UIC ---- Underground Injection Wells Listing
PFAS TRIS ---- List of PFAS Added to the TRI
MINES MRDS ---- Mineral Resources Data System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS ---- Recovered Government Archive State Hazardous Waste Facilities List
RGA LF ---- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Lists of state- and tribal hazardous waste facilities

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites

may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health.

A review of the SHWS list, as provided by EDR, and dated 11/22/2022 has revealed that there are 5 SHWS sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
KEAAU VILLAGE		NNW 1/2 - 1 (0.777 mi.)	2	9

Lower Elevation	Address	Direction / Distance	Map ID	Page
KEAAU HIGH SCHOOL EX	16-725 KEAAU-PAHOA R	NNW 1/4 - 1/2 (0.446 mi.)	1	8
KEAAU PROPOSED AFFOR	PAHOA RD	NNW 1/2 - 1 (0.814 mi.)	3	10
KEAAU MIDDLE SCHOOL	16-565 KEAAU-PAHOA R	NNW 1/2 - 1 (0.949 mi.)	5	12
KEAAU MIDDLE SCHOOL	***16-565 KEAAU-PAHOA R***	***NNW 1/2 - 1 (0.995 mi.)***	***6***	***13***

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

FUDS: The Listing includes locations of Formerly Used Defense Sites Properties where the US Army Corps Of Engineers is actively working or will take necessary cleanup actions.

A review of the FUDS list, as provided by EDR, and dated 05/08/2023 has revealed that there is 1 FUDS site within approximately 1 mile of the target property.

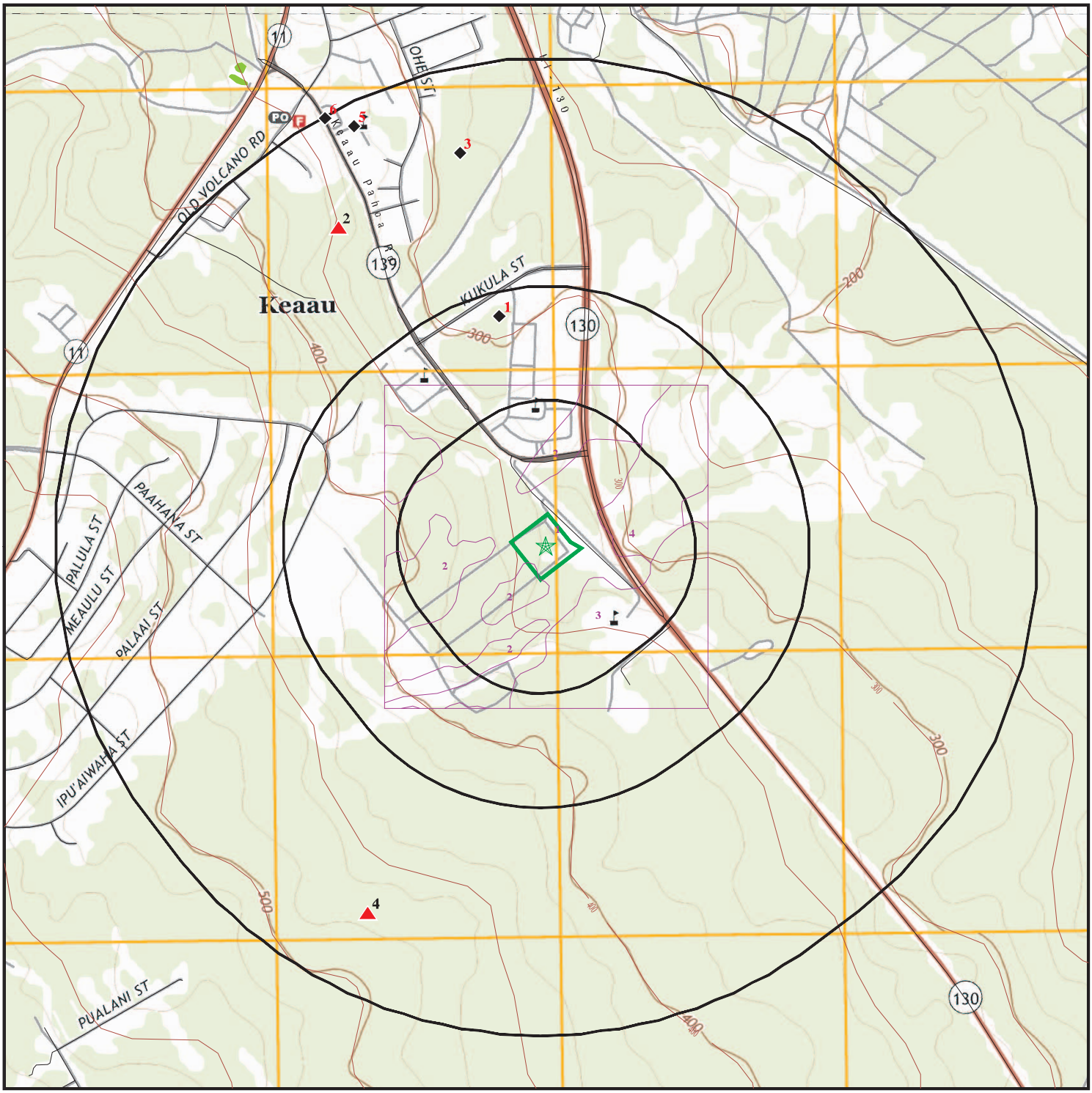
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
HILO RESEARCH SITE		SSW 1/2 - 1 (0.822 mi.)	4	11

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 2 records.

Site Name	Database(s)
KEAAU PAHOA ROAD 118 ACRE PARCEL	RGA HWS
KEAAU PAHOA ROAD 118 ACRE PARCEL F	RGA HWS

OVERVIEW MAP - 7426412.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Special Flood Hazard Area (1%)

0.2% Annual Chance Flood Hazard

National Wetland Inventory

State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	16-790 KEAAU PAHOA ROAD	CLIENT:	Lehua Environmental Inc
ADDRESS:	16-790 KEAAU PAHOA ROAD Keaau HI 96749	CONTACT:	Kama
		INQUIRY #:	7426412.2s
LAT/LONG:	19.60802 / 155.031246	DATE:	August 24, 2023 3:57 pm

DETAIL MAP - 7426412.2S

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 16-790 KEAAU PAHOA ROAD ADDRESS: 16-790 KEAAU PAHOA ROAD Keaau HI 96749 LAT/LONG: 19.60802 / 155.031246	CLIENT: Lehua Environmental Inc CONTACT: Kama INQUIRY #: 7426412.2s DATE: August 24, 2023 3:57 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
Delisted NPL	1.000		0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
CORRACTS	1.000		0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
Lists of state- and tribal hazardous waste facilities								
SHWS	1.000		0	0	1	4	NR	5
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500		0	0	0	NR	NR	0
Lists of state and tribal leaking storage tanks								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
Lists of state and tribal registered storage tanks								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
Lists of state and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	0.001		0	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
SPILLS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	1	NR	1
DOD	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
PFAS NPL	0.250		0	0	NR	NR	NR	0
PFAS FEDERAL SITES	0.250		0	0	NR	NR	NR	0
PFAS TSCA	0.250		0	0	NR	NR	NR	0
PFAS RCRA MANIFEST	0.250		0	0	NR	NR	NR	0
PFAS ATSDR	0.250		0	0	NR	NR	NR	0
PFAS WQP	0.250		0	0	NR	NR	NR	0
PFAS NPDES	0.250		0	0	NR	NR	NR	0
PFAS ECHO	0.250		0	0	NR	NR	NR	0
PFAS ECHO FIRE TRAINING	0.250		0	0	NR	NR	NR	0
PFAS PART 139 AIRPORT	0.250		0	0	NR	NR	NR	0
AQUEOUS FOAM NRC	0.250		0	0	NR	NR	NR	0
PFAS	0.250		0	0	NR	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
LEAD	0.001		0	NR	NR	NR	NR	0
UIC	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
PFAS TRIS	0.250		0	0	NR	NR	NR	0
MINES MRDS	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	0.001		0	NR	NR	NR	NR	0
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	0	1	5	0	6

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
NNW
1/4-1/2
0.446 mi.
2355 ft.

KEAAU HIGH SCHOOL EXPANSION PROJECT
16-725 KEAAU-PAHOA RD
KEAAU, HI 96749

SHWS **S126282828**
N/A

Relative:
Lower

Actual:
295 ft.

SHWS:

Name:	KEAAU HIGH SCHOOL EXPANSION PROJECT
Address:	16-725 KEAAU-PAHOA RD
City,State,Zip:	KEAAU, HI 96749
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Hawaii
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	2844
Location Description:	16-725 Keaau-Pahoa Rd, Keaau, HI 96749
Is Public:	True
Update On:	11/05/2021
Latitude:	19.615385
Longitude:	-155.032799
Aliases:	Brownfields Unranked Site
Status Name:	Assessment

2
NNW
1/2-1
0.777 mi.
4102 ft.

KEAAU VILLAGE

KEAAU, HI 96749

SHWS **S126282832**
N/A

Relative:
Higher

Actual:
353 ft.

SHWS:

Name:	KEAAU VILLAGE
Address:	Not reported
City,State,Zip:	KEAAU, HI 96749
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Hawaii
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	2954
Location Description:	Keaau, HI 96749
Is Public:	True
Update On:	11/05/2021
Latitude:	19.618213
Longitude:	-155.0382
Aliases:	Brownfields Unranked Site
Status Name:	Assessment

3
NNW
1/2-1
0.814 mi.
4298 ft.

KEAAU PROPOSED AFFORDABLE HOUSING
PAHOA RD
KEAAU, HI 96749

SHWS **S126282830**
N/A

Relative:
Lower

Actual:
285 ft.

SHWS:

Name:	KEAAU PROPOSED AFFORDABLE HOUSING
Address:	PAHOA RD
City,State,Zip:	KEAAU, HI 96749
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Hawaii
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	2306
Location Description:	Pahoa Rd
Is Public:	True
Update On:	02/07/2020
Latitude:	19.620585
Longitude:	-155.03412
Aliases:	Brownfields Low Priority Site, Keaau Affordable Housing Project, Keaau Area Arsenic Investigation, Keaau Pahoa Road 118 Acre Parcel
Status Name:	Remedy Selected

4 SSW 1/2-1 0.822 mi. 4342 ft. **HILO RESEARCH SITE** **FUDS** **1018283042** **N/A**

HILO, HI

Relative: Higher

Actual: 473 ft.

FUDS:

EPA Region:	09
Installation ID:	HI99799F386300
Congressional District Number:	2
Name:	HILO RESEARCH SITE
FUDS Number:	H09HI0123
City:	HILO
State:	HI
County:	HAWAII
Object ID:	5470
USACE Division:	POD
USACE District:	Honolulu District (POH)
Status:	Properties with all projects at site closeout
Current Owner:	PRIV: PRIVATE W.H. SHIPMAN, LTD.
EMS Map Link:	https://fudsportal.usace.army.mil/ems/inventory/map?id=57883
Eligibility:	Eligible
Has Projects:	Yes
NPL Status:	Not reported
Project Required:	Yes
Feature Description:	THE SITE WAS ACQUIRED FROM W.H. SHIPMAN BY A LAND LEASE (CONTRACT NO. DA-94-626-ENG-6) IN JANUARY 1962 TO CONDUCT HIGH FREQUENCY AND IONOSPHERIC PROPAGATION RESEARCH UNDER THE PURVIEW OF THE AIR FO RCE TACTICAL AIR COMMAND. IN APRIL 1962, AN ADJOINING PARCEL OF LAND APPROXIMATLEY 400 FEET BY 600 FEET WAS ALSO ACQUIRED BY IRREVOCAVBLE LICENSE FOR TEMPORARY EMPLACEMENT OF ANTENNAS AND ASSOCIAT ED EQUIPMENT. THE IRREOVCABLE LICENSE TERMINATED IN AUGUST 1962 AND THE LAND LEASE 6/30/64.
Latitude:	19.59638889
Longitude:	-155.03722222

FUDS Detail as of Jan 2015:

Fiscal Year:	2013
Federal Facility ID:	HI9799F3863
RAB:	Not reported
NPL Status:	Not Listed
Description:	THE 37.1 ACRE SITE WAS AN IONOSPHERIC PROPAGATION RESEARCH WHICH CONSISTED OF THREE ANTENNA SYSTEMS AND ASSOCIATED FACILITIES INCLUDING AN OPOERATIONS SUPPORT BUILDING, AN EMERGENCY POWER GENERATOR BUILDING, TRANSFORMER ENCLOSURE, ACCESS ROAD, AND ELECTRICAL AND WATE LINES. THE SITE CONTAINS THREE PAD MOUNTED 37.5 KVA SINGLE PHASE ELECTRICAL DISTRUBTION TRANSFORMERS. OF THE THREE UNITS, O NE IS EMPTY AND TWO ARE LEAKING.
History:	THE SITE WAS ACQUIRED FROM W.H. SHIPMAN BY A LAND LEASE (CONTRACT NO. DA-94-626-ENG-6) IN JANUARY 1962 TO CONDUCT HIGH FREQUENCY AND IONOSPHERIC PROPAGATION RESEARCH UNDER THE PURVIEW OF THE AIR FO RCE TACTICAL AIR COMMAND. IN APRIL 1962, AN ADJOINING PARCEL OF LAND APPROXIMATLEY 400 FEET BY 600 FEET WAS ALSO ACQUIRED BY IRREVOCAVBLE LICENSE FOR TEMPORARY EMPLACEMENT OF ANTENNAS AND ASSOCIAT ED EQUIPMENT. THE IRREOVCABLE LICENSE TERMINATED IN AUGUST 1962 AND THE LAND LEASE 6/30/64.
CTC:	141.59999999999999
Current Program:	Not reported
Future Program:	Not reported
Institutional ID:	57883

5
NNW
1/2-1
0.949 mi.
5012 ft.

KEAAU MIDDLE SCHOOL BUILDING EXTERIOR SOILS
16-565 KEAAU-PAHOA RD
KEAAU, HI 96749

SHWS **S126282829**
N/A

Relative:
Lower

Actual:
325 ft.

SHWS:

Name:	KEAAU MIDDLE SCHOOL BUILDING EXTERIOR SOILS
Address:	16-565 KEAAU-PAHOA RD
City,State,Zip:	KEAAU, HI 96749
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	Not reported
Hazard Priority:	Not reported
Potential Hazards And Controls:	Not reported
Island:	Hawaii
SDAR Environmental Interest Name:	Not reported
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Not reported
Priority:	Not reported
Assessment:	Not reported
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Not reported
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Not reported
Contact Information:	Not reported
Facility ID:	759
Location Description:	16-565 Keaau-Pahoa Rd, Keaau, HI 96749
Is Public:	True
Update On:	01/28/2020
Latitude:	19.621435
Longitude:	-155.037675
Aliases:	DOE East Hawaii Schools Building Exterior Soils
Status Name:	Remedy In Place

6
NNW
1/2-1
0.995 mi.
5251 ft.

KEAAU MIDDLE SCHOOL
16-565 KEAAU-PAHOA RD
KEAAU, HI 96749

SHWS **S110061619**
INST CONTROL **N/A**

Relative:
Lower

Actual:
336 ft.

SHWS:

Name:	KEAAU MIDDLE SCHOOL
Address:	16-565 KEAAU-PAHOA RD
City,State,Zip:	KEAAU, HI 96749
Supplemental Location:	Keaau Middle School
Island:	Hawaii
Environmental Interest:	Keaau Middle School
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Program:	State
Project Manager:	John Peard
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Managed With Controls
Island:	Hawaii
SDAR Environmental Interest Name:	Keaau Middle School
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER Office
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	Low
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Found: Arsenic in soil.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	No use of the garden area.
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	John Peard
Contact Information:	(808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720
Facility ID:	2309
Location Description:	16-565 Keaau-Pahoa Rd, Keaau, HI 96749
Is Public:	True
Update On:	01/28/2020
Latitude:	19.621916
Longitude:	-155.038189
Aliases:	Brownfields Low Priority Site, Construction EHMP, Keaau Area Arsenic Investigation
Status Name:	Remedy In Place

INST CONTROL:

Potential hazards and controls:	Hazard Managed With Controls
Supplemental Location:	Keaau Middle School
Zip Suffix:	Not reported
Island:	Hawaii
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued

Count: 2 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
KEAAU	S116400154	KEAAU PAHOA ROAD 118 ACRE PARCEL	PAHOA RD		RGA HWS
KEAAU	S116400153	KEAAU PAHOA ROAD 118 ACRE PARCEL F	PAHOA RD		RGA HWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2023
Date Data Arrived at EDR: 03/28/2023
Date Made Active in Reports: 05/30/2023
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 06/23/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/23/2023
Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/23/2023
Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 07/31/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 14

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 07/31/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 07/31/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 07/31/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 07/31/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/25/2023
Date Data Arrived at EDR: 05/31/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 54

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 11/20/2023
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/22/2023
Date Data Arrived at EDR: 05/23/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 62

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/21/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/22/2023
Date Data Arrived at EDR: 05/23/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 62

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/21/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/12/2023
Date Data Arrived at EDR: 06/20/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 55

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/20/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

Lists of state- and tribal hazardous waste facilities

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 11/22/2022
Date Data Arrived at EDR: 03/07/2023
Date Made Active in Reports: 05/24/2023
Number of Days to Update: 78

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/08/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Semi-Annually

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF: Permitted Landfills in the State of Hawaii

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 03/22/2023
Date Data Arrived at EDR: 03/29/2023
Date Made Active in Reports: 06/13/2023
Number of Days to Update: 76

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 06/27/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Varies

Lists of state and tribal leaking storage tanks

LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 05/25/2023
Date Data Arrived at EDR: 05/30/2023
Date Made Active in Reports: 08/21/2023
Number of Days to Update: 83

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 11/22/2023
Next Scheduled EDR Contact: 09/04/2023
Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/19/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 04/19/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/14/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/25/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/26/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 05/09/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 03/08/2023
Date Data Arrived at EDR: 03/09/2023
Date Made Active in Reports: 05/30/2023
Number of Days to Update: 82

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 06/27/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 05/25/2023
Date Data Arrived at EDR: 05/30/2023
Date Made Active in Reports: 08/21/2023
Number of Days to Update: 83

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/04/2023
Data Release Frequency: Semi-Annually

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/19/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/25/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/14/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/26/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/20/2023
Date Data Arrived at EDR: 05/09/2023
Date Made Active in Reports: 07/14/2023
Number of Days to Update: 66

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/17/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites

A listing of sites with engineering controls in place.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 404-586-4249
Last EDR Contact: 06/08/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls

Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 04/17/2019
Date Data Arrived at EDR: 05/21/2019
Date Made Active in Reports: 05/30/2019
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/08/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

Lists of state and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/13/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites
Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 11/22/2022
Date Data Arrived at EDR: 03/07/2023
Date Made Active in Reports: 05/24/2023
Number of Days to Update: 78
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/08/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 11/22/2022
Date Data Arrived at EDR: 03/07/2023
Date Made Active in Reports: 05/24/2023
Number of Days to Update: 78
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/08/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 04/06/2023
Date Data Arrived at EDR: 04/13/2023
Date Made Active in Reports: 04/19/2023
Number of Days to Update: 6
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/08/2023
Next Scheduled EDR Contact: 09/25/2023
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: Solid Waste Recycling Information
A listing of recycling and drop-off facilities located in Hawaii.

Date of Government Version: 09/14/2022
Date Data Arrived at EDR: 09/28/2022
Date Made Active in Reports: 10/05/2022
Number of Days to Update: 7

Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/19/2023
Next Scheduled EDR Contact: 11/06/2023
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/11/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 07/27/2023
Next Scheduled EDR Contact: 11/13/2023
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 05/22/2023
Date Data Arrived at EDR: 05/23/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 48

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/21/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 10/22/2010
Number of Days to Update: 42
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/31/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/22/2023
Date Data Arrived at EDR: 05/23/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 48
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/21/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: Quarterly

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18
Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/19/2023
Date Data Arrived at EDR: 03/21/2023
Date Made Active in Reports: 05/30/2023
Number of Days to Update: 70
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/20/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

SPILLS: Release Notifications
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 05/30/2023
Date Data Arrived at EDR: 05/31/2023
Date Made Active in Reports: 07/12/2023
Number of Days to Update: 42
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 08/09/2023
Next Scheduled EDR Contact: 11/27/2023
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 07/24/2023
Date Data Arrived at EDR: 07/31/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 14

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 05/08/2023
Date Data Arrived at EDR: 05/16/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 55

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 08/15/2023
Next Scheduled EDR Contact: 11/27/2023
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 07/13/2021
Date Made Active in Reports: 03/09/2022
Number of Days to Update: 239

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/10/2023
Next Scheduled EDR Contact: 10/23/2023
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 07/30/2021
Date Data Arrived at EDR: 02/03/2023
Date Made Active in Reports: 02/10/2023
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/01/2023
Next Scheduled EDR Contact: 11/20/2023
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 06/19/2023
Date Data Arrived at EDR: 06/20/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 55

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/20/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 11/13/2023
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/03/2023
Next Scheduled EDR Contact: 11/13/2023
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 06/14/2022
Date Made Active in Reports: 03/24/2023
Number of Days to Update: 283

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/16/2023
Next Scheduled EDR Contact: 09/25/2023
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 02/16/2023
Date Made Active in Reports: 05/02/2023
Number of Days to Update: 75

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 08/18/2023
Next Scheduled EDR Contact: 11/27/2023
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 04/17/2023
Date Data Arrived at EDR: 04/18/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 83

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/18/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/04/2022
Date Made Active in Reports: 05/10/2022
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 06/12/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 11/13/2023
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 03/20/2023
Date Data Arrived at EDR: 04/04/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 66

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/07/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 06/27/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/15/2023
Date Data Arrived at EDR: 03/21/2023
Date Made Active in Reports: 05/30/2023
Number of Days to Update: 70

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/12/2023
Next Scheduled EDR Contact: 10/30/2023
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 04/14/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 87
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 08/03/2023
Next Scheduled EDR Contact: 11/13/2023
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 06/22/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 07/25/2023
Next Scheduled EDR Contact: 11/06/2023
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2023
Date Data Arrived at EDR: 04/20/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 81

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/27/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2021
Date Data Arrived at EDR: 03/09/2023
Date Made Active in Reports: 03/20/2023
Number of Days to Update: 11

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 07/31/2023
Next Scheduled EDR Contact: 10/02/2023
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 03/03/2023
Date Data Arrived at EDR: 03/03/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 98

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 07/26/2023
Next Scheduled EDR Contact: 11/13/2023
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 08/10/2023
Next Scheduled EDR Contact: 11/27/2023
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 06/22/2023
Date Data Arrived at EDR: 07/06/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 18

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data

Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 04/03/2023
Date Data Arrived at EDR: 04/04/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 66

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 11/20/2023
Data Release Frequency: Quarterly

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/01/2023
Date Data Arrived at EDR: 05/24/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 61

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 08/22/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 01/07/2022
Date Data Arrived at EDR: 02/24/2023
Date Made Active in Reports: 05/17/2023
Number of Days to Update: 82

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/04/2023
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/04/2023
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 06/13/2023
Date Data Arrived at EDR: 06/14/2023
Date Made Active in Reports: 08/14/2023
Number of Days to Update: 61

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/13/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 05/04/2023
Date Data Arrived at EDR: 05/25/2023
Date Made Active in Reports: 07/24/2023
Number of Days to Update: 60

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/11/2023
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 03/25/2023
Date Data Arrived at EDR: 03/31/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 70

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/29/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82
Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 08/15/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites
A listing of unexploded ordnance site locations

Date of Government Version: 11/09/2021
Date Data Arrived at EDR: 10/20/2022
Date Made Active in Reports: 01/10/2023
Number of Days to Update: 82
Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/06/2023
Next Scheduled EDR Contact: 10/23/2023
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 05/15/2023
Date Data Arrived at EDR: 05/17/2023
Date Made Active in Reports: 07/10/2023
Number of Days to Update: 54
Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 08/15/2023
Next Scheduled EDR Contact: 11/27/2023
Data Release Frequency: Quarterly

PFAS NPL: Superfund Sites with PFAS Detections Information
EPA's Office of Land and Emergency Management and EPA Regional Offices maintain data describing what is known about site investigations, contamination, and remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) where PFAS is present in the environment.

Date of Government Version: 06/07/2023
Date Data Arrived at EDR: 06/08/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 1
Source: Environmental Protection Agency
Telephone: 703-603-8895
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS FEDERAL SITES: Federal Sites PFAS Information
Several federal entities, such as the federal Superfund program, Department of Defense, National Aeronautics and Space Administration, Department of Transportation, and Department of Energy provided information for sites with known or suspected detections at federal facilities.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 04/07/2023
Number of Days to Update: 8
Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS TSCA: PFAS Manufacture and Imports Information
EPA issued the Chemical Data Reporting (CDR) Rule under the Toxic Substances Control Act (TSCA) and requires chemical manufacturers and facilities that manufacture or import chemical substances to report data to EPA. EPA publishes non-confidential business information (non-CBI) and includes descriptive information about each site, corporate parent, production volume, other manufacturing information, and processing and use information.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 71
Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS RCRA MANIFEST: PFAS Transfers Identified In the RCRA Database Listing

To work around the lack of PFAS waste codes in the RCRA database, EPA developed the PFAS Transfers dataset by mining e-Manifest records containing at least one of these common PFAS keywords: PFAS, PFOA, PFOS, PERFL, AFFF, GENX, GEN-X (plus the VT waste codes). These keywords were searched for in the following text fields: Manifest handling instructions (MANIFEST_HANDLING_INSTR), Non-hazardous waste description (NON_HAZ_WASTE_DESCRIPTION), DOT printed information (DOT_PRINTED_INFORMATION), Waste line handling instructions (WASTE_LINE_HANDLING_INSTR), Waste residue comments (WASTE_RESIDUE_COMMENTS).

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 05/02/2023
Number of Days to Update: 33

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS ATSDR: PFAS Contamination Site Location Listing

PFAS contamination site locations from the Department of Health & Human Services, Center for Disease Control & Prevention. ATSDR is involved at a number of PFAS-related sites, either directly or through assisting state and federal partners. As of now, most sites are related to drinking water contamination connected with PFAS production facilities or fire training areas where aqueous film-forming firefighting foam (AFFF) was regularly used.

Date of Government Version: 06/24/2020
Date Data Arrived at EDR: 03/17/2021
Date Made Active in Reports: 11/08/2022
Number of Days to Update: 601

Source: Department of Health & Human Services
Telephone: 202-741-5770
Last EDR Contact: 07/19/2023
Next Scheduled EDR Contact: 11/06/2023
Data Release Frequency: Varies

PFAS WQP: Ambient Environmental Sampling for PFAS

The Water Quality Portal (WQP) is a part of a modernized repository storing ambient sampling data for all environmental media and tissue samples. A wide range of federal, state, tribal and local governments, academic and non-governmental organizations and individuals submit project details and sampling results to this public repository. The information is commonly used for research and assessments of environmental quality.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 05/02/2023
Number of Days to Update: 33

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS NPDES: Clean Water Act Discharge Monitoring Information

Any discharger of pollutants to waters of the United States from a point source must have a National Pollutant Discharge Elimination System (NPDES) permit. The process for obtaining limits involves the regulated entity (permittee) disclosing releases in a NPDES permit application and the permitting authority (typically the state but sometimes EPA) deciding whether to require monitoring or monitoring with limits. Caveats and Limitations: Less than half of states have required PFAS monitoring for at least one of their permittees and fewer states have established PFAS effluent limits for permittees. New rulemakings have been initiated that may increase the number of facilities monitoring for PFAS in the future.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 04/07/2023
Number of Days to Update: 8

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS ECHO: Facilities in Industries that May Be Handling PFAS Listing

Regulators and the public have expressed interest in knowing which regulated entities may be using PFAS. EPA has developed a dataset from various sources that show which industries may be handling PFAS. Approximately 120,000 facilities subject to federal environmental programs have operated or currently operate in industry sectors with processes that may involve handling and/or release of PFAS.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 04/03/2023
Number of Days to Update: 4

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS ECHO FIRE TRAINING: Facilities in Industries that May Be Handling PFAS Listing

A list of fire training sites was added to the Industry Sectors dataset using a keyword search on the permitted facilitys name to identify sites where fire-fighting foam may have been used in training exercises. Additionally, you may view an example spreadsheet of the subset of fire training facility data, as well as the keywords used in selecting or deselecting a facility for the subset. as well as the keywords used in selecting or deselecting a facility for the subset. These keywords were tested to maximize accuracy in selecting facilities that may use fire-fighting foam in training exercises, however, due to the lack of a required reporting field in the data systems for designating fire training sites, this methodology may not identify all fire training sites or may potentially misidentify them.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 04/03/2023
Number of Days to Update: 4

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS PART 139 AIRPORT: All Certified Part 139 Airports PFAS Information Listing

Since July 1, 2006, all certified part 139 airports are required to have fire-fighting foam onsite that meet military specifications (MIL-F-24385) (14 CFR 139.317). To date, these military specification fire-fighting foams are fluorinated and have been historically used for training and extinguishing. The 2018 FAA Reauthorization Act has a provision stating that no later than October 2021, FAA shall not require the use of fluorinated AFFF. This provision does not prohibit the use of fluorinated AFFF at Part 139 civilian airports; it only prohibits FAA from mandating its use. The Federal Aviation Administration?s document AC 150/5210-6D - Aircraft Fire Extinguishing Agents provides guidance on Aircraft Fire Extinguishing Agents, which includes Aqueous Film Forming Foam (AFFF).

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 03/30/2023
Date Made Active in Reports: 04/03/2023
Number of Days to Update: 4

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

AQUEOUS FOAM NRC: Aqueous Foam Related Incidents Listing

The National Response Center (NRC) serves as an emergency call center that fields initial reports for pollution and railroad incidents and forwards that information to appropriate federal/state agencies for response. The spreadsheets posted to the NRC website contain initial incident data that has not been validated or investigated by a federal/state response agency. Response center calls from 1990 to the most recent complete calendar year where there was indication of Aqueous Film Forming Foam (AFFF) usage are included in this dataset. NRC calls may reference AFFF usage in the ?Material Involved? or ?Incident Description? fields.

Date of Government Version: 04/27/2023
Date Data Arrived at EDR: 04/27/2023
Date Made Active in Reports: 05/02/2023
Number of Days to Update: 5

Source: Environmental Protection Agency
Telephone: 202-272-0167
Last EDR Contact: 07/06/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PFAS: PFAS Contamination Site Listing

A listing of sites where "Potential PFAS" were found. The listing includes sites with "PFAs" and "fluoro", and site names that include "firefight", fire fight", "fire train".

Date of Government Version: 02/25/2022
Date Data Arrived at EDR: 02/28/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 10

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/21/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 06/28/2022
Date Data Arrived at EDR: 06/30/2022
Date Made Active in Reports: 09/14/2022
Number of Days to Update: 76

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 08/15/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 01/23/2023
Date Data Arrived at EDR: 02/23/2023
Date Made Active in Reports: 05/12/2023
Number of Days to Update: 78

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 08/02/2023
Next Scheduled EDR Contact: 10/09/2023
Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/30/2023
Date Data Arrived at EDR: 04/04/2023
Date Made Active in Reports: 06/14/2023
Number of Days to Update: 71

Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 05/31/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

LEAD: Lead Inspection Listing
Lead inspections

Date of Government Version: 03/07/2023
Date Data Arrived at EDR: 03/09/2023
Date Made Active in Reports: 05/24/2023
Number of Days to Update: 76

Source: Department of Health
Telephone: 808-586-5800
Last EDR Contact: 05/31/2023
Next Scheduled EDR Contact: 09/18/2023
Data Release Frequency: Varies

UIC: Underground Injection Wells Listing
A listing of underground injection well locations.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/12/2013
Date Made Active in Reports: 04/09/2013
Number of Days to Update: 56

Source: Department of Health
Telephone: 808-586-4258
Last EDR Contact: 08/15/2023
Next Scheduled EDR Contact: 12/04/2023
Data Release Frequency: Varies

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 06/27/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 06/27/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: No Update Planned

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 08/23/2022
Date Data Arrived at EDR: 11/22/2022
Date Made Active in Reports: 02/28/2023
Number of Days to Update: 98

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 05/25/2023
Next Scheduled EDR Contact: 09/04/2023
Data Release Frequency: Varies

PFAS TRIS: List of PFAS Added to the TRI
Section 7321 of the National Defense Authorization Act for Fiscal Year 2020 (NDAA) immediately added certain per- and polyfluoroalkyl substances (PFAS) to the list of chemicals covered by the Toxics Release Inventory (TRI) under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) and provided a framework for additional PFAS to be added to TRI on an annual basis.

Date of Government Version: 06/07/2023
Date Data Arrived at EDR: 06/08/2023
Date Made Active in Reports: 06/09/2023
Number of Days to Update: 1

Source: Environmental Protection Agency
Telephone: 202-566-0250
Last EDR Contact: 07/05/2023
Next Scheduled EDR Contact: 10/16/2023
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 191

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/17/2014
Number of Days to Update: 200

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005, 2010 and 2015 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
KEAAU, HI 96749

TARGET PROPERTY COORDINATES

Latitude (North):	19.60802 - 19° 36' 28.87''
Longitude (West):	155.031246 - 155° 1' 52.49''
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	286962.0
UTM Y (Meters):	2169244.0
Elevation:	338 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	9372267 MOUNTAIN VIEW, HI
Version Date:	2017
North Map:	9757551 HILO, HI
Version Date:	2017

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

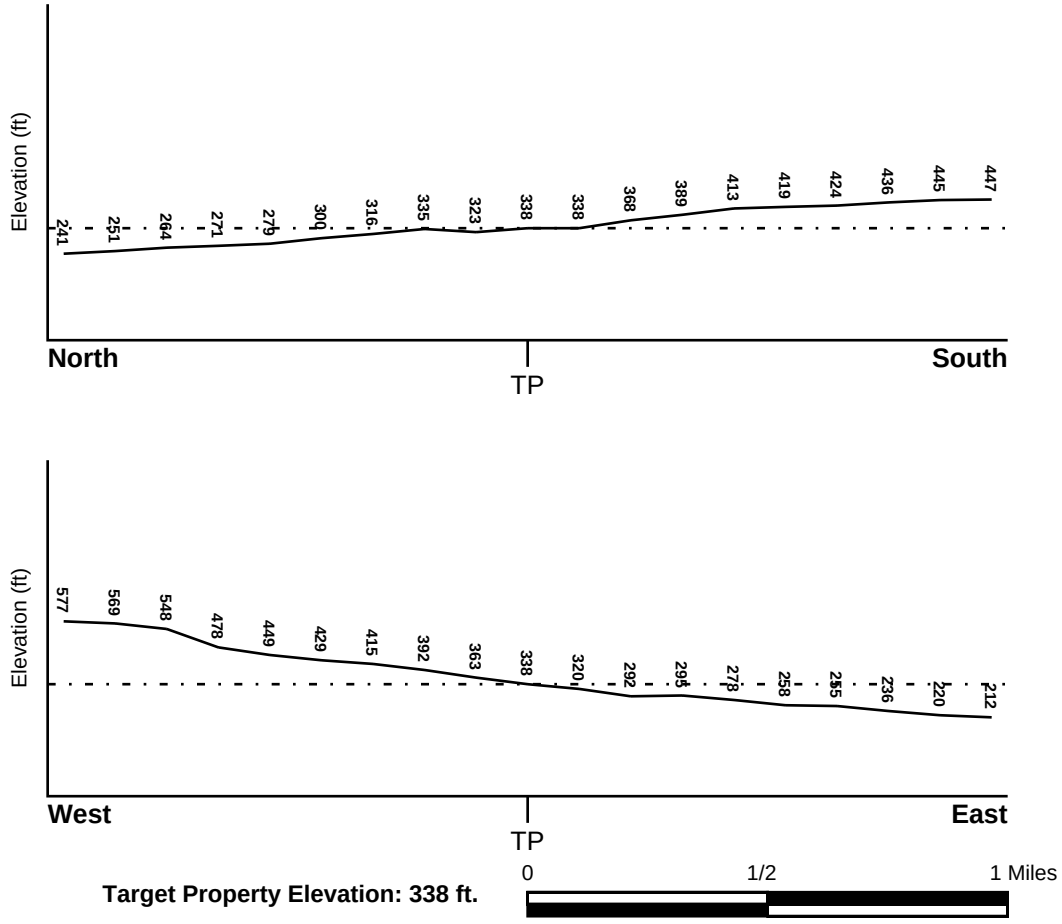
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General ENE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
1551661125C	FEMA Q3 Flood data

Additional Panels in search area:	FEMA Source Type
1551660895C	FEMA Q3 Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
MOUNTAIN VIEW	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

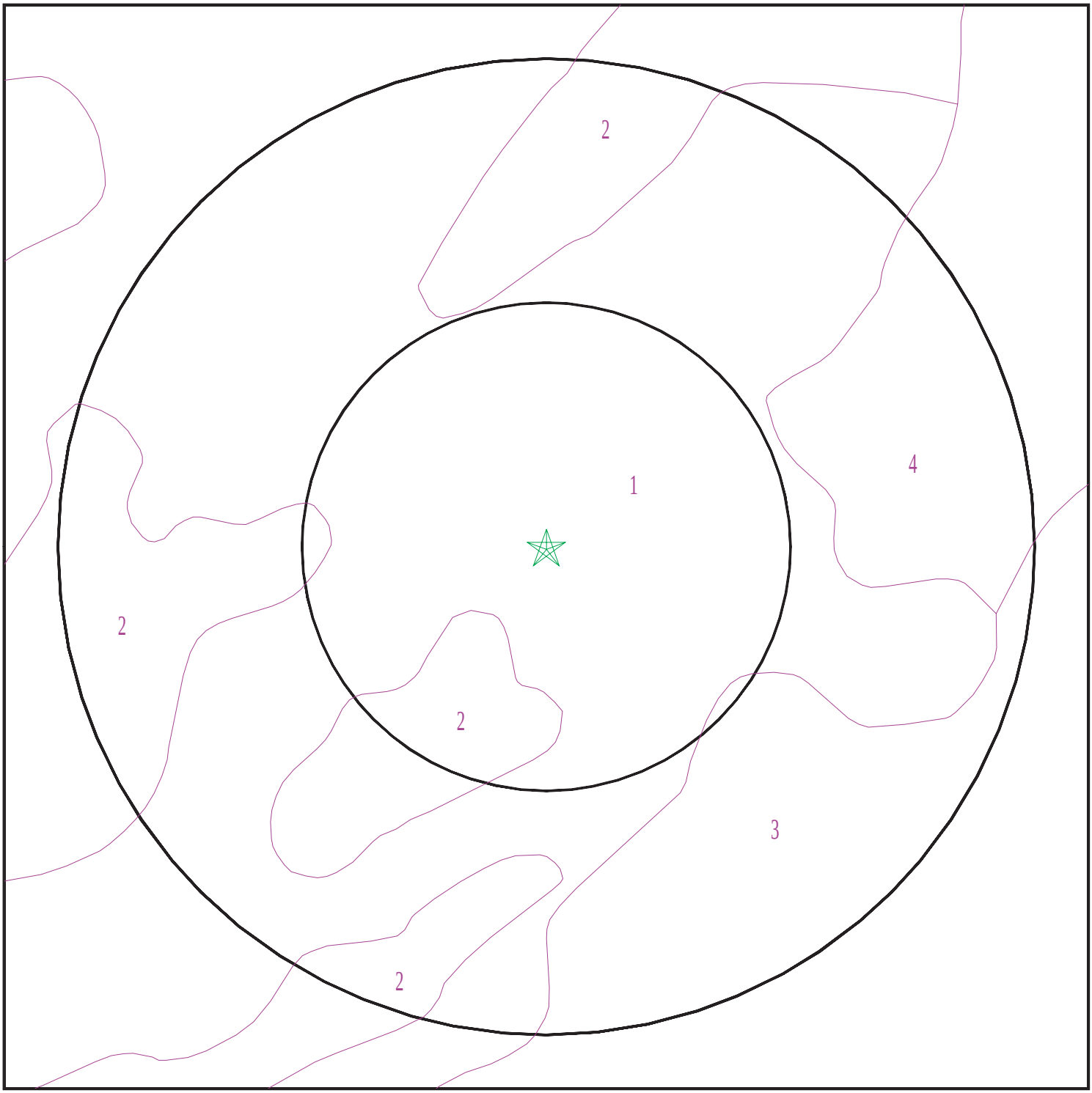
Era:	-
System:	-
Series:	-
Code:	N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 7426412.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	16-790 KEAAU PAHOA ROAD	CLIENT:	Lehua Environmental Inc
ADDRESS:	16-790 KEAAU PAHOA ROAD Keaau HI 96749	CONTACT:	Kama
		INQUIRY #:	7426412.2s
LAT/LONG:	19.60802 / 155.031246	DATE:	August 24, 2023 3:57 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Olaa

Soil Surface Texture: silty clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 700 Min: 141.14	Max: 6.5 Min: 5.6
2	7 inches	25 inches	extremely stony silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 700 Min: 141.14	Max: 6.5 Min: 5.6
3	25 inches	35 inches	extremely cobbly material	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 700 Min: 141.14	Max: 6.5 Min: 5.6

Soil Map ID: 2

Soil Component Name: Olaa

Soil Surface Texture: extremely stony silty clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	16 inches	25 inches	extremely stony silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 141.14 Min: 14.11	Max: 6.5 Min: 5.6
2	25 inches	35 inches	extremely cobbly material	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 141.14 Min: 14.11	Max: 6.5 Min: 5.6
3	0 inches	16 inches	extremely stony silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 141.14 Min: 14.11	Max: 6.5 Min: 5.6

Soil Map ID: 3

Soil Component Name: Lava flows, pahoehoe

Soil Surface Texture: bedrock

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	59 inches	bedrock	Not reported	Not reported	Max: 1.42 Min: 0.42	Max: Min:

Soil Map ID: 4

Soil Component Name: Hilo

Soil Surface Texture: silty clay loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 4.23 Min: 0.42	Max: 6.5 Min: 5.6
2	11 inches	59 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel.	Max: 4.23 Min: 0.42	Max: 6.5 Min: 5.6

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

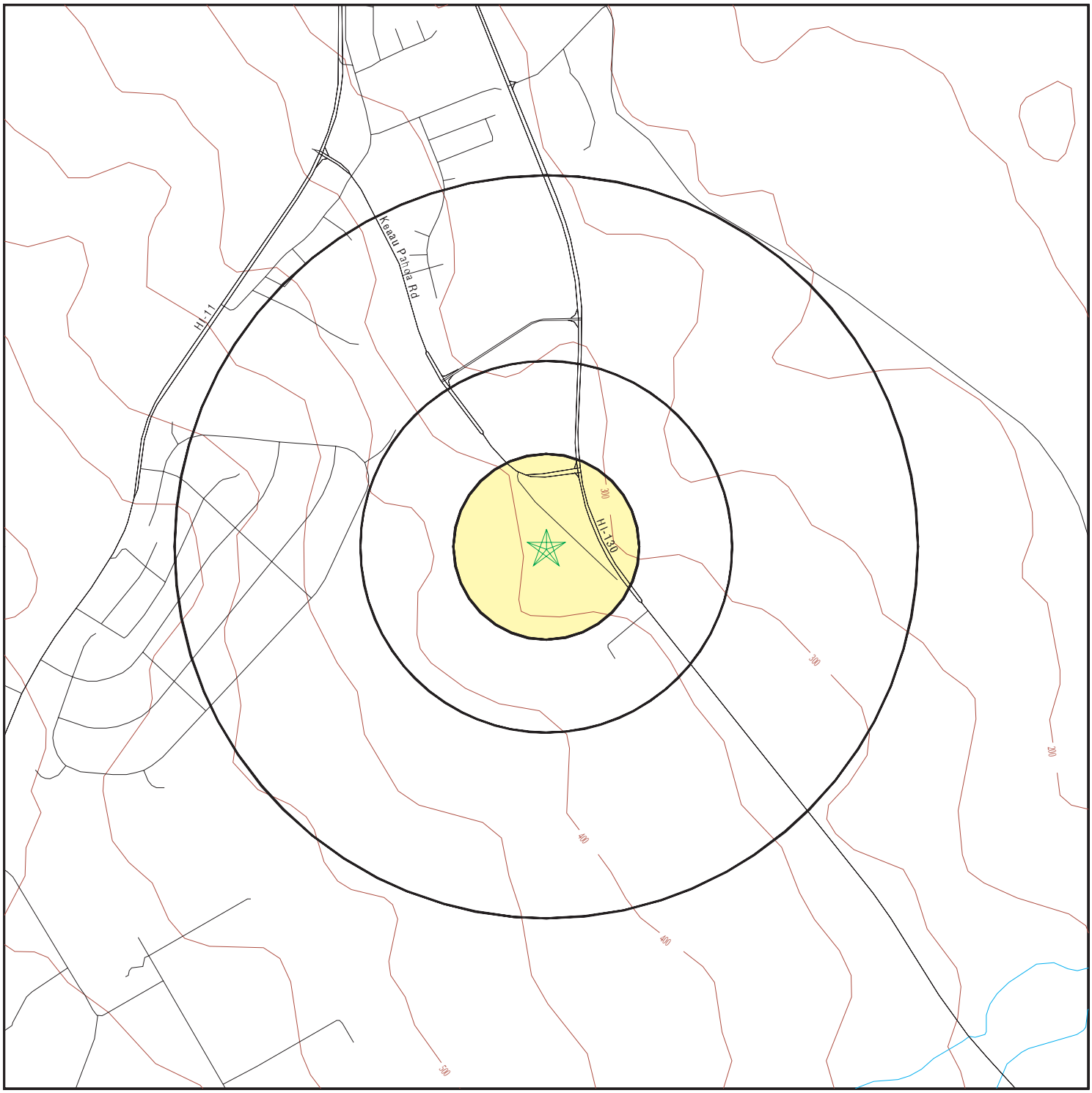
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 7426412.2s



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location

N

SITE NAME:	16-790 KEAAU PAHOA ROAD	CLIENT:	Lehua Environmental Inc
ADDRESS:	16-790 KEAAU PAHOA ROAD Keaau HI 96749	CONTACT:	Kama
LAT/LONG:	19.60802 / 155.031246	INQUIRY #:	7426412.2s
		DATE:	August 24, 2023 3:57 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for HAWAII County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96749

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005, 2010 and 2015 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii.

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

16-790 KEAAU PAHOA ROAD

16-790 KEAAU PAHOA ROAD

Keaau, HI 96749

Inquiry Number: 7426412.11

August 25, 2023

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/25/23

Site Name:

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
EDR Inquiry # 7426412.11

Client Name:

Lehua Environmental Inc
PO Box 1018
Kamuela, HI 96743
Contact: Kama

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
1992	1"=500'	Flight Date: September 23, 1992	USGS
1974	1"=500'	Flight Date: October 19, 1974	USGS
1961	1"=500'	Flight Date: February 04, 1961	USGS
1954	1"=500'	Flight Date: October 30, 1954	USGS

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

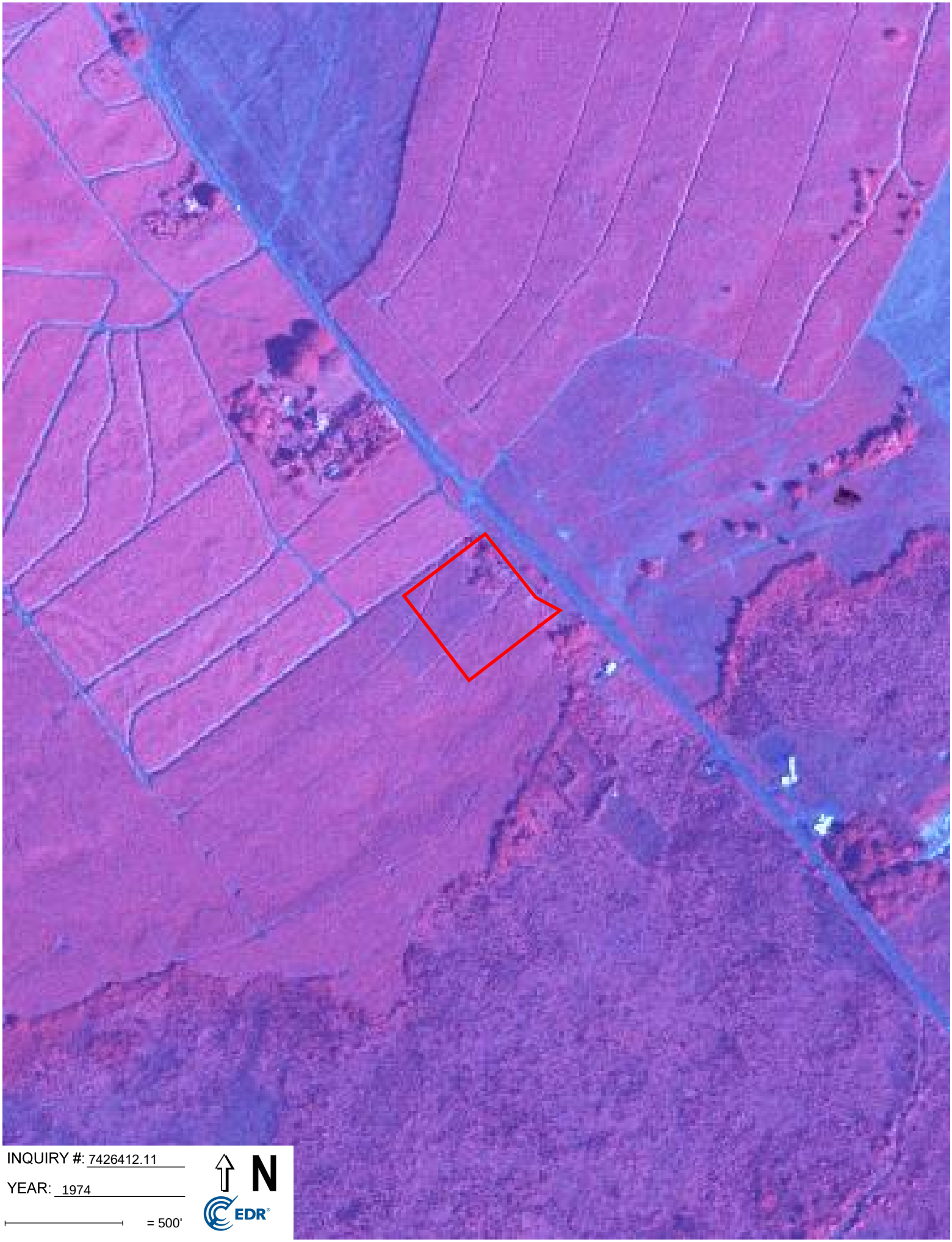
INQUIRY #: 7426412.11

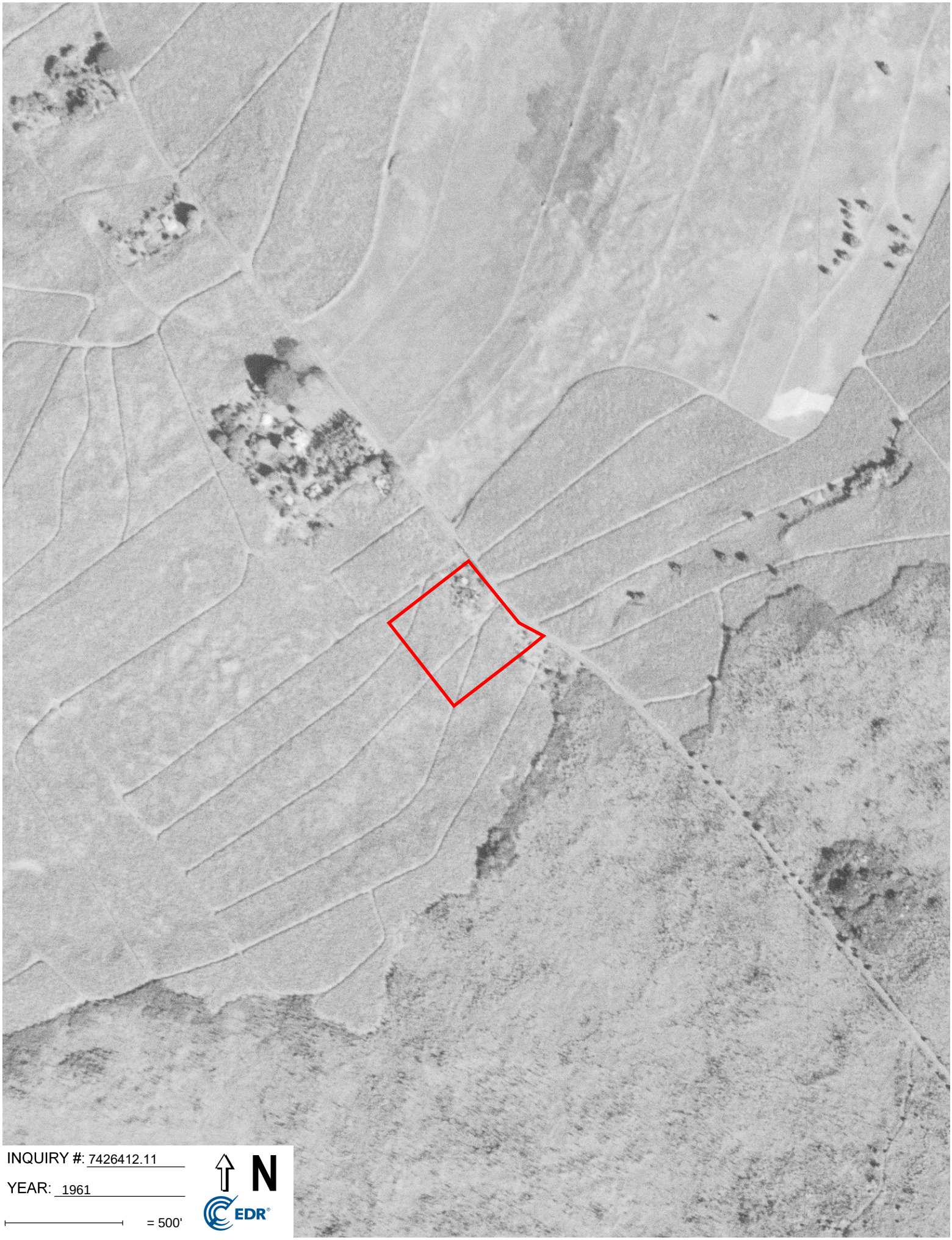
YEAR: 1992

= 500'

N

EDR


INQUIRY #: 7426412.11
YEAR: 1974
= 500'
N
EDR



INQUIRY #: 7426412.11

YEAR: 1961

= 500'

N

EDR

INQUIRY #: 7426412.11

YEAR: 1954

= 500'

N

EDR

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749

Inquiry Number: 7426412.8
August 24, 2023

EDR Building Permit Report

Target Property and Adjoining Properties

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Building Permit Report: Search Documentation

8/24/23

Site Name:
16-790 KEAAU
16-790 KEAAU
Keaau, HI 96749

EDR Inquiry # 7426412.8

Client Name:
Lehua Environmental Inc
PO Box 1018
Kamuela, HI 96743

Contact: Kama

Search Documentation

DATA GAP

The complete collection of Building Permit data available to EDR has been searched, and as of 8/24/23, EDR does not have access to building permits in the city where your target property is located (Keaau, HI).

EDR BUILDING PERMIT REPORT

About This Report

The EDR Building Permit Report provides a practical and efficient method to search building department records for indications of environmental conditions. Generated via a search of municipal building permit records gathered from more than 1,600 cities nationwide, this report will assist you in meeting the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527 - 21), or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

Building permit data can be used to identify current and/or former operations and structures/features of environmental concern. The data can provide information on a target property and adjoining properties such as the presence of underground storage tanks, pump islands, sumps, drywells, etc., as well as information regarding water, sewer, natural gas, electrical connection dates, and current/former septic tanks.

ASTM and EPA Requirements

ASTM E1527 - 21 lists building department records as a "standard historical source," as detailed in § 8.3.4.7: "Building Department Records - The term building department records means those records of the local government in which the property is located indicating permission of the local government to construct, alter, or demolish improvements on the property." ASTM also states that "Uses in the area surrounding the property shall be identified in the report, but this task is required only to the extent that this information is revealed in the course of researching the property itself."

EPA's Standards and Practices for All Appropriate Inquires (AAI) states: "§312.24: Reviews of historical sources of information. (a) Historical documents and records must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f). Historical documents and records may include, but are not limited to, aerial photographs, fire insurance maps, building department records, chain of title documents, and land use records."

Methodology

EDR has developed the EDR Building Permit Report through our partnership with BuildFax, the nation's largest repository of building department records. BuildFax collects, updates, and manages building department records from local municipal governments. The database now includes 30 million permits, on more than 10 million properties across 1,600 cities in the United States.

The EDR Building Permit Report comprises local municipal building permit records, gathered directly from local jurisdictions, including both target property and adjoining properties. Years of coverage vary by municipality. Data reported includes (where available): date of permit, permit type, permit number, status, valuation, contractor company, contractor name, and description.

Incoming permit data is checked at seven stages in a regimented quality control process, from initial data source interview, to data preparation, through final auditing. To ensure the building department is accurate, each of the seven quality control stages contains, on average, 15 additional quality checks, resulting in a process of approximately 105 quality control "touch points."

For more information about the EDR Building Permit Report, please contact your EDR Account Executive at (800) 352-0050.

EDR® Environmental Data Resources Inc

BUILD FAX PROPERTY HISTORY

16-790 KEAAU PAHOA ROAD

16-790 KEAAU PAHOA ROAD

Keaau, HI 96749

Inquiry Number: 7426412.3

August 24, 2023

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

08/24/23

Site Name:

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
EDR Inquiry # 7426412.3

Client Name:

Lehua Environmental Inc
PO Box 1018
Kamuela, HI 96743
Contact: Kama

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Lehua Environmental Inc were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 33F9-4B97-94BA

PO # NA

Project NA

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 33F9-4B97-94BA

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

Lehua Environmental Inc (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

16-790 KEAAU PAHOA ROAD

16-790 KEAAU PAHOA ROAD

Keaau, HI 96749

Inquiry Number: 7426412.4

August 24, 2023

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/24/23

Site Name:

16-790 KEAAU PAHOA ROAD
16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
EDR Inquiry # 7426412.4

Client Name:

Lehua Environmental Inc
PO Box 1018
Kamuela, HI 96743
Contact: Kama

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Lehua Environmental Inc were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA
Project: NA

Coordinates:

Latitude:	19.60802 19° 36' 29" North
Longitude:	-155.031246 -155° 1' 52" West
UTM Zone:	Zone 5 North
UTM X Meters:	286965.25
UTM Y Meters:	2169373.37
Elevation:	336.91' above sea level

Maps Provided:

2017
2013
1994, 1995
1981
1963
1932
1917
1914

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2017 Source Sheets

Mountain View
2017
7.5-minute, 24000

Hilo
2017
7.5-minute, 24000

2013 Source Sheets

Mountain View
2013
7.5-minute, 24000

Hilo
2013
7.5-minute, 24000

1994, 1995 Source Sheets

Mountain View
1994
7.5-minute, 24000
Aerial Photo Revised 1994

Hilo
1995
7.5-minute, 24000
Aerial Photo Revised 1995

1981 Source Sheets

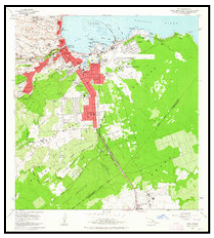
Mountain View
1981
7.5-minute, 24000
Aerial Photo Revised 1977

Hilo
1981
7.5-minute, 24000
Aerial Photo Revised 1977

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

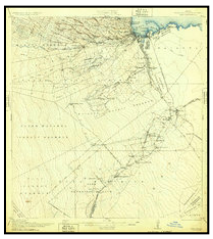
1963 Source Sheets



Hilo
1963
7.5-minute, 24000
Aerial Photo Revised 1961

Mountain View
1963
7.5-minute, 24000
Aerial Photo Revised 1961

1932 Source Sheets

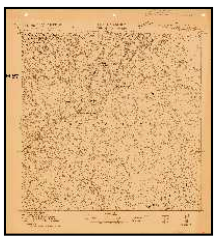


Hilo
1932
15-minute, 62500

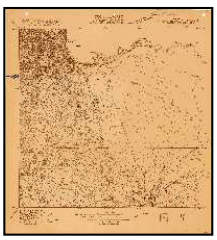
1917 Source Sheets

Hilo
1917
15-minute, 62500

1914 Source Sheets



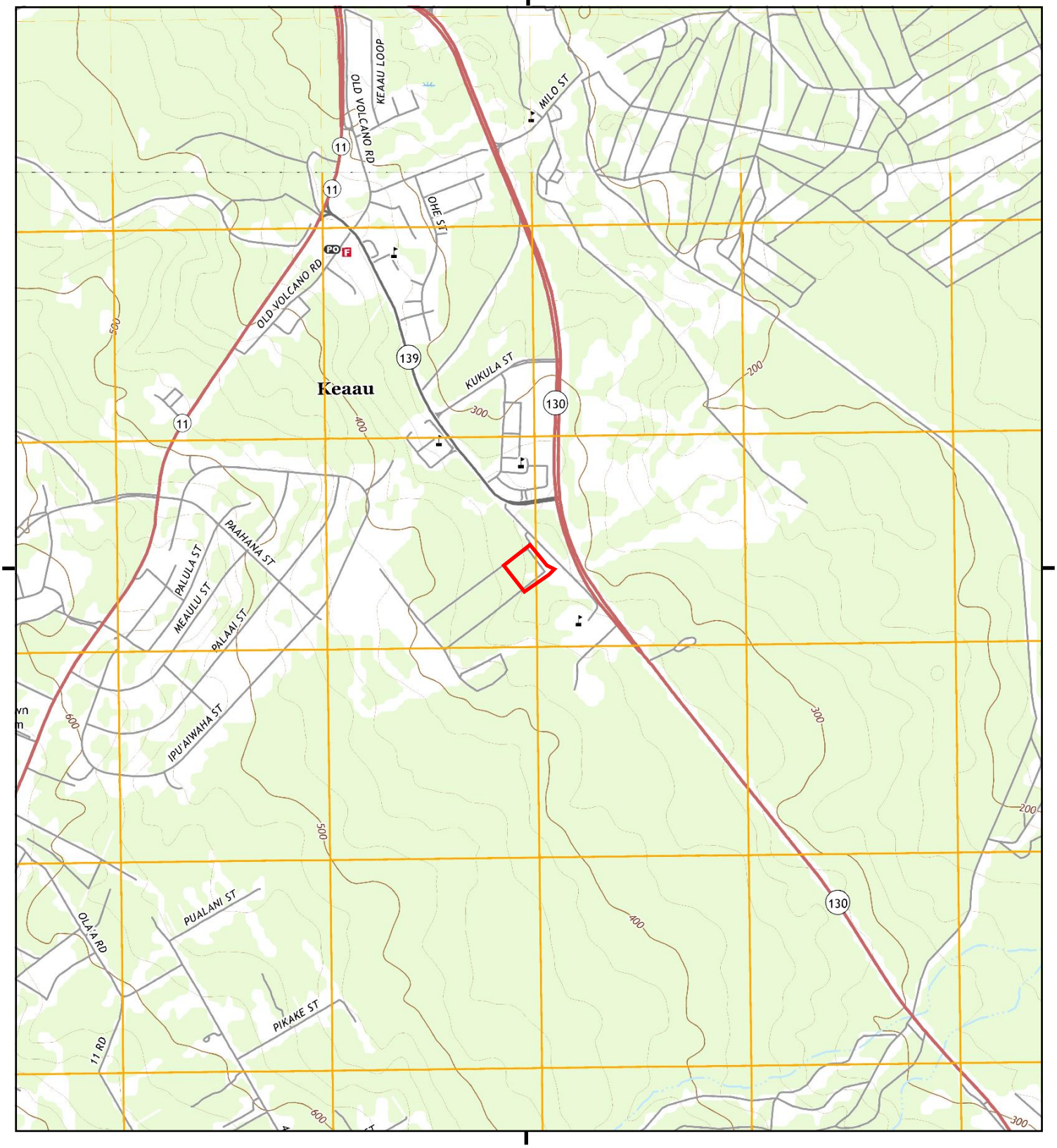
MOUNTAINVIEW
1914
7.5-minute, 31680



WAIAKEA
1914
7.5-minute, 31680

Historical Topo Map

2017



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0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

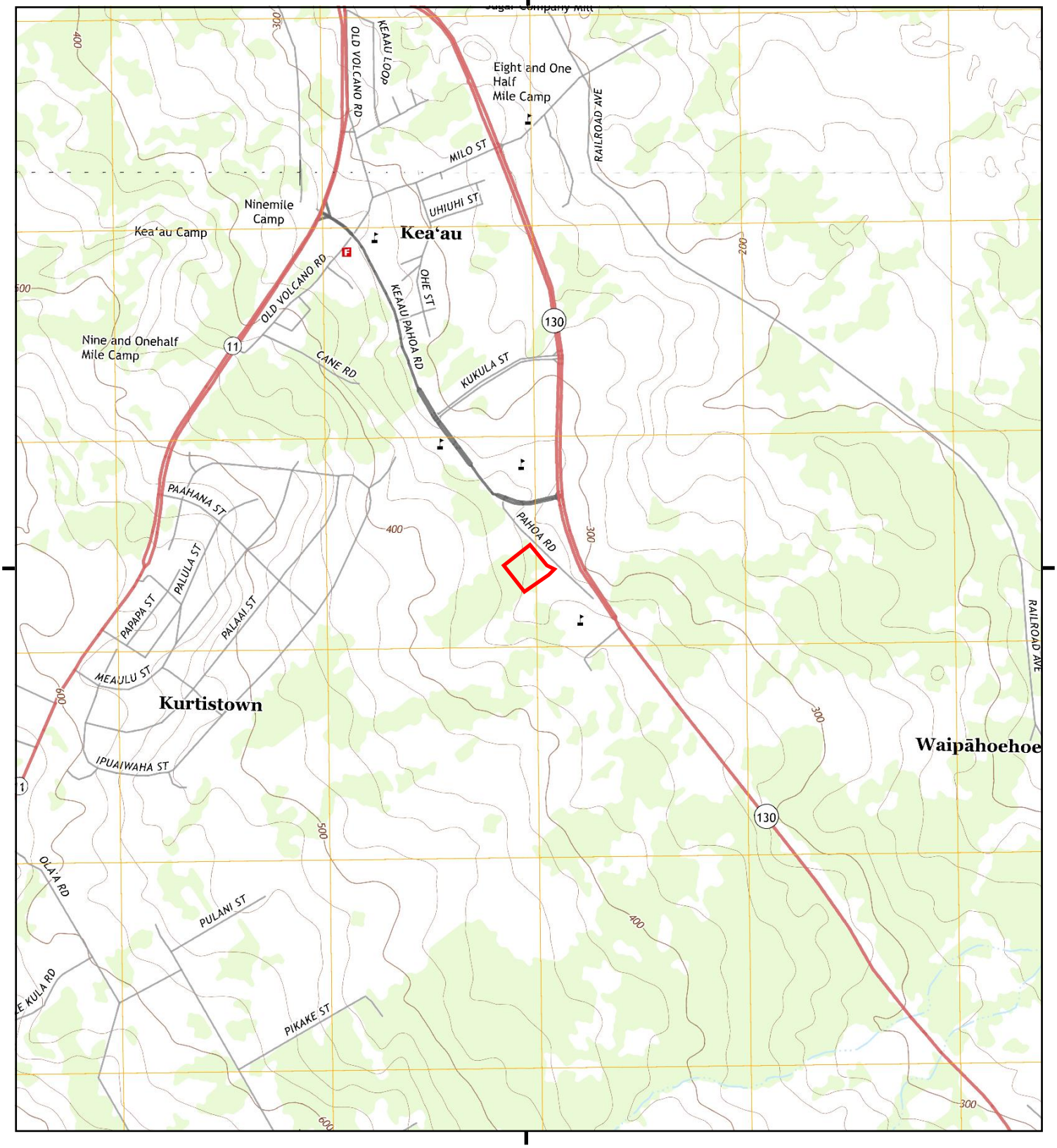
TP, Mountain View, 2017, 7.5-minute
N, Hilo, 2017, 7.5-minute

SITE NAME: 16-790 KEAAU PAHOA ROAD
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N

Historical Topo Map

2013



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W E
SW S SE

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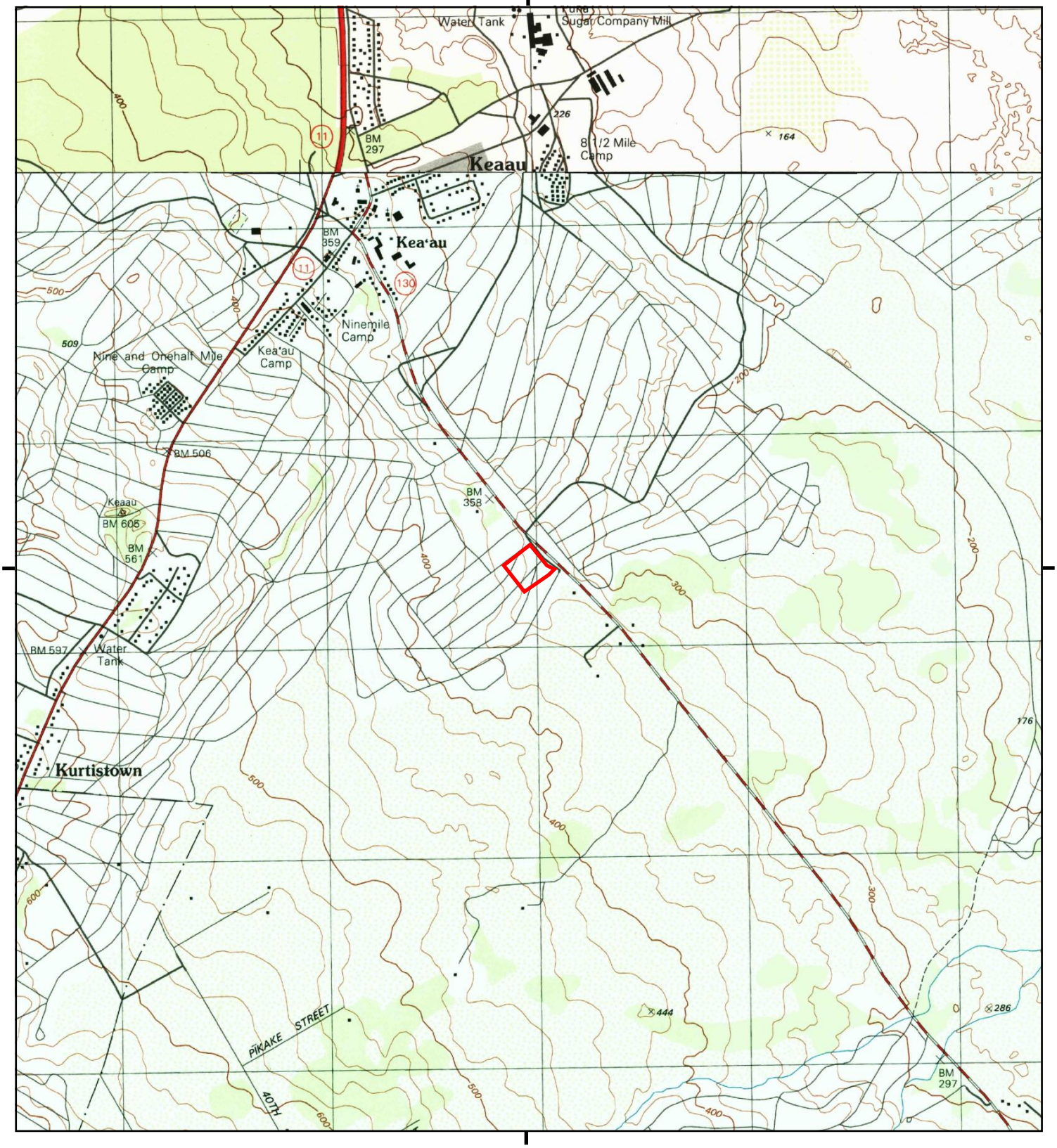
N, Hilo, 2013, 7.5-minute

SITE NAME: 16-790 KEAAU PAHOA ROAD
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N

Historical Topo Map

1994, 1995



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W E
SW S SE

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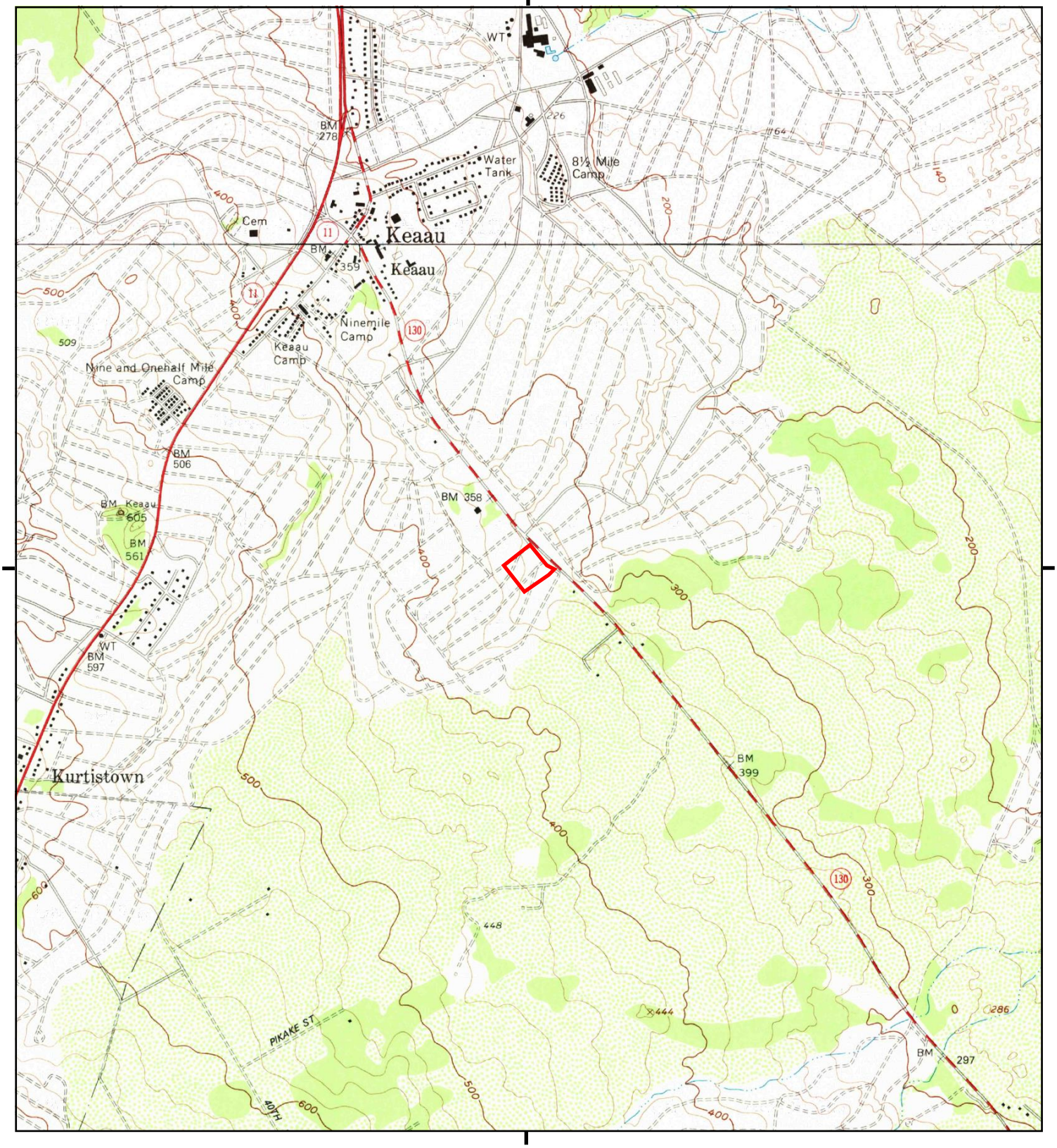
N, Hilo, 1995, 7.5-minute

SITE NAME: 16-790 KEAAU PAHOA ROAD
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N

Historical Topo Map

1981



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SW S SE

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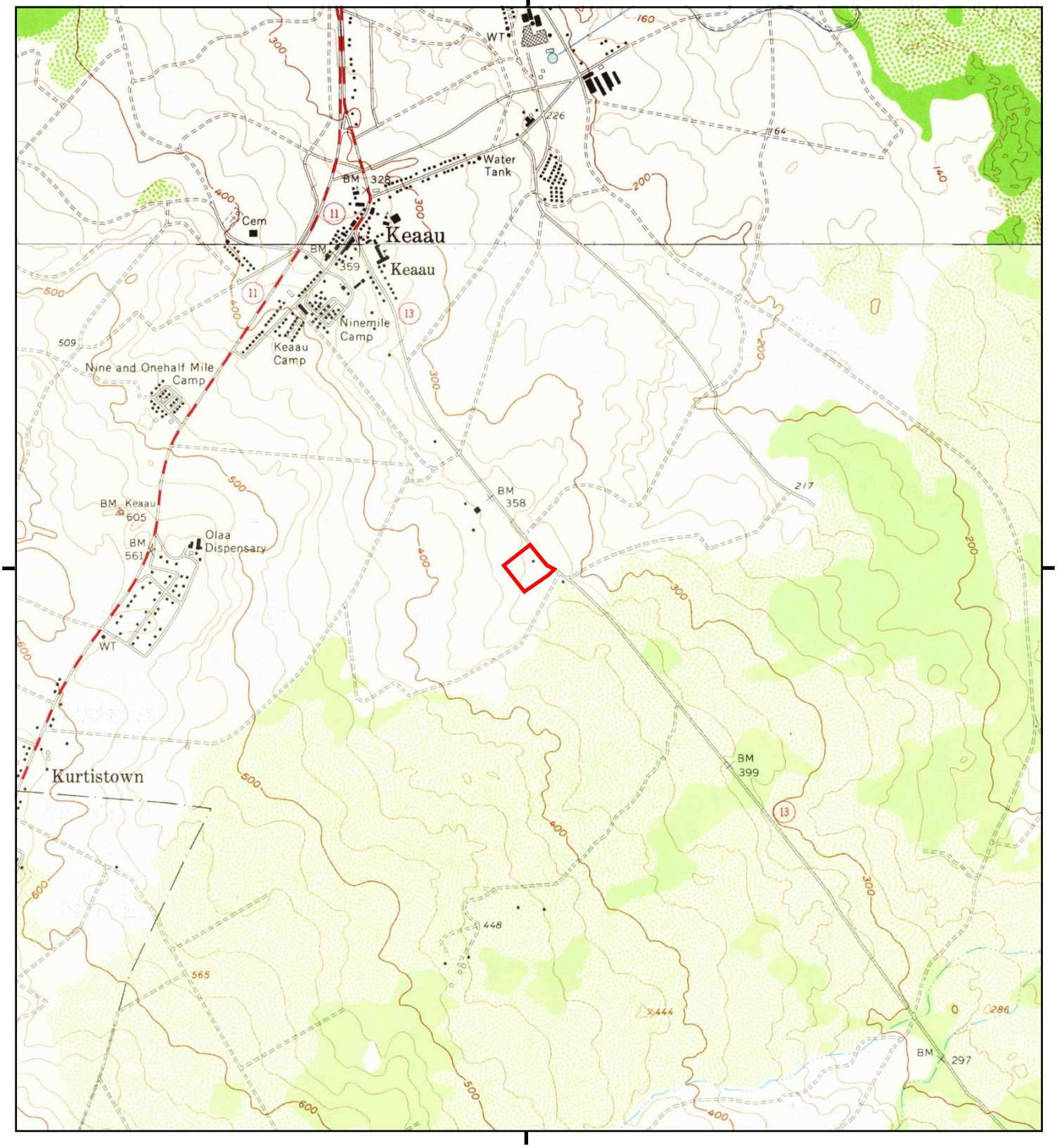
N, Hilo, 1981, 7.5-minute

SITE NAME: 16-790 KEAAU PAHOA ROAD
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N

Historical Topo Map

1963



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W E
SW S SE

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N, Hilo, 1963, 7.5-minute

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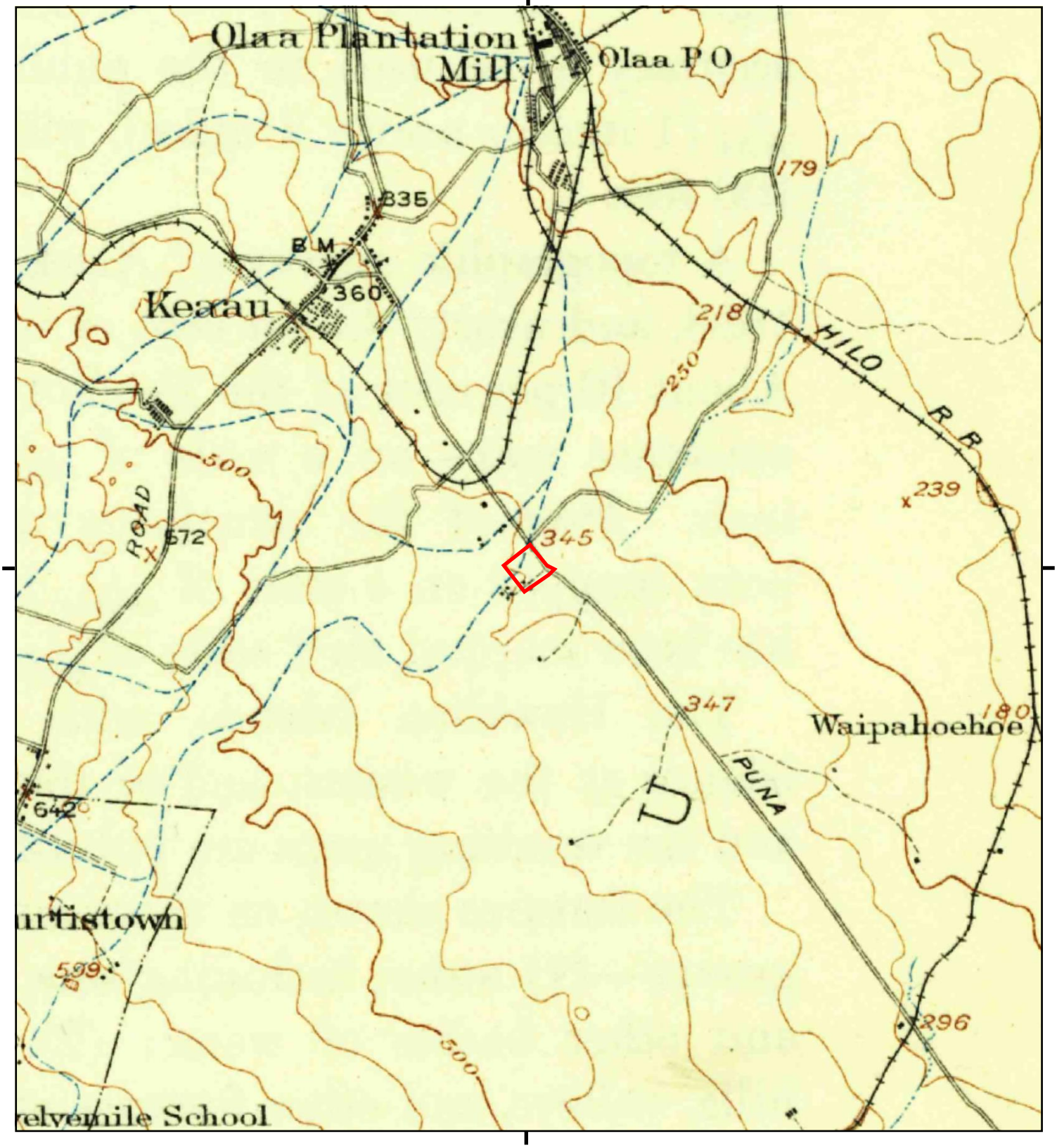
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N



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W E
SW S SE

TP, Hilo, 1932, 15-minute

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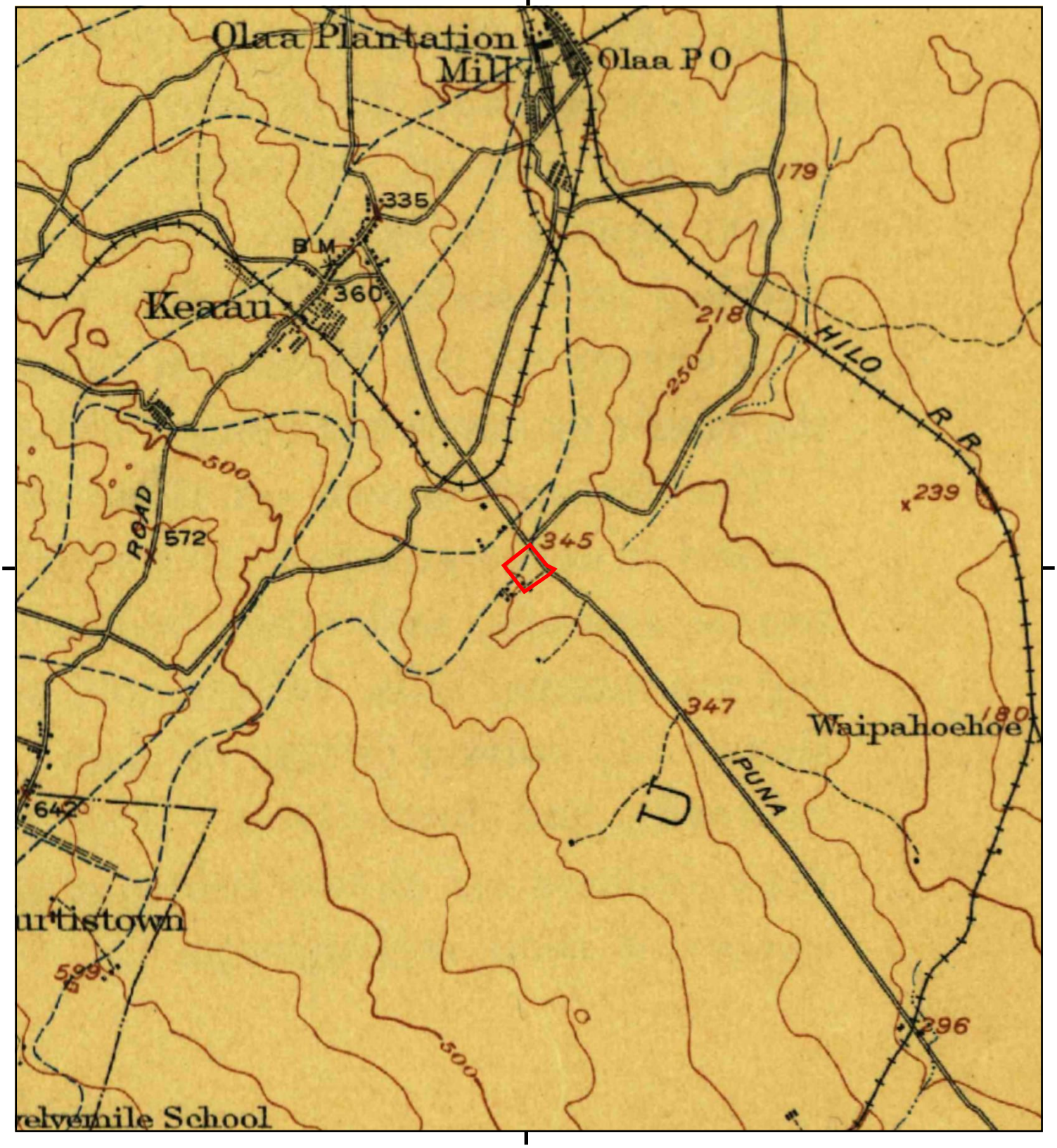
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N



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W E
SW S SE

TP, Hilo, 1917, 15-minute

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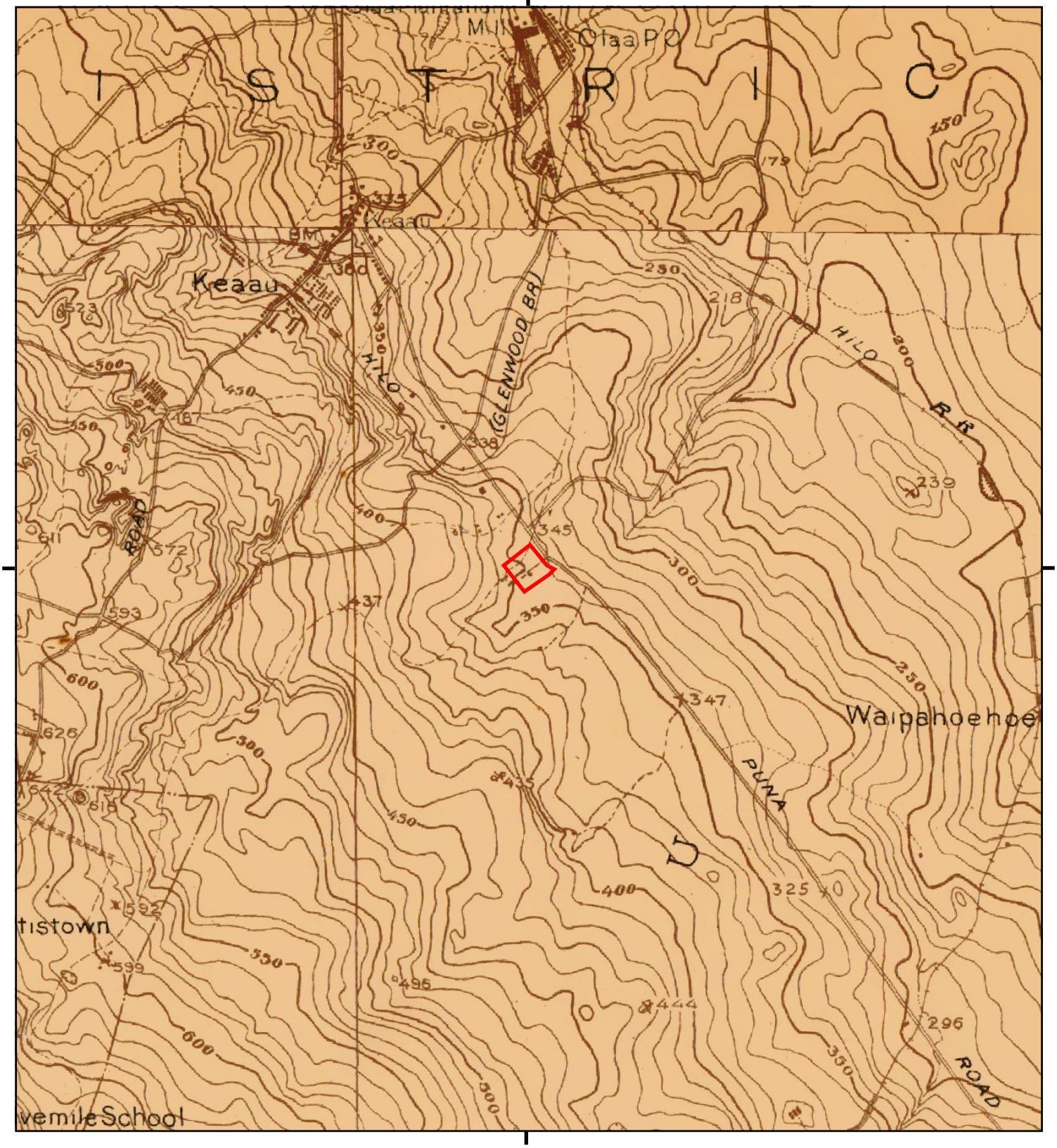
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N



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NW N NE
W E
SW S SE

TP, MOUNTAINVIEW, 1914, 7.5-minute
N, WAIAKEA, 1914, 7.5-minute

SITE NAME: 16-790 KEAAU PAHOA ROAD
ADDRESS: 16-790 KEAAU PAHOA ROAD
Keaau, HI 96749
CLIENT: Lehua Environmental Inc

N

Appendix C: Environmental Professional Qualifications

Kamalana Kobayashi, Environmental Professional

Mr. Kobayashi has 20 years of experience successfully completing a variety of environmental projects including Phase I ESAs, Phase II ESAs, and hazardous materials assessments in Hawaii. Specific duties have included managing and executing projects and coordinating with clients to problem solve in achieving regulatory compliance, planning and executing field work, and coordinating with subcontractors to execute a variety of specialized environmental work tasks.

APPENDIX D - TESTING RESULTS

Lehua Environmental Inc.

P.O. Box 1018 • Kamuela, Hawaii 96743 • Tel: (808) 494-0365 • Website: www.lehuaenvironmental.com

HAZARDOUS MATERIALS SURVEY AND SOIL SCREEN REPORT

PROJECT SITE:
HILO MEDICAL CENTER – KEA'AU HEALTHCARE AND WELLNESS COMPLEX
16-790 KEA'AU-PĀHOA ROAD, KEAAU, HAWAI'I 96749
TMK: (3) 1-6-003:081, LOT 1-A (7-ACRE SUBDIVIDE LOT)

PREPARED FOR:
FLEMING & ASSOCIATES, LLC
557 MANONO STREET
HILO, HAWAI'I 96720

CONDUCTED BY:
LEHUA ENVIRONMENTAL INC.
P.O. BOX 1018
KAMUELA, HAWAI'I 96743

DATE: JULY 11, 2024

TABLE OF CONTENTS

1.0 CERTIFICATIONS AND LIMITATIONS

Lehua Environmental Inc. (LEI) has completed this Hazardous Materials Survey and Soil Screen for the Hilo Medical Center Kea'au Healthcare and Wellness Complex project located within the 7-acre subdivided lot (Lot 1-A) in TMK: (3) 1-6-003:081 at 16-790 Kea'au-Pāhoa Road in Kea'au, Hawai'i. LEI's findings and recommendations contained herein are based on research, site observations, government regulations and laboratory data, which were gathered at the time and location of the study. Opinions stated in this report do not apply to changes that may have occurred after the services were performed.

LEI has performed specified services for this project with the degree of care, skill and diligence ordinarily exercised by professional consultants performing the same or similar services. No other warranty, guarantee, or representation, expressed or implied, is included or intended; unless otherwise specifically agreed to in writing by both LEI and LEI's Client.

LEI makes no warranty or assumes no liability for the inappropriate use or misuse of this document.

Prepared By: _____

Kamalana Kobayashi
State of Hawaii Asbestos Certification
Certification #: HIASB-0613, Expires: 6/18/25
State of Hawaii Certified Lead Risk Assessor
Certification #: PB-0132, Expires: 5/16/25

Report Date: July 11, 2024

2.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

Subject: Hazardous Materials Survey and Soil Screen Report
Hilo Medical Center (HMC) Kea'au Healthcare and Wellness Complex Project
7-acre subdivided lot (Lot 1-A) in TMK: (3) 1-6-003:081
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

Lehua Environmental Inc. (LEI) conducted a Hazardous Materials survey and soil screen from June 20-21, 2024 for the HMC Kea'au Healthcare and Wellness Complex Project located in Lot 1-A in TMK: (3) 1-6-003:081 and located at 16-790 Kea'au-Pāhoa Road in Kea'au, Hawai'I (Subject Site).

ASBESTOS-CONTAINING MATERIALS (ACM)

The grey mastic located throughout the metal corrugated roof of the warehouse was identified to be a category I non-friable ACM.

The category I non-friable ACM, which could be crumbled and pulverized during renovation/demolition activities must be removed and disposed of by a qualified asbestos abatement contractor. Disturbance activities that would render the identified and assume ACM to be friable must be avoided.

In addition, the services of a qualified consultant should be obtained to conduct air monitoring and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of asbestos-containing material.

LEAD-CONTAINING PAINT (LCP)

LCPs were identified in poor to fair conditions on various interior and exterior painted surfaces within the planned areas of disturbance at the Subject Site. LEI recommends the following for LCP disturbance:

- Spot remove and dispose of all LCP that may be disturbed or become dislodged during renovation activities in accordance with applicable local, state, and federal regulations.
- Spot remove and dispose of all loose and flaking (poor condition) LCP that may be disturbed or become dislodged during renovation activities in accordance with applicable local, state, and federal regulations.
- Workers performing disturbance of LCP must take appropriate measures to comply with applicable OSHA and HIOSH regulations pertaining to the handling of lead containing materials, lead dust and worker protection. Note that OSHA and HIOSH regulate activities that disturb paint which contain any detectable concentration of lead. Note that detectable levels of lead in the paint were found throughout the Subject Site.
- A qualified consultant should be obtained to conduct air monitoring and inspection activities to ensure compliance with applicable state and federal regulations pertaining to the handling of lead paint.

SOIL SCREEN SURVEY

Arsenic-impacted soils with concentrations that exceed the arsenic Hawaii Department of Health (HDOH) Tier 1 Environmental Action Level (EAL) for unrestricted land use was detected in decision unit: KHMC DU-4A (0"-6" below ground surface (bgs). This decision unit is located in the northern corner of Lot 1-A of the Subject Site and is approximately 250' x 130'.

The following requirements and recommendations should be followed in areas with soils identified to exceed the Hawaii DOH EAL for arsenic in soil.

- The owner or operator of the facility must immediately notify the Hawai'i State Emergency Response Commission (HSERC) (through the HEER Office) and the appropriate Local Emergency Planning Committee (LEPC) if there is a release into the environment of a hazardous substance that is equal to or exceeds the minimum reportable quantity in any 24-hour period as set forth in the regulation. Call (808) 586-4249 and following up with a written Release Notification. Additional details regarding requirements for notification can be found at: https://health.hawaii.gov/heer/reporting/how-to-report-a-release-spill/. Notification to the HEER Office should be made immediately upon confirmation of contaminated soil at concentrations that exceed Tier 1 and/or Tier 2 Environmental Action Levels and therefore pose a potential hazard to human health and/or the environment.
- Use of good general hygiene practices for tenants, public, employees and workers to avoid soil exposure.
- Limit exposure to the contaminated soils to properly trained personnel by fencing or blocking off all bare soil or patchy grass areas so that children, site workers and the general public will not be able to access bare soil or patchy grass areas.
- Prior to construction activities that disturb the arsenic-impacted soils, prepare and submit for approval to the Hawaii DOH Hazard Evaluation and Emergency Response (HEER) office a Construction-Environmental Hazard Management Plan (C-EHMP) which outlines the proper handling and management of soil and/or groundwater, sampling and analysis protocol for soil, the planned re-use/disposal locations for excavated soil, health and safety measures to be taken to protect workers, environment and the general public. The C-EHMP should be approved by the Hawaii DOH HEER office prior to the start of arsenic-impacted soils disturbance at the Subject Site.

  If applicable, develop a Removal Action Report (RAR) presenting the results of the removal action, based on the Removal Action Work Plan (RAWP). The RAWP is usually completed prior to initiating a removal action; however, this may not be possible in the case of emergency response. The RAR should include background information, remedial action details and description of confirmation testing to demonstrate effectiveness of the remedial action in reducing contamination levels below Tier 1 environmental action levels.
- Assume all untested soils at the Subject Site are arsenic-contaminated until further testing determines otherwise.

3.0 SCOPE OF WORK

LEI performed the following scope of work:

- Performed site reconnaissance at the Subject Site;
- Collected a total of forty-eight (48) bulk asbestos samples from the Subject Site in accordance with DOH/EPA guidelines;
- Submitted the forty-eight (48) bulk samples to Hawaii Analytical Laboratories, LLC for analysis by polarized light microscopy (PLM) in accordance with NIOSH Method – 600/R-93/116 to determine asbestos type and content;
- Collected thirty-three (33) paint chip samples from painted surfaces within the planned areas of disturbance of the Subject Site;
- Submitted the thirty-three (33) paint chip samples to Hawaii Analytical Laboratories, LLC for analysis via EPA Method 7082m LEAD by Flame Atomic Absorption Spectrophotometry (FAAS) for total lead content;
- Identified a total of sixteen (16) decision unit within the Subject Site;
- Collected a total of twenty (20) multi-increment samples (MIS) from the identified decision units at the Subject Site, which includes triplicate samples per DOH HEER TGM recommendations. Each MIS included 100 sub-samples collected utilizing DOH recommended hand tools and equipment;
- Submitted the twenty (20) MIS soil samples to Advanced Analytical Laboratory Inc. in Honolulu, Hawaii for the following analysis:
    - MIS laboratory preparation
    - Total RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, selenium, mercury and silver) by Environmental Protection Agency (EPA) Method 6020B/3050B
    - Bioaccessible arsenic by EPA Method 1340
    - Organochlorine pesticides by EPA Method 8081B/3550C
- Provided this Letter Report documenting LEI's methodologies, findings, photograph documentation and recommendations.

4.0 METHODOLOGY

ASBESTOS

From June 20-21, 2024, LEI's State of Hawaii certified asbestos inspectors collected forty-eight (48) samples of suspect materials from the areas of planned disturbance from the Subject Site for asbestos analysis. These samples were collected in accordance with DOH/EPA guidelines and recommendations.

Each suspect asbestos containing material was first wetted with water. A small piece was then removed and placed in a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. All samples were properly logged and recorded following strict chain of custody procedure and submitted to Hawaii Analytical Laboratories, LLC (HAL) for analysis by polarized light microscopy in accordance with EPA Method 600/R-93/116. HAL is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP).

LEAD PAINT

From June 20-21, 2024, LEI's State of Hawaii certified lead-based paint risk assessors collected thirty-three (33) paint chip samples from the areas of planned disturbance from the Subject Site in accordance with the DOH/EPA guidelines and recommendations.

The suspected lead paints were wetted with amended water before sample collection. Paint was carefully scraped and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. All samples were properly logged and recorded following strict chain of custody procedure and submitted to HAL for analysis in accordance with EPA Method 7082m LEAD by FAAS.

SOIL SCREEN

The multi-increment sampling (MIS) soil screen at the Subject Site included a surface (0"-6" bgs) and shallow subsurface (6"-12" bgs) soils screen for the contaminants of potential concern (COPC) at the Subject Site with established Department of Health (DOH) Environmental Action Levels (EALs) to be disturbed during this project. Laboratory analytical results of the soil samples were used to determine if the surface and shallow subsurface soils contain COPC that exceed applicable DOH Environmental Action Levels (EALs) at the Subject Site.

The COPC were identified based on current and past land use of the Subject Site which includes agriculture and use as a farm. COPC includes arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver and organochlorine pesticides. Field activities involved multi-incremental sampling (MIS) of surface and shallow subsurface soils.

Selection of Decision Units

Sixteen (16) decision units (DUs) were designated for the planned project at the Subject Site. A description of the DUs and sampling locations are presented in the table below:

Summary of Decision Units and Soil Sampling and Analysis

DU	Location/ Approx. Size	Rational/ Project Plan	Depth (in. bgs)	Sample ID	Analytes (EPA Method)		
					RCRA 8 Metals (6020B/3050B)	Pesticides (8081B/3550C)	Arsenic bio-accessibility (1340)
DU1	Western corner of lot, 200’ x 150’	Planned driveway and parking lot	0-6, 6-12	KHMC 1A, KHMC 1B	X	X	X
DU2	West side of lot between DU1 & DU6, 200’ x 180’	Planned driveway, parking lot and Phase 3 building site	0-6, 6-12	KMHC 2A, KHMC 2B	X	X	X
DU3	Middle northern side of lot between DU1 & DU4, 200’ x 270’	Planned driveway, parking lot and Phase 2 building site	0-6, 6-12	KHMC 3A, KHMC 3B	X	X	X
DU4	Northern corner of lot, 250’ x 130’	Planned driveway, parking lot and Phase 1 building site	0-6, 6-12	KHMC 4A, KHMC 4B	X	X	X
DU5	Eastern corner of lot, 230’ x 130’	Planned driveway, parking lot and Phase 1 building site	0-6, 6-12	KHMC 5A, KHMC 5B	X	X	X
DU6	Southern corner of lot, 320’ x 150’	Planned driveway, parking lot and Phase 3 building site	0-6, 6-12	KHMC 6A, KHMC 6B	X	X	X
DU7	Middle section of lot, 200’ x 75’	Existing shed, planned driveway, parking lot and Phase 2 building site	0-6, 6-12	KHMC 7A1, 7A2, 7A3, 7B	X	X	X
DU8	Warehouse dripline, extends 5’ out from structure perimeter	Existing warehouse, planned driveway, parking lot and Phase 2 building site	0-6, 6-12	KHMC 8A1, 7A2, 7A3, 7B	X	X	X

MIS soil sampling was chosen for the Subject Site so that reproducible data, representative of average background concentrations, can be obtained for use as reference control data. Sixteen (16) DUs were identified at the Subject Site. The DU boundaries were based on the location of the proposed site work and site characteristics (Figure 2, Appendix II). Each MIS soil sample consisted of 100 increments. Based on sampling theory (Pitard, 1993), a minimum of 30 increments per sample is generally recommended in order to obtain a reliable estimate of the mean concentration. The DOH typically specifies the use of 30 to 100 increments per sample in their Technical Guidance Manual (DOH, 2009b). Each increment was taken from 0-6 inches below ground surface for surface soils and 6-12 inches below ground surface for shallow subsurface soils.

The location of each increment was based on a systematic random grid that was developed during the site visit. The grid was drawn with a random starting point for even distribution across the sampling area. The

systematic random sampling design provided coverage of the DU along a horizontal plane, without the gaps associated with purely random designs.

Each increment was taken and then placed into a double-bagged Ziploc® bag. This process was repeated until 100 increments were collected. MIS soil samples were then placed into a cooler with ice packs for delivery to the laboratory for analysis.

Data Quality Control and Review

In accordance with DOH policy, LEI implemented a 10% QC program, meaning that a duplicate and triplicate sample were taken for a minimum of 10% of primary samples, and submitted for chemical analysis. The duplicate and triplicate samples were taken from locations directly adjacent to and at approximately the same depth of the primary sample. The duplicate and triplicate samples were collected, handled, and analyzed using the same methods as the primary samples.

QA of samples collected in the field was ensured through the use of trained sampling personnel, documented and standardized procedures, and collection of field QC samples.

Field QC samples were analyzed for the same parameters as the primary samples. Laboratory QC samples and surrogates were analyzed according to the laboratory's SOPs.

Precision is defined as the agreement between a set of replicate measurements without assumption and knowledge of the true value. Precision was evaluated using a sample group consisting of primary, duplicate, and triplicate samples for ISM soil samples. QC samples were collected at a rate of 10% of project samples.

The mean and relative standard deviations were used to evaluate the precision of the QC sample groups. If the relative standard deviation of the sample group is less than 35%, then the reported concentrations are considered precise. For the field QC samples collected from the ISM sampling all analytes had a standard deviation less than 35% for every analyte (Table 3, Appendix I). Additionally, laboratory QC tests were all within their acceptable ranges which points to the accuracy of the reported concentrations. Therefore, the results of all analytes are considered precise.

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. Accuracy is measured as the percent recovery (%R) of an analyte in a reference standard or spiked sample. Accuracy limits for surrogate samples are established by the individual laboratory. The acceptance criteria for accuracy are dependent on the analytical method, and are based on historical laboratory data.

Surrogate samples were used to assess analytical accuracy in response to potential matrix interferences. The surrogate soil sample results for all the analytes were within acceptable ranges. Therefore, all soil data included within this report is considered accurate.

Equipment Decontamination

All sampling equipment used to collect MIS samples were decontaminated prior to use between DUs. The decontamination procedure for sampling equipment is as follows:

1. Clean with distilled water and brush, if necessary, to remove particulate matter and surface films.
2. Rinse thoroughly with distilled water.
3. Rinse thoroughly with Liquinox™.
4. Rinse with distilled water.

5.0 RESULTS

ASBESTOS

The grey mastic present throughout the corrugated metal roof of the warehouse was identified to be a category I non-friable ACM.

Table 1 located in Appendix I summarizes the results of LEI's asbestos bulk sampling for suspect ACM within the planned areas of disturbance at the Subject Site. The identified ACMs are listed in bold text. Additionally, Figure 1 located in Appendix II includes the locations of the identified ACM. Additionally, Photograph Log 1 included in Appendix III includes photographs of the sampled materials. Finally, the laboratory results are included in Appendix IV.

LEAD PAINT

Ten (10) of the sampled painted building components contained detectable levels of lead less than 5,000 mg/kg or were identified to have an elevated laboratory detection limo and are considered or assumed to be Lead-Containing Paint (LCP). None of the sampled painted building components contained lead in excess of the EPA/HUD guideline of 5,000 mg/kg to be considered Lead-Based Paint (LBP).

Table 2 located in Appendix I summarizes the results of LEI's lead paint sampling for suspect lead paint within the planned areas of disturbance at the Subject Site. The identified LCPs are listed in bold text. Additionally, Photograph Log 2 included in Appendix III includes photographs of the sampled materials. Finally, the laboratory results are included in Appendix IV.

SOIL SCREEN

Arsenic

Total and bioaccessible arsenic were detected in decision unit: KHMC DU-4A, at concentrations that exceed the arsenic HDOH Tier 1 EAL for unrestricted land use. The soils of decision unit: KHMC DU-4A are classified as Category B arsenic soils.

The remaining sampled areas of the Subject Site were identified to have total arsenic concentrations above the HDOH Tier 1 EAL, however, further laboratory analysis via bioaccessible arsenic did not identify concentrations of arsenic above the HDOH EAL for unrestricted land use. The soils in the remaining decision units are classified as Category B arsenic soils.

Barium, Cadmium, Chromium, Lead, Selenium, Mercury and Silver (Remaining RCRA 7 Metals)

The remaining RCRA 7 metals (barium, cadmium, chromium, lead, selenium, mercury and silver) were not detected above the HDOH Tier 1 EALs for unrestricted land use.

Organochlorine Pesticides

Organochlorine pesticides were not detected above the HDOH Tier 1 EALs for unrestricted land use.

Table 3 located in Appendix I summarizes the soil screen findings. Results that exceed the applicable HDOH Tier 1 or Tier 2 EAL are listed in bold text. Figure 2 located in Appendix II identifies the decision unit (DU) locations at the Subject Site. Figure 3 located in Appendix II identifies the locations of the identified arsenic-impacted soils classified as Category C arsenic soils.

Appendix I

Table 1. Asbestos Survey Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

Int./ Ext.	*Room/ Area*	*Homogeneous Materials*	*Color*	*Friable*	*Type*	*Cond.*	*Est. Amt. of Material (ft^2)*	*Asbestos Content*	*Sample ID*
Int.	Warehouse	Concrete Floor	Grey	No	Misc.	Fair	2,000	None Detected	A1
								None Detected	A2
								None Detected	A3
Int.	Warehouse- Bathroom & Bedroom 1	Sheetrock Wall/ Ceiling Joint Compound	White	Yes	Misc.	Fair	730	None Detected	A4
								None Detected	A5
								None Detected	A6
Int.	Warehouse- Bathroom	Counter Caulking	White	No	Misc.	Fair	10 linear feet (l.f.)	None Detected	A7
								None Detected	A8
								None Detected	A9
Int.	Warehouse- Bathroom	Shower Caulking	White	No	Misc.	Fair	20 l.f.	None Detected	A10
								None Detected	A11
								None Detected	A12
Int.	Warehouse- Kitchen	12" x 12" Ceramic Counter Top Tile Grout	White	No	Surface	Fair	40	None Detected	A13
								None Detected	A14
								None Detected	A15
Int.	Warehouse- Kitchen	Window Frame Caulking	White	No	Misc.	Fair	20 l.f.	None Detected	A16
								None Detected	A17
								None Detected	A18
Int.	Warehouse- Kitchen	Sink Insulation	Off-White	Yes	Surface	Fair	2	None Detected	A19
								None Detected	A20
								None Detected	A21
Ext.	**Warehouse Roof**	**Mastic on the Corrugated Metal Roof Panels**	**Grey**	**No**	**Misc.**	**Fair**	**1,200 l.f. (throughout roof)**	**4% Chrysotile (Grey Caulk)**	**A22**
									A23
									A24
Ext.	Warehouse	Wall Panel Skim Coat	Green	No	Misc.	Fair	Throughout	None Detected	A25
								None Detected	A26
								None Detected	A27
Ext.	Warehouse- Roof	Roof Screws Caulking	Clear	No	Misc.	Fair	50 l.f.	None Detected	A28
								None Detected	A29
								None Detected	A30

Identified ACM listed in bold text.

Table 1. Asbestos Survey Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

Int./ Ext.	***Room/ Area***	***Homogeneous Materials***	***Color***	***Friable***	***Type***	***Cond.***	***Est. Amt. of Material (ft^2)***	***Asbestos Content***	***Sample ID***
Ext.	Warehouse- Front	Concrete Landing	Grey	No	Misc.	Fair	200	None Detected	A31
								None Detected	A32
								None Detected	A33
Ext.	Warehouse	Tape	Silver	No	Misc.	Fair	20 l.f.	None Detected	A34
								None Detected	A35
								None Detected	A36
Int.	Warehouse- Bedroom 2 (Second Floor)	Sheetrock Wall/ Ceiling Joint Compound	White	Yes	Misc.	Fair	770	None Detected	A37
								None Detected	A38
								None Detected	A39
Int.	Warehouse- Kitchen	Sink Caulking	Black	No	Misc.	Fair	5 l.f.	None Detected	A40
								None Detected	A41
								None Detected	A42
Int.	Warehouse- Bathroom	Sink Insulation	White	Yes	Misc.	Fair	2	None Detected	A43
								None Detected	A44
								None Detected	A45
Ext.	Pump Shed	Concrete slab	Grey	No	Misc.	Fair	25	None Detected	KHMC A1
								None Detected	KHMC A2
								None Detected	KHMC A3

Identified ACM listed in bold text.

Table 2. Lead Paint Survey Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

Int./ Ext.	*Area*	*Description*	*Color*	*Substrate*	*Cond.*	*Lead Conc. (mg/kg)*	*LCP or LBP?*	*Sample ID*
Ext.	Warehouse	Wall Panel	Green	Metal	Fair	< 40	No	L1
Ext.	**Warehouse**	**Roll Up Door**	**Green**	**Metal**	**Fair**	**<130[1]**	**Assumed LCP**	**L2**
Ext.	**Warehouse**	**Door Frame**	**Green**	**Metal**	**Fair**	**160**	**LCP**	**L3**
Ext.	Warehouse	Door Frame	Brown	Metal	Fair	< 40	No	L4
Ext.	Warehouse	Roof Panel (Under)	Green	Metal	Poor	<40	No	L5
Ext.	Warehouse	Door Frame	Brown	Wood	Fair	<40	No	L6
Ext.	Warehouse	Window Frame	Green	Metal	Fair	< 40	No	L7
Ext.	**Warehouse**	**Fascia**	**Green**	**Metal**	**Fair**	**380**	**LCP**	**L8**
Ext.	Warehouse	Door & Door Frame	Brown	Metal	Fair	< 40	No	L9
Ext.	**Warehouse**	**Corner Trim**	**Brown**	**Metal**	**Fair**	**500**	**LCP**	**L10**
Ext.	Warehouse	Window Frame	White	Metal	Fair	<65	No	L11
Ext.	Warehouse	Pipe	Green	PCV	Fair	< 40	No	L12
Ext.	Warehouse	Overhang Frame & Post	Green	Wood	Fair	<40	No	L13
Ext.	Warehouse	Gutter	Brown	Metal	Fair	<52	No	L14
Ext.	**Warehouse**	**Flashing**	**Red**	**Metal**	**Fair**	**1,200**	**LCP**	**L15**
Ext.	**Warehouse**	**Roof Panel**	**White/ Red**	**Metal**	**Fair**	**65**	**LCP**	**L16**
Int.	**Warehouse**	**Wall Panel**	**Grey**	**Metal**	**Poor**	**180**	**LCP**	**L17**
Int.	Warehouse	Wall Frame	White	Metal	Poor	<40	No	L18
Int.	Warehouse	Structure Frame	Red	Metal	Poor	<40	No	L19
Int.	Warehouse	Window Frame	White	Metal	Fair	<67	No	L20
Int.	Warehouse	Wall & Trim	White	Wood	Fair	<40	No	L21
Int.	Warehouse	Steps	Brown	Wood	Fair	<40	No	L22
Int.	Warehouse	Railing & Post	White	Wood	Fair	<40	No	L23
Int.	Warehouse-Bathroom	Door	Brown	Wood	Fair	<40	No	L24

Identified and assumed LCP listed in bold text.

[1] *Elevated laboratory detection limit, assumed LCP.*

Table 2. Lead Paint Survey Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

Int./ Ext.	***Area***	***Description***	***Color***	***Substrate***	***Cond.***	***Lead Conc. (mg/kg)***	***LCP or LBP?***	***Sample ID***
Int.	Warehouse	Wall & Ceiling	White	Sheetrock	Fair	<40	No	L25
Int.	Warehouse	Door & Window Frame	White	Wood	Fair	<40	No	L26
Int.	Warehouse- Kitchen	Cabinets	Brown	Wood	Fair	<40	No	L27
Int.	Warehouse- Bedroom 1	Door	Stained	Wood	Fair	<40	No	L28
Int.	**Warehouse**	**Ceiling Panel**	**Grey**	**Metal**	**Fair**	**180**	**LCP**	**L29**
Ext.	Warehouse	Overhang Roof Panel	White	Metal	Fair	<68	No	L30
Ext.	**Warehouse**	**Window Screen**	**Green**	**Metal**	**Poor**	**2,700**	**LCP**	**L31**
Ext.	Pump Shed	Walls	Red	Wood	Fair	<40	No	KHMC L1
Ext.	**Pump Shed**	**Roof**	**Blue**	**Metal**	**Far**	**<370[1]**	**Assumed LCP**	**KHMC L2**

Identified and assumed LCP listed in bold text.

[1] Elevated laboratory detection limit, assumed LCP.

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	Western corner of lot (0" - 6"bgs)			Western corner of lot (6" - 12"bgs)			West side of lot between DU1 & DU6 (0" - 6"bgs)		
			Descriptive Sample ID	KHMC DU-1A			KHMC DU-1B			KHMC DU-2A		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals												
Arsenic (Total)	EPA 6020B/ 3050B	24	95	79	2	Fail	56	2	Fail	40	2	Fail
Arsenic (Bioaccessible)	EPA 1340	24	95	14	0.1	Pass	13	0.1	Pass	9.8	0.1	Pass
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	250	5	Pass	15	5	Pass	9.9	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	27	2	Pass	23	2	Pass	14	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	2.7	1	Pass	2.9	1	Pass	3.1	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides												
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
EAL = Environmental Action Level
mg/kg = Milligrams per kilogram
NA = Not available

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	West side of lot between DU1 & DU6 (6" - 12"bgs)			Middle northern side of lot between DU1 & DU4 (0" - 6"bgs)			Middle northern side of lot between DU1 & DU4 (6" - 12"bgs)		
			Descriptive Sample ID	KHMC DU-2B			KHMC DU-3A			KHMC DU-3B		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals												
Arsenic (Total)	EPA 6020B/ 3050B	24	95	43	2	Fail	45	2	Fail	44	2	Fail
Arsenic (Bioaccessible)	EPA 1340	24	95	12	,1	Pass	8.6	0.1	Pass	10	0.1	Pass
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	15	5	Pass	10	5	Pass	13	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	18	2	Pass	18	2	Pass	22	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	1.8	1	Pass	5.4	1	Pass	3	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides												
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
EAL = Environmental Action Level
mg/kg = Milligrams per kilogram
NA = Not available

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	Northern corner of lot (0" - 6"bgs)			Northern corner of lot (6" - 12"bgs)			Eastern corner of lot (0" - 6"bgs)		
			Descriptive Sample ID	KHMC DU-4A			KHMC DU-4B			KHMC DU-5A		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals												
Arsenic (Total)	EPA 6020B/ 3050B	24	95	260	2	Fail	31	2	Fail	27	2	Fail
Arsenic (Bioaccessible)	EPA 1340	24	95	**30**	**0.1**	**FAIL**	9.8	0.1	Pass	4	0.1	Pass
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	12	5	Pass	13	5	Pass	8.3	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	45	2	Pass	15	2	Pass	27	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	6.8	1	Pass	1.7	1	Pass	3.4	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides												
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
EAL = Environmental Action Level
mg/kg = Milligrams per kilogram
NA = Not available

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	Eastern corner of lot (6" - 12"bgs)			Southern corner of lot (0" - 6"bgs)			Southern corner of lot (6" - 12"bgs)		
			Descriptive Sample ID	KHMC DU-5B			KHMC DU-6A			KHMC DU-6B		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals												
Arsenic (Total)	EPA 6020B/ 3050B	24	95	43	2	Fail	29	2	Fail	25	2	Fail
Arsenic (Bioaccessible)	EPA 1340	24	95	11	0.1	Pass	5.1	0.1	Pass	7.1	0.1	Pass
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	14	5	Pass	7.1	5	Pass	11	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	18	2	Pass	26	2	Pass	21	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	2.1	1	Pass	1.4	1	Pass	1.6	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides												
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
EAL = Environmental Action Level
mg/kg = Milligrams per kilogram
NA = Not available

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	Middle section of lot (0" - 6"bgs)			Middle section of lot, (0" - 6"bgs)			Middle section of lot (0" - 6"bgs)		
			Descriptive Sample ID	KHMC DU-7A1			KHMC DU-7A2			KHMC DU-7A3		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals												
Arsenic (Total)	EPA 6020B/ 3050B	24	95	40	2	Fail	25	2	Fail	29	2	Fail
Arsenic (Bioaccessible)	EPA 1340	24	95	6.3	0.1	Pass	3.9	0.1	Pass	4.8	0.1	Pass
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	9.4	5	Pass	7.8	5	Pass	8.4	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	41	2	Pass	26	2	Pass	30	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	9.4	1	Pass	3.1	1	Pass	5.4	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides												
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
EAL = Environmental Action Level
mg/kg = Milligrams per kilogram
NA = Not available

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	Middle section of lot (6" - 12"bgs)			Warehouse dripline, extends 5' out from bldg. perimeter (0" - 6"bgs)			Warehouse dripline, extends 5' out from bldg. perimeter (0" - 6"bgs)		
			Descriptive Sample ID	KHMC DU-7B			KHMC DU-8A1			KHMC DU-8A2		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals												
Arsenic (Total)	EPA 6020B/ 3050B	24	95	30	2	Fail	20	2	Pass	31	2	Fail
Arsenic (Bioaccessible)	EPA 1340	24	95	8.1	0.1	Pass	NA	NA	NA	5	0.1	Pass
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	14	5	Pass	8.6	5	Pass	8.4	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	21	2	Pass	30	2	Pass	27	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	2.5	1	Pass	5.4	1	Pass	2.8	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides												
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
EAL = Environmental Action Level
mg/kg = Milligrams per kilogram
NA = Not available

Table 3. Soil Screen Results
Hilo Medical Center - Keaau Healthcare and Wellness Complex
TMK: (3) 1-6-003:081, Lot 1-A (7-Acre Subdivide Lot)

			Sample Location	Warehouse dripline, extends 5' out from bldg. perimeter (0" - 6"bgs)			Warehouse dripline, extends 5' out from bldg. perimeter (6" - 12"bgs)		
			Descriptive Sample ID	KHMC DU-8A3			KHMC DU-8B		
Analyte	**Laboratory Analytical Method**	**DOH EAL Unrestricted Land Use (mg/kg)**	**DOH EAL Commercial/ Industrial Land Use (mg/kg)**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**	**Result (mg/kg)**	**Laboratory Reporting Limit (mg/kg)**	**Pass/Fail**
RCRA 7 Metals									
Arsenic (Total)	EPA 6020B/ 3050B	24	95	34	2	Fail	21	2	Pass
Arsenic (Bioaccessible)	EPA 1340	24	95	4.8	0.1	Pass	NA	NA	NA
Barium (Ba)	EPA 6020B/ 3050B	1000	2500	8.7	5	Pass	14	5	Pass
Cadmium (Cd)	EPA 6020B/ 3050B	14	72	ND	1	Pass	ND	1	Pass
Chromium (Cr)	EPA 6020B/ 3050B	1100	1100	31	2	Pass	17	2	Pass
Lead (Pb)	EPA 6020B/ 3050B	200	800	2.8	1	Pass	1.7	1	Pass
Selenium (Se)	EPA 6020B/ 3050B	78	1000	ND	2	Pass	ND	2	Pass
Silver (Ag)	EPA 6020B/ 3050B	78	1000	ND	1	Pass	ND	1	Pass
Mercury (Hg)	EPA 6020B/ 3050B	4.7	61	ND	0.5	Pass	ND	0.5	Pass
Organochlorine Pesticides									
4,4'-DDD	EPA 8081B/3550C	2.2	8.4	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDE	EPA 8081B/3550C	1.9	8.2	ND	0.05	Pass	ND	0.05	Pass
4,4'-DDT	EPA 8081B/3550C	1.8	5.6	ND	0.05	Pass	ND	0.05	Pass
Aldrin	EPA 8081B/3550C	3.9	8.4	ND	0.01	Pass	ND	0.01	Pass
alpha-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass
beta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass
Chlordane (Technical)	EPA 8081B/3550C	17	23	ND	0.1	Pass	ND	0.1	Pass
delta-BHC	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass
Dieldrin	EPA 8081B/3550C	2.5	24	ND	0.01	Pass	ND	0.01	Pass
Endosulfan I	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass
Endosulfan II	EPA 8081B/3550C	13	13	ND	0.05	Pass	ND	0.05	Pass
Endosulfan sulfate	EPA 8081B/3550C	13	13	ND	0.1	Pass	ND	0.1	Pass
Endrin	EPA 8081B/3550C	3.8	30	ND	0.01	Pass	ND	0.01	Pass
Endrin Aldehyde	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass
Endrin ketone	EPA 8081B/3550C	NA	NA	ND	0.05	Pass	ND	0.05	Pass
gamma-BHC (Lindane)	EPA 8081B/3550C	NA	NA	ND	0.01	Pass	ND	0.01	Pass
Heptachlor	EPA 8081B/3550C	1.3	5.6	ND	0.01	Pass	ND	0.01	Pass
Heptachlor epoxide	EPA 8081B/3550C	0.2	2.7	ND	0.01	Pass	ND	0.01	Pass
Methoxychlor	EPA 8081B/3550C	16	16	ND	0.05	Pass	ND	0.05	Pass

Notes:
ND = Not detected above the laboratory detection limit
DOH = State of Hawai'i Department of Health
EPA = Environmental Protection Agency
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mg/kg = Milligrams per kilogram
NA = Not available

Appendix II

Figure 1. Identified ACM Locations on Warehouse Building
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i 96749
Hilo Medical Center - Kea'au Healthcare and Wellness Complex

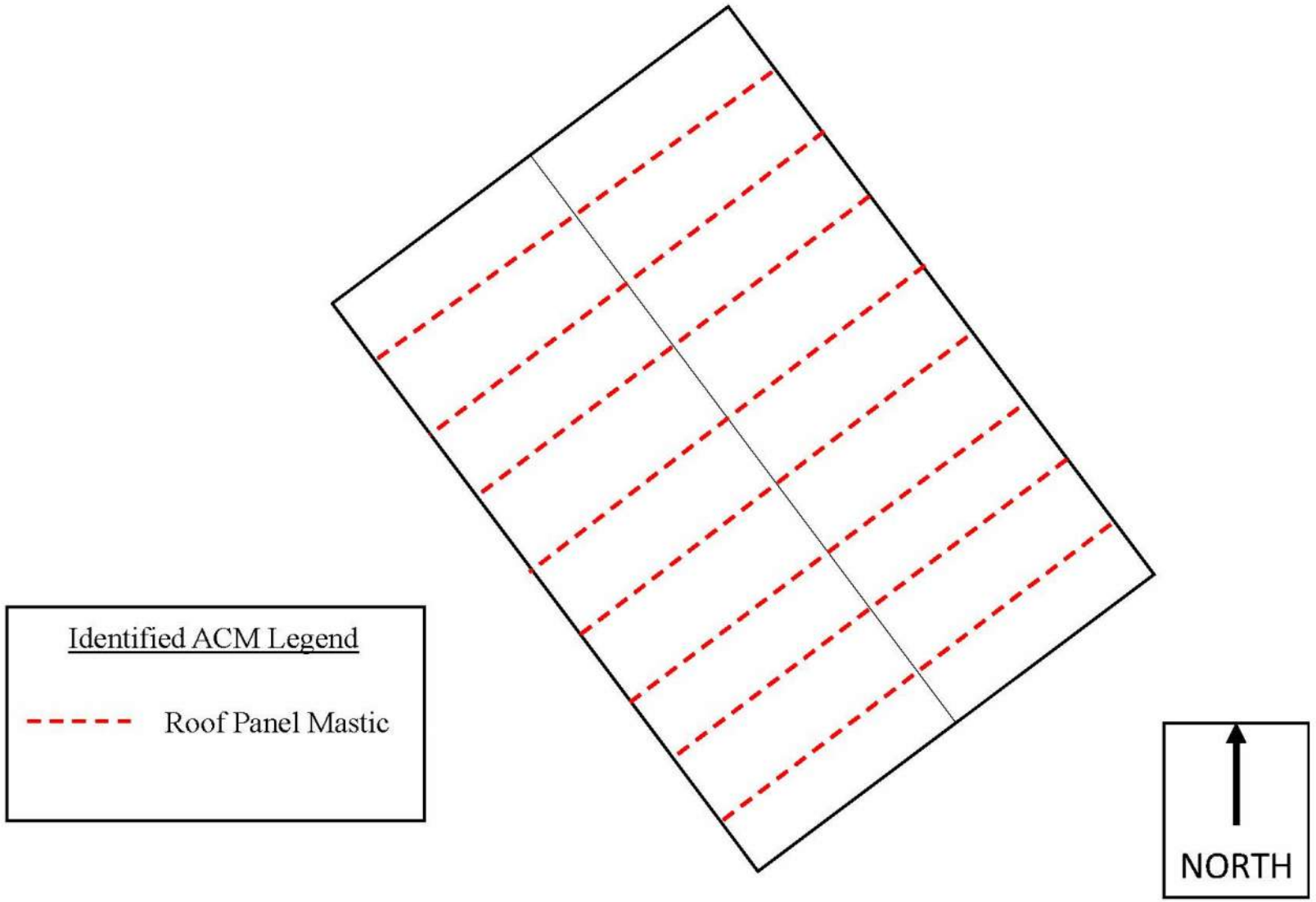


Figure 2. Decision Unit (DU) Site Layout
Hilo Medical Center - Kea'au Healthcare and Wellness Complex

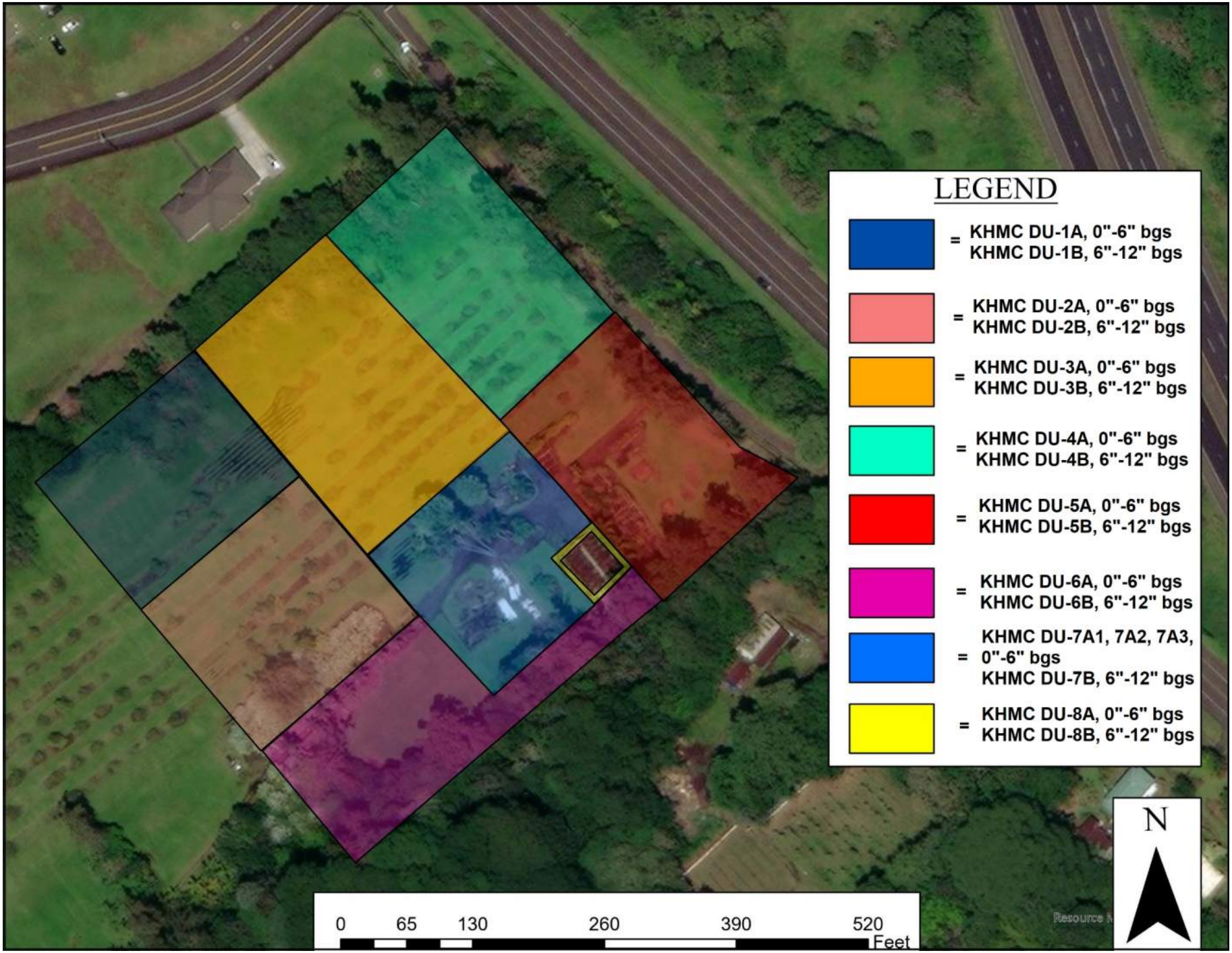
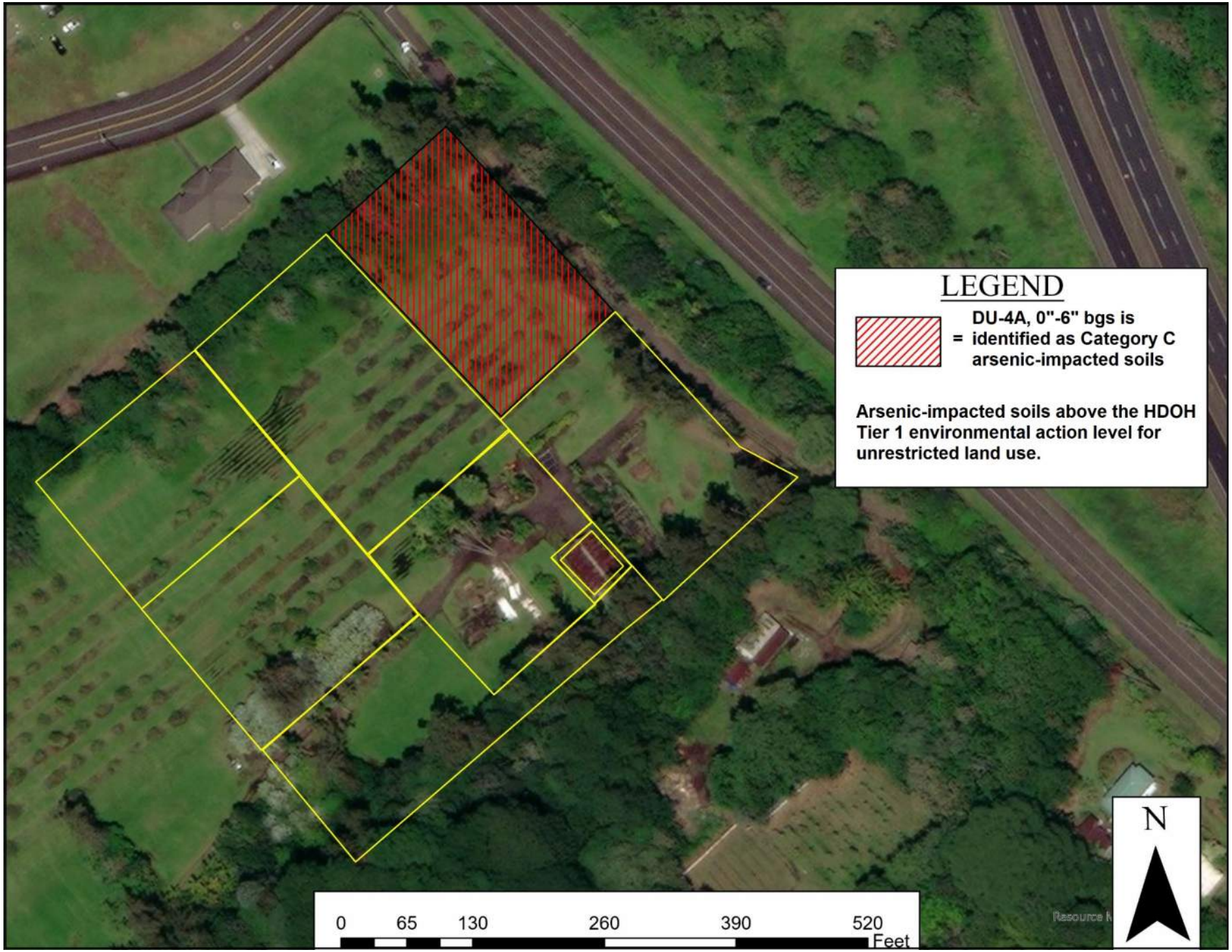


Figure 3. Arsenic-Impacted Soils (Category C) Locations
Hilo Medical Center - Kea'au Healthcare and Wellness Complex



Appendix III

PHOTOGRAPH LOG 1 – ASBESTOS SURVEY
PHOTOGRAPH LOG 2 – LEAD PAINT SURVEY

Photograph Log 1. Asbestos Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

A1: None Detected
A2: None Detected
A3: None Detected

Interior grey concrete floor located throughout the warehouse.

A4: None Detected
A5: None Detected
A6: None Detected

Interior white sheetrock wall/ ceiling & joint compound located throughout the bathroom and bedroom 1 of the warehouse.

A7: None Detected
A8: None Detected
A9: None Detected

Interior white counter caulking located in the bathroom of the warehouse.

Photograph Log 1. Asbestos Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

A10: None Detected
A11: None Detected
A12: None Detected

Interior white shower caulking located in the bathroom of the warehouse.

A13: None Detected
A14: None Detected
A15: None Detected

Interior white 12” x 12” ceramic counter top tile grout located in the kitchen of the warehouse.

A16: None Detected
A17: None Detected
A18: None Detected

Interior white window frame caulking located in the kitchen of the warehouse.

Photograph Log 1. Asbestos Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

A19: None Detected
A20: None Detected
A21: None Detected

Interior sink insulation located in the kitchen of the warehouse.

A22: 4% Chrysotile (Grey Caulk)
A23: Not Analyzed
A24: Not Analyzed

Exterior grey mastic located throughout the metal corrugated roof of the warehouse.

A25: None Detected
A26: None Detected
A27: None Detected

Exterior grey wall panel skim coat located throughout the warehouse.

Photograph Log 1. Asbestos Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

A28: None Detected
A29: None Detected
A30: None Detected

Exterior clear roof screws caulking located on the roof of the warehouse.

A31: None Detected
A32: None Detected
A33: None Detected

Exterior grey concrete landing located at the front of the warehouse.

A34: None Detected
A35: None Detected
A36: None Detected

Exterior silver tape located on the warehouse.

Photograph Log 1. Asbestos Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

A37: None Detected
A38: None Detected
A39: None Detected

Interior white sheetrock wall/ ceiling located throughout room 2 of the warehouse.

A40: None Detected
A41: None Detected
A42: None Detected

Interior black sink caulking located in the kitchen of the warehouse.

A43: None Detected
A44: None Detected
A45: None Detected

Interior white sink insulation located in the bathroom of the warehouse.

Photograph Log 1. Asbestos Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

KHMC A1: None Detected
KHMC A2: None Detected
KHMCA3: None Detected

Exterior grey concrete slab located throughout the pump shed.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L1: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior green metal wall panels located throughout the warehouse.

L2: Assumed LCP (<130 mg/kg)

Exterior green metal roll-up door located at the front of the warehouse.

L3: LCP (160 mg/kg)

Exterior green metal door frame located at the front of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L4: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior brown metal door frame located at the front of the warehouse.

L5: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior green metal roof panel (under) located throughout the warehouse.

L6: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior brown wood door frame located at the front of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L7: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior green metal window frame located on the left & right side of the warehouse.

L8: LCP (160 mg/kg)

Exterior green metal fascia located throughout the warehouse.

L9: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior brown metal door & door frame located on the left side of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L10: LCP (500 mg/kg)

Exterior brown metal corner trim located on the corners of the warehouse.

L11: Does not contain lead above the laboratory detection limit (<65 mg/kg)

Exterior white metal window frames located at the back of the warehouse.

L12: Does not contain lead above the laboratory detection limit (< 40 mg/kg)

Exterior green PVC pipes located at the back of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L13: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior green wood overhang frame & posts located at the back of the warehouse.

L14: Does not contain lead above the laboratory detection limit (<52 mg/kg)

Exterior brown metal gutter located on the overhang at the back of the warehouse.

L15: LCP (1,200 mg/kg)

Exterior red metal flashing located at the front & back of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L16: LCP (65 mg/kg)

Exterior white/red metal roof panels located throughout the warehouse.

L17: LCP (180 mg/kg)

Interior grey metal wall panels located throughout the warehouse.

L18: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior white metal wall frames located throughout the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L19: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior red metal structure frames located throughout the warehouse.

L20: Does not contain lead above the laboratory detection limit (<67 mg/kg)

Interior white metal window frames located on the left and right side of the warehouse.

L21: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior white wood walls and trim located at the back of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L22: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior brown wood steps located at the back of the warehouse.

L23: Does not contain lead above the laboratory detection limit (<40mg/kg)

Interior white wood railings and posts located at the back of the warehouse.

L24: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior brown wood door located at the bathroom of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L25: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior white sheetrock walls & ceilings located throughout the bathroom and bedrooms 1 & 2 of the warehouse.

L26: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior white wood door, door frame, & window frame located at the back of the warehouse.

L27: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior brown wood cabinet located in the kitchen of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L28: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Interior stained wood door located in bedroom 1 of the warehouse.

L29: LCP (180 mg/kg)

Interior grey metal ceiling panels located throughout the warehouse.

L30: Does not contain lead above the laboratory detection limit (<68 mg/kg)

Exterior white metal overhang roof panels located at the back of the warehouse.

Photograph Log 2. Lead Paint Survey
HMC Kea'au Healthcare and Wellness Complex Project
16-790 Kea'au-Pāhoa Road, Kea'au, Hawai'i

L31: LCP (2,700 mg/kg)

Exterior/ interior green metal window screen located throughout the warehouse.

KHMC L1: Does not contain lead above the laboratory detection limit (<40 mg/kg)

Exterior red wood wall located throughout the pump shed.

KHMC L2: Assumed LCP (<370 mg/kg)

Exterior blue metal roof located throughout the pump shed

Appendix IV

ASBESTOS LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORMS
LEAD PAINT LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORMS
SOIL SCREEN LABORATORY ANALYTICAL RESULTS AND CHAIN-OF CUSTODY FORMS

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Wednesday, June 26, 2024

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406397
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443157	**A1**		NONE DETECTED		None detected		Calcite + quartz	6/25/2024
Layer	Gray concrete							
Comments								
202443158	**A2**		NONE DETECTED		None detected		Calcite + quartz	6/25/2024
Layer	Gray concrete							
Comments								
202443159	**A3**		NONE DETECTED		None detected		Calcite + quartz	6/25/2024
Layer	Gray concrete							
Comments								
202443160	**A4**		NONE DETECTED		Cellulose (undulose)	**15**	Gypsum	6/25/2024
Layer	White drywall							
Comments								
202443160	**A4**		NONE DETECTED		None detected		Calcite + paint	6/25/2024
Layer	White joint compound / white paint							
Comments								
202443161	**A5**		NONE DETECTED		Cellulose (undulose)	**15**	Gypsum	6/25/2024
Layer	White drywall							
Comments								

Hawaii Analytical Laboratory is a NIST NVLAP accredited laboratory (NVLAP Lab Code 200655-0) and is accredited in accordance with the recognized ISO/ IEC 17025:2017. Controlled doc.: Asbestos Report, rev. 4 – 20240311

Mr. Kama Kobayashi
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P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406397
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443161	**A5**		NONE DETECTED		None detected		Calcite + paint	6/25/2024
Layer	White joint compound / white paint							
Comments								
202443162	**A6**		NONE DETECTED		Cellulose (undulose)	**15**	Gypsum	6/25/2024
Layer	White drywall							
Comments								
202443162	**A6**		NONE DETECTED		None detected		Calcite + paint	6/25/2024
Layer	White joint compound / white paint							
Comments								
202443163	**A7**		NONE DETECTED		None detected		Calcite + paint	6/25/2024
Layer	White textured / white paint							
Comments								
202443164	**A8**		NONE DETECTED		Cellulose (undulose) + fibrous glass (amorphous)	**5**	Gypsum	6/25/2024
Layer	White drywall							
Comments								
202443165	**A9**		NONE DETECTED		Cellulose (undulose) + fibrous glass (amorphous)	**5**	Gypsum	6/25/2024
Layer	White drywall							
Comments								
202443166	**A10**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Clear caulk							
Comments								
202443167	**A11**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Clear caulk							
Comments								

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Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443168	**A12**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Clear caulk							
Comments								
202443169	**A13**		NONE DETECTED		None detected		Calcite + binder	6/25/2024
Layer	White grout							
Comments								
202443170	**A14**		NONE DETECTED		None detected		Calcite + binder	6/25/2024
Layer	White grout							
Comments								
202443171	**A15**		NONE DETECTED		None detected		Calcite + binder	6/25/2024
Layer	White grout							
Comments								
202443172	**A16**		NONE DETECTED		None detected		Calcite + binder	6/25/2024
Layer	White caulk							
Comments								
202443173	**A17**		NONE DETECTED		None detected		Calcite + binder	6/25/2024
Layer	White caulk							
Comments								
202443174	**A18**		NONE DETECTED		None detected		Calcite + binder	6/25/2024
Layer	White caulk							
Comments								
202443175	**A19**		NONE DETECTED		Cellulose (undulose)	**10**	Calcite + quartz + binder	6/25/2024
Layer	Off-white sink coating							
Comments								

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Lab Job No: 202406397
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443176	**A20**		NONE DETECTED		Cellulose (undulose)	**10**	Calcite + quartz + binder	6/25/2024
Layer	Off-white sink coating							
Comments								
202443177	**A21**		NONE DETECTED		Cellulose (undulose)	**10**	Calcite + quartz + binder	6/25/2024
Layer	Off-white sink coating							
Comments								
202443178	**A22**	**Yes**	Chrysotile	**4**	None detected		Paint + calcite + binder	6/25/2024
Layer	Gray caulk							
Comments								
202443181	**A25**		NONE DETECTED		Wollastonite (+/- optical sign)	**2**	Paint + other	6/25/2024
Layer	Green paint							
Comments								
202443182	**A26**		NONE DETECTED		Wollastonite (+/- optical sign)	**2**	Paint + other	6/25/2024
Layer	Green paint							
Comments								
202443183	**A27**		NONE DETECTED		Wollastonite (+/- optical sign)	**2**	Paint + other	6/25/2024
Layer	Green paint							
Comments								
202443184	**A28**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Clear caulk							
Comments								
202443185	**A29**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Clear caulk							
Comments								

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Lab Job No: 202406397
Date Submitted: 6/21/2024
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Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443186	**A30**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Clear caulk							
Comments								
202443187	**A31**		NONE DETECTED		None detected		Calcite + quartz	6/25/2024
Layer	Gray concrete							
Comments								
202443188	**A32**		NONE DETECTED		None detected		Calcite + quartz	6/25/2024
Layer	Gray concrete							
Comments								
202443189	**A33**		NONE DETECTED		None detected		Calcite + quartz	6/25/2024
Layer	Gray concrete							
Comments								
202443190	**A34**		NONE DETECTED		None detected		Tar + calcite + foil	6/25/2024
Layer	Black tar / foil tape							
Comments								
202443191	**A35**		NONE DETECTED		None detected		Tar + calcite + foil	6/25/2024
Layer	Black tar / foil tape							
Comments								
202443192	**A36**		NONE DETECTED		None detected		Tar + calcite + foil	6/25/2024
Layer	Black tar / foil tape							
Comments								
202443193	**A37**		NONE DETECTED		Cellulose (undulose)	**15**	Gypsum	6/25/2024
Layer	White drywall							
Comments								

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Lab Job No: 202406397
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Your Project: Keeau HMC, 6/20/24

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443193	**A37**		NONE DETECTED		Cellulose (undulose)	**2**	Calcite + paint	6/25/2024
Layer	White joint compound / white paint							
Comments								
202443194	**A38**		NONE DETECTED		Cellulose (undulose)	**15**	Gypsum	6/25/2024
Layer	White drywall							
Comments								
202443194	**A38**		NONE DETECTED		Cellulose (undulose)	**2**	Calcite + paint	6/25/2024
Layer	White joint compound / white paint							
Comments								
202443195	**A39**		NONE DETECTED		Cellulose (undulose)	**15**	Gypsum	6/25/2024
Layer	White drywall							
Comments								
202443195	**A39**		NONE DETECTED		Cellulose (undulose)	**2**	Calcite + paint	6/25/2024
Layer	White joint compound / white paint							
Comments								
202443196	**A40**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Black caulk							
Comments								
202443197	**A41**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Black caulk							
Comments								
202443198	**A42**		NONE DETECTED		None detected		Binder + other	6/25/2024
Layer	Black caulk							
Comments								

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Lab Job No: 202406397
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443199	**A43**		NONE DETECTED		None detected		Paint + calcite	6/25/2024
Layer	White paint / skim coat							
Comments								
202443200	**A44**		NONE DETECTED		None detected		Paint + calcite	6/25/2024
Layer	White paint / skim coat							
Comments								
202443201	**A45**		NONE DETECTED		None detected		Paint + calcite	6/25/2024
Layer	White paint / skim coat							
Comments								

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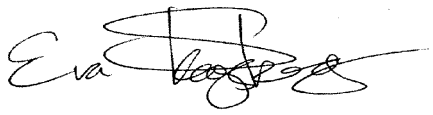
Lab Job No: 202406397
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

General Comments
The bulk sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures outlined in the United States Environmental Protection Agency's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (EPA-600/M4-82-020, Dec. 1982) and / or "Method for Determination of Asbestos in bulk Building Materials" (EPA-600/R-93-116, July 1993). The analysis of each bulk sample relates only to the material examined, and may or may not represent the overall composition of its original source. Floor tile and other resinously bound materials, when analyzed by the EPA methods referenced above may yield false negative results because of limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Gravimetric treatment, which HAL does not offer, may also be appropriate for certain NOB (non-friable organically bound) materials. Unless specifically requested by clients, NOB samples can be subcontracted to a NVLAP accredited lab, or else, they will be analyzed by HAL using regular PLM technique. In addition, alternative methods of identification, including Transmission Electron Microscopy (TEM) may or may not be applicable. We utilize calibrated visual area estimation on a routine basis and do not conduct point counting unless specifically requested to do so. Estimated error for the visual determinations presented are 75% relative (1 to 2%), 50% relative (3 to 5%); 25% relative (6 to 25%) and 20% (>26% v/v). We will not separate layers which in our opinion are not readily discernable. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Governement. Unless otherwise indicated, the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
None Detected = asbestos was not observed in the sample. If trace amount of asbestos was detected below our quantifiable limits of 1.0%, <1% (trace) would be indicated and the asbestos type listed. Point counting, where applicable, are recommended to improve accuracy.



Eva Skogsberg
Laboratory Supervisor

HAWAII ANALYTICAL LABORATORY, LLC
3615 Harding Avenue, Suite 308
Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
https://analyzehawaii.com

☐ New Client?

Report To*	Kama Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	808-494-0365
Report results to	K. Kobayashi
via email or fax	nicoleg@lehuaenv.com
	lehuaenvironmental@gmail.com

Invoice To*	Kamalana Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:
- ☐ 5 Working Days (WD)
- ☐ 4 WD
- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau HMC ☐

Sampled By & Certif. # : Nicole Garaganza-Tengan

Special Instructions:

PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
- ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202406397

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
1		A1	6/20/2024	Bulk		Asbestos %		202443157
2		A2	6/20/2024	Bulk		Asbestos %		202443158
3		A3	6/20/2024	Bulk		Asbestos %		202443159
4		A4	6/20/2024	Bulk		Asbestos %		202443160
5		A5	6/20/2024	Bulk		Asbestos %		202443161
6		A6	6/20/2024	Bulk		Asbestos %		202443162
7		A7	6/20/2024	Bulk		Asbestos %		202443163
8		A8	6/20/2024	Bulk		Asbestos %		202443164
9		A9	6/20/2024	Bulk		Asbestos %		202443165
10		A10	6/20/2024	Bulk		Asbestos %		202443166
11		A11	6/20/2024	Bulk		Asbestos %		202443167
12		A12	6/20/2024	Bulk		Asbestos %		202443168
13		A13	6/20/2024	Bulk		Asbestos %		202443169
14		A14	6/20/2024	Bulk		Asbestos %		202443170
15		A15	6/20/2024	Bulk		Asbestos %		202443171

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☐ New Client?

Report To*	Kama Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	808-494-0365
Report results to	K. Kobayashi
via email or fax	nicoleg@lehuaenv.com
	lehuaenvironmental@gmail.com

Invoice To*	Kamalana Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:
- ☐ 5 Working Days (WD)
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- ☑ 3 WD
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- ☐ 24 hours
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Client Project No.:

Site/Project Name: Keaau HMC ☐

Sampled By & Certif. # : Nicole Garaganza-Tengan

Special Instructions:

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Verbal results? ☐

Lab Report No.: 202406397

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	Lab Sample(s) No.:
16		A16	6/20/2024	Bulk		Asbestos %		202443172
17		A17	6/20/2024	Bulk		Asbestos %		202443173
18		A18	6/20/2024	Bulk		Asbestos %		202443174
19		A19	6/20/2024	Bulk		Asbestos %		202443175
20		A20	6/20/2024	Bulk		Asbestos %		202443176
21		A21	6/20/2024	Bulk		Asbestos %		202443177
22		A22	6/20/2024	Bulk		Asbestos %		202443178
23		A23	6/20/2024	Bulk		Asbestos %		202443179
24		A24	6/20/2024	Bulk		Asbestos %		202443180
25		A25	6/20/2024	Bulk		Asbestos %		202443181
26		A26	6/20/2024	Bulk		Asbestos %		202443182
27		A27	6/20/2024	Bulk		Asbestos %		202443183
28		A28	6/20/2024	Bulk		Asbestos %		202443184
29		A29	6/20/2024	Bulk		Asbestos %		202443185
30		A30	6/20/2024	Bulk		Asbestos %		202443186

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Client Project No.:

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PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
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Verbal results? ☐

Lab Report No.: 202406397

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	Lab Sample(s) No.:
31		A31	6/20/2024	Bulk		Asbestos %		202443187
32		A32	6/20/2024	Bulk		Asbestos %		202443188
33		A33	6/20/2024	Bulk		Asbestos %		202443189
34		A34	6/20/2024	Bulk		Asbestos %		202443190
35		A35	6/20/2024	Bulk		Asbestos %		202443191
36		A36	6/20/2024	Bulk		Asbestos %		202443192
37		A37	6/20/2024	Bulk		Asbestos %		202443193
38		A38	6/20/2024	Bulk		Asbestos %		202443194
39		A39	6/20/2024	Bulk		Asbestos %		202443195
40		A40	6/20/2024	Bulk		Asbestos %		202443196
41		A41	6/20/2024	Bulk		Asbestos %		202443197
42		A42	6/20/2024	Bulk		Asbestos %		202443198
43		A43	6/20/2024	Bulk		Asbestos %		202443199
44		A44	6/20/2024	Bulk		Asbestos %		202443200
45		A45	6/20/2024	Bulk		Asbestos %		202443201

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
Nicole Garaganza-Tengan	6/20/24 1400	Savannah Newman	06-21-24 A09:56 RCVD

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- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau HMC ☐

Sampled By & Certif. # : Nicole Garaganza-Tengan

Special Instructions:

PLM POSITIVE STOP?
☐ + stop / SAMPLE
☐ + stop / LAYER

Verbal results? ☐

Lab Report No.:
202406397

Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***

06-21-24A09:56 RCVD

***Sample description can be paint chips, concrete, specific sample collection location, etc...**
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
***Required fields, failure to complete these fields may result in a delay in your samples being processed.**

☑ via HAC ☐ via USPS ☐ via drop box ☐ via FedEx ☐ via pick up

awb#: 173-35492083

Page: _____ of _____

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Thursday, June 27, 2024

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P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
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Lab Job No: 202406485
Date Submitted: 6/25/2024
Your Project: Keeau Hilo Medical Center, 6/21/24

Bulk Asbestos Determination

Sample No.	Your Sample ID / Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202443993	**KHMC A1**		NONE DETECTED		None detected		Cementitious + other	6/25/2024
Layer	Gray concrete							
Comments								
202443994	**KHMC A2**		NONE DETECTED		None detected		Cementitious + other	6/25/2024
Layer	Gray / red concrete							
Comments								
202443995	**KHMC A3**		NONE DETECTED		None detected		Cementitious + other	6/25/2024
Layer	Gray / red concrete							
Comments								

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Email: lehuaenvironmental@gmail.com

Lab Job No: 202406485
Date Submitted: 6/25/2024
Your Project: Keeau Hilo Medical Center, 6/21/24

General Comments
The bulk sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures outlined in the United States Environmental Protection Agency's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (EPA-600/M4-82-020, Dec. 1982) and / or "Method for Determination of Asbestos in bulk Building Materials" (EPA-600/R-93-116, July 1993). The analysis of each bulk sample relates only to the material examined, and may or may not represent the overall composition of its original source. Floor tile and other resinously bound materials, when analyzed by the EPA methods referenced above may yield false negative results because of limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Gravimetric treatment, which HAL does not offer, may also be appropriate for certain NOB (non-friable organically bound) materials. Unless specifically requested by clients, NOB samples can be subcontracted to a NVLAP accredited lab, or else, they will be analyzed by HAL using regular PLM technique. In addition, alternative methods of identification, including Transmission Electron Microscopy (TEM) may or may not be applicable. We utilize calibrated visual area estimation on a routine basis and do not conduct point counting unless specifically requested to do so. Estimated error for the visual determinations presented are 75% relative (1 to 2%), 50% relative (3 to 5%); 25% relative (6 to 25%) and 20% (>26% v/v). We will not separate layers which in our opinion are not readily discernable. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Governement. Unless otherwise indicated, the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
None Detected = asbestos was not observed in the sample. If trace amount of asbestos was detected below our quantifiable limits of 1.0%, <1% (trace) would be indicated and the asbestos type listed. Point counting, where applicable, are recommended to improve accuracy.

Jennifer Hsu Liao
Laboratory Manager

HAWAII ANALYTICAL LABORATORY, LLC

3615 Harding Avenue, Suite 308
Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
https://analyzehawaii.com

☐ New Client?

Report To*	Kama Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	808-494-0365
Report results to	K. Kobayashi
via email or fax	calvin@lehuaenv.com
	lehuaenvironmental@gmail.com

Invoice To*	Kamalana Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:
- ☐ 5 Working Days (WD)
- ☐ 4 WD
- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau Hilo Medical Center ☐

Sampled By & Certif. # : Calvin Arca

Special Instructions:

PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
- ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202406485

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
1		KHMC A1	6/21/2024	Bulk		Asbestos %		202443993
2		KHMC A2	6/21/2024	Bulk		Asbestos %		202443994
3		KHMC A3	6/21/2024	Bulk		Asbestos %		202443995
4		KHMC L1	6/21/2024	Paint Chips		Total Lead		202443996
5		KHMC L2	6/21/2024	Paint Chips		Total Lead		202443997
6								
7								
8								
9								
10								
11								
12								

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
Calvin Arca	6/24/2024 0:00	Savannah Newman	
Calvin Arca		Savannah Newman	06-25-24A10:11 RCVD

*Sample description can be paint chips, concrete, specific sample collection location, etc...
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

☑ via HAC ☐ via USPS ☐ via drop box ☐ via FedEx ☐ via pick up
awb#: 173-35442094

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Wednesday, June 26, 2024

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406398
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202443202	**L1**	< 40	mg/kg	6/26/2024
Comments				
202443203	**L2**	< 130	mg/kg	6/26/2024
Comments				
202443204	**L3**	160	mg/kg	6/26/2024
Comments				
202443205	**L4**	< 40	mg/kg	6/26/2024
Comments				
202443206	**L5**	< 40	mg/kg	6/26/2024
Comments				
202443207	**L6**	< 40	mg/kg	6/26/2024
Comments				
202443208	**L7**	< 40	mg/kg	6/26/2024
Comments				
202443209	**L8**	380	mg/kg	6/26/2024
Comments				

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406398
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202443210	**L9**	< 40	mg/kg	6/26/2024
Comments				
202443211	**L10**	500	mg/kg	6/26/2024
Comments				
202443212	**L11**	< 65	mg/kg	6/26/2024
Comments				
202443213	**L12**	< 40	mg/kg	6/26/2024
Comments				
202443214	**L13**	< 40	mg/kg	6/26/2024
Comments				
202443215	**L14**	< 52	mg/kg	6/26/2024
Comments				
202443216	**L15**	1200	mg/kg	6/26/2024
Comments				
202443217	**L16**	65	mg/kg	6/26/2024
Comments				
202443218	**L17**	180	mg/kg	6/26/2024
Comments				
202443219	**L18**	< 40	mg/kg	6/26/2024
Comments				
202443220	**L19**	< 40	mg/kg	6/26/2024
Comments				

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406398
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202443221	**L20**	< 67	mg/kg	6/26/2024
Comments				
202443222	**L21**	< 40	mg/kg	6/26/2024
Comments				
202443223	**L22**	< 40	mg/kg	6/26/2024
Comments				
202443224	**L23**	< 40	mg/kg	6/26/2024
Comments				
202443225	**L24**	< 40	mg/kg	6/26/2024
Comments				
202443226	**L25**	< 40	mg/kg	6/26/2024
Comments				
202443227	**L26**	< 40	mg/kg	6/26/2024
Comments				
202443228	**L27**	< 40	mg/kg	6/26/2024
Comments				
202443229	**L28**	< 40	mg/kg	6/26/2024
Comments				
202443230	**L29**	180	mg/kg	6/26/2024
Comments				
202443231	**L30**	< 68	mg/kg	6/26/2024
Comments				

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406398
Date Submitted: 6/21/2024
Your Project: Keeau HMC, 6/20/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202443232	**L31**	2700	mg/kg	6/26/2024
Comments				

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

General Comments
The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. All analysts participate in interlaboratory quality control testing to continuously document profiency. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
# = Analytical methods marked with an "#" are not within our AIHA LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit.

Jennifer Hsu Liao
Laboratory Manager

HAWAII ANALYTICAL LABORATORY, LLC

3615 Harding Avenue, Suite 308
Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
https://analyzehawaii.com

☐ New Client?

Report To*	Kama Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	808-494-0365
Report results to	K. Kobayashi
via email or fax	nicoleg@lehuaenv.com
	lehuaenvironmental@gmail.com

Invoice To*	Kamalana Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:
- ☐ 5 Working Days (WD)
- ☐ 4 WD
- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau HMC ☐

Sampled By & Certif. # : Nicole Garaganza-Tengan

Special Instructions:

PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
- ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202406398

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
1		L1	6/20/2024	Paint Chips		Total Lead		202443202
2		L2	6/20/2024	Paint Chips		Total Lead		202443203
3		L3	6/20/2024	Paint Chips		Total Lead		202443204
4		L4	6/20/2024	Paint Chips		Total Lead		202443205
5		L5	6/20/2024	Paint Chips		Total Lead		202443206
6		L6	6/20/2024	Paint Chips		Total Lead		202443207
7		L7	6/20/2024	Paint Chips		Total Lead		202443208
8		L8	6/20/2024	Paint Chips		Total Lead		202443209
9		L9	6/20/2024	Paint Chips		Total Lead		202443210
10		L10	6/20/2024	Paint Chips		Total Lead		202443211
11		L11	6/20/2024	Paint Chips		Total Lead		202443212
12		L12	6/20/2024	Paint Chips		Total Lead		202443213
13		L13	6/20/2024	Paint Chips		Total Lead		202443214
14		L14	6/20/2024	Paint Chips		Total Lead		202443215
15		L15	6/20/2024	Paint Chips		Total Lead		202443216

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Report results to	K. Kobayashi
via email or fax	nicoleg@lehuaenv.com
	lehuaenvironmental@gmail.com

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Company	Lehua Environmental Inc.
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	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:
- ☐ 5 Working Days (WD)
- ☐ 4 WD
- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau HMC ☐

Sampled By & Certif. # : Nicole Garaganza-Tengan

Special Instructions:

PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
- ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202406398

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
16		L16	6/20/2024	Paint Chips		Total Lead		202443217
17		L17	6/20/2024	Paint Chips		Total Lead		202443218
18		L18	6/20/2024	Paint Chips		Total Lead		202443219
19		L19	6/20/2024	Paint Chips		Total Lead		202443220
20		L20	6/20/2024	Paint Chips		Total Lead		202443221
21		L21	6/20/2024	Paint Chips		Total Lead		202443222
22		L22	6/20/2024	Paint Chips		Total Lead		202443223
23		L23	6/20/2024	Paint Chips		Total Lead		202443224
24		L24	6/20/2024	Paint Chips		Total Lead		202443225
25		L25	6/20/2024	Paint Chips		Total Lead		202443226
26		L26	6/20/2024	Paint Chips		Total Lead		202443227
27		L27	6/20/2024	Paint Chips		Total Lead		202443228
28		L28	6/20/2024	Paint Chips		Total Lead		202443229
29		L29	6/20/2024	Paint Chips		Total Lead		202443230
30		L30	6/20/2024	Paint Chips		Total Lead		202443231

HAWAII ANALYTICAL LABORATORY, LLC

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Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
https://analyzehawaii.com

☐ New Client?

Report To*	Kama Kobayashi
Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	808-494-0365
Report results to	K. Kobayashi
via email or fax	nicoleg@lehuaenv.com
	lehuaenvironmental@gmail.com

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Company	Lehua Environmental Inc.
Address*	PO BOX 1018
	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:

- ☐ 5 Working Days (WD)
- ☐ 4 WD
- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau HMC ☐

Sampled By & Certif. # : Nicole Garaganza-Tengan

Special Instructions:

PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
- ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202406398

Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
31	L31	6/20/2024	Paint Chips		Total Lead		202443232

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
Nicole Garaganza-Tengan	6/20/24 1400	Savannah Newman Savannah Newman	06-21-24 A09:56 RCVD

***Sample description can be paint chips, concrete, specific sample collection location, etc...**
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
***Required fields, failure to complete these fields may result in a delay in your samples being processed.**

☑ via HAC ☐ via USPS ☐ via drop box ☐ via FedEx ☐ via pick up
awb#: 173-35442083

Page: _____ of _____

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Thursday, June 27, 2024

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406485
Date Submitted: 6/25/2024
Your Project: Keeau Hilo Medical Center, 6/21/24

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample ID / Description	Results	Units	Date Analyzed
202443996	**KHMC L1**	< 40	mg/kg	6/25/2024
Comments				
202443997	**KHMC L2**	< 370	mg/kg	6/25/2024
Comments				

Mr. Kama Kobayashi
Lehua Environmental Inc.
P.O. Box 1018
Kamuela HI 96743

Phone Number: (808)494-0365
Facsimile:
Email: lehuaenvironmental@gmail.com

Lab Job No: 202406485
Date Submitted: 6/25/2024
Your Project: Keeau Hilo Medical Center, 6/21/24

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

General Comments
The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. All analysts participate in interlaboratory quality control testing to continuously document profiency. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

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< This testing result is less than the numerical value listed.
# = Analytical methods marked with an "#" are not within our AIHA LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit.

Jennifer Hsu Liao
Laboratory Manager

HAWAII ANALYTICAL LABORATORY, LLC

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via email or fax	calvin@lehuaenv.com
	lehuaenvironmental@gmail.com

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Company	Lehua Environmental Inc.
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	Kamuela, Hawaii 96743
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	lehuaenvironmental@gmail.com

Need Results By*:
- ☐ 5 Working Days (WD)
- ☐ 4 WD
- ☑ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Client Project No.:

Site/Project Name: Keaau Hilo Medical Center ☐

Sampled By & Certif. # : Calvin Arca

Special Instructions:

PLM POSITIVE STOP?
- ☐ + stop / SAMPLE
- ☐ + stop / LAYER

Verbal results? ☐

Lab Report No.: 202406485

	Sample ID	Sample Description*	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	***Lab Sample(s) No.:***
1		KHMC A1	6/21/2024	Bulk		Asbestos %		202443993
2		KHMC A2	6/21/2024	Bulk		Asbestos %		202443994
3		KHMC A3	6/21/2024	Bulk		Asbestos %		202443995
4		KHMC L1	6/21/2024	Paint Chips		Total Lead		202443996
5		KHMC L2	6/21/2024	Paint Chips		Total Lead		202443997
6								
7								
8								
9								
10								
11								
12								

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
Calvin Arca	6/24/2024 0:00	Savannah Newman	
Calvin Arca		Savannah Newman	06-25-24A10:11 RCVD

*Sample description can be paint chips, concrete, specific sample collection location, etc...
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
*Required fields, failure to complete these fields may result in a delay in your samples being processed.

☑ via HAC ☐ via USPS ☐ via drop box ☐ via FedEx ☐ via pick up
awb#: 173-35442094

ADVANCED ANALYTICAL LABORATORY INC

July 5, 2024

Lehua Environmental Inc
PO BOX 1018
Kamuela, HI
96743

Dear Kama Kobayashi:

Please find enclosed the analytical report for:

Project Name:	Keaau HMC
AAL Project #:	Z553
Date Received:	06/25/2024
MIS Prep:	Yes

The results, applicable reporting limits, QA/QC data, invoice, and copy of COC are included.

Advanced Analytical Laboratory appreciates the opportunity to provide analytical services for this project. If you have any questions regarding this project, please don't hesitate to contact AAL.

Thank you for your business and continuing support.

Sincerely,

Uwe Baumgartner, Ph.D
Owner

Elisa M. Young
Owner

ACCU LABORATORY

12524 130th Lane NE
Kirkland WA 98034

Tel: (425) 214-5858
(425) 214-5868
Email: lisa@accu-lab.com
website: www.accu-lab.com

Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Organochlorine Pesticides in Soil by EPA 8081B/3550C

Accu Lab Batch# AL070124-4

Client sample ID					**KHMC DU1 A**	**KHMC DU2 A**	**KHMC DU3 A**	**KHMC DU4 A**	**KHMC DU5 A**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	24-AL0628-1-1	24-AL0628-1-2	24-AL0628-1-3	24-AL0628-1-4	24-AL0628-1-5
Matrix			Solid	Solid	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
α-BHC	1.0	ug/kg	nd		nd	nd	nd	nd	nd
γ-BHC (Lindane)	1.0	ug/kg	nd	108%	nd	nd	nd	nd	nd
β-BHC	1.0	ug/kg	nd		nd	nd	nd	nd	nd
Heptachlor	1.0	ug/kg	nd	107%	nd	nd	nd	nd	nd
δ-BHC	1.0	ug/kg	nd		nd	nd	nd	nd	nd
Aldrin	1.0	ug/kg	nd	106%	nd	nd	nd	nd	nd
Heptachlor Epoxide	1.0	ug/kg	nd		nd	nd	nd	nd	nd
γ-Chlordane	5.0	ug/kg	nd		nd	nd	nd	nd	nd
α-Chlordane	5.0	ug/kg	nd		nd	nd	nd	nd	nd
Endosulfan I	1.0	ug/kg	nd		nd	nd	nd	nd	nd
4,4'-DDE	5.0	ug/kg	nd		nd	nd	nd	nd	nd
Dieldrin	1.0	ug/kg	nd	106%	nd	nd	nd	nd	nd
Endrin	1.0	ug/kg	nd	117%	nd	nd	nd	nd	nd
4,4'-DDD	5.0	ug/kg	nd		nd	nd	nd	nd	nd
Endosulfan II	5.0	ug/kg	nd		nd	nd	nd	nd	nd
4,4'-DDT	5.0	ug/kg	nd	78%	nd	nd	nd	nd	nd
Endrin Aldehyde	5.0	ug/kg	nd		nd	nd	nd	nd	nd
Methoxychlor	5.0	ug/kg	nd		nd	nd	nd	nd	nd
Endrin Ketone	5.0	ug/kg	nd		nd	nd	nd	nd	nd
Endosulfan Sulfate	10	ug/kg	nd		nd	nd	nd	nd	nd
Technical Chlordane	0.10	**mg/kg**	nd		nd	nd	nd	nd	nd
Toxaphene	0.20	**mg/kg**	nd		nd	nd	nd	nd	nd
Surrogate Recoveries									
Decachlorobiphenyl			105%	101%	111%	115%	118%	111%	108%
Tetrachloro-m-xylene			89%	95%	103%	104%	104%	102%	101%

Acceptable Recovery Limits:

Surrogates	*50-150%*
LCS/MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Organochlorine Pesticides in Soil by EPA 8081B/3550C

Accu Lab Batch# AL070124-4

Client sample ID			**KHMC DU6 A**	**KHMC DU7 A-1**	**KHMC DU7 A-2**	**KHMC DU7 A-3**	**KHMC DU8 A-1**	**KHMC DU8 A-2**
Lab ID	**MRL**	**Unit**	24-AL0628-1-6	24-AL0628-1-7	24-AL0628-1-8	24-AL0628-1-9	24-AL0628-1-10	24-AL0628-1-11
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
α-BHC	1.0	ug/kg	nd	nd	nd	nd	nd	nd
γ-BHC (Lindane)	1.0	ug/kg	nd	nd	nd	nd	nd	nd
β-BHC	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Heptachlor	1.0	ug/kg	nd	nd	nd	nd	nd	nd
δ-BHC	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Aldrin	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Heptachlor Epoxide	1.0	ug/kg	nd	nd	nd	nd	nd	nd
γ-Chlordane	5.0	ug/kg	nd	nd	nd	nd	nd	nd
α-Chlordane	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endosulfan I	1.0	ug/kg	nd	nd	nd	nd	nd	nd
4,4'-DDE	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Dieldrin	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Endrin	1.0	ug/kg	nd	nd	nd	nd	nd	nd
4,4'-DDD	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endosulfan II	5.0	ug/kg	nd	nd	nd	nd	nd	nd
4,4'-DDT	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endrin Aldehyde	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Methoxychlor	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endrin Ketone	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endosulfan Sulfate	10	ug/kg	nd	nd	nd	nd	nd	nd
Technical Chlordane	0.10	**mg/kg**	nd	nd	nd	nd	nd	nd
Toxaphene	0.20	**mg/kg**	nd	nd	nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			108%	109%	111%	110%	115%	110%
Tetrachloro-m-xylene			103%	105%	106%	106%	109%	103%

Acceptable Recovery Limits:

Surrogates	*50-150%*
LCS/MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Organochlorine Pesticides in Soil by EPA 8081B/3550C

Accu Lab Batch# AL070124-4

Client sample ID			**KHMC DU8 A-3**	**KHMC DU1 B**	**KHMC DU2 B**	**KHMC DU3 B**	**KHMC DU4 B**	**KHMC DU5 B**
Lab ID	**MRL**	**Unit**	24-AL0628-1-12	24-AL0628-1-13	24-AL0628-1-14	24-AL0628-1-15	24-AL0628-1-16	24-AL0628-1-17
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/2/2024	7/2/2024
α-BHC	1.0	ug/kg	nd	nd	nd	nd	nd	nd
γ-BHC (Lindane)	1.0	ug/kg	nd	nd	nd	nd	nd	nd
β-BHC	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Heptachlor	1.0	ug/kg	nd	nd	nd	nd	nd	nd
δ-BHC	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Aldrin	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Heptachlor Epoxide	1.0	ug/kg	nd	nd	nd	nd	nd	nd
γ-Chlordane	5.0	ug/kg	nd	nd	nd	nd	nd	nd
α-Chlordane	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endosulfan I	1.0	ug/kg	nd	nd	nd	nd	nd	nd
4,4'-DDE	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Dieldrin	1.0	ug/kg	nd	nd	nd	nd	nd	nd
Endrin	1.0	ug/kg	nd	nd	nd	nd	nd	nd
4,4'-DDD	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endosulfan II	5.0	ug/kg	nd	nd	nd	nd	nd	nd
4,4'-DDT	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endrin Aldehyde	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Methoxychlor	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endrin Ketone	5.0	ug/kg	nd	nd	nd	nd	nd	nd
Endosulfan Sulfate	10	ug/kg	nd	nd	nd	nd	nd	nd
Technical Chlordane	0.10	**mg/kg**	nd	nd	nd	nd	nd	nd
Toxaphene	0.20	**mg/kg**	nd	nd	nd	nd	nd	nd
Surrogate Recoveries								
Decachlorobiphenyl			107%	114%	111%	113%	113%	114%
Tetrachloro-m-xylene			99%	105%	108%	106%	109%	111%

Acceptable Recovery Limits:

Surrogates	*50-150%*
LCS/MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Organochlorine Pesticides in Soil by EPA 8081B/3550C

Accu Lab Batch# AL070124-4

Client sample ID			**KHMC DU6 B**	**KHMC DU7 B**	**KHMC DU8 B**	**MS**	**MSD**	**RPD**
Lab ID	**MRL**	**Unit**	24-AL0628-1-18	24-AL0628-1-19	24-AL0628-1-20	24-AL0628-1-13	24-AL0628-1-13	24-AL0628-1-13
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/2/2024	7/2/2024	7/2/2024	7/1/2024	7/1/2024	7/1/2024
α-BHC	1.0	ug/kg	nd	nd	nd			
γ-BHC (Lindane)	1.0	ug/kg	nd	nd	nd	109%	114%	4%
β-BHC	1.0	ug/kg	nd	nd	nd			
Heptachlor	1.0	ug/kg	nd	nd	nd	118%	122%	3%
δ-BHC	1.0	ug/kg	nd	nd	nd			
Aldrin	1.0	ug/kg	nd	nd	nd	106%	108%	2%
Heptachlor Epoxide	1.0	ug/kg	nd	nd	nd			
γ-Chlordane	5.0	ug/kg	nd	nd	nd			
α-Chlordane	5.0	ug/kg	nd	nd	nd			
Endosulfan I	1.0	ug/kg	nd	nd	nd			
4,4'-DDE	5.0	ug/kg	nd	nd	nd			
Dieldrin	1.0	ug/kg	nd	nd	nd	111%	115%	4%
Endrin	1.0	ug/kg	nd	nd	nd	134%	138%	3%
4,4'-DDD	5.0	ug/kg	nd	nd	nd			
Endosulfan II	5.0	ug/kg	nd	nd	nd			
4,4'-DDT	5.0	ug/kg	nd	nd	nd	72%	66%	9%
Endrin Aldehyde	5.0	ug/kg	nd	nd	nd			
Methoxychlor	5.0	ug/kg	nd	nd	nd			
Endrin Ketone	5.0	ug/kg	nd	nd	nd			
Endosulfan Sulfate	10	ug/kg	nd	nd	nd			
Technical Chlordane	0.10	**mg/kg**	nd	nd	nd			
Toxaphene	0.20	**mg/kg**	nd	nd	nd			
Surrogate Recoveries								
Decachlorobiphenyl			113%	106%	107%	125%	124%	
Tetrachloro-m-xylene			113%	113%	103%	125%	122%	

Acceptable Recovery Limits:

Surrogates	*50-150%*
LCS/MS/MSD	*50-150%*
Acceptable RPD limit:	*30%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B

Accu Lab Batch# AL070124-12

Client sample ID					**KHMC DU1 A**	**KHMC DU2 A**	**KHMC DU3 A**	**KHMC DU4 A**	**KHMC DU5 A**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	24-AL0628-1-1	24-AL0628-1-2	24-AL0628-1-3	24-AL0628-1-4	24-AL0628-1-5
Matrix			Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Arsenic (As)	2.0	mg/kg	nd	102%	79	40	45	260	27
Barium (Ba)	5.0	mg/kg	nd	101%	250	9.9	10	12	8.3
Cadmium (Cd)	1.0	mg/kg	nd	102%	nd	nd	nd	nd	nd
Chromium (Cr)	2.0	mg/kg	nd	96%	27	14	18	45	27
Lead (Pb)	1.0	mg/kg	nd	98%	2.7	3.1	5.4	6.8	3.4
Selenium (Se)	2.0	mg/kg	nd	108%	nd	nd	nd	nd	nd
Silver (Ag)	1.0	mg/kg	nd	111%	nd	nd	nd	nd	nd
Mercury (Hg)	0.50	mg/kg	nd	104%	nd	nd	nd	nd	nd

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B

Accu Lab Batch# AL070124-12

Client sample ID			**KHMC DU6 A**	**KHMC DU7 A-1**	**KHMC DU7 A-2**	**KHMC DU7 A-3**	**KHMC DU8 A-1**	**KHMC DU8 A-2**
Lab ID	**MRL**	**Unit**	24-AL0628-1-6	24-AL0628-1-7	24-AL0628-1-8	24-AL0628-1-9	24-AL0628-1-10	24-AL0628-1-11
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Arsenic (As)	2.0	mg/kg	29	40	25	29	20	31
Barium (Ba)	5.0	mg/kg	7.1	9.4	7.8	8.4	8.6	8.4
Cadmium (Cd)	1.0	mg/kg	nd	nd	nd	nd	nd	nd
Chromium (Cr)	2.0	mg/kg	26	41	26	30	27	27
Lead (Pb)	1.0	mg/kg	1.4	9.4	3.1	5.4	1.5	2.8
Selenium (Se)	2.0	mg/kg	nd	nd	nd	nd	nd	nd
Silver (Ag)	1.0	mg/kg	nd	nd	nd	nd	nd	nd
Mercury (Hg)	0.50	mg/kg	nd	nd	nd	nd	nd	nd

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B

Accu Lab Batch# AL070124-12

Client sample ID			**KHMC DU8 A-3**	**KHMC DU1 B**	**KHMC DU2 B**	**KHMC DU3 B**	**KHMC DU4 B**	**KHMC DU5 B**
Lab ID	**MRL**	**Unit**	24-AL0628-1-12	24-AL0628-1-13	24-AL0628-1-14	24-AL0628-1-15	24-AL0628-1-16	24-AL0628-1-17
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Arsenic (As)	2.0	mg/kg	34	56	43	44	31	43
Barium (Ba)	5.0	mg/kg	8.7	15	15	13	13	14
Cadmium (Cd)	1.0	mg/kg	nd	nd	nd	nd	nd	nd
Chromium (Cr)	2.0	mg/kg	31	23	18	22	15	18
Lead (Pb)	1.0	mg/kg	2.8	2.9	1.8	3.0	1.7	2.1
Selenium (Se)	2.0	mg/kg	nd	nd	nd	nd	nd	nd
Silver (Ag)	1.0	mg/kg	nd	nd	nd	nd	nd	nd
Mercury (Hg)	0.50	mg/kg	nd	nd	nd	nd	nd	nd

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B

Accu Lab Batch# AL070124-12

Client sample ID			**KHMC DU6 B**	**KHMC DU7 B**	**KHMC DU8 B**	**MS**	**MSD**	**RPD**
Lab ID	**MRL**	**Unit**	24-AL0628-1-18	24-AL0628-1-19	24-AL0628-1-20	24-AL0628-1-1	24-AL0628-1-1	24-AL0628-1-1
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024	7/1/2024
Date Analyzed			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Arsenic (As)	2.0	mg/kg	25	30	21	76%	78%	3%
Barium (Ba)	5.0	mg/kg	11	14	14	105%	112%	6%
Cadmium (Cd)	1.0	mg/kg	nd	nd	nd	110%	114%	4%
Chromium (Cr)	2.0	mg/kg	21	21	17	98%	105%	7%
Lead (Pb)	1.0	mg/kg	1.6	2.5	1.7	116%	95%	20%
Selenium (Se)	2.0	mg/kg	nd	nd	nd	79%	80%	1%
Silver (Ag)	1.0	mg/kg	nd	nd	nd	96%	100%	4%
Mercury (Hg)	0.50	mg/kg	nd	nd	nd	89%	92%	4%

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B (<0.25mm Fraction)

Accu Lab Batch# AL070224-13

Client sample ID					**KHMC DU1 A**	**KHMC DU2 A**	**KHMC DU3 A**	**KHMC DU4 A**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	24-AL0628-1-1	24-AL0628-1-2	24-AL0628-1-3	24-AL0628-1-4
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Arsenic (As)	5.0	mg/kg	nd	105%	120	75	61	240

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B (<0.25mm Fraction)

Accu Lab Batch# AL070224-13

Client sample ID			**KHMC DU5 A**	**KHMC DU6 A**	**KHMC DU7 A-1**	**KHMC DU7 A-2**	**KHMC DU7 A-3**	**KHMC DU8 A-2**
Lab ID	**MRL**	**Unit**	24-AL0628-1-5	24-AL0628-1-6	24-AL0628-1-7	24-AL0628-1-8	24-AL0628-1-9	24-AL0628-1-11
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Arsenic (As)	5.0	mg/kg	38	41	57	37	43	41

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B (<0.25mm Fraction)

Accu Lab Batch# AL070224-13

Client sample ID			**KHMC DU8 A-3**	**KHMC DU1 B**	**KHMC DU2 B**	**KHMC DU3 B**	**KHMC DU4 B**	**KHMC DU5 B**
Lab ID	**MRL**	**Unit**	24-AL0628-1-12	24-AL0628-1-13	24-AL0628-1-14	24-AL0628-1-15	24-AL0628-1-16	24-AL0628-1-17
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			2/22/2024	2/22/2024	2/22/2024	2/22/2024	2/22/2024	2/22/2024
Date Analyzed			2/22/2024	2/22/2024	2/22/2024	2/22/2024	2/22/2024	2/22/2024
Arsenic (As)	5.0	mg/kg	49	66	54	49	42	44

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Metals in Soil by EPA 6020B/EPA3050B (<0.25mm Fraction)

Accu Lab Batch# AL070224-13

Client sample ID			**KHMC DU6 B**	**KHMC DU7 B**	**MS**	**MSD**	**RPD**
Lab ID	**MRL**	**Unit**	24-AL0628-1-18	24-AL0628-1-19	24-AL0628-1-1	24-AL0628-1-1	24-AL0628-1-1
Matrix			Soil	Soil	Soil	Soil	Soil
Date Digested			7/2/2024	7/2/2024	7/2/2024	7/2/2024	7/2/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Arsenic (As)	5.0	mg/kg	34	35	104%	117%	12%

Acceptable Recovery Limits:

LCS	*80-120%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID			**KHMC DU1 A**	**KHMC DU2 A**	**KHMC DU3 A**	**KHMC DU4 A**	**KHMC DU5 A**	**KHMC DU6 A**
Lab ID	**MRL**	**Unit**	24-AL0628-1-1	24-AL0628-1-2	24-AL0628-1-3	24-AL0628-1-4	24-AL0628-1-5	24-AL0628-1-6
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.10	mg/kg	14	9.8	8.6	30	4.0	5.1

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID			**KHMC DU7 A-1**	**KHMC DU7 A-2**	**KHMC DU7 A-3**	**KHMC DU8 A-2**	**KHMC DU8 A-3**	**KHMC DU1 B**
Lab ID	**MRL**	**Unit**	24-AL0628-1-7	24-AL0628-1-8	24-AL0628-1-9	24-AL0628-1-11	24-AL0628-1-12	24-AL0628-1-13
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.10	mg/kg	6.3	3.9	4.8	5.0	4.8	13

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID			**KHMC DU2 B**	**KHMC DU3 B**	**KHMC DU4 B**	**KHMC DU5 B**	**KHMC DU6 B**	**KHMC DU7 B**
Lab ID	**MRL**	**Unit**	24-AL0628-1-14	24-AL0628-1-15	24-AL0628-1-16	24-AL0628-1-17	24-AL0628-1-18	24-AL0628-1-19
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.10	mg/kg	12	10	9.8	11	7.1	8.1

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID		**KHMC DU1 A**	**KHMC DU2 A**	**KHMC DU3 A**	**KHMC DU4 A**	**KHMC DU5 A**	**KHMC DU6 A**
Lab ID	**Unit**	24-AL0628-1-1	24-AL0628-1-2	24-AL0628-1-3	24-AL0628-1-4	24-AL0628-1-5	24-AL0628-1-6
Matrix		Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted		7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed		7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Arsenic (As) Bioaccessibility	%	12%	13%	14%	13%	11%	12%

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID		**KHMC DU7 A-1**	**KHMC DU7 A-2**	**KHMC DU7 A-3**	**KHMC DU8 A-2**	**KHMC DU8 A-3**	**KHMC DU1 B**
Lab ID	**Unit**	24-AL0628-1-7	24-AL0628-1-8	24-AL0628-1-9	24-AL0628-1-11	24-AL0628-1-12	24-AL0628-1-13
Matrix		Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted		7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed		7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Arsenic (As) Bioaccessibility	%	11%	11%	11%	12%	10%	20%

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID		**KHMC DU2 B**	**KHMC DU3 B**	**KHMC DU4 B**	**KHMC DU5 B**	**KHMC DU6 B**	**KHMC DU7 B**
Lab ID	**Unit**	24-AL0628-1-14	24-AL0628-1-15	24-AL0628-1-16	24-AL0628-1-17	24-AL0628-1-18	24-AL0628-1-19
Matrix		Soil	Soil	Soil	Soil	Soil	Soil
Date Extracted		7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed		7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Arsenic (As) Bioaccessibility	%	22%	20%	23%	25%	21%	23%

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID					**KHMC DU1 A**	**KHMC DU2 A**	**KHMC DU3 A**	**KHMC DU4 A**	**KHMC DU5 A**
Lab ID	**MRL**	**Unit**	**MTH BLK**	**LCS**	24-AL0628-1-1	24-AL0628-1-2	24-AL0628-1-3	24-AL0628-1-4	24-AL0628-1-5
Matrix			Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.0020	mg/l	nd	116%	0.14	0.098	0.086	0.30	0.040

Acceptable Recovery Limits:

LCS	*85-115%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID			**KHMC DU6 A**	**KHMC DU7 A-1**	**KHMC DU7 A-2**	**KHMC DU7 A-3**	**KHMC DU8 A-2**	**KHMC DU8 A-3**
Lab ID	**MRL**	**Unit**	24-AL0628-1-6	24-AL0628-1-7	24-AL0628-1-8	24-AL0628-1-9	24-AL0628-1-11	24-AL0628-1-12
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.0020	mg/l	0.051	0.063	0.039	0.048	0.050	0.048

Acceptable Recovery Limits:

LCS	*85-115%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID			**KHMC DU1 B**	**KHMC DU2 B**	**KHMC DU3 B**	**KHMC DU4 B**	**KHMC DU5 B**	**KHMC DU6 B**
Lab ID	**MRL**	**Unit**	24-AL0628-1-13	24-AL0628-1-14	24-AL0628-1-15	24-AL0628-1-16	24-AL0628-1-17	24-AL0628-1-18
Matrix			Soil	Soil	Soil	Soil	Soil	Soil
Date Digested			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.0020	mg/l	0.13	0.12	0.10	0.098	0.11	0.071

Acceptable Recovery Limits:

LCS	*85-115%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	**Advanced Analytical Laboratory**	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Project#	**Z553**		

Bioaccessible Arsenic in Soil (<0.25mm Fraction) by EPA1340

Accu Lab Batch# AL070324-10

Client sample ID			**KHMC DU7 B**	**MS**	**MSD**	**RPD**
Lab ID	**MRL**	**Unit**	24-AL0628-1-19	24-AL0628-1-1	24-AL0628-1-1	24-AL0628-1-1
Matrix			Soil	Soil	Soil	Soil
Date Digested			7/3/2024	7/3/2024	7/3/2024	7/3/2024
Date Analyzed			7/3/2024	7/3/2024	7/3/2024	7/3/2024
Bioaccessible Arsenic (As)	0.0020	mg/l	0.081	123%	125%	2%

Acceptable Recovery Limits:

LCS	*85-115%*
MS/MSD	*75-125%*
Acceptable RPD limit:	*20%*

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Analytical Report

Client	Advanced Analytical Laboratory	**Acculab WO#**	**24-AL0628-1**
	544 Ohohia Street #10		
	Honolulu, HI, 96819	Date Sampled	6/21/2024
Project Manager	Uwe Baumgartner/ Elisa Young	Date Received	6/28/2024
Project Name	**Keaau HMC**	Date Reported	7/5/2024
Client Project#			
Project#	**Z553**		

Data Qualifiers and Comments:

Results reported on dry-weight basis for soil samples.

MRL- Method Reporting Limit
nd- Indicates the analyte is not detected at the listing reporting limit.
C- Coelution with other compounds.
M- % Recovery of surrogate, MS/MSD is out of the acceptable limit due to matrix effect.
B- Indicates the analyte is detected in the method blank associated with the sample.
J- The analyte is detected at below the reporting limit.
E- The result reported exceeds the calibration range, and is an estimate.
D- Sample required dilution due to matrix. Method Reporting Limits were elevated due to dilutions.
H- Sample was received or analyzed past holding time
Q- Sample was received with head space, improper preserved or above recommended temperature.
I- Due to insufficient sample, LCS/LCS DUP were analyzed in place of MS/MSD.
R- The recovery of this analyte in QC sample failed high, but the analyte was not detected in all related samples. No action was taken.
R-1- The RPD value for the MS/MSD was outside of QC acceptance limits however both recoveries were acceptable. All related samples were "nd". No action was taken.
R-2- The recovery of the surrogate in sample failed high, but all related analytes were not detected in the sample. No action was taken.

ADVANCED ANALYTICAL LABORATORY-CHAIN OF CUSTODY RECORD

Phone: (808) 836 2252 Fax:(808) 836 2250 Address: 544 Ohohia St., unit 10 Honolulu, HI 96819

TURNAROUND TIME: RUSH & Metals (Arsenic 1 day, rest 5 day) AAL PROJECT#: 2553

Bioaccessible Arsenic for total arsenic 723mg/kg 3day Organochloric Pesticide 5day

CLIENT:	Lehua Environmental Inc.	PROJECT NAME:	Keaau HMC
ADDRESS:	P.O. Box 1018, Kamuela, HI 96743	COLLECTOR:	Calvin Arca
PHONE:	(808)494-036 Lehuaenvironmental@gmail.com	DATE OF COLLECTION:	6/21/2024
CLIENT PROJECT#:		PROJECT MANAGER:	K. Kobayashi

Sample Number	Time	Sample type	Container Type	Multi-Incremental Volatile	Multi-Incremental Non Volatile	8015M TPH Fuel Scan	8015M TPH Gasoline	8015M TPH Diesel	8015M TPH Oil	8260B Volatiles	8260 BTEX	Bioaccessible Arsenic	8270 PAH DOH 4	8270 PAH 17 analytes	8270 Semi Volatiles	8082 PCB	TCLP 8081 OrganoChlorind Pe	Organochlorine Pesticides	Total Lead	Total Cadmium	TCLP RCRA 8 Metals	Total RCRA 8 Metals	Field Notes	Number of containers	Number containers received
KHMC DU1A		MI	zip lock bag	x							x					x				x				1	1
KHMC DU2A		MI	zip lock bag	x							x					x				x				1	1
KHMC DU3A		MI	zip lock bag	x							x					x				x				1	1
KHMC DU4A		MI	zip lock bag	x							x					x				x				1	1
KHMC DU5A		MI	zip lock bag	x							x					x				x				1	1
KHMC DU6A		MI	zip lock bag	x							x					x				x				1	1
KHMC DU7A-1		MI	zip lock bag	x							x					x				x				1	1
KHMC DU7A-2		MI	zip lock bag	x							x					x				x				1	1
KHMC DU7A-3		MI	zip lock bag	x							x					x				x				1	1
KHMC DU8A-1		MI	zip lock bag	x							x					x				x				1	1
KHMC DU8A-2		MI	zip lock bag	x							x					x				x				1	1
KHMC DU8A-3		MI	zip lock bag	x							x					x				x				1	1

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	6/24/24 9AM		6/25/24 11:00
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	12
CHAIN OF CUSTODY SEALS INTACT	N
RECEIVED IN GOOD CONDITION	Yes
TEMPERATURE	4.9° C
PAGE _ OF _	

LABORATORY NOTES:

ADVANCED ANALYTICAL LABORATORY-CHAIN OF CUSTODY RECORD

Phone: (808) 836 2252 Fax:(808) 836 2250 Address: 544 Ohohia St., unit 10 Honolulu, HI 96819

TURNAROUND TIME: RCRA 8 Metals Arsenic 1day, rest 5 day AAL PROJECT#: 2553

Bioaccessible Arsenic for total Arsenic >23mg/kg 3day Organochlorine Pesticide 5day

CLIENT:	Lehua Environmental Inc.	PROJECT NAME:	Keaau HMC
ADDRESS:	P.O. Box 1018, Kamuela, HI 96743	COLLECTOR:	Calvin Arca
PHONE:	(808)494-036: Lehuaenvironmental@gmail.com	DATE OF COLLECTION:	6/21/2024
CLIENT PROJECT#:		PROJECT MANAGER:	K. Kobayashi

Sample Number	Time	Sample type	Container Type	Multi-Incremental Volatile	Multi-Incremental Non Volatile	8015M TPH Fuel Scan	8015M TPH Gasoline	8015M TPH Diesel	8015M TPH Oil	8260B Volatiles	8260 BTEX	Bioaccessible Arsenic	8270 PAH DOH 4	8270 PAH 17 analytes	8270 Semi Volatiles	8082 PCB	TCLP 8081 OrganoChlorind Pes	Organochlorine Pesticides	Total Lead	Total Cadmium	TCLP RCRA 8 Metals	Total RCRA 8 Metals	Field Notes	Number of containers	Number containers received
KHMC DU1B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU2B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU3B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU4B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU5B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU6B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU7B		MI	zip lock bag	x						x						x				x				1	1
KHMC DU8B		MI	zip lock bag	x						x						x				x				1	1

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	6/24/24 9AM		6/25/24 11:00
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	8
CHAIN OF CUSTODY SEALS INTACT	N
RECEIVED IN GOOD CONDITION	Yes
TEMPERATURE	5.1° C
PAGE _ OF _	

LABORATORY NOTES:

APPENDIX E - SHPD LETTER

STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

April 18, 2023

IN REPLY REFER TO:
Project No. 2023PR00476
Doc. No. 2404JG11
Archaeology

Steven Pause, Director
Department of Public Works
County of Hawaii
101 Pauahi Street, Suite 7
Hilo, HI 96720
Public_works@hawaiicounty.gov

Dear Mr. Pause:

SUBJECT: **Chapter 6E-42 Historic Preservation Review**
County of Hawaii Grubbing Permit for the Puna Certified Nursery Inc. property
Kea'au Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-6-003:081

This letter provides the State Historic Preservation Division's (SHPD's) review of the subject County of Hawaii (COH) grubbing permit application received by our office on April 17, 2023. The submittal includes a HRS 6E Submittal Form, a Permit Snapshot Report (PW.ENG2023-00083), and a TMK and a satellite image of the proposed project area. The applicant proposes grubbing activities to clear the project area of vegetation. The proposed project area consist of the entire 26.86-acre parcel.

A review of our records indicates that the proposed project area has not been included as part of any previous archaeological survey studies and that no historic properties have been previously identified within the project parcel. Additionally, historic (1965) and contemporary aerial imagery confirms that the current project area has been previously impacted by ground-disturbing activities associated with land clearing and agricultural activities. Thus, low potential exists for the project to encounter and impact significant historic properties.

Based on current information, SHPD's determination is **no historic properties affected** for the proposed project. Pursuant to HAR §13-284-7(e), when the SHPD agrees that the action will not affect any significant historic properties, this is the SHPD's written concurrence and historic preservation review ends. The HRS 6E historic preservation review process is ended. The permit issuance process may proceed.

Attach to permit: If historic properties such as lava tube openings, concentrations of artifacts, structural remains or human skeletal remains are found during construction activities please cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division at (808) 933-7651.

Please contact Joshua Gastilo at joshua.gastilo@hawaii.gov for any questions or concerns regarding this letter.

Aloha,
Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Department of Public Works, Engineering Division, dpweng@hawaiicounty.gov
Robyn Matsumoto, robyn.matsumoto@hawaiicounty.gov
Herman Ludwig, herman.t@ludgigconstructionhi.com

APPENDIX A - PLANNING DEPARTMENT LETTER REGARDING GENERAL PLAN DESIGNATION

Mitchell D. Roth
Mayor

Lee E. Lord
Managing Director

West Hawai'i Office
74-5044 Ane Keohokālole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

Zendo Kern
Director

Jeffrey W. Darrow
Deputy Director

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

April 18, 2022

Mr. Sidney Fuke, Planning Consultant
100 Pauahi Street, Suite 212
Hilo, HI 96720

Dear Mr. Fuke:

SUBJECT: General Plan LUPAG Conformation
Tax Map Key: 1-6-003: 081

This is to acknowledge receipt of your letter and supportive information dated January 28, 2022, requesting for a confirmation of the General Plan Land Use Pattern Allocation Guide (LUPAG) map designation as Extensive Agriculture for the above referenced property, as it is our understanding that the owner is considering a possible change of zone action.

The General Plan states the following regarding the review and interpretation of the General Plan LUPAG map in relation to Zoning requests:

14.1.4 Standards

(a) The designated land uses will be delineated on the General Plan Land Use Pattern Allocation Guide Map. The broad-brush boundaries indicated are graphic expressions of the General Plan policies, particularly those relating to land uses. They are long-range guides to general location and will be subject to: a) existing zoning; and b) State Land Use District.

(b) Zoning requests shall be reviewed with respect to General Plan designation, district goals, regional plans, State Land Use District, compatibility with adjacent zoned uses, availability of public services and utilities, access, and public need.

In reviewing the request for an interpretation of the GP LUPAG map designation for the property in relation to the above and submitted information, we can determine the following:

1. The property is in an area that transitions between the Medium Density Urban (MDU), Important Agricultural Lands (IAL) and Extensive Agriculture (EA) GP

LUPAG designations. Since the application of the LUPAG map designations are broad brush, the property can be interpreted to be within these designations.

2. Prior to the current GP LUPAG designations for this area approved in 2006 and 2015, the subject property and surrounding areas were designated as "Orchards" since 1971 when the original General Plan was approved. The Orchards designation were identified as those agricultural lands, which though rocky in character and content, support productive macadamia nuts, papaya, citrus and other similar agricultural products.

3. The neighboring Ola Hou Estates Subdivision that adjoins the property to the northwest was rezoned from A-20a to A-1a in 1995 and amended in 2012. The neighboring property was determined to be within the General Plan LUPAG Orchards and Low Density Urban designations, which allowed the rezoning to A-1a.

4. The property is on the border of the Kea'au Regional Town Center that was established by the Puna Community Development Plan.

5. Lastly, the property is in an area that has the appropriate infrastructure to support a change of zone to allow for 1-acre lots, including utilities and access.

Based on the above review, we can confirm that the GP LUPAG map designation for the property is Extensive Agriculture. This determination is made not by simply looking at where the LUPAG Map lines roughly fall on the ground, but by carefully assessing how lots in the area were established and the practical application of uses, existing and foreseen, in the area are supported by existing infrastructure.

Should you have any questions, please feel free to contact me at 961-8125.

Sincerely,

Zendo Kern
Zendo Kern (Apr 19, 2022 08:21 HST)

ZENDO KERN
Planning Director