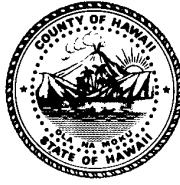


Mitchell D. Roth
Mayor



Victor A. Kandle
Mass Transit
Administrator

County of Hawai'i Mass Transit Agency

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August 5, 2024

Mary Alice Evans, Director
Office of Planning and Sustainable Development
Environmental Review Program
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

**SUBJECT: Pahoa Transit Hub and Library
Pahoa, Puna District, Island of Hawaii
Tax Map Keys (TMK): (3) 1-5-007:007, 005, 004, 076, 082, 083
Publication of Final Environmental Assessment and
Finding of No Significant Impact**

Dear Director Evans,

With this letter, the County of Hawaii Mass Transit Agency and Hawaii State Public Library System hereby transmits the Final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the proposed Pahoa Transit Hub and Library project. The FEA-FONSI has been prepared pursuant to Chapter 343, Hawaii Revised Statutes, and Title 11, Chapter 200.1, Hawaii Administrative Rules.

We request that the Office of Planning and Sustainable Development, Environmental Review Program publish notice of the FEA-FONSI publication in the next available periodic bulletin, *The Environmental Notice*.

If there are any questions, please feel free to contact me at (808) 961-8744 or by email at victor.kandle@hawaiicounty.gov.

Sincerely,

Victor Kandle

Victor A. Kandle
Mass Transit Administrator

From: webmaster@hawaii.gov
To: [DBEDT OPSD Environmental Review Program](#)
Subject: New online submission for The Environmental Notice
Date: Wednesday, September 25, 2024 4:21:04 PM

Action Name

Pahoa Transit Hub and Library

Type of Document/Determination

Final environmental assessment and finding of no significant impact (FEA-FONSI)

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) 1-5-007:007, 005, 004, 076, 082, 083

Action type

Agency

Other required permits and approvals

HRS Chapter 6E, NPDES, Grading Permit, Community Noise/Variance, Individual Wastewater System Approval to Construct, Building Permit, Site Plan Approval, State Land Use District Boundary Amendment, Permit to Perform Work on State Highways

Proposing/determining agency

County of Hawaii Mass Transit Agency and Hawaii State Public Library System

Agency contact name

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[Map It](#)

Is there a consultant for this action?

Yes

Consultant

SSFM International, Inc.

Consultant contact name

Jennifer Scheffel

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[Map It](#)

Action summary

The County of Hawai'i Mass Transit Agency and Hawai'i State Public Library System propose to construct a transit hub and public library with a variety of civic services and community amenities in Pāhoā Village. This would include a mass transit facility and a library with a broad range of community programs and services. There would also be sufficient space to include a daycare center and other facilities to accommodate community needs, provide learning resources, and create a gathering space for the surrounding Puna community.

Reasons supporting determination

Alternative 1, 2, or 3 would have short-term and temporary impacts during construction that would be less than significant to water resources, biological resources, archaeological and historic resources, cultural practices and beliefs, geology and soils, traffic and transportation, air quality, the existing noise environment, and public facilities and services. Best Management Practices (BMPs) and other measures would be implemented to minimize impacts, as applicable.

Alternatives 1, 2, and 3 would have beneficial impacts by providing additional access to transportation services, the numerous resources associated with the State Public Library, and provide space to celebrate community arts and culture. Alternative 1, 2, or 3 would be located within an existing commercial area and designed to be compatible with surrounding community character and planned growth patterns. The implementation of additional services in Pāhoā Village would have an increased beneficial impact in particular for vulnerable local families and aims to provide critical services for a growing population.

Specific details regarding project impacts are provided in Section 5.1 of the Final EA.

Attached documents (signed agency letter & EA/EIS)

- [Pahoa-Hub-Final-EA-Letter.pdf](#)
- [240923-Pahoa_Final-EA_COMPLETE.pdf](#)

Shapefile

- The location map for this Final EA is the same as the location map for the associated Draft EA.

Action location map

- [AlternativeSites.zip](#)

Authorized individual

Jennifer Scheffel

Authorization

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



October 2024

Pāhoā

Transit Hub and Library

Final Environmental Assessment

Created for:

County of Hawai'i Mass Transit Agency
Hawai'i State Public Library System

Created by:

SSFM International, Inc.



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Draft Environmental Assessment

Pāhoa Transit Hub and Library Pāhoa, Island of Hawai'i, Hawai'i

Prepared for:

County of Hawai'i Mass Transit Agency



And

Hawai'i State Public Library System



Prepared by:

SSFM International, Inc.



October 2024

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Project Summary

Project Name	Pāhoa Transit Hub and Library
Location	Pāhoa, Island of Hawai'i, Hawai'i
District	Puna
Project Site Tax Map Key	(3) 1-5-007:007, 005, 004, 076, 082, 083
Landowners	Private
Project Site Existing Uses	Agricultural/Residential
State Land Uses	Agricultural
Hawai'i County Zoning	A-1a
Proposed Alternatives	<p>The County of Hawai'i Mass Transit Agency and Hawai'i State Public Library System propose to construct a transit hub and public library with a variety of civic services and community amenities in Pāhoa Village. This would include a mass transit facility and a library with a broad range of community programs and services. There would also be sufficient space to include a daycare center and other facilities to accommodate community needs, provide learning resources, and create a gathering space for the surrounding Puna community.</p> <p>There are three alternative locations proposed in this Environmental Assessment. More information on Alternatives 1, 2, and 3 may be found in Section 2.0.</p>
Anticipated Impacts	<p>As discussed in Section 3.0, Alternative 1, 2, or 3 would have short-term and temporary impacts during construction that would be less than significant to water resources, biological resources, archaeological and historic resources, cultural practices and beliefs, geology and soils, traffic and transportation, air quality, the existing noise environment, and public facilities and services. Best Management Practices (BMPs) and other measures would be implemented to minimize impacts, as applicable.</p> <p>Alternatives 1, 2, and 3 would have beneficial impacts by providing additional access to transportation services, the numerous resources associated with the State Public Library, and provide space to celebrate community arts and culture. Alternative 1, 2, or 3 would be located within an existing commercial area and designed to be compatible with surrounding community character and planned growth patterns. The implementation of additional services in Pāhoa Village would have an increased beneficial impact in particular for vulnerable local families and aims to provide critical services for a growing population.</p>

Proposing Agency	County of Hawai'i Mass Transit Agency and Hawai'i State Public Library System
Determination	Finding of No Significant Impact (FONSI)
Project Site Permits/ Approvals Required	See Table 1
EA Preparer	SSFM International 99 Aupuni Street, Suite 202 Hilo, Hawai'i 96720 Contact: Jennifer Scheffel (808) 356-1273
Consultations	See Section 6.0.

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Acronyms

AADT	annual average daily traffic
AAQS	Ambient Air Quality Standards
ACS	American Community Survey
ADA	Americans with Disabilities Act
AIS	Archaeological Inventory Survey
ALICE	Asset Limited, Income Constrained, Employed
AWSC	all-way stop-controlled
BMP	Best Management Practices
CCD	Census County Divisions
CDP	Community Development Plan
CREC	Controlled Recognized Environmental Condition
CZM	Coastal Zone Management Act
CZMA	Coastal Zone Management Act of 1972
dBA	Decibels
DEM	County of Hawai'i Department of Environmental Management
DLNR	Hawai'i State Department of Land and Natural Resources
DOH	Hawai'i State Department of Health
DOE	Hawai'i State Department of Education
DPW	County of Hawai'i Department of Public Works
DWS	County of Hawai'i Department of Water Supply
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GHG	greenhouse gases
HAR	Hawai'i Administrative Rules
HCCMAC	Hawai'i Climate Change Minimization and Adaptation Commission
HCM6	Highway Capacity Manual, Sixth Edition
HFD	County of Hawai'i Fire Department
HPD	County of Hawai'i Police Department
HRS	Hawai'i Revised Statutes
HSPLS	Hawai'i State Public Library System
IBC	International Building Code
LOS	level of service

LUPAG	Land Use Pattern Allocation Guide
mdu	Medium Density Urban
MGD	million gallons per day
MTA	County of Hawai'i Mass Transit Agency
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
REC	Recognized Environmental Conditions
ROD	Rapid 'Ōhi'a Death
SDC	Seismic Design Category
SF	square feet
SHPD	Hawai'i State Historic Preservation Division
SMA	Special Management Area
TMK	Tax Map Key
TMMP	County of Hawai'i Transit Multi-Modal Master Plan
TOD	Transit-Oriented Development
TWSC	two-way stop-controlled
USGS	United States Geological Survey
µg/m³	micrograms per cubic meter

1.0 Project Description

1.1 Introduction

The County of Hawai'i Planning Department and Mass Transit Agency (MTA), in partnership with the Hawai'i State Library System (HSPLS), propose to develop a Transit Hub and State Library in Pāhoa, Puna on the Island of Hawai'i. This project would implement one of the goals of the County of Hawai'i Transit and Multi-Modal Transportation Master Plan (TMMP) to "Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places." The implementation of a new library in Pāhoa would likewise support the County's Transit-Oriented-Development (TOD) efforts by providing community services and amenities in a central location. Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoa community and advance TOD principles.

This project is subject to the State environmental review process prescribed under Chapter 343 (Environmental Impact Statements), Hawai'i Revised Statutes (HRS), as amended, also known as the Hawai'i Environmental Policy Act, and Title 11, Chapter 200.1 (Environmental Impact Statement Rules), Hawai'i Administrative Rules (HAR). Under these regulations, nine specific types of actions are identified that "trigger" environmental review. This project triggers the State environmental review process under these regulations because of the use of State or County funds (HRS Section 343-5(a)(1)).

1.1.1 Pāhoa Transit Hub

Transit Hubs are facilities that are designed to provide convenient access to various modes of travel at a central location. Transit hubs are used to create hub and spoke style transit systems that provide access to public transit in a way that is convenient and safe for the community. They typically include a number of passenger amenities including information booths, shelter, benches, bicycle storage, restrooms, security, and lighting. Many have parking available to facilitate "park and ride" or "kiss and ride" services where commuters can be dropped off or safely park their car when they switch to a different transportation mode. Transit hubs also create a convenient location to locate nearby taxi or ride-share services.

In this hub and spoke model, hubs are served by transit routes or "spokes." The spokes are those localized routes providing neighborhood connections to the hubs. Passengers can transfer to other routes to continue their trip. The TMMP includes a conceptual map of this design for the area surrounding Pāhoa (see **Figure 1**). This would create a bus system that allows commuters from nearby Puna neighborhoods such as Hawaiian Beaches, Nānāwale, Kalapana, and Seaview to conveniently connect to bus routes to and from Kea'au or Hilo.

The benefits of transit hubs are closely linked to and compatible with the TOD design concept by locating transit hubs within walking distance of surrounding shopping, services, parks, and other amenities. This facilitates active transportation options like walking and biking within town centers. It would also increase

accessibility and mobility for Puna communities, providing more feasible options for commuters and reducing traffic congestion.

There are currently three bus routes that go to Pāhoa and the Puna Kai shopping center; all leave their first trip out from the Puna Kai Shopping Center at 5:30AM with the last bus back at 9:28PM. These bus routes are not expected to change. The proposed features for the Pāhoa Transit Hub include, at a minimum, a passenger shelter, seating, lighting, and trash receptacles. Other considerations include:

- **Access:** Including bus-only signs to access the facility, to include drop-off locations and commuter parking areas. Transit facilities should have pedestrian access such as sidewalks or separated walking areas.
- **Passenger Waiting Area:** Three types of passenger waiting areas: center island, plaza, and sidewalk. The center island would be where buses stop on both sides and passengers can transfer between busses without vehicle conflicts. Plaza designs would be similar but the center pedestrian area would be built on a larger scale and may include fountains, food kiosks, and other services.
- **Lighting:** A range is possible from high-mast streetlamps to specialized in-ground lighting. Passenger shelters at hubs should have overhead lights underneath the shelter roof.
- **Passenger Seating:** Options include stools, standard benches, and seating extended from planters and other landscaping features such as walls.
- **Passenger Shelters:** These can be the standard shelters the County uses at bus stops, or they may be unique shelter designs.
- **Parking:** Including parking for cars, carpool, vanpool, bikes, bikeshare, carshare, taxi and Transportation Network Companies – Park and Ride/Kiss and Ride.
- **Day care:** A service to care for children while their parents commute, the specifics of this facility to be further decided in the design phase of the project and may be provided by others.
- **Cultural Center:** Connected to the Pāhoa Public Library to provide a space for performances, classes, and workshops with the goal to celebrate and perpetuate culture.
- **Various community amenities/functions:** police sub-station, public restrooms, donation drop-offs, ballot drop-boxes, mailboxes, recycling locations, and other services as available.
- Bicycle racks/lockers.
- Public restrooms.
- Wayfinding displays and maps.
- Vending machines dispensing items such as newspapers, free publications, snacks, drinks, as well as ATM.
- Wi-Fi and telephones.

Figure 1. County of Hawai'i Transit and Multi-Modal Transportation Master Plan, Pāhoa Hub



Source: County of Hawai'i Transit and Multi-Modal Transportation Master Plan, 2018

1.1.2 Pāhoa Public Library

The existing library in Pāhoa is located at the Pāhoa High and Intermediate School. It is accessible to the public; however, parking for the library is limited and the increasing patronage from the public presents safety concerns for students. Re-locating the Pāhoa Public Library would provide more space for the school while enabling improved library services and programming for the local community. Co-locating the Pāhoa Public Library with the transit hub would allow increased access to library services in a convenient location.

The proposed construction of the new Pāhoa Public Library would include 8,000 square feet (SF) of enclosed, air-conditioned, interior space and 1,000 SF of indoor-outdoor entry lanai activity area. The enclosed space would include the following function areas:

Public Space:

- Central hub: self-service area, news zone, co-working zone, Friends of Library space.
- Quiet zone: study areas and computer stations.
- Busy zone: lounge area and computer stations.
- Keiki area: unique activity space and computer stations.
- Restroom and maintenance.

Staff Area:

- Open workroom/lounge.
- Manager's office.
- Storage/maintenance.
- Circulation and support.

Community Use Space:

- Multi-purpose room/dividable meeting room.

The new library would also include exterior spaces which may include a community garden, nonbook collection, a courtyard, bookmobile area, food truck/concessions, drop-off area, and outdoor lockers.

Other amenities to be considered during the design phase once a final site has been selected also include:

- An outdoor theater/stage area for book reading groups and outdoor events. Indoor auditorium for author presentations and movies.
- An area for Friends of the Pāhoa Library book sales.
- Computers and fast Wi-Fi connection.

1.2 Project Background

1.2.1 Transit Hub Site Selection Process

The Pāhoa Transit Hub project was initiated as part of the TMMP that was completed in August of 2018. The MTA initiated public outreach in 2019 along with the initial identification of locations for consideration of a transit hub.

- A community meeting was held in March 2019, where four possible locations were proposed,

along with parcel ownership, address Tax Map Key (TMK), size (in acres), and zoning.

- A second community meeting was held in July 2019, where two additional sites were added by Hawai'i County.
- A seventh location was added after research results were presented, and site advantages/disadvantages were discussed by attendees.

After the public outreach in 2019, the Hawai'i County Planning Department and MTA added additional locations and ranked 13 potential sites based on the criteria previously identified. Of the 13, three were removed from consideration. In 2022, a site suitability analysis was completed on the remaining ten sites, resulting in three preferred sites. The details of the full site suitability analysis can be found in **Appendix A**.

The three sites that were identified as preferences during the site selection process were Sites 2, 8, and 9. These sites are now being considered by the MTA as alternative options moving forward in this Environmental Assessment: Alternatives 1 (Site 2), 2 (Site 8), and 3 (Site 9). More information about the three alternatives, including the alternatives considered but not carried forward may be found in **Section 2.0**.

1.2.2 Pāhoa Public Library Site Selection

In October 2015, HSLPS started a project to determine the preliminary design features and possible location for expanding access to a regional public library in Puna. The project was motivated by the need to deviate from the previous 1960s design strategy of co-locating schools and public libraries. As mentioned previously, the co-location of these facilities has led to concerns for school security as well as a need to plan for future expansion of services to meet the demands of a growing population. The HSLPS hosted a series of three community focus group meetings (in Kea'au, Mountain View, and Pāhoa) to gauge public interest in the desired uses and services provided by a new regional library. Based on the focus group meetings feedback, the HSLPS determined that two new libraries will be planned for Puna, one in Pāhoa and the other in Kea'au, in order to adequately serve the growing needs of the Puna district.

In April 2018, six State-owned or County-owned candidate sites were selected and evaluated based on pre-set criteria to rate them on their suitability. Of the six sites, three were narrowed down that best suit the needs of the project. In September 2021, the Department of Accounting and General Services' consultant, G70, completed an Environmental Assessment for the Pāhoa Public Library Site Selection with the three chosen candidate sites. This Environmental Assessment concluded with a Finding of No Significant Impact (FONSI)

HSPLS determined that the identified sites were ultimately not satisfactory to proceed with the design phase of the project. They coordinated with State and County TOD efforts to explore the possible co-location of the library with the proposed transit hub.

1.3 Project Location

The alternative sites are located on the northern side of Pāhoa Village on the mauka side of the Pāhoa Village Road and are close to existing commercial areas (see **Figure 2**).

- Alternative 1 is located at the northwest corner of Pāhoa Village Road and Kahakai Boulevard between Pāhoa Marketplace and the Puna Kai Shopping Center (TMK: (3) 1-5-007:007). The site has 9.572 acres.
- Alternative 2 is located along Pāhoa Village Road to the South of the Puna Kai Shopping Center (TMK: (3) 1-5-007:005). The site has 10 acres.
- Alternative 3 is located along Pāhoa Village Road at the corner of 'Apa'a Street and consists of four parcels (TMKs: (3) 1-5-007:076, 004, 082, 083). The site has 5.641 acres.

Additional details about the three alternative sites can be found in **Section 2.0**.

1.4 Purpose and Need

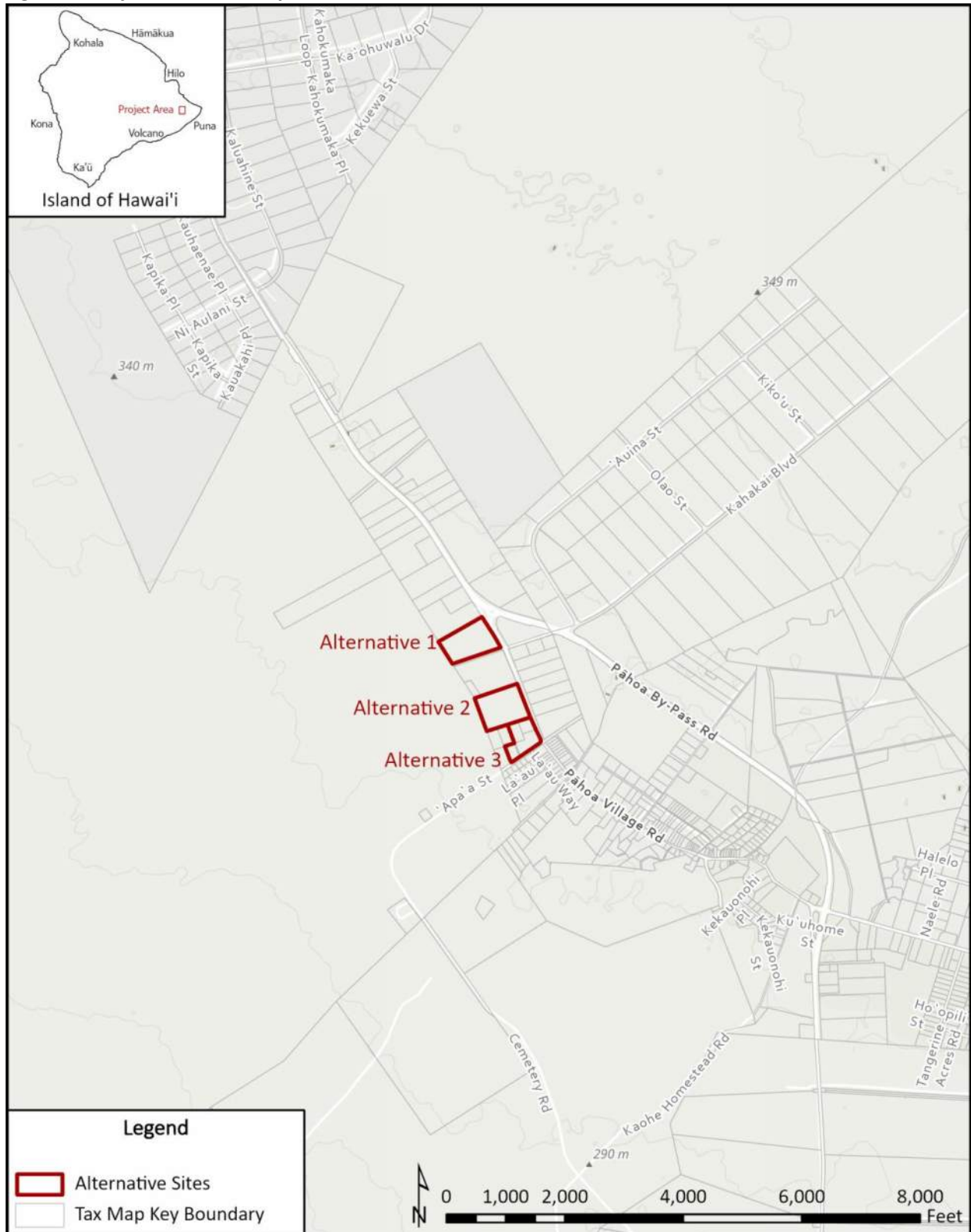
1.4.1 Purpose of the Proposed Project

The purpose of this project is to create a hub for the Pāhoa community that centralizes a variety of needed services and amenities. The Transit Hub would be co-located with a Hawai'i State Public Library to offer access to other connected services such as community meeting and learning spaces. This project would implement longstanding needs heard from community members as reflected in various community plans including the Puna Community Development Plan (CDP) and the TMMP. The design and function of the Pāhoa Transit Hub and Library also corresponds with community planning best practices that would support equitable access to government services and job centers, childcare, as well as arts and cultural programs to support a healthy Pāhoa community.

Transit Hub

The primary goal of the Pāhoa Transit Hub is to enhance accessibility for residents in the surrounding area by facilitating the use of transit services and promoting active modes of transportation. The project aims to enhance mobility and provide improved transit access to individuals and families who benefit from, or rely on, these services. This project seeks to promote TOD planning measures in a district that is experiencing rapid population growth. The hub will serve a central location surrounded by community amenities to include the library and other essential services. By encouraging diverse transit options for residents, the project aims to reduce traffic congestion and carbon emissions by providing reliable, alternative commuting options.

Figure 2. Project Location Map.



Pāhoa Public Library

HSPLS developed a Master Plan for Public Libraries in 1991 which was intended, in part, to establish the location for the construction of new libraries and the consolidation of existing libraries to better service the community. This would ensure they are conveniently located and of sufficient size to provide economical, flexible, and comprehensive services. The goal was to upgrade the physical condition of libraries so that they are safer, well-designed, and of sufficient size to support growing service needs over the next twenty years.

The 1991 Master Plan included the eventual consolidation of the Kea'au, Mountain View, and Pāhoa libraries to be replaced with the development of a new regional library facility to service the Puna region. A fiscal year 2014-2015 budget appropriation specified a Puna District regional library to be located in Pāhoa.

In 2017, HSPLS created a new plan to better implement the goals of the 1991 Master Plan while considering the current demographics of the Puna region. Based on community input and HSPLS considerations, two library sites would be planned, one to serve the Pāhoa area and one to serve Kea'au-Mountain View. In May 2023, a Draft Environmental Assessment was published for the Kea'au-Mountain View Public Library.

From the 2017 HSPLS Master Plan, the three main core values for the Pāhoa Public Library were listed as follows:

Community / Educational / Cultural Hub:

- This value highlights the role of the library as a gathering place for the community and the region. Through the promotion of literacy, providing educational opportunities for all age ranges, and providing opportunities for continued cultural practices, this core value reinforces the library as a beacon for knowledge, arts, and culture.

Access:

- The core value of Access applies to multiple facets of the library. This access ranges from access to information, to access to the library's collections and materials, even as far as access to government and government officials through forms and resources to webcast capabilities with elected officials, to its widest interpretation – giving Puna residents and library users access to the entire world.

Collection and Preservation:

- Collection and preservation are the most traditional values of the Pāhoa Library and continue the legacy of library institutions throughout history. This core value speaks to the physical preservation of hard copy materials, digital preservation of electronic and hard copy materials, preservation of historic items in the Puna region, and the potential collection and organization of other types of library collections such as tools, seeds, or other non-book type inventories.

1.4.2 Need for the Proposed Project

Transit Hub

The TMMP completed in August 2018 identified five (5) goals, including the following: “Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places.” The TMMP recommended a hub and spoke service design to ensure easy access to transit and other community services. This model centralizes services to improve accessibility and cluster community amenities. This includes facilities such as a shelter, restrooms, benches, and bicycle storage as well as safety improvements such as security and lighting.

The district-specific proposals in the TMMP were developed through a community engagement effort combined with population and employment projects for various areas of the County. An Environmental Justice analysis for the Puna area was conducted that identified a greater need for transit services in correspondence with disproportionately high minority populations and households below the poverty line in the district. More details on socioeconomic impacts and need for the area surrounding Pāhoa may be found in **Section 3.6**.

The inclusion of a transit hub in Pāhoa is included in the TMMP which recognizes Pāhoa as a Regional Town Center providing services to support numerous surrounding communities. The plan recognizes key retail and business spaces like the Puna Kai Shopping Center, the Pāhoa Marketplace, and the commercial center at the intersection of Pāhoa Bypass Road and Pāhoa Village Road. These developments create a major commercial area, emphasizing the need for accessible and equitable transit options in the region. Additionally, the demand for a park-and-ride lot in Pāhoa was identified during the Puna CDP process, reflecting the long-standing community need for a Transit Hub in the area.

An extensive community engagement process was conducted between July 2022 and March 2023 to assess community needs and site selection preferences. This included pop-up events, meetings, charettes, and an online open house comment period. The feedback indicated additional needs for the Pāhoa community. Details regarding community engagement are provided in **Section 6.0**. Preliminary designs for the Transit Hub include facilities include a Day Care Center and Cultural Center that may be constructed by others and which are proposed to accommodate additional needed services and amenities for the community.

Pāhoa Public Library

Currently, the Puna region is served by three libraries: the Kea'au Public and School Library, the Mountain View Public and School Library, and the Pāhoa Public and School Library. All three libraries are situated on Hawai'i State Department of Education (DOE) campuses with designation for providing library services for the community. The concept of having both public and school libraries co-located with schools was a strategic approach that began in the 1960s when these libraries were established. However, due to concerns related to school security and the substantial growth experienced in the Puna region, the HSPLS intends to locate its facilities outside of the DOE land. This includes the establishment of new libraries to better serve and accommodate the needs of the growing district.

The library would also play an important role in providing community access to broadband, in alignment with HRS §226-10.5A. More information about broadband and the local socioeconomic makeup of the Pāhoa area is discussed in **Section 3.6**.

1.5 Project Schedule

As shown in **Figure 3**, the project timeline is projected to run through to 2027. The Environmental Assessment process will determine site selection and applicability for the project as currently planned. MTA anticipates the completion of a Final Environmental Assessment in January 2024 to await final determination. Upon a FONSI determination, the project would then move forward to the design and permitting followed by construction phases. MTA anticipates that it will take through 2024 to complete the permitting process and that construction would commence in 2025.

Figure 3. Project Schedule



1.6 Permits and Approvals Which May Be Required for the Proposed Project

Implementation of Alternatives 1, 2, or 3 would require coordination with State and County agencies for permits or approvals. The permits and approvals presented in **Table 1** may be required for Alternatives 1, 2, or 3. Permit requirements would be determined through continued agency coordination during the HRS Chapter 343 process.

Table 1. Permits and Approvals Which May Be Required for Alternatives 1, 2, or 3

Permit or Approval	Description	Regulation(s)	Administrative Authority
Environmental Assessment and FONSI	Required for projects that “trigger” environmental review, including those that propose the use of state or county lands and the use of state or county funds.	<ul style="list-style-type: none"> HRS Chapter 343, Environmental Impact Statements HAR Title 11 Section 200.1, Environmental Impact Statement Rules 	Office of Planning and Sustainable Development, Environmental Review Program
Historic Preservation Review	Required for projects that may affect historic property or a burial site.	<ul style="list-style-type: none"> HRS Chapter 6E 	Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD)

Permit or Approval	Description	Regulation(s)	Administrative Authority
National Pollutant Discharge Elimination System	Coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit is required for stormwater discharge associated with construction activities over 1 acre.	<ul style="list-style-type: none"> • Clean Water Act, Section 401 • HAR Section 11-55 	DOH – Clean Water Branch
County Grading Permit	Required when any one of the following items are exceeded: <ul style="list-style-type: none"> • 100 cubic yards of excavation or fill; • Vertical height of excavation or fill measured at its highest point exceeds 5 feet; or • When the general and localized drainage pattern with respect to abutting properties is altered. 	<ul style="list-style-type: none"> • Hawai'i County Code, Chapter 10 – Erosion and Sedimentation Control 	County of Hawai'i Department of Public Works (DPW)
Community Noise Permit/ Community Noise Variance	Required for construction projects exceeding 78 decibels (dBA) or has a total cost of more than \$250,000.	<ul style="list-style-type: none"> • HRS Chapter 342F • HAR Title 11, Chapter 46 	Hawai'i State Department of Health (DOH) - Indoor and Radiological Health Branch
Individual Wastewater System, Approval to Construct and Occupy	Required to upgrade or replace a failing cesspool or septic system	<ul style="list-style-type: none"> • HAR Section 11-62 	DOH -Wastewater Branch
County Building Permit	Required for any project that proposes to erect, construct, enlarge, alter, repair, move, convert, or demolish any building or structure in the County.	<ul style="list-style-type: none"> • Hawai'i County Code, Chapter 5 – Building 	DPW
County Site Plan Approval	Required prior to the construction or establishment of public uses, structures and buildings, and community buildings.	<ul style="list-style-type: none"> • Hawai'i County Code, Chapter 25 – Zoning 	County of Hawai'i Planning Department
State Land Use District Boundary Amendment	To change the State Land Use District classification from agriculture to urban in conformance with surrounding land uses. The County of Hawai'i is the accepting authority for areas less than 15 acres.	<ul style="list-style-type: none"> • Hawai'i County Code, Chapter 25 – Zoning and in alignment with HRS Chapter 205/205A and Land Use Commission Administrative Rules 	County of Hawai'i Planning Department

Permit or Approval	Description	Regulation(s)	Administrative Authority
Permit to Perform Work Upon State Highways	Required for any work within the state highway right-of-way, as applicable.	<ul style="list-style-type: none">• HRS Chapter 264	State of Hawai'i Department of Transportation

2.0 Alternatives

2.1 Alternative 1: Preferred Alternative

Alternative 1 is located at the northwest corner of Pāhoa Village Road and Kahakai Boulevard between the Pāhoa Marketplace and the Puna Kai Shopping Center (TMK: (3) 1-5-007:007). During the earlier stages of the site selection process (before the parcels were narrowed down to the three alternatives) the parcels were assigned numbers corresponding to the 13 candidate sites (detailed in **Section 1.2**). Therefore, this parcel was labeled “Site 2” in earlier documents.

The site is 9.572 acres. The site provides a large parcel with a good shape and could provide a gateway opportunity for Pāhoa. Bus access can be placed away from high pedestrian traffic areas. There are opportunities to enhance walkability, connectivity, and pedestrian safety along Kahakai Boulevard and Pāhoa Village Road frontages with opportunities to create a pedestrian friendly environment from the Puna Kai Shopping Center to the site. See the pros and cons identified during the site selection process for Alternative 1 in **Table 2** below.

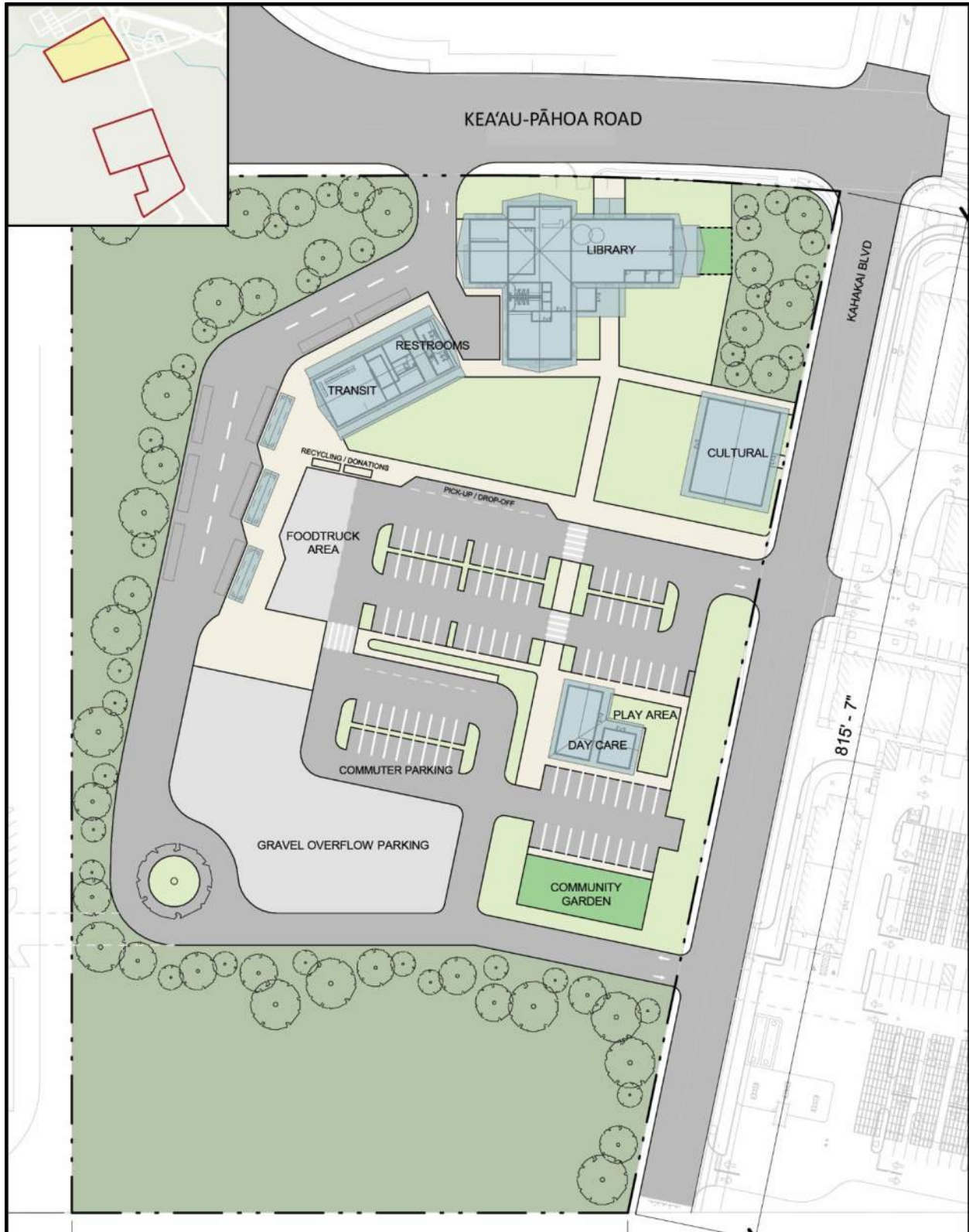
This parcel currently contains two three-bedroom agricultural dwellings, one built in 1959 and the other in 1955. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Access to this parcel for bus-only transit access would be provided off Pāhoa Village Road with clearly marked signage. The main parking area would be accessed off Kahakai Boulevard. Crosswalks would be added to bus entrance driveway and along the intersection between the main entry along Kahakai Boulevard connecting to the Puna Kai Shopping Center. Sidewalks along the parcel frontage of both Kahakai Boulevard and Pāhoa Village Road would accommodate pedestrian traffic and connect the Transit Hub and Library to the Pāhoa Marketplace and Puna Kai Shopping center. Bike access would be accommodated off the roadway with easy access to bike storage facilities to support multi-modal goals of Pāhoa Village (see **Figure 4**).

Table 2. Alternative 1: Pros and Cons Presented During the Site Selection Process

Pros:	Cons:
<ul style="list-style-type: none">• Large parcel with good shape;• Location provides a gateway opportunity for Pāhoa;• Bus access can be placed away from high pedestrian traffic areas;• Adjacent to the more pedestrian-oriented side of Puna Kai Shopping Center;• Opportunities to enhance walkability, connectivity, and pedestrian safety along Kahakai Blvd. and Kea’au-Pāhoa Rd frontages;• Opportunities to create pedestrian friendly environment from Puna Kai Shopping Center to the site.	<ul style="list-style-type: none">• No existing raised sidewalk;• Existing traffic signal could be point of congestion for bus access.

Figure 4. Alternative 1 Preliminary Site Design



This parcel was chosen as the preferred alternative following extensive community engagement efforts during the project site selection process. Participants in the outreach process frequently mentioned the convenience of accessing nearby shopping facilities and the desire to establish a connection between the Puna Kai Shopping Center and the Pāhoa Marketplace.

2.2 Alternative 2

Alternative 2 is located along Pāhoa Village Road immediately mauka of the Puna Kai Shopping Center (TMK: (3) 1-5-007:005). During the earlier stages of the site selection process (before the parcels were narrowed down to the three alternatives) the parcels were assigned numbers corresponding to the 13 candidate sites (detailed in **Section 1.2**). Therefore, this parcel was labeled “Site 8” in earlier documents.

The site is 10 acres and provides a large parcel with a good shape. This site is slightly separated from the congested Puna Kai Shopping Center, which might be easier for bus access. There is good street frontage, but the site is adjacent to fewer pedestrian-oriented uses. See the pros and cons identified during the site selection process for Alternative 2 in **Table 3** below.

This parcel currently contains a two-bedroom agricultural dwelling built in 1995.

Access to this parcel for bus-only transit access would be provided off the Pāhoa Village Road with clearly marked signage. The main parking area would also be accessed off Pāhoa Village Road toward the south side of the property. Crosswalks would be added to bus entrance driveway and along the intersection between the main entry along Kahakai Boulevard connecting to the Puna Kai Shopping Center. Bike access would be accommodated off the roadway with easy access to bike storage facilities to support multi-modal goals of Pāhoa Village (see **Figure 5**).

Table 3. Alternative 2: Pros and Cons Presented During the Site Selection Process

Pros:	Cons:
<ul style="list-style-type: none"> • Large parcel with good shape; • Slightly separated from congested Puna Kai Shopping Center area which might be easier for bus access; • Good street frontage; • A single parcel with relatively low land costs. 	<ul style="list-style-type: none"> • No existing raised sidewalk and limited asphalt shoulder space outside of property frontage; • Site will need to be cleared; • Adjacent to fewer pedestrian-oriented uses.

Figure 5. Alternative 2 Preliminary Site Design



2.3 Alternative 3

Alternative 3 is located along Pāhoa Village Road at the corner of Apa'a Street and would consist of four parcels (TMKs: (3) 1-5-007:076, 004, 082, 083). During the earlier stages of the site selection process (before the parcels were narrowed down to the three alternatives) the parcels were assigned numbers corresponding to the 13 candidate sites (detailed in **Section 1.2**). Therefore, this parcel was labeled "Site 9" in earlier documents.

The site is 5.641 acres. The site has good street frontage and is close to but separated from nearby commercial areas. The total parcel size just meets the basic minimum footprint with no room for potential expansion. It is also adjacent to surrounding single-family homes. Across the street is a neighborhood and the Pāhoa Christian Mission Church, making this area less pedestrian-oriented than the other two alternatives. See the pros and cons identified during the site selection process for Alternative 3 in **Table 4** below.

These parcels currently contain a four-bedroom agricultural dwelling built in 1970 and a two-bedroom agricultural dwelling built in 1968. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Access to this parcel for bus-only transit access would be provided off Pāhoa Village Road with clearly marked signage. The main parking area would be accessed off Apa'a Street. Crosswalks would be added to bus entrance driveway and along the intersection between the main entry along Apa'a Street which would connect the Transit Hub to the neighborhood to the south toward Pāhoa Village. Bike access would be accommodated off the roadway with easy access to bike storage facilities to support the multi-modal goals of Pāhoa Village (see **Figure 6**).

Table 4. Alternative 3: Pros and Cons Presented During the Site Selection Process

Pros:	Cons:
<ul style="list-style-type: none"> • Good parcel size • Located at the corner site of Pāhoa Village Rd and Apa'a St, close to commercial points of interest and separated from the congested Puna Kai Shopping Center area; • Good street frontage. 	<ul style="list-style-type: none"> • Parcel size just meets basic minimum footprint with no room for potential expansion; • No existing raised sidewalk; • Adjacent to single-family development resulting in the site being less pedestrian oriented; • Potential increase in acquisition costs due to land assembly and existing structures on site.

Figure 6. Alternative 3 Preliminary Site Design



2.4 Alternative 4: No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be constructed. The Puna district population will continue to grow, and outsized traffic congestion issues will continue to be exacerbated for commuters. An Environmental Justice analysis for the Puna area identified a greater need for transit services as a historically underserved district despite its accelerated growth. A snapshot of the demographic landscape of the Puna district is discussed in more detail in **Section 3.6**.

Transit services would need to expand to assist residents who rely on or benefit from public transportation to reach employment hubs and other vital destinations. Without the implementation of the Pāhoa Transit Hub and Library, the current level of transit services for the local population would remain inadequate. This would leave residents with limited options and access to essential services.

The Pāhoa Public Library would continue to be located at the Pāhoa High and Intermediate School. Access to the library would be limited by space available on the campus with no room for growth to accommodate future population growth. Co-habiting the library with the school would continue to present a security risk for students. The resources available and services provided at public libraries play a crucial part of supporting healthy communities. They can strengthen community networks, increase civic engagement, and enrich the quality of life for residents (Putnum, 2000). Without the expansion of the Pāhoa Public Library, there would be reduced access to community gathering spaces, the internet, government services, and arts/cultural classes which would particularly impact the most vulnerable populations in the district.

The regional town center of Pāhoa would continue to have decreased connectivity to support a walkable community. This is particularly true in the case of Alternative 1, which would create a linkage between the Pāhoa Marketplace and the Puna Kai Shopping Center, centralizing needed services and activities surrounding these major commercial areas. The sidewalks between these spaces would also continue to be inadequate to provide pedestrians a safe way to navigate through the town center.

Without the Pāhoa Transit Hub and Library, traffic conditions are projected to continually get worse over the next 20 years, as per the TIAR conducted for this project. This is discussed in more detail in **Section 3.7**. Minimization measures would be needed to prevent traffic congestion and maintain an adequate level of service.

2.5 Alternatives Considered But Not Carried Forward For Further Analysis

The initial process of selecting a site for the Transit Hub involved evaluating various other alternatives based on their suitability for the project's needs. These alternatives underwent a scoring process to assess their viability. They were excluded from further consideration because the drawbacks outweighed the benefits. The community engagement process played a crucial role in identifying the disadvantages associated with these sites. In total, 13 sites underwent evaluation and ranking for suitability, with three sites eliminated from consideration. This resulted in ten sites being subjected to a detailed site suitability

analysis. **Table 5** offers a summary of this analysis, with more comprehensive results available in **Appendix A**.

Table 5. Evaluated Sites for the Pāhoa Transit Hub and Library

#	Site	Evaluation	
		Pros	Cons
4	Akebono Theatre 1-5-012:069 1-5-002:026 1-5-002:024	<ul style="list-style-type: none"> • Close proximity to Pāhoa Village points of interest • Good street frontage • Corner site • Good pedestrian connectivity; existing sidewalks 	<ul style="list-style-type: none"> • Total area less than basic minimum footprint • Parcels have odd configuration; less than ideal flow/circulation • Significant land costs due to previous development
5	Pāhoa District Park 1-5-002:020	<ul style="list-style-type: none"> • Large area for transit hub • Potentially low land costs due to County ownership 	<ul style="list-style-type: none"> • Only in close proximity to park uses • Poor visibility and street frontage • Due to long driveway pedestrian and bike access is poor
7	Post Office Road 1-5-013:022, 1-5-013:031 1-5-013:023, 1-5-013:030	<ul style="list-style-type: none"> • Somewhat close proximity to Pāhoa • Good infrastructure potential due to close proximity to main road 	<ul style="list-style-type: none"> • Total area less than basic minimum footprint • Parcels have odd configuration; might offer less than ideal flow/circulation • Poor pedestrian connectivity; road has no shoulder
10	Miyatake & Tsubota 1-5-007:059 1-5-007:054	<ul style="list-style-type: none"> • Close proximity to points of interest • Good infrastructure potential due to proximity to main road 	<ul style="list-style-type: none"> • Requires acquisition of multiple parcels • Short street frontage; limited vehicle access potential • Poor pedestrian connectivity; narrow shoulder
11	Julian & Good Shepherd Foundation 1-5-007:072 1-5-007:023	<ul style="list-style-type: none"> • Good parcel size and acceptable location • Large street frontage • Good infrastructure proximal 	<ul style="list-style-type: none"> • Poor pedestrian connectivity; narrow asphalt shoulder
12	Santo, Lee & Sugimoto 1-5-013:013 1-5-013:014 1-5-013:015	<ul style="list-style-type: none"> • Good infrastructure potential due to proximity to road • Large street frontage for multiple vehicle access 	<ul style="list-style-type: none"> • Parcels have odd configuration; might offer less than ideal flow/circulation • Not in close proximity to points of interest • Poor pedestrian connectivity; narrow asphalt shoulder

#	Site	Evaluation	
		Pros	Cons
13	Across Post Office Road 1-5-013:030, 1-5-013:023 1-5-013:024, 1-5-013:029 1-5-013:032, 1-5-013:034	<ul style="list-style-type: none"> • Somewhat close proximity to Pāhoa • Good infrastructure potential due to close proximity to main road 	<ul style="list-style-type: none"> • Parcels have odd configuration; might offer less than ideal flow/circulation • Limited street frontage • Poor pedestrian connectivity; road has no shoulder

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3.0 Affected Environment, Potential Impacts, and Minimization Measures

3.1 Water Resources

3.1.1 Affected Environment

Groundwater

As shown in **Figure 7**, Alternative Sites 1, 2 and 3 are located within the Pāhoa aquifer system of the Kīlauea sector (Aquifer Code 80801). The Kīlauea sector has a sustainable yield of 621 million gallons per day (MGD); the Pāhoa aquifer has a sustainable yield of 432 MGD. Withdrawal from the Pāhoa aquifer system is estimated to be .86 MGD or 0.2% of the current sustainable yield (State of Hawai'i Commission on Water Resource Management, Water Resource Protection Plan, 2019).

Water service to Alternatives 1, 2, and 3 are provided by the County of Hawai'i Department of Water Supply (DWS). **Section 3.14** outlines water utility services and needs.

Surface Waters

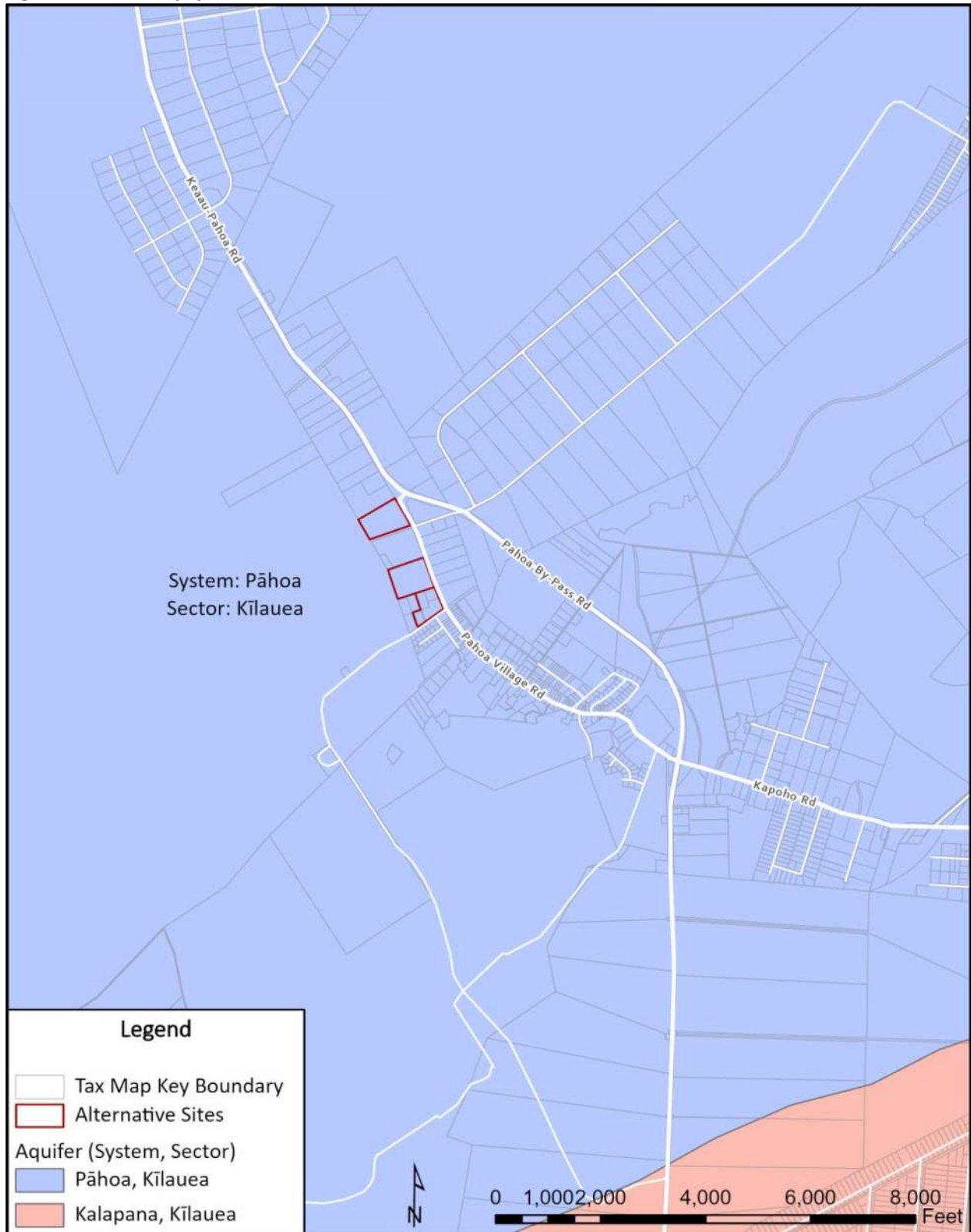
There are no standing water bodies, streams, or other surface water features in the immediate vicinity of Alternatives 1, 2, and 3. There is a riverine wetland habitat in the vicinity of Alternative 1 which is discussed in the subsection below.

Wetlands

As shown in **Figure 8**, the project site of Alternative 1 is crossed by a riverine habitat classified as R4SBC (Riverine, intermittent, streambed, seasonally flooded) as delineated by the National Wetland Inventory. This riverine wetland is intermittent, containing water only for part of the year. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface. The MTA is coordinating with the Army Corps of Engineers to assess permitting needs and to ensure compliance with all applicable requirements. Minimization measures related to wetlands and drainage for both construction and ongoing operation of the project are discussed in **Section 3.1.3**.

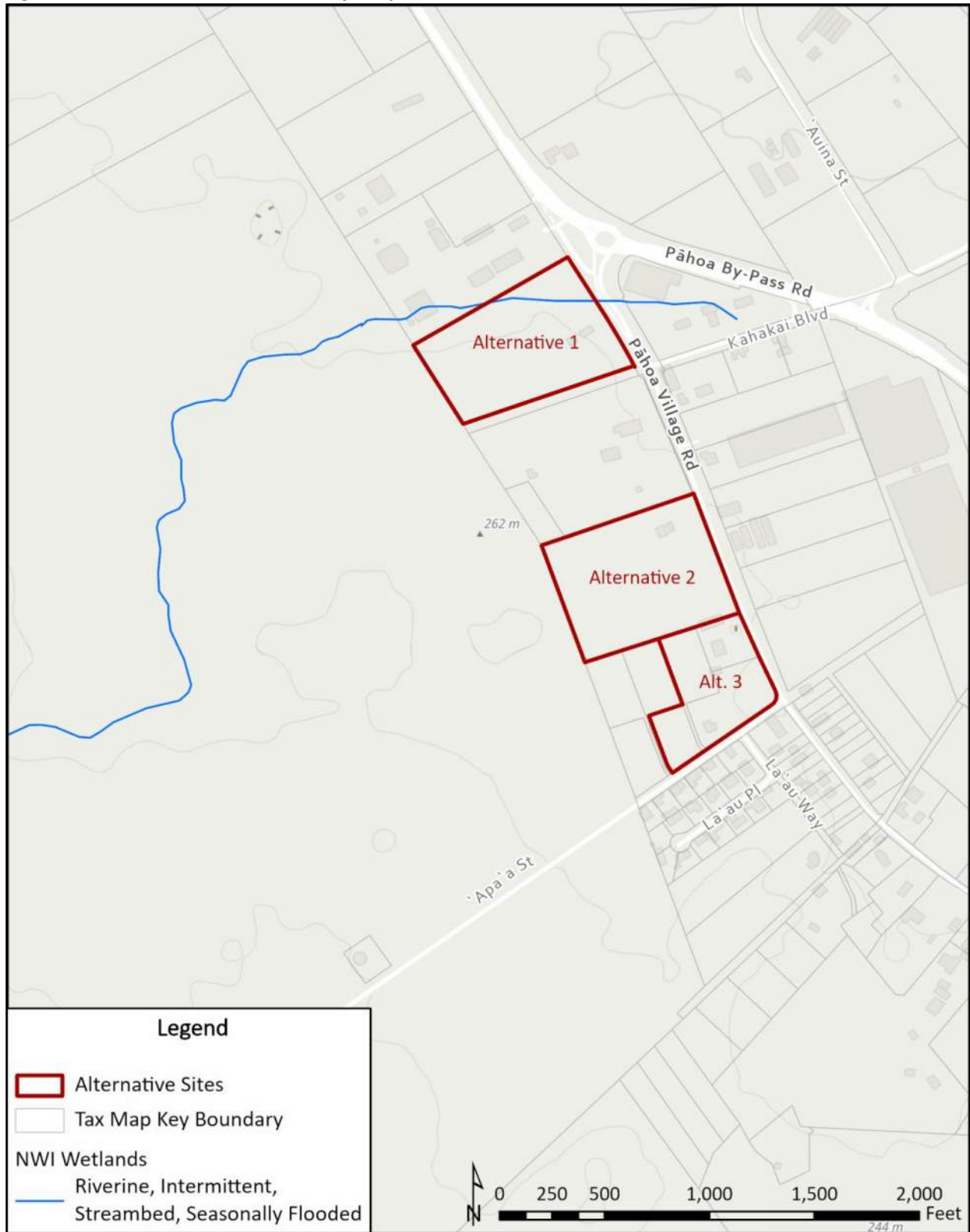
Alternative Sites 2 and 3 do not have wetland habitats on or around the project sites as recorded by the National Wetland Inventory.

Figure 7. Pāhoa Aquifer



Source: DLNR, Commission on Water Resource Management (2022).

Figure 8. National Wetland Inventory Map



Source: US Fish and Wildlife Service, National Wetland Inventory (1977).

3.1.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Construction of Alternative 1, 2, or 3 would consist of grubbing and grading of the chosen parcel. No significant impact to groundwater underlying Alternatives 1, 2, or 3 would be anticipated during construction. Construction of Alternative 1, 2, or 3 is unlikely to introduce or release any substance into the soil that could adversely affect groundwater quality.

Construction of Alternative 1, 2, or 3 would add approximately 5 acres of impervious surface, including roofs, driveways, and parking spaces, although the MTA and HSPLS may consider opting for pervious pavement where feasible to reduce this. To protect the recreational value of coastal waters, the State of Hawai'i has adopted water quality standards. Generally, these standards require submittal and adherence to the conditions in a National Pollutant Discharge Elimination System (NPDES) permit. This permit requires compliance with Best Management Practices (BMPs) during construction to minimize soil erosion into adjacent waterways and to maintain water quality during operation. A NPDES permit will be required for Alternatives 1, 2, or 3. Drainage minimization measures are discussed in **Section 3.1.3**.

Any runoff generated by the construction of Alternatives 1, 2, or 3 will be disposed of on-site and not directed toward any adjacent properties. A drainage study shall be prepared, and the recommended drainage system shall be constructed meeting the approval of the Department of Public Works. All construction activities would comply with the requirements of Hawai'i County Code, Chapter 10, Erosion and Sedimentation Control.

Alternative 1

The building design for Alternative 1 would leave the northern corner of the property untouched providing an appropriate buffer to minimize impacts from construction activities on the identified wetland habitat. Construction-related BMPs would also be implemented, as discussed in **Section 3.1.3**.

No-Action Alternative

Under the No-Action Alternative, Alternative 1, 2, or 3 would not be constructed; therefore, there would be no impacts to water resources.

Operation

Alternatives 1, 2, and 3

No significant impact to groundwater underlying Alternative 1, 2, or 3 would be anticipated during the operation of the Pāhoa Transit Hub and Library. Any runoff generated by Alternatives 1, 2, or 3 would be disposed of on-site and not directed toward any adjacent properties. All activities will comply with the requirements of Hawai'i County Code, Chapter 10, Erosion and Sedimentary Control.

Alternative 1

The building design for Alternative 1 would leave the northern corner of the property untouched providing an appropriate buffer to minimize impacts from Transit Hub and Library operations on the identified wetland habitat. Further avoidance and minimization measures are discussed in **Section 3.1.3**.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be in operation; therefore, there would be no impact to the existing water resource quality.

3.1.3 Avoidance and Minimization Measures

The MTA and HSPLS would obtain coverage under the NPDES General Permit for stormwater discharge associated with construction activities. As part of the permit process, the MTA and HSPLS would prepare a construction site BMP Plan that would include an erosion and sediment control plan, a site-specific plan to minimize erosion of soil and discharge of other pollutants into State waters, and descriptions of measures that would minimize the discharge of pollutants via stormwater after construction is complete.

BMPs during construction would include some or more of the following measures:

- Watering or applying dust suppressants at active work areas and project access roads, as needed.
- Installing dust screens or wind barriers around the construction site.
- Installation of Filter Sock Perimeter Controls adjacent and downslope from disturbed areas.
- Cleaning nearby pavements and paved roads after construction.
- Covering open trucks carrying construction materials and debris.
- Limiting areas to be disturbed at any given time.

Design features may be considered for the project that would provide ongoing protection from stormwater runoff:

- Dikes and swales may be installed as a permanent site drainage control feature.
- Pipe slope drains to contain and convey runoff without coming in contact with bare slope soils causing erosion.
- Sediment traps and ponds.
- Landscaping/riparian buffer restoration.
- Various green infrastructure solutions including infiltration basins/trenches, dry wells, rain gardens, pervious pavement, bioswales, and buffer strips.

3.2 Biological Resources

3.2.1 Affected Environment

A biological survey was completed for Alternatives 1, 2, and 3 in June 2023 by Geometrician Associates, LLC. The objectives of the botanical survey component of the survey were to: 1) describe the vegetation; 2) list all species encountered; and 3) identify the locations of any special status species. Plant species were identified in the field and, as necessary, collected and identified in the laboratory. Special attention was given to the possible presence of any federally listed threatened or endangered plant species, although the habitat did not indicate a high potential for their presence. The faunal portion of the survey

consisted of visual/auditory faunal surveys both during and apart from the botanical survey covering birds and introduced mammals, reptiles, or amphibians. Also considered during the survey was the general value of the habitat for native birds and the Hawaiian hoary bat. Not included in the survey were invertebrates, as the properties did not have the potential to contain special status invertebrate species. Similarly, because of the lack of lakes, ponds, or watercourses no aquatic species survey was conducted. At the time of the survey, right of entry had not been obtained for Alternative 2 and two of the properties of Alternative 3; these properties were observed from the boundaries. A follow up biological survey may be conducted of Alternative 2 and the non-surveyed parcels within Alternative 3, should they be selected. The biological survey report is included in **Appendix B**.

Vegetation Communities and Habitat

Alternative 1

Alternative 1 is located between the Pāhoa Marketplace and the Puna Kai Shopping Center. According to the biological survey, the majority of the surface of this property has been disturbed with about two-thirds of the land mostly graded with bulldozer pushpiles that form large berms. Vegetation in this parcel is largely dominated by elephant grass (*Cenchrus purpureus*) and albizia trees (*Falcataria moluccana*). Weedy trees and shrubs were observed including: strawberry guava (*Psidium cattleianum*), macaranga (*Macaranga tanarius* and *M. mappia*), gunpowder tree (*Trema orientalis*), cecropia (*Cecropia obtusifolia*), rattlepod (*Crotalaria spp.*), Asian melastome (*Melastoma candidum*) and autograph tree (*Clusia rosea*). The understory consists of saplings, vines such as pilau maile (*Paederia foetida*) and little bell (*Ipomoea triloba*), Koster's curse (*Clidemia hirta*), and various grasses, herbs and ferns, all non-native except the sedge pycreus (*Cyperus polystachyos*). A strip on the far north edge appears to never have been graded. It has a heavily invaded native forest of 'ōhi'a and uluhe, with some native 'uki sedge (*Machaerina mariscoides*) as well. Even here, though, non-natives such as Asian melastome actually dominate. A disturbed strip between the somewhat recently bulldozed areas on the south and the disturbed 'ōhi'a forest on the north is slightly more open in the sub-canopy layer, with a higher proportion of ferns including laua'e (*Phymatosorus grossus*), hare's foot (*Phlebodium aureum*), and the one native fern present, pakahakaha (*Lepisorus thunbergianus*); bamboo orchid (*Arundina graminifolia*) and Philippine ground orchid (*Spathoglottis plicata*); and other plants not seen much elsewhere on the lot including honohono (*Commelina diffusa*). No threatened or endangered plant species as listed by the U.S. Fish and Wildlife Service (USFWS) were observed, nor were there uniquely valuable habitats. No existing or proposed federally designated critical plant habitat is present on or near the project site. However it is recognized that the 'ōhi'a forest, despite its moderate to heavy degradation, has intrinsic conservation value.

Alternative 2

The flora on Alternative 2 is similar to the undisturbed portions of Alternative 1, with only the northwest corner where a home is located showing any signs of recent clearing. The same species observed in Alternative 1 are likely present, as well as a few additional ones, notably including mango (*Mangifera indica*), avocado (*Persea americana*), Podocarpus sp., and Chinese banyan (*Ficus microcarpa*), all associated with the home. No threatened or endangered plant species as listed by the USFWS were

observed, nor were there uniquely valuable habitats. No existing or proposed federally designated critical plant habitat is present on or near the project site. However, it is recognized that the 'ōhi'a forest, despite its moderate to heavy degradation, has intrinsic conservation value.

Alternative 3

Alternative 3 has the longest history of disturbance (air photos from 1965 show it as fully cleared). Where not occupied by homes and yards, the vegetation consists of elephant grass, guinea grass, bushy bluestem (*Andropogon glomeratus*), macaranga, albizia, and toon (*Toonia ciliata*). No threatened or endangered plant species as listed by the USFWS were observed, nor were there uniquely valuable habitats. No existing or proposed federally designated critical plant habitat is present on or near the project site.

Fauna

A total of 10 bird species were observed during the survey: Japanese white-eyes (*Zosterops japonicus*) as well as common mynas (*Acridotheres tristis*), northern cardinals (*Cardinalis cardinalis*), spotted doves (*Spilopelia chinensis*), house finches (*Haemorhous mexicanus*), yellow-billed cardinals (*Paroaria capitata*), yellow-fronted canaries (*Serinus mozambicus*), saffron finches (*Sicalis flaveola*), striped doves (*Geopilia striata*), and chickens (*Gallus gallus*). All species are common non-natives of urban, suburban, and rural areas.

The low elevation, mostly non-native vegetation, and proximity to human activity make Alternatives 1, 2, and 3 to be poor habitat for native forest birds. It was noted that two native forest birds, the Hawaiian hawk or i'o (*Buteo solitarius*) and the Hawai'i 'amakihi (*Chlorodrepanis virens virens*), could occasionally be present. Although not seen during the survey, the Hawaiian hawk occurs throughout the island of Hawai'i from sea level to 8,530 feet in elevation. Hawks often forage in forests near agricultural tracts and nest in tall trees of a variety of species. Hawaiian hawks generally prefer 'ōhi'a forest habitat but are known to breed successfully in both native and non-native forests.

Bird survey work in Puna documented by Spiegel et al (2006) indicates that in many lowland forests, Hawai'i 'amakihi are the most common and widespread native birds. They are significantly associated with 'ōhi'a. At low elevations there has been widespread recovery of this species and a changing composition of the forest bird community; nevertheless, lowlands dominated by non-native vegetation and bird species continue to have few native forest birds. This is true for the area surrounding Alternatives 1, 2, and 3. The Hawai'i 'amakihi is not a listed threatened or endangered species.

The Pacific golden-plover or kolea (*Pluvialis fulva*) is protected under the Migratory Bird Treaty Act. Although not identified during the biological survey, it is estimated to be the only species of shorebird likely to be seen within the vicinity of Alternatives 1, 2, or 3.

The area surrounding Alternatives 1, 2, and 3 are not suitable habitat for waterbirds due to the lack of streams or ponds. Therefore, the only waterbird likely to occasionally be present is the threatened Hawaiian goose or nēnē (*Branta sandwicensis*). Nēnē have become very common on many Hawaiian islands and can be found at elevations ranging from sea level to sub-alpine areas above 7,000 feet. While grassy patches on the disturbed portions of the properties may occasionally host nēnē, there were no signs of them observed.

Although they would rarely if ever be visible, several listed seabirds may overfly the Pāhoa area between the months of May and November, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). These seabirds hunt over the ocean during the day and fly to higher elevations at night to nest. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals including cats and mongooses. Although each of these seabirds may fly over Pāhoa on their way to and from mountain nesting areas and the open ocean, no suitable nesting habitat for any of them is present on Alternatives 1, 2, or 3.

The Hawaiian hoary bat or 'ōpe'ape'a (*Lasiurus cinereus semotus*) is found throughout Puna and most areas on the island of Hawai'i. Bats may forage for flying insects on the properties on a seasonal basis and may also roost in trees and large shrubs. Bats are often visible while they are feeding on flying insects near dusk and dawn at various locations around the island of Hawai'i. Although not identified during the biological survey, it is likely that Hawaiian hoary bats may sometimes be present on Alternatives 1, 2, or 3, and adjacent properties.

Invasive Species

Soil and plant material may contain invasive fungal pathogens (e.g., Rapid 'Ōhi'a Death [ROD]), vertebrate and invertebrate pests (e.g., Little Fire Ants, Coconut Rhinoceros Beetles), or invasive plant parts that could harm our native species and ecosystems.

ROD disease is caused by the *Ceratocystis* spp. and has been found on the islands of Hawai'i, Kaua'i, Maui, and O'ahu. The *Ceratocystis* fungus enters the 'ōhi'a (*Metrosideros polymorpha*) tree through a wound (e.g., broken limb, twig, scuffed exposed root) and grows in the sapwood of infected ohia trees and ultimately kills the tree. Humans are thought to be a main vector through the movement of wood or contaminated tools, gear, and vehicles from one location to another. Other potential vectors include feral ungulates and beetles.

The little fire ant (*Wasmannia auropunctata*) is an invasive species known to occur throughout Hawai'i Island. The little fire ant does not build mounded dirt nests; rather, it nests in a variety of habitats including in trees, around potted plants, irrigation lines, and in electrical boxes. Little fire ants were detected on Alternatives 1, 2, and 3 and are a pest that has become near-universal in settled parts of Puna.

3.2.2 Potential Impacts

Construction

Alternatives 1, 2, and 3.

Alternatives 1, 2, and 3 were observed to have varying degrees of previously disturbed flora and fauna. Alternative 2 was estimated to have the greatest extent of native forest, followed by Alternative 1, with Alternative 3 having the least. No rare, threatened, or endangered plant or animal species were present

on Alternatives 1, 2, or 3. The lesser disturbed areas contained native shrubs, ferns, and trees which are components for the habitats of many native animal species as well.

An issue for construction in properties with 'ōhi'a trees includes the propagation of two species of fungus called *Ceratocystis lukuohia* and *C. huliiohia*, which produce a disease called ROD. Projects that harm or relocate 'ōhi'a trees can spread the disease, and certain minimization measures are recommended.

Although not expected, any grading, tree removal, or other construction activities could disturb nesting activities of the Hawaiian hawk if nests are near enough to the construction area. Avoidance and minimization measures would be implemented to minimize potential impacts to the Hawaiian hawk (see **Section 3.2.3**).

Construction of Alternative 1, 2, or 3 is not expected to have adverse impacts to the Pacific golden-plover since there is not sufficient habitat in the surrounding area that the species could utilize.

Construction of Alternative 1, 2, or 3 is not expected to have adverse impacts to Hawaiian waterbirds since there is not appropriate habitat within the construction area. Construction of Alternative 1, 2, or 3 could have short-term, indirect impacts (e.g., noise, dust control) to Hawaiian waterbirds if they are utilizing areas adjacent to the project area. Avoidance and minimization measures would be implemented to minimize potential impacts to Hawaiian waterbirds (see **Section 3.2.3**).

Construction of Alternative 1, 2, or 3 would occur during daylight hours; therefore, there would be no impacts to listed seabirds. However, avoidance and minimization measures would be implemented to minimize potential impacts to seabirds should there be nighttime construction activities (see **Section 3.2.3**).

Depending on the final site design and building area, the construction of Alternative 1, 2, or 3 could involve removing trees greater than 15-foot-tall. There would be no tree trimming or clearing during the bat breeding season (June 1 through September 15). During the construction of Alternative 1, 2, or 3, the Hawaiian hoary bat may be temporarily displaced from the project area. The temporary displacement of these individuals at the project site is not expected to affect individual survival or overall species populations. The measures in **Section 3.2.3** would be implemented to minimize potential impacts to the Hawaiian hoary bat.

Construction of Alternative 1, 2, or 3 would involve the movement of soil and plant materials from the site. Construction activities could spread invasive species to new areas through the movement of vehicles and materials. Avoidance and minimization measures would be implemented to minimize potential impacts to native species from the inadvertent spread of invasive species off-site (see **Section 3.2.3**).

Per May 24, 2024 comments received by the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife, Hawaiian short-eared owl or pueo (*Asio flammeus sandwichensis*) could potentially nest in the project areas for Alternatives 1, 2, and 3. Avoidance and minimization measures would be implemented to minimize potential impacts to the Hawaiian short-eared owl and are discussed in **Section 3.2.3**.

Alternative 1.

About two-thirds of Alternative 1 has been previously disturbed and is not dominated by non-native species, many of which are considered invasive. No rare, threatened, or endangered plant species are present. Some areas of this property do contain degraded medium-stature 'ōhi'a forest accompanied by uluhe fern and 'uki sedge. Minimization measures for these findings are discussed in **Section 3.2.3**.

Alternative 2.

Alternative 2 was observed to likely contain the greatest extent of native forest and the biological survey identified the need for additional minimization measures. Considering the thousands of acres of surrounding Conservation District land, the 'ōhi'a trees on Alternative 2 are not critical to the preservation of habitat overall. However, if Alternative 2 is selected, additional plant surveys would be required to verify this assessment.

Alternative 3.

Alternative 3 was found to have been fully cleared in the past (air photos from 1965 show it as fully cleared), and as such overwhelmingly contains non-native grasses, shrubs, and trees. As such grubbing and grading activities associated with the construction of Alternative 3 are anticipated to have the least amount of impact on native plant or animal species. However, the minimization efforts discussed in **Section 3.2.3** remain applicable for this alternative.

No-Action Alternative.

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no impacts on flora or fauna.

Operation

Alternatives 1, 2, and 3

Operation of Alternatives 1, 2, or 3 would include outdoor lighting which may impact seabirds. These impacts would be minimized as discussed in **Section 3.2.3**. Operation of Alternatives 1, 2, or 3 would have no impacts to other flora or fauna resources.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be built; therefore, there would be no impacts to biological resources.

3.2.3 Avoidance and Minimization Measures

The following measures would be implemented to minimize potential impacts associated with flora species:

- Native plants would be used for landscaping.
- The contractor would retain the services of a qualified certified arborist with experience in tree protection and preservation during construction. The arborist would be present during all excavation activities adjacent to trees that would remain in place.

The following measures would be implemented to minimize potential impacts to the Hawaiian hawk:

- A pre-construction survey for hawk nests would be completed if construction is initiated during the breeding season (March 1 through September 30). If hawk nests are found to be present on or near the project site, all land clearing activity would cease until the end of the breeding season.

The following measures would be implemented to minimize potential impacts to Hawaiian waterbirds:

- If any Hawaiian waterbirds are present within or adjacent to the project area during construction, then all activities within 100 feet (30 meters) would cease, and the bird or birds would 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, the Hawai'i Island Branch Division of Forestry and Wildlife Office would be contacted.

The following measures would be implemented to minimize potential impacts to Hawaiian seabirds:

- Construction activity would be restricted to daylight hours as much as practicable during the seabird peak fledgling fallout period (September 15 to December 15) to avoid the use of nighttime lighting that could attract seabirds.
- All outdoor lights would be shielded to prevent upward radiation to reduce the potential for seabird attraction and shall not be directed to travel across property boundaries toward the shoreline and ocean waters.
- Outside lights not needed for security or safety would be turned off from dusk through dawn during the fledgling fallout period. Comments received from the DLNR Division of Forestry and Wildlife on May 24, 2024, provided guidelines for seabird friendly light styles to be incorporated into the project design.

The following measures would be implemented to minimize potential impacts to the Hawaiian hoary bat:

- Any fences that are erected during the construction of Alternatives 1, 2, or 3 would have barbless top strand wire to prevent Hawaiian hoary bats from becoming entangled on barbed wire.
- Trees taller than 15 feet would not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15).

The following measures would be implemented to minimize the spread of invasive invertebrate and flora species:

- All construction equipment and vehicles would be washed and inspected before entering the project area.
- Construction materials would be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species.
- When possible, raw materials (e.g., fill and construction materials) would be purchased from a local supplier to avoid introducing non-native species not present on the island.
- Native Hawaiian plants and/or non-invasive plants would be used in all landscaping.
- MTA and HSPLS would take actions to minimize the presence of nonnative predators such as cats, rodents, and mongooses. This includes removing cats, placing bait stations for rodents and

mongoose, and providing covered trash receptacles. Additionally, the feeding of feral cats on the premises would be prohibited.

The following measures would be implemented to minimize potential impacts to the Hawaiian short-eared owl:

- Before any vegetative alteration or ground-based disturbance, line transect surveys during crepuscular (twilight) hours would be conducted by a qualified biologist.
- In the event of discovering a pueo nest, a minimum buffer distance of 100 meters from the nest would be established until the chicks are capable of flight.

3.3 Archaeological and Historic Resources

3.3.1 Affected Environment

An Archaeological Literature Review and Field Inspection was completed for Alternatives 1, 2, and 3 in June 2023 by ASM Affiliates, Inc. This study, which is included in **Appendix C**, was conducted to provide MTA with information regarding the general nature, density, and distribution of archaeological and historic resources that may be expected in the location of Alternatives 1, 2, and 3. The study provided recommendations and guidance on future historic preservation work to support MTA and HSPLS in complying with the applicable state laws and any future County of Hawai'i development permitting that may be required.

Alternatives 1, 2, and 3 are situated at the northern end of Pāhoa Town on the mauka (western) side of Pāhoa Village Road on lots that were created as part of the Keonepoko Iki Homesteads during the end of the 19th century. They are located within the Keonepoko Iki Ahupua'a. Keonepoko Iki Ahupua'a is one of fifty traditional land divisions found in the District of Puna on the eastern shores of the Island of Hawai'i. Since the early 1900s, several archaeological studies have examined the Keonepoko area of Puna, though these studies have largely focused on the coast where Precontact and early Historic populations tended to concentrate.

The Precontact population of the Puna District lived in small settlements along the coast where they subsisted on marine resources and agricultural products. As coastal populations increased, the need for food caused people to seek arable land at higher elevations. This trend of increasing population along desirable coastal locations and the expansion into upland regions to support the coastal populations would have continued throughout prehistory, slowly populating more marginal areas of Puna District.

As the town of Pāhoa has grown, the necessity for archaeological investigation and identification of resources prior to development has prompted surveys of both large and small properties within Keonepoko Iki. There have been six archaeological surveys over the last nineteen years in the immediate vicinity of Alternatives 1, 2, and 3. No historic properties of any kind were identified during these six archaeological surveys.

Lava tubes, both culturally sterile and those containing cultural material, have been recorded in the vicinity of Alternatives 1, 2, and 3. There is a moderate possibility that lava tube openings exist within the study areas.

3.3.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

The presence of archaeological features on Alternatives 1, 2, or 3 is not anticipated due to the lack of archaeological resources identified by previously conducted Archaeological Inventory Surveys (AIS) in the surrounding area. There is a moderate possibility that subterranean lava tubes could exist under the three Alternative sites that have the potential to contain cultural and historic resources. Prior to any ground disturbing work, an AIS of the selected Alternative may be required if requested by SHPD. This is expected to minimize the possibility of construction activity interfering with historic resources of significance. An AIS would also identify the presence of cave entrances on Alternatives 1, 2, or 3 that would require minimization measures in advance of construction activities.

Overall, the probability of adverse impacts in this area seems very low as no historic properties have been identified during archaeological investigations on nearby TMK parcels. Alternatives 1 and 3 have supported residences and/or small-scale agricultural production since the mid-twentieth century. Those activities have likely left features within these locales such as rubbish, abandoned machinery, and any land modifications necessary for habitation or agriculture use such as bulldozer push piles and cobble mounds. Additionally, Alternatives 1 and 3 have undergone extensive mechanical disturbance, therefore limiting the likelihood of Precontact surface features. Any archaeological features that might have escaped this disturbance could include agricultural features typical of this part of Puna (e.g., modified depressions, modified outcrops, alignments, and/or mounds associated), and possibly, but not likely, scattered habitation features (platforms, terraces, pavements, walls, and/or enclosures), though they would not be expected to maintain much integrity.

Alternative 1

According to the Archeological Literature Review and Field Inspection provided by ASM Affiliates, the likelihood of encountering surface archaeological features for Alternative 1 is limited to the undisturbed area that extends from the northern boundary into the interior of the parcel. This parcel also contains two Historic Era residential structures (built in 1955 and 1959) near the eastern boundary of the parcel.

Alternative 2

Alternative 2 was not surveyed due to access restrictions to the property and therefore specific details regarding archaeological resources were not ascertained. This property has also proven to be the least disturbed of the three alternatives and therefore has the greatest likelihood, however unlikely, of containing surface archaeological features. This parcel contains a residence that was constructed in 1995 in the northeast corner, which would not be considered a historic resource.

Alternative 3

The Archeological Field Inspection included two of the four parcels that make up Alternative 3. No archaeological resources were identified on parcels with TMKs ending in 082 and 083. County of Hawai'i records list one Historic Era residential structure (built in 1968) on the parcel with TMK ending in 004. A second Historic Era residential structure (built in 1970) is located on parcel with TMK ending in 076 along with several ancillary structures associated with the former Pāhoa Feed and Fertilizer and likely prior agricultural activities that occurred on parcels 082 and 083. As with Alternative 1, the parcels that make up Alternative 3 have a history of ground disturbance that minimizes the possibility of occurring surface archaeological resources.

Consultation that was conducted for the project Cultural Impact Assessment identified Alternative 3 to contain a cave entrance on the makai (ocean side) of the corner property. The presence of this cave entrance requires further investigation to determine appropriate mitigative measures.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no impacts to archaeological or historic resources. The existing Historic Era residential structures on Alternatives 1 and 3 would remain in place.

Operation

Alternatives 1, 2, and 3

Operation of Alternatives 1, 2, or 3 would have no impacts to archaeological and historic resources as there would be no additional ground disturbing activities.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be built; therefore, there would be no impacts to archaeological or historic resources. The existing Historic Era residential structures on Alternatives 1 and 3 would continue to operate as residential structures.

3.3.3 Avoidance and Minimization Measures

The following measures would be implemented to minimize potential impacts to archaeological and historic resources:

- If human remains or burials are identified, all earth-moving activities in the area would stop, the area would be cordoned off, and SHPD and the Hawai'i County Police Department would be notified pursuant to HAR Section 13-300-40.
- If any potential historic properties are identified during construction activities, including the discovery of subterranean lava tube entrances at the chosen project site, all activities in the area would cease and SHPD would be notified pursuant to HAR Section 13-280-3.

3.4 Cultural Practices and Beliefs

3.4.1 Affected Environment

A Cultural Impact Assessment (CIA) was completed for Alternatives 1, 2, and 3 in August 2023 by ASM Affiliates, Inc. The CIA was prepared pursuant to Act 50 and in accordance with the Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts, adopted by the State of Hawai'i Environmental Council on November 19, 1997. Act 50, which was proposed and passed as Hawai'i State House Bill No. 2895 and signed into law by the Governor on April 26, 2000, specifically acknowledges the State's responsibility to protect native Hawaiian cultural practices. Act 50 further states that environmental studies ". . . should identify and address effects on Hawai'i's culture, and traditional and customary rights" and that "native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the 'aloha spirit' in Hawai'i. Articles IX and XII of the State Constitution, other State laws, and the courts of the State impose on governmental agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups."

The CIA report, which is included as Appendix D, contains background information outlining the study area's physical and cultural contexts, a presentation of previous archaeological work in the vicinity of Alternatives 1, 2, and 3, methods and results of the consultation process, and a discussion of potential cultural impacts. The report also includes actions and strategies that may help minimize any identified impacts.

Consultation

To identify individuals knowledgeable about traditional cultural practices and/or uses associated with Alternatives 1, 2, and 3 and surrounding project areas, a public notice was published in the May issue of *Ka Wai Ola*, the Office of Hawaiian Affairs' monthly newsletter. No responses were received. In addition, ASM staff contacted 21 individuals and organizations that were identified as persons who were long-time residents of the Keonepoko Iki-Pāhoa area and were believed to have knowledge of past land use, history, or other types of cultural information. Two agreed to be interviewed for the study.

Findings, Recommendations, and Conclusion

The findings of the cultural-historical analysis revealed limited information regarding the identification of valued cultural or natural resources and traditional customary practices specific to the area. It found that ground-disturbing activities associated with the construction of Alternatives 1, 2, or 3 have the potential to encounter subterranean lava tubes that may contain cultural material and human remains. In alignment with the conclusions of the Archaeological Literature Review and Field Inspection, the conclusion was that consultation with SHPD would determine if an AIS would be required in compliance with HRS Chapter 6E and meeting the requirements of HAR Chapter 13-276. This would include recommendations for measures regarding the treatment of any identified archaeological sites and should be submitted to SHPD for review and acceptance prior to the start of any ground-disturbing work.

The two consulting parties interviewed as part of this study expressed mixed support for the Transit Hub and Library. The expressed benefits included creating connections to existing developments to lessen the

overall impact and traffic concerns. Parcel-specific cultural impacts were not identified that would stem from known cultural resources on the land. However, a concern was expressed as to the preservation of the Puna cave system that may extend below Alternatives 1, 2, and 3. Alternative 3 was identified to contain a cave entrance on the makai (ocean side) of the corner property. In addition, a concern was noted regarding the potential that the introduction of new services could bring more people to the area, exacerbating existing issues of littering and homelessness.

3.4.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

During the construction of Alternatives 1, 2, or 3, there would be an increase in noise and dust. These impacts would be temporary and minimized to the extent possible. Prior to any ground disturbing work, an AIS of the selected Alternative may be required if requested by SHPD. This is expected to minimize the possibility of construction activity interfering with historic resources of significance. An AIS would also identify the presence of cave entrances on the alternative project sites that would require minimization measures in advance of construction activities.

Currently, none of the alternative sites are known to host cultural gatherings or contain culturally-sensitive resources utilized by the community. It is therefore not anticipated that construction activities would impact cultural practices and beliefs. The minimization measures in **Section 3.3.3** related to archaeological impacts are applicable in the event of the discovery of human remains or historic properties.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no impacts to cultural practices and beliefs.

Operation

Alternatives 1, 2, and 3

Alternatives 1, 2, and 3 are not anticipated to impact existing cultural gatherings or culturally-sensitive resources. The potential implementation of community uses and gathering spaces would provide a space to celebrate culture and integrate it into the services offered through the transit hub and library. The inclusion of cultural amenities would be done through consultation and in partnership with cultural practitioners. Alternatives 1, 2, and 3 are intended to support the further celebration of culture in Pāhoa by providing a community gathering space and resources.

No-Action Alternative

Under the No-Action Alternative, there would be no changes to the current use of Alternatives 1, 2, and 3; therefore, there would be no impacts to cultural practices and beliefs.

3.4.3 Avoidance and Minimization Measures

The following measures would be implemented to minimize potential impacts to cultural practices and beliefs:

- A ground-breaking ceremony may be held to bless the 'āina (land), the people, and the work before construction.
- The implementation of a cultural center would provide a space to celebrate culture and integrate it into the community services offered through the transit hub and library.

3.5 Geology and Soils

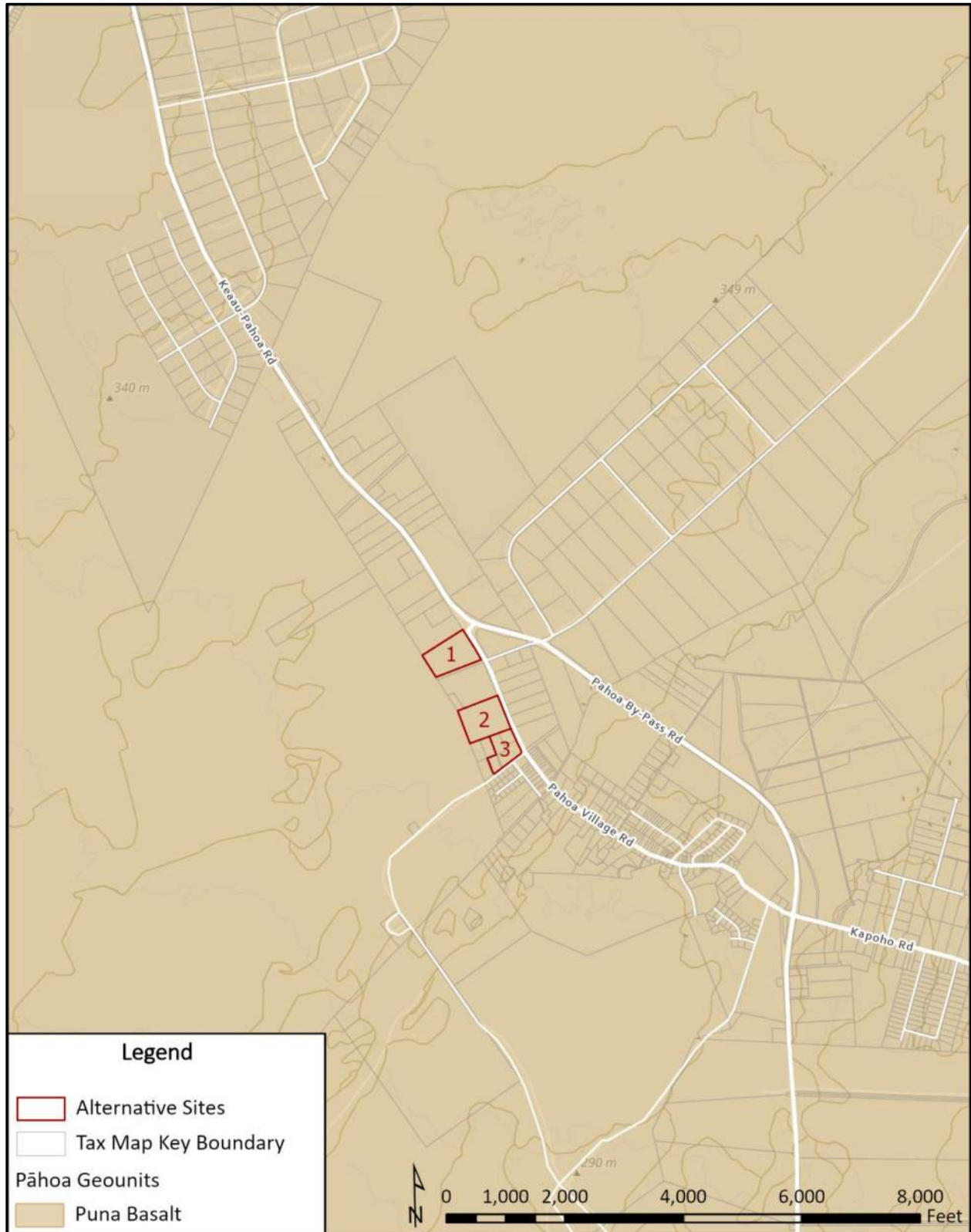
3.5.1 Affected Environment

The Island of Hawai'i is the largest island in the Hawaiian Archipelago and covers an area of approximately 4,000 square miles. The island was formed by the activity of five shield volcanoes: Kohala (long extinct), Maunakea (activity during the recent geologic time), Hualālai (last erupted 1801 to 1803), and Maunaloa and Kīlauea (both still active).

Alternative Sites 1, 2, and 3 are on eastern flank of the Kīlauea shield volcano. As shown in **Figure 9**, Alternative Sites 1, 2, and 3 are underlain by the Puna basalt series of Kīlauea, which were deposited during the Holocene and Pleistocene Epoch. The lava formation encountered at the site appears to consist of both a'ā and pāhoehoe type flows of the Puna Basalt Series, which spread and ponded as they approached the ocean. A'ā lava is typically characterized by a porous, rough, and irregular flow surface resembling a jagged accumulation of rock fragments, including cobbles and boulders. Pāhoehoe is characterized by a smooth, rope-like, or billowy surface and an internal structure of vesicular (porous) rock. Elevation profiles vary across the three alternative sites, with Alternative 1 ranging from 613 to 646 feet; Alternative 2 ranging from 635 to 653 feet; and Alternative 3 ranging from 633 to 646 feet.

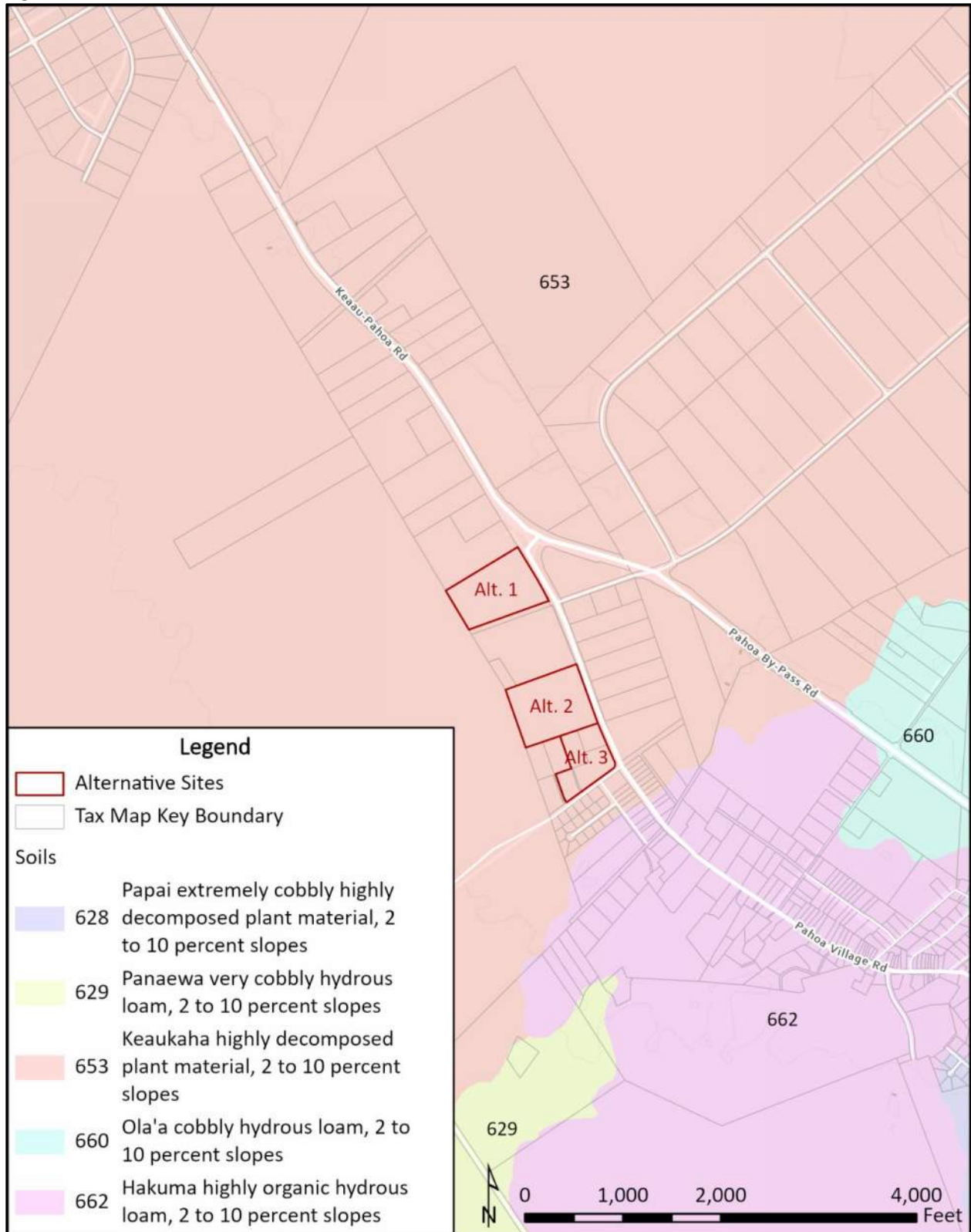
As shown in **Figure 10**, soils at Alternatives 1, 2, and 3 consist of Keaukaha Highly Decomposed Plant Material, 2 to 10 percent slopes. This particular soil category comprises shallow and extremely shallow soils that are well drained. These soils have developed on top of a thin layer of organic material and a small quantity of volcanic ash, which overlays smooth, undulating pāhoehoe lava (SSURGO, 2016).

Figure 9. Geologic Units



Source: *Geological Units for the State of Hawai'i*, USGS (2007)

Figure 10. Soils



Source: U.S. Department of Agriculture, Natural Resources Conservation Service (2016)

3.5.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Alternatives 1, 2, and 3 would not substantially alter the overall existing geology and topography. Ground-disturbing activities associated with the construction of Alternative 1, 2, or 3 have the potential to cause minor soil loss and erosion. All excavation and grading activities would be limited to the project area to minimize erosion potential. Contaminated soils encountered during construction would remain within the site using onsite encapsulation. Any excess excavated contaminated soils would be disposed of properly at an approved facility. Measures to minimize impacts would be implemented, as discussed in **3.5.3**.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no construction-related impacts to geology and soil resources.

Operation

Alternatives 1, 2, and 3

MTA and HSPLS do not anticipate that the operation of Alternative 1, 2, or 3 would impact existing geology and topography. There may be impacts to soils and grading due to water runoff from impervious surfaces on the site, such as the parking lot, driveways, and building footprints.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not operate; therefore, there would be no impacts to surrounding geology or soil resources.

3.5.3 Avoidance and Minimization Measures

Any grading would be in conformance with the Hawai'i County Grading Ordinance. In addition, MTA and HSPLS would obtain coverage under the NPDES General Permit for stormwater discharge associated with construction activities. As part of the permit process, MTA and HSPLS would prepare a construction site BMP Plan that would include an erosion and sediment control plan, a site-specific plan to minimize erosion of soil and discharge of other pollutants into State waters, and descriptions of measures that would minimize the discharge of pollutants via stormwater after construction is complete.

BMPs would include some or more of the following measures:

- Watering or applying dust suppressants at active work areas and project access roads, as needed
- Installing dust screens or wind barriers around the construction site
- Installation of Filter Sock Perimeter Controls adjacent and downslope from disturbed areas
- Cleaning nearby pavements and paved roads after construction
- Covering open trucks carrying construction materials and debris
- Limiting areas to be disturbed at any given time

BMPs would be implemented prior to ground-disturbing activities and would be inspected and maintained throughout the construction period.

The following measures would be implemented to minimize impacts associated with contaminated soils:

- Site workers would be informed of the presence of contaminated soil.
 - All work involving contaminated soil would be conducted in a controlled manner protective of the workers, site users, the public, and the environment.
 - All workers would be provided necessary training and hazard communication.
- Any excess excavated contaminated soils not encapsulated on site would be disposed of at an approved facility.

3.6 Socioeconomics and Environmental Justice

3.6.1 Affected Environment

Alternatives 1, 2, and 3 are located within the Puna District of the island of Hawai'i. As of the 2020 Decennial Census, the Puna district consists of ten census tracts that form the Pāhoa-Kalapana and Kea'au-Mountain View Census County Divisions (CCD). Over the past few decades, the Puna District has experienced rapid population growth compared to other districts in Hawai'i County. As shown in **Table 6**, the Pāhoa-Kalapana and Kea'au-Mountain View CCDs had 51,704 residents combined in 2020, which made up approximately 26% of the total population of Hawai'i County.

Table 6. Population Numbers

	2000	2010	Percent Change 2000-2010	2020	Percent Change 2010-2020
Pāhoa-Kalapana CCD	8,597	11,060	28.65%	10,494	-5.12%
Kea'au-Mountain View CCD	22,738	34,266	50.70%	41,210	20.26%
Hilo CCD	42,425	45,714	7.75%	46,118	0.88%
Papaikou-Wailea CCD	4,961	5,213	5.08%	5,433	4.22%
North Hilo CCD	1,720	2,041	18.66%	2,114	3.58%
Pa'auhau-Pa'auilo CCD	2,213	2,588	16.95%	2,678	3.48%
Honoka'a-Kukuihaele CCD	3,895	3,925	0.77%	4,212	7.31%
North Kohala CCD	6,038	6,322	4.70%	6,979	10.39%
South Kohala CCD	13,131	17,627	34.24%	19,310	9.55%
North Kona CCD	28,543	37,875	32.69%	43,313	14.36%
South Kona CCD	8,589	9,997	16.39%	9,789	-2.08%
Ka'ū CCD	5,827	8,451	45.03%	8,979	6.25%
Hawai'i County	148,677	185,079	24.48%	200,629	8.40%
Hawai'i State	1,211,537	1,360,301	12.28%	1,455,271	6.98%

Source: US Census (2000, 2010, 2020)

Examining broadband and transportation access provides further insight into the socioeconomic landscape of the Puna district, particularly due to the relative distance to essential services. Access to broadband services is vital for the well-being of households and is crucial for people to access jobs, education, health care, entertainment, and civic engagement activities. As shown in **Table 7**, the

percentage of households in the Puna District without internet at home exceeds both County and State levels.

Table 7. Broadband Access

	% Households with No Internet at Home	% Households Only Cellular Data at Home
Kea'au-Mountain View CCD	14.3	15.17
Pāhoa-Kalapana CCD	16.9	11.28
Hawai'i County	12.5	11.8
Hawai'i State	8.7	9.95

Source: ACS 2021 5-year estimates

According to a 2017 Trends and Future Needs study that was conducted as part of the TMMP, the Puna district is considered an “underserved growth area.” This is defined by limited access to services and infrastructure combined with a high population growth rate. It also identified Highway 130 between Pāhoa and Highway 11 between Kea'au and Hilo to be “significantly over capacity”. These highways together serve as the only major route to job centers and a variety of essential services for many Puna residents.

Environmental Justice

The EPA provides guidance for considering environmental justice concerns for a proposed action which puts forward general principles to assist in the process of comprehensive decision-making for impact minimization (EPA, 2015).

Demographic Composition

Demographic data is useful to determine whether minority, low-income, and indigenous populations are present in the area affected by a proposed action. It indicates that the Puna district experiences significant relative poverty levels as compared to other Hawai'i County and State districts. According to the 2021 American Community Survey (ACS), the Pāhoa-Kalapana and Kea'au-Mountain View CCDs have the highest and fourth highest percentage of households under the federal poverty line in Hawai'i County. The percentage of households in poverty within the Puna district is among the highest in the entire State of Hawai'i. In particular, out of the 42 CCDs in the State of Hawai'i, the Pāhoa-Kalapana CCD had the highest percentage of households in poverty in 2021 and the Kea'au-Mountainview CCD had the ninth highest.

The Hawai'i Island United Way maintains a socioeconomic index called ALICE (Asset Limited, Income-Constrained, Employed), specifically created to capture household financial hardship that may not be apparent when considering poverty rates alone. ALICE factors the location-specific cost of living and calculates the minimum household income necessary to cover basic survival expenses. Households that are below the ALICE threshold consistently struggle to make ends meet and potentially forego basic needs in the event of an unanticipated expense. ALICE estimates indicate that 67% of families in the Pāhoa-

Kalapana CCD and 54% in the Kea'au-Mountain View CCD do not meet the survival budget threshold. As shown in **Table 8**, these percentages are also higher than Hawai'i County and State averages.

Table 8. Household Poverty

	% Households Below Poverty Line	% Households Below ALICE*	Median Household Income
Pāhoa-Kalapana CCD	23.7	67	\$39,663
Kea'au-Mountain View CCD	15.3	54	\$60,875
Hilo CCD	15.8	46	\$69,613
Papaikou-Wailea CCD	13.4	46	\$70,769
North Hilo CCD	18.7	61	\$51,488
Pa'auhau-Pa'auilo CCD	14.9	53	\$61,050
Honoka'a-Kukuihaele CCD	5.4	52	\$61,275
North Kohala CCD	9.2	38	\$85,313
South Kohala CCD	9.0	36	\$87,639
North Kona CCD	10.1	41	\$80,125
South Kona CCD	11.7	44	\$69,078
Ka'ū CCD	23.0	69	\$38,505
Hawai'i County	13.8	31	\$68,399
Hawai'i State	9.5	30	\$88,005

Source: ACS 2021 5-year estimates, 2021 inflation-adjusted dollars

*Source: Hawai'i Island United Way ALICE (2021)

Racial demographic data from the 2021 ACS for the Kea'au-Mountain View CCD and the Pāhoa-Kalapana CCD provide a mixed picture, see **Table 9**. In the Kea'au-Mountain View CCD, White and Asian population percentages align closely with the average for Hawai'i County, with a higher concentration of Native Hawaiian or Other Pacific Islander residents. In the Pāhoa-Kalapana CCD there is an above average concentration of White population, along with lower Asian and Native Hawaiian or Other Pacific Islander populations. These three racial groups (White, Asian, and Native Hawaiian or Other Pacific Islander) represented a broad majority of the population in both CCDs with Black/African American, Native American/Alaska Native, and Some Other Race categories each representing between 1% and 3% of the population.

Table 9. Racial Demographics

	White	Asian	Native Hawaiian or Other Pacific Islander	Two or More Races
Pāhoa-Kalapana CCD	50.87%	11.77%	8.94%	25.08%
Kea'au-Mountain View CCD	31.28%	18.13%	15.11%	32.00%
County	32.58%	22.08%	12.02%	29.81%
State	23.69%	37.47%	10.56%	24.42%

Source: ACS 2021 5-year estimates

Public Health

The consideration of relevant public health data and industry data can provide insights into multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards. Hawai'i County has been designated a Medically Underserved Area since 2003. The Puna district has also been identified as a Health Professional Shortage Area for both primary care and mental health services (DOH, 2016).

According to a 2015 Hawai'i County Community Health Needs Assessment, traveling to receive healthcare was one of several key concerns for rural communities on Hawai'i Island. This included considerations on the distance to services, lack of public transportation, and limited road infrastructure that present barriers to access. Traffic is a growing concern that impacts not only cars and buses but also ambulances in cases of emergency. Lower-cost housing is often further away from urban areas that have healthcare services, resulting in longer travel and fewer options (Healthcare Association of Hawai'i, 2015).

Table 10 displays various demographic factors that can impact the health of a community. Highlighted in this table are State of Hawai'i, Hawai'i County, and Puna district population percentages.

Table 10. Demographic Health Factors

	<i>Under 18 Years of Age</i>	<i>65 Years if Age and Older</i>	<i>Households with Linguistic Isolation</i>	<i>No Insurance</i>	<i>Public Coverage</i>
Pāhoa-Kalapana CCD	18.7%	21.9%	4.5%	10.5%	59.9%
Kea'au-Mountain View CCD	22.5%	21.8%	3.4%	4.5%	53.6%
Hilo CCD	21.6%	20.6%	3.8%	2.9%	45.3%
Papaikou-Wailea CCD	22.1%	19.1%	4.7%	6.2%	42.7%
North Hilo CCD	14.4%	31.4%	6.4%	3.4%	60.7%
Pa'auhau-Pa'auilo CCD	23.2%	23.2%	32%	3.6%	46.2%
Honoka'a-Kukuihaele CCD	20.0%	21.4%	3.4%	8.2%	49.2%
North Kohala CCD	19.0%	29.3%	4.4%	5.9%	47.1%
South Kohala CCD	24.2%	19.0%	1.5%	5.5%	32.6%
North Kona CCD	20.8%	22.7%	4.8%	5.4%	41.9%
South Kona CCD	19.5%	29.3%	2.2%	3.2%	44.6%
Ka'ū CCD	24.5%	19.2%	5.8%	8.3%	61.0%
Hawai'i County	21.5%	21.3%	4.0%	5.1%	46.4%
Hawai'i State	21.4%	18.5%	5.6%	4.0%	36.4%

Source: ACS 2021 5-year estimates

Inter-related Factors

Federal environmental justice guidance proposes that environmental assessments explore interrelated factors that can impact surrounding populations. This includes cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action.

Active volcanoes in the County pose a risk to the safety and wellbeing of the community and produce sulfur dioxide and negatively impact air quality, which in turn affects respiratory health. In 2018, Kīlauea's East Rift Zone erupted causing ongoing impacts to the Puna community. It originated from a series of fissures that started near the Leilani Estates and Lanipuna Gardens subdivisions. The eruption resulted in the destruction of over 700 homes and covered several roadways, including the Kapoho-Kalapana road, and causing significant damage to Highway 130. Entire neighborhoods – such as Kapoho Vacationland, Lanipuna Gardens and Kapoho Beach Lots, as well as Kua O Ka Lā Public Charter School, Kapoho Bay and tidepools, and the Ahalanui Warm Ponds were destroyed (County of Hawai'i, 2023). The impacts of this event are still being felt today.

The 2015 Healthcare Association Report identified several subpopulations of people who experience disproportionate impacts and have higher risk factors to environmental conditions. Children, teens, and adolescents were found to have limited access to health care, healthy foods, and outlets for physical activity. They were found to have a higher burden of asthma, mental health issues, substance abuse, and teen birth rates than State averages. Older adults were another vulnerable population with inadequate care services, infrastructure, and support systems. They were found to underutilize preventative services, and there are elevated percentages of seniors living alone or in poverty (Healthcare Association of Hawai'i, 2015).

The homeless population encounters difficulties accessing essential services such as food, shelter, mental health support, and addiction treatment, among other needs. The Marshallese community is found to be a particularly vulnerable group, facing barriers to adequate transportation, healthcare, and financial assistance. Language and cultural differences further complicate efforts to bridge these gaps. Native Hawaiians experience higher rates of poverty, substance abuse, incarceration, and various health issues and risk factors (Healthcare Association of Hawai'i, 2015).

Public Participation

To identify potential community impacts, ensuring adequate and meaningful representation in the public participation process is essential. **Section 6.2** details the community engagement process for this project in more detail, which has thus far involved efforts to obtain feedback on the location of the Pāhoa Transit Hub to identify related concerns as well as design features and services that are important to the community. This process utilized several different forms of engagement, from public meetings, to pop-up stands, and community events through Hawai'i County's Kīlauea Recovery efforts, to obtain feedback from a diverse array of community members. This public engagement process is expected to continue after the release of the draft environmental assessment to further clarify potential community impacts and preferences.

The process of drafting the Cultural Impact Assessment involved a consultation process with cultural practitioners that provided them an opportunity to provide feedback early in the project. More details on this are provided in **Section 3.4**. The project will also be compliant with the Section 106 process to illicit further consultation with Native Hawaiian Organizations through invitation as well as through newspaper advertisement.

3.6.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Construction of Alternative 1, 2, or 3, would not increase the population of the area, nor have a substantial adverse effect on the economic or social welfare of the community or State. Construction would result in temporary, positive economic activity in the form of construction jobs and material procurements.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no construction-related socioeconomic impacts.

Operation

Alternatives 1, 2, and 3

The implementation of Alternative 1, 2, or 3 would introduce new public services that have the potential to generate positive impacts for the surrounding area. The transit hub would further establish safe and dependable public transit options that enhance access to job centers and essential services.

The Pāhoa State Library would offer a range of services, activities, and resources. It would, among many things, serve as a community gathering space to foster connections and enrich community networks. Library resources are free and provide information accessibility and broadband internet access. They provide direct resources for job seekers or those in need of social services. Additionally, the library would offer community meeting spaces for civic engagement or various interest groups to gather.

The potential inclusion of day care services at the facility could provide families with the convenience of safe childcare options during their commute. This would address the needs of families to have affordable childcare services and promote a healthy work-life balance that can lead to upward mobility.

Cultural services associated with the library could create a space for celebrating and perpetuating culture. This would promote a sense of belonging, increased community awareness and understanding, and help to create a more cohesive community.

Additional consideration may be necessary for Alternative 3 due to its location in close proximity to nearby residences. Introducing close by amenities could cause the regional commercial services of Pāhoa town to encroach on the nearby neighborhood. While the location of Alternative 3 was identified as one of the top 3 preferred spaces, the design and permitting process would involve consultation with nearby property owners to minimize potential disruptions.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be in operation; therefore, there would be no associated beneficial socioeconomic impacts.

3.6.3 Avoidance and Minimization Measures

Alternatives 1 and 2

No avoidance and minimization measures are proposed for potential socioeconomic impacts, and none are expected to be required.

Alternative 3

For Alternative 3, the planning process of the Pāhoa Transit Hub and Library would include continued open and transparent dialogue with possible affected property owners to identify and develop strategies to minimize adverse impacts. Such collaborative efforts would aim to better understand and respect existing neighborhood dynamics and sense of place to promote balance between new amenities and the surrounding residential area.

3.7 Roadways and Traffic

3.7.1 Affected Environment

A traffic impact analysis report (TIAR) was completed for Alternatives 1, 2, and 3 in October 2023 (see **Appendix E**). The TIAR analyzed anticipated traffic with project conditions and without to cover a variety of possible circumstances, design options, and configurations. Five intersections were analyzed in the surrounding area as well as existing multi-modal facilities including sidewalks and bus stops.

Roadways

There are four roadways in the vicinity of Alternatives 1, 2, and 3:

- **Pāhoa Village Road:** Pāhoa Village Road (also referred to as Kea'au-Pāhoa Road), is a County-owned roadway extending 1.5-miles between the Pāhoa Bypass roundabout in the north and its signalized intersection with the Pāhoa Bypass Road/Pāhoa Kalapana Road and Kapoho Road in the south. The corridor is also referred to as Kea'au-Pāhoa Road, which extends further north of the Pāhoa Bypass roundabout towards Hilo. In the surrounding project area, Pāhoa Village Road has a Federal Highway Association (FHWA) functional classification of a major collector, per the State of Hawai'i Department of Transportation (DOT) Federal-Aid Functional Classification Update (Federal-Aid Update) (CH2MHill, December 2012).
The corridor is two-way, two-lanes, providing access to major commercial centers such as Pāhoa Marketplace and the Puna Kai Shopping Center in the project area. South of the commercial center is the Historic Pāhoa Village in addition to numerous schools, businesses, and parks. In the surrounding project area, a raised concrete paved sidewalk with curb and gutter spans the west side of the corridor fronting the Puna Kai Shopping Center, while the east side of the corridor has no curb or gutter. No dedicated bike facilities exist along the corridor, although variable width striped shoulders along the corridor may be used by both bicyclists and pedestrians. Within the study area, parking is not permitted along Pāhoa Village Road. The posted speed limit within the project study area is 30 miles-per-hour.
- **Kahakai Boulevard:** Kahakai Boulevard is a County-owned roadway extending 6.25-miles between an existing dead-end adjacent to the Puna Kai Shopping Center in the west and its

intersection with Welea Street within the Hawaiian Shores Recreational Estates to the east. It does not have a FHWA functional classification per the Federal-Aid Update in the section between the Pāhoa Bypass Road and the existing dead-end adjacent to the Puna Kai Shopping Center. In the project study area, the corridor is two-way, two-lanes, providing access to the Puna Kai Shopping Center, as well as various developments between Pāhoa Village Road and Pāhoa Bypass Road. In the surrounding project area, a paved sidewalk with curb and gutter exists only along the south side of the corridor fronting the Puna Kai Shopping Center. No dedicated bike facilities exist along the corridor, although variable width striped shoulders exist, which may be used by both bicyclists and pedestrians. The corridor currently ends in a stub-out at the western edge of the Puna Kai Shopping Center, allowing for it to be extended further west in the future. Within the study area, parking is not permitted along Kahakai Boulevard. No speed limit is posted along the corridor within the study area.

- **'Apa'a Street:** 'Apa'a Street is a County-owned roadway extending 0.5-miles from Pāhoa Village Road and curves south to become Cemetery Road. It does not have a FHWA functional classification per the Federal-Aid Update. The corridor is two-way, two lanes, and provides access to Lā'au Way and various single-family residences. The corridor is largely undeveloped on both sides. No paved sidewalk or bike facilities exist along the corridor, nor are the shoulders paved or marked. Parking is not explicitly prohibited through signage along the corridor, although due to its rural nature, it is not prevalent. No speed limit is posted along the corridor within the study area.
- **Pāhoa Bypass Road:** Pāhoa Bypass Road (also referred to as State Route 130), is a State-owned roadway extending 1.5-miles between its intersection with Pāhoa Village Road at the roundabout in the north, to its intersection with Pāhoa Village Road/Kapoho Road in the south, at which point it becomes Pāhoa Kalapana Road. Per FHWA, its functional classification is a small urban minor arterial. It provides an alternative route for vehicles to bypass traffic and developments within Pāhoa town. It is a two-way, two-lane corridor, with limited development on either side. No paved sidewalk, curb and gutter, or bike facilities exist along the corridor. Paved and marked shoulders exist along both sides of the corridor. The posted speed limit within the project study area is 45 miles-per-hour.

Study Intersections:

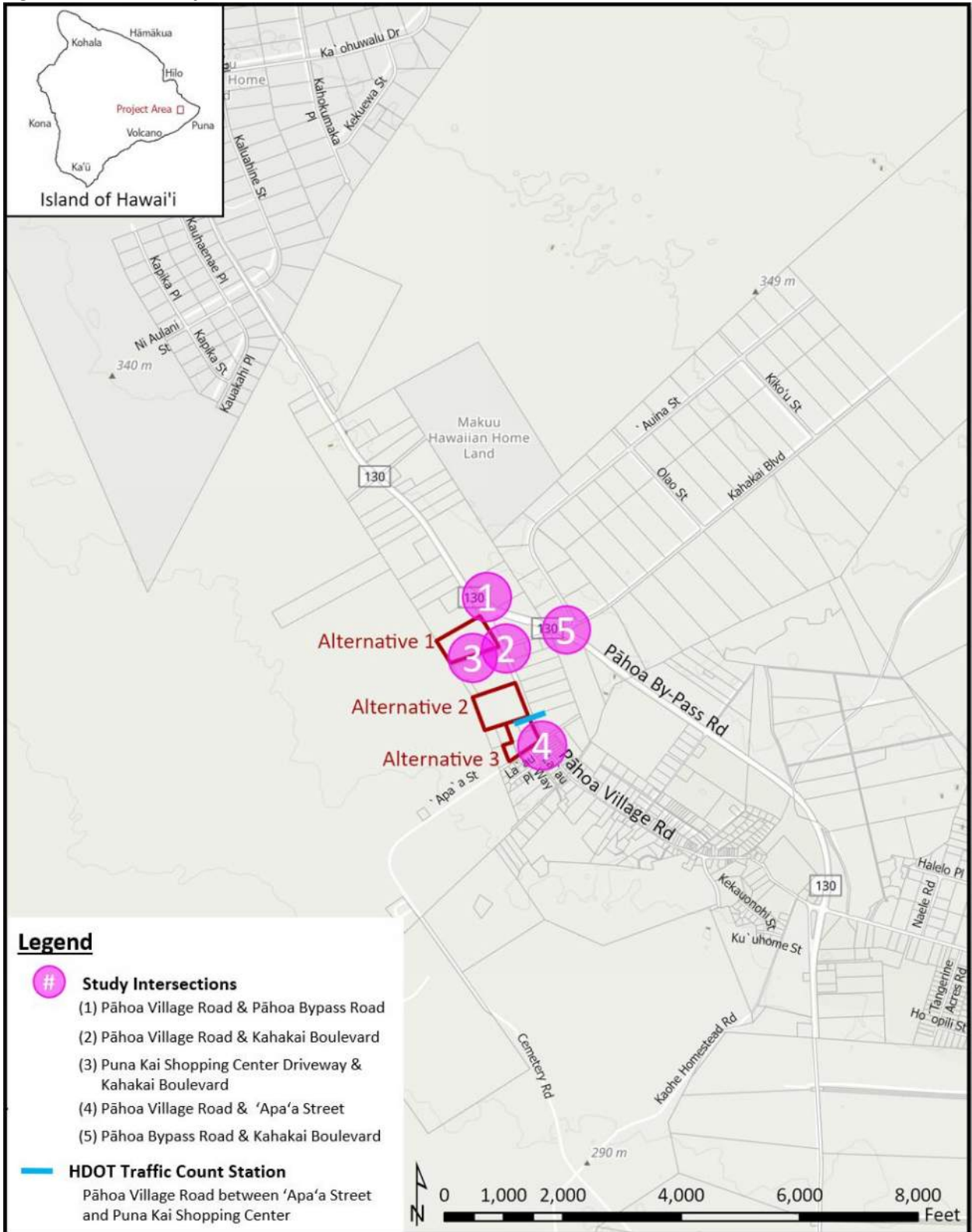
In the surrounding project area, five study intersections were analyzed, as shown in **Figure 11**.

- **Pāhoa Village Road & Pāhoa Bypass Road:** The intersection of Pāhoa Village Road and Pāhoa Bypass Road is a three-legged, single-lane roundabout. Pāhoa Village Road is the southern leg of the roundabout, connecting with Pāhoa town's primary core. Pāhoa Bypass Road bends to form the northern and eastern legs of the roundabout, providing a bypass of Pāhoa town. There is a driveway from the Pāhoa Marketplace onto southbound Pāhoa Bypass Road on the north leg, offset approximately 150-feet from the edge of the roundabout. Drivers exiting Pāhoa Marketplace and using this access point are only allowed to turn right onto Pāhoa Bypass Road, heading south towards the roundabout. Additionally, a driveway from southbound Pāhoa Bypass Road into the Pāhoa Marketplace is located approximately 325-feet from the edge of the roundabout. No turns from the Pāhoa Marketplace onto southbound Pāhoa Bypass Road are

allowed. No direct access to the Pāhoa Marketplace is provided for vehicles originating on the southern leg of Pāhoa Village Road (coming from Pāhoa town) or on the eastern leg of Pāhoa Bypass Road. As such, drivers must exit the roundabout heading southbound back towards Pāhoa town before turning right onto the Pāhoa Village frontage road, which provides access into/out of Pāhoa Marketplace.

- Marked crosswalks exist on the outside edge of the roundabout across all three legs. Splitter islands provide pedestrian refuge across all three crossings. All crossings provide curb ramps, both from the sidewalk and within the splitter islands. Paved sidewalks with curb and gutter exist along all sides of the perimeter of the roundabout. A mountable truck apron is present within the center island of the roundabout to accommodate heavy vehicle turning movements. No dedicated bike facilities exist at the roundabout.
- **Pāhoa Village Road & Kahakai Boulevard:** The intersection of Pāhoa Village Road and Kahakai Boulevard is four-legged and signalized. Pāhoa Village Road is aligned in the north-south direction while Kahakai Boulevard is aligned in the east-west direction. Dedicated left-turn lanes are provided on all legs of the intersection while a dedicated right-turn lane is also provided on the north leg of Pāhoa Village Road. All other legs provide a shared through-right lane. All left-turn movements are protected-permitted. There are marked crosswalks on all legs of the intersection. Paved sidewalks only exist in the southwest corner of the intersection, extending west along Kahakai Boulevard and extending south along Pāhoa Village Road. Similarly, a curb ramp exists only in the southwest corner of the intersection. All other corners of the intersection have a paved and striped shoulder, but no physical protection for pedestrians. No dedicated bike facilities exist at the intersection. The intersection's traffic signal controller timing was observed to be fully-actuated, with phase lengths varying during each cycle depending on vehicular demand.
- **Puna Kai Shopping Center Driveway & Kahakai Boulevard:** The intersection of Puna Kai Shopping Center Driveway and Kahakai Boulevard is three-legged with stop-control provided along the southern leg of the intersection at the Puna Kai Shopping Center Driveway. A dedicated left-turn lane is provided in the westbound direction of Kahakai Boulevard, along with a through lane, while a shared through-right lane is provided in the eastbound direction. Varying width striped shoulders exist along both sides of Kahakai Boulevard. Separated left- and right-turn lanes are provided in the northbound direction at the Puna Kai Shopping Center Driveway. There are no marked crosswalks at the intersection, nor are there any dedicated bike facilities. A paved sidewalk with curb and gutter exists along the south side of Kahakai Boulevard at the intersection, with curb ramps at the Puna Kai Shopping Center Driveway. The north side of Kahakai Boulevard has no curb or gutter.
- **Pāhoa Village Road & 'Apa'a Street:** The intersection of Pāhoa Village Road and 'Apa'a Street is three-legged with stop-control provided along the western leg of the intersection at 'Apa'a Street. No dedicated left- or right-turn lanes are provided at the intersection and all approaches are single-lanes. A crosswalk is only marked along the western leg of the intersection. No raised sidewalks, curb and gutter, or curb ramps are present at the intersection. Varying width marked shoulders are present along both sides of Pāhoa Village Road. No dedicated bike facilities are present at the intersection.

Figure 11. TIAR Study Intersections and DOT Tube Count Station



- **Pāhoa Bypass Road & Kahakai Boulevard:** The intersection of Pāhoa Village Road and Kahakai Boulevard is four-legged, two-way stop-controlled (TWSC), with stop-control provided along the Kahakai Boulevard western and eastern legs. Pāhoa Bypass Road is aligned in the north-south direction, while Kahakai Boulevard is aligned in the east-west direction. The intersection is skewed, with the western leg of the intersection approximately 125-feet offset to the north of the eastern leg. Dedicated right-turn lanes are provided along all legs of the intersection. The southbound Pāhoa Bypass Road and westbound Kahakai Boulevard dedicated right-turn lanes are both free-flow, uncontrolled movements, with an acceleration lane provided for the westbound Kahakai Boulevard dedicated right-turn lane onto northbound Pāhoa Bypass Road. The northbound Pāhoa Bypass Road dedicated right-turn lane is yield-controlled, having to yield to southbound left-turning vehicles from Pāhoa Bypass Road. The eastbound Kahakai Boulevard dedicated right-turn lane is stop-controlled. Dedicated left-turn lanes are provided in the northbound Pāhoa Bypass Road and westbound Kahakai Boulevard directions, with an acceleration lane provided for westbound Kahakai Boulevard left-turning vehicles onto southbound Pāhoa Bypass Road. Additionally, a stop-controlled U-turn slip lane is provided in the eastbound direction of Kahakai Boulevard before the intersection. No marked crosswalks, sidewalks, curb and gutter, curb ramps, or dedicated bike facilities are present at the intersection.

Transit Facilities

The County operates the Hele-On Bus throughout the island, of which three routes operate within Pāhoa – Routes 40 (Hilo – Pāhoa), 401 (Hawai'i Beaches – Nānāwale – Seaview), and 402 (Paradise – Ainaloa – Orchidland). Route 40 is the primary route to Downtown Hilo, at which point riders can transfer to numerous other routes connecting to the rest of the island. Effective February 27, 2022, Hele-On fares are free through December 31, 2025.

Currently, the closest bus stops are located on both sides of the street along the southern leg of the Pāhoa Village Road and Kahakai Boulevard intersection, fronting the Puna Kai Shopping Center. The bus stop in the southeast-bound direction along Pāhoa Village Road (Stop ID 968) has a concrete bus pullout outside of the general travel lanes, and a passenger shelter with seating, lighting, and trash receptacles setback from the raised concrete sidewalk. The bus stop in the northwest-bound direction along Pāhoa Village Road (Stop ID 981) is within a striped and paved shoulder, outside of the general travel lanes, and has a passenger shelter with seating and trash receptacles. These existing County bus stops would be relocated within the Pāhoa Transit Hub with this proposed development.

All three bus routes travel southeast-bound along Pāhoa Village Road from the Pāhoa Village Road and Pāhoa Bypass Road roundabout, stopping at Stop ID 968. However, only Route 401 travels northwest-bound back toward the roundabout, stopping at Stop ID 981, while the other two routes travel along Pāhoa Bypass Road. Various buses operate at the stops between 5:30AM through 9:30PM each day. Each bus route operates once every hour.

Multi-Modal Circulation

There are minimal multi-modal facilities between the Historic Pāhoā Village in the south and the Pāhoā Regional Town Center in the north. Sidewalks and bikeable shoulders are limited, resulting in unfavorable conditions for pedestrians and people on bikes.

The Puna Kai Shopping Center was recently constructed with the first batch of businesses opening in 2020. As part of the development, the intersection of Pāhoā Village Road and Kahakai Boulevard was reconstructed, and paved sidewalks were constructed along the portions of Pāhoā Village Road and Kahakai Boulevard fronting the development. The aforementioned transit facilities along Pāhoā Village Road fronting the development were put in where previously no stops were provided. Internal to the development, a compact “block structure” was used, connecting to the adjacent corridors of Pāhoā Village Road and Kahakai Boulevard, providing optimal circulation for all modes. Internal crosswalks were marked to guide pedestrians throughout the development, while the newly constructed sidewalks along the adjacent corridors were interconnected with internal sidewalks within the development. Additionally, crosswalks were marked at the reconstructed intersection of Pāhoā Village Road and Kahakai Boulevard. These crosswalks provide a potential connection for pedestrians between the Puna Kai Shopping Center and the various commercial businesses located at the northeast corner of the intersection. Additionally, at this time there is no direct connection for any users between the Puna Kai Shopping Center and Pāhoā Marketplace. **Figure 12** shows the internal multi-modal circulation provided within the Puna Kai Shopping Center. Many of these features are desired with the proposed Pāhoā Transit Hub development, with the goal of providing multi-modal circulation between the two.

Figure 12. Puna Kai Shopping Center Circulation



Traffic Counts

Historic Hawai'i DOT annual average daily traffic counts (AADT) were available on Pāhoa Village Road north of 'Apa'a Street, south of the Puna Kai Shopping Center development. Volumes were available between 2016-2022, with the exception of 2017-2018, when data was missing. Additionally, 24-hour, two-directional counts were collected on Wednesday, May 17th, 2023, at the same location. A summary of the volumes is shown in **Table 11**.

Table 11. 24-Hour Traffic Count Data North of 'Apa'a Street, South of the Puna Kai Shopping Center

Year	24-Hour AADT
2016	7,600
2017	Not Available
2018	Not Available
2019	7,500
2020*	6,300
2021	8,300
2022	8,300
2023**	9,054

*Collected during Covid-19 Pandemic

**Non-DOT 24-hour Counts

As seen in **Existing Level** of Service

Level of service (LOS) is a rating system used in traffic engineering to measure the effectiveness of roadway operating conditions (see **Table 12**). There are six LOS ratings from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays; LOS F is defined as conditions where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersections and movements.

As stated in the Highway Capacity Manual, Sixth Edition (HCM6) (TRB, 2016), LOS for an all-way stop-controlled (AWSC) and a two-way stop-controlled (TWSC) intersection is determined by the measured control delay. Delay at an AWSC intersection is defined for the intersection as a whole and for each movement. 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. As stated in the HCM6 (TRB, 2016), roundabouts share the same control delay thresholds as AWSC and TWSC intersections.

Figure 13, hourly traffic distributions remained fairly consistent between 2021 and 2023. Unlike a roadway corridor with separate AM and PM commuter peak hours, traffic volumes along Pāhoa Village Road tended to continuously increase throughout the morning into the early afternoon, peaking between 3:00PM – 4:00PM, before decreasing throughout the rest of the day. Midday traffic volumes around 12:00PM were historically higher than AM peak hour volumes. This indicates that Pāhoa Village Road may not primarily serve traditional commuter traffic and may instead primarily serve as access for businesses along the corridor which have greater trip attractions during the afternoon.

Existing Level of Service

Level of service (LOS) is a rating system used in traffic engineering to measure the effectiveness of roadway operating conditions (see **Table 12**). There are six LOS ratings from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays; LOS F is defined as conditions where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersections and movements.

As stated in the Highway Capacity Manual, Sixth Edition (HCM6) (TRB, 2016), LOS for an all-way stop-controlled (AWSC) and a two-way stop-controlled (TWSC) intersection is determined by the measured control delay. Delay at an AWSC intersection is defined for the intersection as a whole and for each movement. 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. As stated in the HCM6 (TRB, 2016), roundabouts share the same control delay thresholds as AWSC and TWSC intersections.

Figure 13. Pāhoā Village Road 24-Hour Volume Historical Distribution

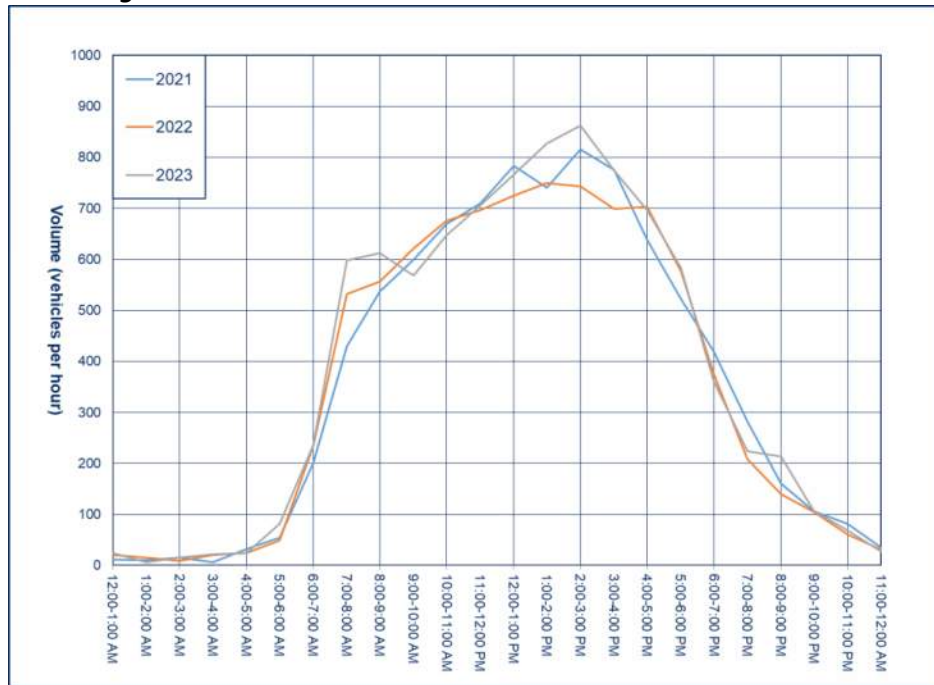


Table 12. LOS Criteria for Unsignalized Intersections

Average Control Delay (sec/veh)	LOS by v/c Ratio	
	≤1.0	>1.0
≤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 and ≤50	E	F
>50	F	F

Source: HCM6 (TRB, 2016)

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 13**. 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.

Another measure of intersection operation is the volume to capacity (v/c) ratio, which is the ratio of the volume of traffic utilizing the intersection compared to the maximum volume of vehicles that can be accommodated by the intersection during a specific period. A v/c ratio under 0.85 means the intersection is operating under capacity and excessive delays are not experienced. An intersection is operating near its capacity when v/c ratios range from 0.85 to 0.95. Unstable flows are expected when the v/c ratio is between 0.95 and 1.0. Any v/c ratio greater than or equal to 1.0 indicates that the intersection is operating at or above capacity (LOS F).

Table 13. LOS Criteria for Signalized Intersections

Average Control Delay (sec/veh)	LOS by v/c Ratio	
	≤1.0	>1.0
≤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 and ≤80	E	F
>80	F	F

Source: HCM6 (TRB, 2016)

Existing LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using Synchro 11.0 and SimTraffic traffic analysis software.

Table 14 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in red.

It should be noted that at the Pāhoa Bypass Road and Pāhoa Village Road roundabout, both the Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches exceeded a v/c ratio of 0.85 in the AM peak hour, although they maintained LOS D. This indicates that these approach legs are approaching capacity. These two legs represented the highest volume approach legs at the intersection. Videos recorded during traffic data collection corroborated the delay on both the Pāhoa Bypass Road southbound and westbound approaches. However, this delay was generally concentrated within a short 30-minute segment between 7:45AM – 8:45AM. Within that period, traffic flowed at minimal speeds approaching the roundabout; however, it generally never resulted in a complete standstill, nor was queuing through the roundabout observed. Outside of this concentrated period, even with the AM peak hour, all approaches to the roundabout visually operated with negligible delay. It should be noted that similar delay was observed for the Pāhoa Bypass Road southbound approach for a short 30-minute segment within the PM peak hour around 3:00PM – 3:30PM; however, likewise this cleared outside of that period, and overall resulted in LOS D (v/c ratio of 0.87) for this southbound approach during the PM peak hour.

Table 14. Existing (2023) Automobile LOS

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	25	-	D	19.0	-	C
Pāhoa Village Road north bound (NB)	11.0	0.45	B	12.0	0.55	B
Pāhoa Bypass Road south bound (SB)	28.0	0.88	D	25.0	0.87	D
Pāhoa Bypass Road west bound (WB)	28.0	0.87	D	12.0	0.54	B
Pāhoa Village Road & Kahakai Boulevard	15.0	-	B	17.1	-	B
Kahakai Boulevard east bound (EB) left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB through-right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WE through-right	29.1	0.50	C	22.8	0.19	C
Pāhoa Village Road NB left	9.2	0.01	A	11.0	0.02	B
Pāhoa Village Road NB through-right	12.9	0.42	B	16.6	0.50	B
Pāhoa Village Road SB left	8.0	0.16	A	10.4	0.19	B
Pāhoa Village Road SB through	11.0	0.45	B	13.4	0.44	B
Pāhoa Village Road SB right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Signalized (TWSC)		
Kahakai Boulevard EB left-through-right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB through	Uncontrolled		A	Uncontrolled		A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB left	10.6	0.00	B	12.6	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road and 'Apa'a Street	Unsignalized (TWSC)			Signalized (TWSC)		
'Apa'a Street EB left-right	17.7	0.32	C	12.1	0.38	C
Pāhoa Village Road NB left-through	8.2	0.03	A	8.3	0.03	A
Pāhoa Village Road SB through-right	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Signalized (TWSC)		
Kahakai Boulevard EB right	11.6	0.24	B	12.1	0.35	B
Kahakai Boulevard WB left*	42.8	-	E	20.6	-	C
Kahakai Boulevard WB right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB right	Yield Controlled		A	Yield Controlled		A
Pāhoa Bypass Road NB through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB left	9.6	0.29	A	8.8	0.26	A
Pāhoa Bypass Road SB through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB right	Free-Flow Slip		A	Free-Flow Slip		A

*Note: Kahakai Boulevard WB left at Pāhoa Bypass Road analyzed using SimTraffic Software

3.7.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Alternative 1, 2, or 3 would have minor, short-term direct and indirect impacts on traffic from project-related vehicles, equipment, materials delivery, and personnel access to the project site. It is expected that if personnel and project equipment and materials would be traveling to the site from Hilo; they would travel in the opposite direction of the AM/PM peak hours.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no construction-related impacts to transportation.

Operation

Alternative 1

Future (2043) traffic projections for Alternative 1 LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using Synchro 11.0 and SimTraffic traffic analysis software. **Appendix E** Table 23 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Potential mitigative treatments are discussed in **Section 3.7.3**.

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 188.0 seconds and 194.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 154.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in existing (2023) conditions, indicating they were already approaching capacity.

- **Pāhoa Village Road & 'Apa'a Street**

The 'Apa'a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS F with a v/c ratio of 0.67 and a delay of 51.8 seconds/vehicle during the PM peak hour. This delay is comparable to the 45.3 seconds/vehicle delay and 0.62 v/c experienced in future (2043) projections for the No-Action Alternative. The v/c ratio continues to indicate that this movement is not approaching capacity. The 'Apa'a Street eastbound approach is projected to have up to 101 vehicles during the PM peak hour, equating to just over 1.5 vehicles per minute. SimTraffic visual simulations did not indicate substantial queuing or delay along this approach, with maximum queues of up to three vehicles occasionally being observed. Due to the relatively low volume of this approach, and the low v/c ratio, no mitigation is recommended for this intersection at this time.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 429.1 seconds/vehicle and LOS F using SimTraffic software (note that SimTraffic does not provide a v/c ratio) during the AM peak hour.

Alternative 2

Future (2043) traffic projections for Alternative 2 LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using Synchro 11.0 and SimTraffic traffic analysis software. Appendix E Table 31 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in red.

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 187.0 seconds and 192.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 154.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in existing (2023) conditions, indicating they were already approaching capacity.

- **Pāhoa Village Road & 'Apa'a Street**

The 'Apa'a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS F with a v/c ratio of 0.66 and a delay of 51.3 seconds/vehicle during the PM peak hour. This delay is comparable to the 45.3 seconds/vehicle delay and 0.62 v/c experienced future (2043) projections for the No-Action Alternative. The v/c ratio continues to indicate that this movement is not approaching capacity. The 'Apa'a Street eastbound approach is projected to have up to 101 vehicles during the PM peak hour, equating to just over 1.5 vehicles per minute. *SimTraffic* visual simulations did not indicate substantial queuing or delay along this approach, with maximum queues of up to three vehicles occasionally being observed. Due to the relatively low volume of this approach, and the low v/c ratio, no mitigation is recommended for this intersection at this time.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 245.0 seconds/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour.

Alternative 3

Traffic simulation modeling through 2043 under Alternative 3 projected that the eastbound 'Apa'a Street approach at Pāhoa Village Road will operate at LOS F during both the AM and PM peak hours. Currently, the approach has a shared left-right lane and is stop-controlled, while Pāhoa Village Road is uncontrolled. Mitigation measures for this are discussed in **Section 3.7.3**.

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays

of 191.0 seconds and 197.0 seconds, respectively. Similarly, the Pāhoā Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 152.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity.

- **Pāhoā Village Road & 'Apa'a Street**

The 'Apa'a Street eastbound approach at Pāhoā Village Road is projected to operate at LOS F with a v/c ratio of 0.80 and a delay of 63.1 seconds/vehicle during the AM peak hour, and LOS F with a v/c ratio of 0.98 and delay of 114.0 seconds/vehicle during the PM peak hour. Potential mitigative treatments will be discussed in the following section.

- **Pāhoā Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoā Bypass Road resulted in an average computed delay of 311.9 seconds/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour.

No-Action Alternative

As a result of projected background growth over the next 20 years, various traffic minimization measures may be required under the No-Action Alternative, including:

- **Pāhoā Village Road & Pāhoā Bypass Road**

Traffic modeling projections show that by 2028, with the No-Action Alternative, the Pāhoā Bypass Road northbound and Pāhoā Bypass Road southbound approaches are projected to exceed a volume/capacity (v/c) ratio over 0.85 and operate at level of service (LOS) E in the AM peak hour, resulting in projected delays of 43.0 seconds and 42.0 seconds, respectively. Similarly, the Pāhoā Bypass Road southbound approach is projected to exceed a v/c ratio over 0.85 and operate at LOS E, resulting in a projected delay of 37.0 seconds during the PM peak hour. Likewise, these movements previously operated at v/c ratios of over 0.85 in existing (2023) conditions, indicating they were already approaching capacity.

- **Pāhoā Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoā Bypass Road resulted in an average computed delay of 46.5 seconds/vehicle and LOS E using *SimTraffic* software (note no v/c ratio is provided) during the AM peak hour. This projected delay is slightly increased compared to the 42.8 second/vehicle delay experienced during the AM peak hour in Existing (2023) Conditions. The increased delay is attributed to the projected increase in volume along Pāhoā Bypass Road due to background growth, reducing the number of gaps turning vehicles have to complete their movement.

3.7.3 Avoidance and Minimization Measures

Alternatives 1, 2, and 3, and the No-Action Alternative

Pāhoā, as well as the Puna District in general, are among the fastest growing areas of the State. As a result of projected background growth over the next 20 years, various traffic measures may be required under

the No-Action Alternative. These traffic conditions likewise may require mitigation under Alternatives 1, 2, and 3, including:

- **Pāhoā Village Road & Pāhoā Bypass Road**

Modifying the existing single-lane roundabout to provide dedicated left-turn and through-right lanes for the Pāhoā Bypass Road southbound and westbound approaches. This would not require widening Pāhoā Bypass Road, as all exits to the roundabout would only require a minimum of one-lane. This minimization may be required by 2028, as Future (2028) Without Project Conditions showed these existing approaches degrading to LOS E during projected peak hours.

- **Pāhoā Bypass Road & Kahakai Boulevard**

Modifying the existing skewed TWSC intersection of Pāhoā Bypass Road and Kahakai Boulevard to either a traffic signal with dedicated turn lanes on all approaches, or a single-lane roundabout. It is recommended to realign the intersection if signaling to remove the existing skew. If installing a single-lane roundabout, realignment would not be required, as a “dogbone-shaped” roundabout could largely fit within the existing roadway limits. In both scenarios, it was assumed that full-access would be provided.

Resulting LOS and delay (in seconds per vehicle) for these alternative treatments are shown in **Appendix E**.

Alternative 3

Additional mitigative measures were recommended for Alternative 3 as a result of potential impacts on the eastbound approach on 'Apa'a Street at Pāhoā Village Road. The intersection was projected to operate at LOS F during both the AM and PM peak hours by 2043.

Two mitigative alternatives will be considered, a traffic signal, as well as widening the eastbound 'Apa'a Street approach to two-lanes, a dedicated left-turn lane and a dedicated right-turn lane. These alternative mitigation measures are discussed in more detail in **Appendix E**.

3.8 Air Quality

3.8.1 Affected Environment

The Clean Air Act of 1972 and its 1990 Amendments and subsequent legislation regulate air emissions from area, stationary, and mobile sources. Both the United States Environmental Protection Agency and the State of Hawai'i have instituted Ambient Air Quality Standards (AAQS) to maintain air quality in the interest of public health and secondary public welfare.

At the present time, seven parameters are regulated: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone, and lead. The Hawai'i AAQS are in some cases considerably more stringent than the comparable National Ambient Air Quality Standards (NAAQS). In particular, the Hawai'i 1-hour AAQS for carbon monoxide is four times more stringent than the comparable national limit. **Table 15** illustrates the NAAQS and State AAQS and the units of measure (micrograms per cubic meter [$\mu\text{g}/\text{m}^3$] and parts per million [ppm]).

Table 15. State of Hawai'i and National Ambient Air Quality Standards

Pollutant	Units	Averaging Time	Maximum Allowable Concentration		
			National Primary	National Secondary	State of Hawai'i
Particulate Matter <10 microns (PM ₁₀)	μg/m ³	Annual	-	-	50
		24 Hours	150 ^a	150 ^a	150 ^b
Particulate Matter <2.5 microns (PM _{2.5})	μg/m ³	Annual	12 ^c	15 ^c	-
		24 Hours	35 ^d	35 ^d	-
Sulfur Dioxide (SO ₂)	ppm	Annual	-	-	0.03
		24 Hours	-	-	0.14 ^b
		3 Hours	-	0.5 ^b	0.5 ^b
Nitrogen Dioxide (NO ₂)	ppm	1 Hour	0.075 ^e	-	-
		Annual	0.053	0.053	0.04
		1 Hour	0.100 ^f	-	-
Carbon Monoxide (CO)	ppm	8 Hours	9 ^b	-	4.4 ^b
		1 Hour	35 ^b	-	9 ^b
Ozone (O ₃)	ppm	8 Hours	0.070 ^g	0.070 ^g	0.08 ^g
Lead	μg/m ³	3 Months	0.15 ^h	0.15 ^h	-
		Quarter	1.5 ⁱ	1.5 ⁱ	1.5 ⁱ
Hydrogen Sulfide	ppb	1 Hour	-	-	25 ^b

Notes: ^aNot to be exceeded more than once per year on average over three years.

^bNot to be exceeded more than once per year.

^cThree-year average of the weighted annual arithmetic mean.

^d98th percentile value averaged over three years.

^eThree-year average of fourth-highest daily 1-hour maximum.

^f98th percentile value of the daily 1-hour maximum averaged over three years.

^gThree-year average of annual fourth-highest daily 8-hour maximum.

^hRolling 3-month average.

ⁱQuarterly average.

Source: DOH, 2015

In addition to the NAAQS and the State AAQS, the State of Hawai'i Department of Health (DOH) regulates fugitive dust. HAR Section 11-60.1-33, Fugitive Dust, states that no person shall cause or permit visible fugitive dust to become airborne without taking reasonable precautions, and no person shall cause or permit the discharge of visible fugitive dust beyond the property lot line on which the fugitive dust originates (DOH, 2014). This rule applies to construction projects and would, therefore, be applicable to Alternatives 1, 2, and 3.

Prevailing winds throughout the year in Hawai'i are the northeasterly trade winds. These trade winds generally help maintain good air quality conditions. The DOH operates a network of air quality monitoring stations at various locations around the State. The closest DOH air quality monitoring station is located in

the town of Mountain View to the west. Air quality data from the Mountain View monitor consistently trends well below Federal air quality standards.

Locally generated contributors to air pollution in the vicinity of the project site include vehicle exhaust, chemical fumes from construction and maintenance activities, and fugitive dust from various sources.

3.8.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Construction of Alternative 1, 2, or 3 would have short-term and temporary impacts to air quality from the generation of dust or particulate matter and exhaust fumes from vehicular travel to and from the site and from equipment operations during construction activities. Construction activities would include grading and vehicle and equipment engine operations. These impacts would generally be the same for Alternatives 1, and 2. Alternative Site 3 is located closer to residential areas and gathering spots such as the Pāhoa Christian Mission Church across the street. Nearby residents and visitors of the church would potentially be sensitive receptors for potential air pollutants. However, because the level of criteria pollutants in Hawai'i are consistently below Federal and State AAQS, and because air pollutants are rapidly dispersed by strong winds, increasing levels of criteria pollutants at the project site from construction activities are not expected to exceed the Federal or State AAQS. The applicable provisions of HAR 11-60.1-33 shall also be followed to mitigate fugitive dust impacts.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no impact to the existing air quality.

Operation

Alternatives 1, 2, and 3

Alternatives 1, 2, and 3 are not anticipated to increase emission sources due to carbon offset from bus operations. As shown in **Section 3.6**, Alternatives 1, 2, and 3 would cause an increase in traffic in the area, which would increase emissions. Traffic, and therefore, levels of emissions would likewise increase with operational activities. The MTA anticipates that emissions are likely to decrease over time with the implementation of electric and hydrogen power alternatives for the County bus fleet.

No-Action Alternative

Under the No-Action Alternative, the facility would not be in operation; therefore, there would be no impact to the existing air quality.

3.8.3 Avoidance and Minimization Measures

All construction activities would comply with the provisions of HAR Chapter 11-60.1, Air Pollution Control, and HAR Chapter 11.60.1-33, Fugitive Dust. A dust control plan would be developed and implemented to minimize fugitive dust during construction. Measures to control fugitive dust during construction may include, but not be limited to, the following:

- Watering of active work areas and project access roads, as needed
- Screening piles of materials from wind, if appropriate
- Covering open trucks carrying construction materials
- Limiting areas to be disturbed at any given time
- Mulching or chemically stabilizing inactive areas that have been disturbed
- Minimizing airborne, visible fugitive dust from shoulders and access roads

Additionally, contractors would be required to maintain equipment with emissions controls.

3.9 Noise

3.9.1 Affected Environment

Noise is defined as “any sound that may produce adverse physiological or psychological effects or interfere with individual or group activities, including but not limited to communication, work, rest, recreation, or sleep” (HAR Title 11, Chapter 46). A number of factors affect sound as it is perceived by the human ear. These include the actual level of the sound (i.e., noise), the frequencies involved, the period of exposure to the noise, and changes or fluctuations in the noise levels (HAR, Title 11, Chapter 200.1 – Occupational Noise Exposure).

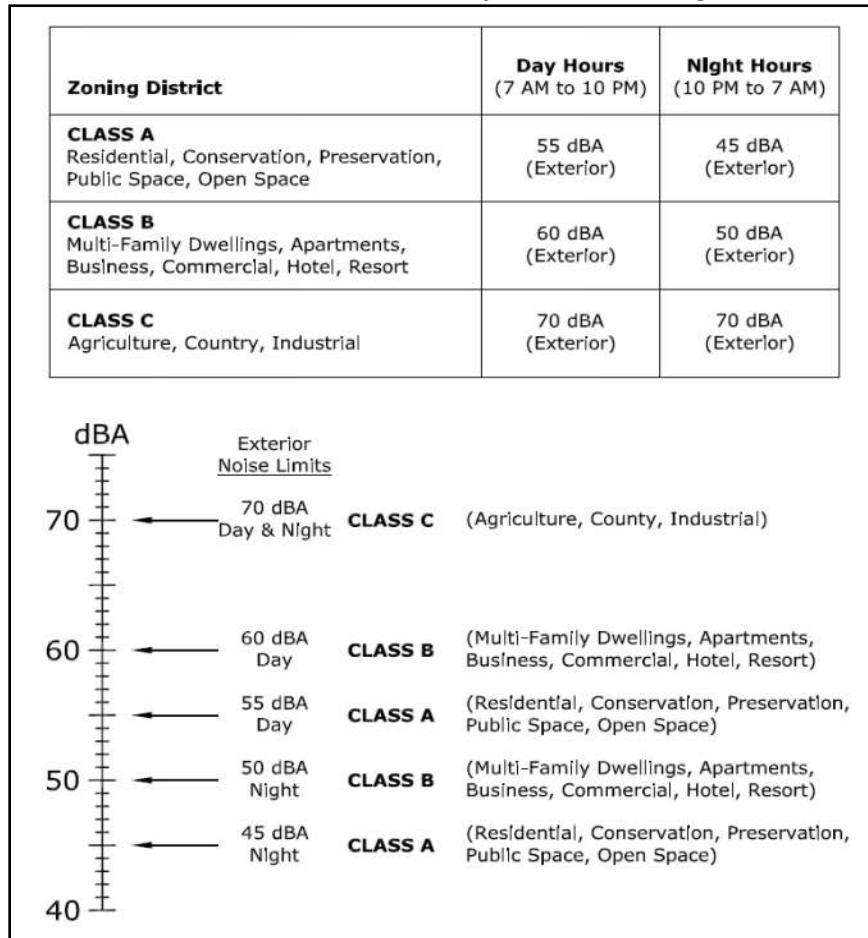
The State of Hawai'i Community Noise Control Rules (HAR Title 11, Chapter 46) defines three classes of zoning districts and specifies corresponding maximum permissible sound levels due to stationary noise sources such as air-conditioning units, exhaust systems, and generators. The accepted unit of measure for noise levels is the decibel (dBA). The Community Noise Control Rules do not address most moving sources, such as vehicular traffic noise, air traffic noise, or rail traffic noise. However, the Community Noise Control Rules do regulate noise related to construction activities, which may not be stationary.

The State of Hawai'i regulates noise exposure in the following statutes and rules:

- HRS Chapter 342F – Noise Pollution
- HAR, Title 11, Chapter 46 – Community Noise Control

The maximum permissible noise levels are enforced by the DOH for any location at or beyond the property line and shall not be exceeded for more than 10% of the time during any 20-minute period. The specified noise limits are a function of the zoning and time of day as shown in **Figure 14**. With respect to mixed zoning districts, the rule specifies that the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level. In determining the maximum permissible sound level, the background noise level is considered by the DOH.

Figure 14. Hawai'i Maximum Permissible Sound Levels for Various Zoning Districts



3.9.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

During the construction of Alternative 1, 2, or 3, noise would be generated from the equipment used to grade the parking lot and building sites. Construction equipment may include excavators, trucks, and other heavy equipment. Typical noise emission levels for construction equipment are provided in **Table 16**.

Alternatives 1, 2, or 3, would be located within commercial/residential areas of Pāhoā. The zoning of Alternatives 1, 2, and 3 are Agricultural however the surrounding commercial uses could classify it as a Class B zoning district with a maximum permissible impulse sound level of 60 dBA during the day and 50 dBA at night. Construction would generally only occur Monday through Friday between the hours of 7:00AM and 3:30PM. Noise generated during construction could impact the enjoyment of visitors to the nearby shops and residences. However, these impacts would be short-term and temporary. In addition, the measures provided in **3.9.3** would be implemented to minimize potential noise impacts.

Table 16. Typical Noise Emission Levels for Construction Equipment

Equipment Type	Equipment Type
Air Compressor	81
Backhoe	80
Bulldozer	82
Chain Saw	85
Concrete/Grout Pumps	82
Crawler Service Crane (100-ton)	83
Dump Truck	88
Excavator	85
Front End Loader	80
Generator	81
Jackhammer (compressed air)	85
Lift Booms	85
Pick-Up Truck	55
Power-Actuated Hammer	88
Water Pump	76
Water Truck	55

Source: Federal Highway Administration, 2015

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no impact to the existing noise environment.

Operation

Alternatives 1, 2, and 3

Hours of operation for the Pāhoa Public Library are expected to be from 10:00AM to 5:00PM. There are currently three bus routes that go to Pāhoa and the Puna Kai shopping center; all leave their first trip out from the Puna Kai Shopping Center at 5:30AM with the last bus back at 9:28PM. Alternatives 1 and 2 are adjacent to commercial shopping centers that naturally raise the ambient noise level in the area during business hours. Alternative 3 is slightly separated from these existing commercial sites and closer to residential areas. In the context of long-term operations, Alternatives 1, 2, and 3, are not anticipated to significantly affect ambient noise levels.

Effective noise control is essential to ensure that transit hub activities and surrounding traffic noise do not impact the creation of a quiet environment for reading, studying, and community activities at the library. The library would incorporate design and structural elements that buffer, soundproof, and insulate noise pollution from outside activities.

No-Action Alternative

Under the No-Action Alternative, no changes to existing conditions would occur; therefore, there would be no additional impacts to the existing noise environment.

3.9.3 Avoidance and Minimization Measures

Noise generated from short-term construction activities and the use of machinery would be minimized by requiring contractors to adhere to State and County noise regulations, including HRS Chapter 342F, Noise Pollution, and HAR Chapter 11-46, Community Noise Control. In the event that work occurs after normal working hours (i.e., at night or on weekends), or if permissible noise levels are exceeded, appropriate permitting and monitoring, as well as the development of administrative and engineering controls, would be employed.

In cases where construction noise exceeds or is expected to exceed the State's "maximum permissible" property line noise levels, a permit must be obtained from DOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., that emit noise levels in excess of the "maximum permissible" levels. In order for DOH to issue the construction permit, the contractor must submit a permit application explaining the construction activities. DOH may also require the contractor to conduct noise monitoring or community meetings inviting the neighboring residents and business owners to discuss construction noise. The contractor should use reasonable and standard practices to minimize noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc. However, the DOH may require additional noise minimization, such as temporary noise barriers, or time of day usage limits for certain kinds of construction activities.

Specific permit restrictions for construction activities are:

- "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels . . . before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday."
- "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels . . . before 9:00 a.m. and after 6:00 p.m. on Saturday."
- "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays."

The use of hoe rams and jack hammers 25 pounds or larger, high-pressure sprayers, chain saws, and pile drivers are restricted to 9:00 a.m. to 5:30 p.m., Monday through Friday. In addition, construction equipment and on-site vehicles or devices whose operations involve the exhausting of gas or air, excluding pile hammers and pneumatic hand tools weighing less than 15 pounds, must be equipped with mufflers.

The DOH noise permit does not limit the noise level generated at the construction site, but rather the times at which noisy construction can take place. Therefore, noise minimization for construction activities should be addressed using project management, such that the time restrictions within the DOH permit are followed.

BMPs would also be considered and implemented as applicable to further minimize noise impacts from transit hub operations. This includes turning bus engines off while idle at the transit hub to reduce air emissions and noise impacts.

3.10 Public Facilities and Services

3.10.1 Affected Environment

Police

The Hawai'i Police Department (HPD) is the Island of Hawai'i's primary law enforcement agency. The department provides 24-hour service in all districts. The department is divided into two "Areas": Area I – East Hawai'i and Area II – West Hawai'i. The project site is located in Area I, which includes the Hāmākua, North Hilo, South Hilo, and Puna districts. The Puna Patrol Division is the second largest patrol division in Area I following the South Hilo Patrol Division. The 683 square mile area is covered by 24-hour police service at a ratio of approximately one officer per 750 people. The Puna Patrol Division has 69 sworn officers and three civilians (HPD, 2021). The nearest police station is the Pāhoa Station located at 15-2615 Pāhoa Village Road, less than one mile northwest of Alternatives 1, 2, and 3. This location also serves as a Hawai'i County Fire Station.

Fire

The County of Hawai'i Fire Department (HFD) is responsible for fire protection and suppression, pre-hospital emergency medical services, land and sea search and rescue, hazardous materials response, ocean safety, and fire prevention and public education for the County. HFD is comprised of 38 fire stations (20 paid fire stations and 18 volunteer fire stations), 16 ambulances, 2 ladder trucks, 2 helicopters, 4 boats, 2 hazmat vehicles, 2 heavy rescue vehicles, 2 light rescue vehicles, and 5 rescue watercraft. HFD is divided into two Battalions: Battalion 1 – East Hawai'i and Battalion 2 – West Hawai'i (HFD, 2021). The nearest fire station is the Pāhoa Station located at 15-2615 Kea'au-Pāhoa Road, less than one mile northwest of Alternatives 1, 2, and 3. This location also serves as a Hawai'i County Police Station.

Medical Services

There is one hospital in Hilo: the Hilo Medical Center. The Medical Unit consists of 46 beds and cares for patients with a variety of medical conditions. The Progressive Care Unit is a 15-bed telemetry monitoring unit that offers a comprehensive range of diagnostic and interventional services. The hospital also consists of an imaging department, maternity ward, intensive care unit, rehabilitation services, and a pharmacy (Hawai'i Health Systems Corporation, 2021). The Hilo Medical Center is located at 1190 Waianuenue Avenue approximately 20 miles northwest of Alternatives 1, 2, and 3.

The locations of nearby police stations, fire stations, and the hospital are shown in **Figure 15**.

Schools

There are 40 public schools on the Island of Hawai'i: 23 kindergartens through 5th/6th grade, three kindergartens through 8th/9th grade, five 6th/7th through 8th grade, six 9th through 12th grade, two 7th through 12th grade, and one kindergarten through 12th grade. In addition, there are 15 public charter schools (three elementary/intermediate and 12 high school grade levels), 16 private schools (seven serving through 12th grade), and two community schools (i.e., adult education) on the island of Hawai'i.

Alternatives 1, 2, and 3 are located within the Ka'ū-Kea'au-Pāhoa Complex Area of the State of Hawai'i Department of Education. In the 2021-2022 school year, there were approximately 2,627 elementary school students, 1,227 middle school students, and 1,573 high school students in the Ka'ū-Kea'au-Pāhoa Complex Area (DOE, 2023). Alternatives 1, 2, and 3 are served by the Pāhoa Elementary, Intermediate, and High Schools. See the map in **Figure 16**.

Recreation Areas

There are several recreation areas on the island of Hawai'i. The William (Billy) Kenoi Park (formerly known as Pāhoa Regional Park) is located approximately one mile away from Alternatives 1, 2, and 3 and hosts a variety of recreational activities, including a baseball and multi-use outdoor fields, covered playcourts and a keiki playground. The area also includes a public aquatic center, a skatepark, and community center that hosts townhall meetings and other events.

3.10.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Construction of Alternative 1, 2, or 3 is not anticipated to impact or increase demand on nearby police, fire, and medical services. Construction activities that could potentially impact road access, such as ingress/egress driveway improvements or crosswalks would also impact the traffic in Pāhoa Village for brief periods. The impacts of this may be minimized by ensuring any construction activities that could impact traffic occur outside of peak rush-hour traffic times. Such construction activities would also be arranged in coordination with these emergency services to minimize disruptions and ensure adequate alternative routes can be accessed as necessary. Construction activities that could impact traffic are expected to be short term and minimal.

Construction of Alternative 1, 2, or 3 is not anticipated to impact or increase demand on nearby public schools. Construction activities that could potentially impact road access, such as ingress/egress driveway improvements or crosswalks would also impact the traffic in Pāhoa Village for brief periods. The impacts this may have on schools could be minimized by any construction activities that could impact traffic occur outside of peak school traffic times. Construction activities that could impact traffic are expected to be short term and minimal.

Construction of Alternative 1, 2, or 3 is not anticipated to impact or increase demand on nearby recreational facilities.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no impacts to public facilities and services.

Figure 15. Public Facilities and Services

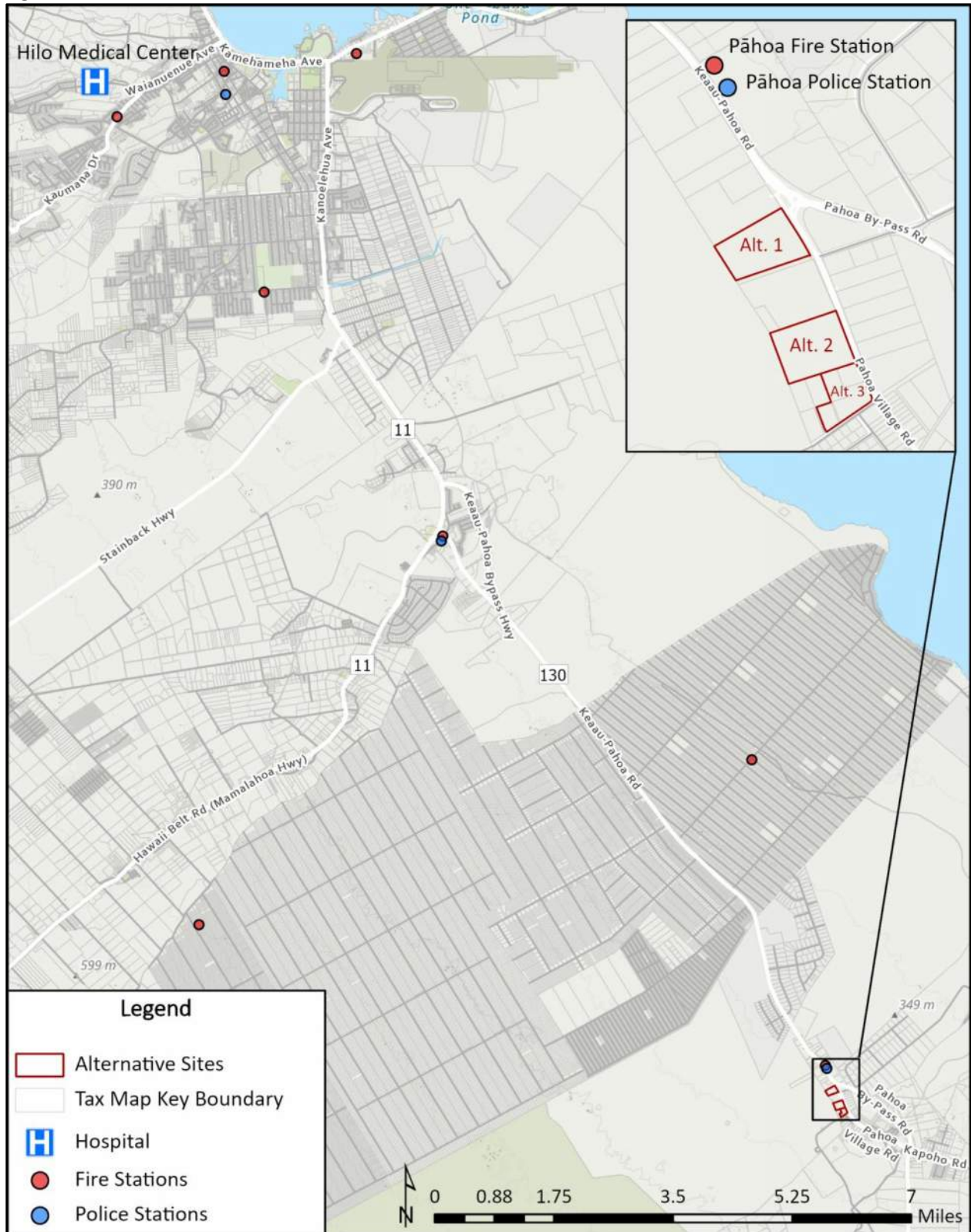
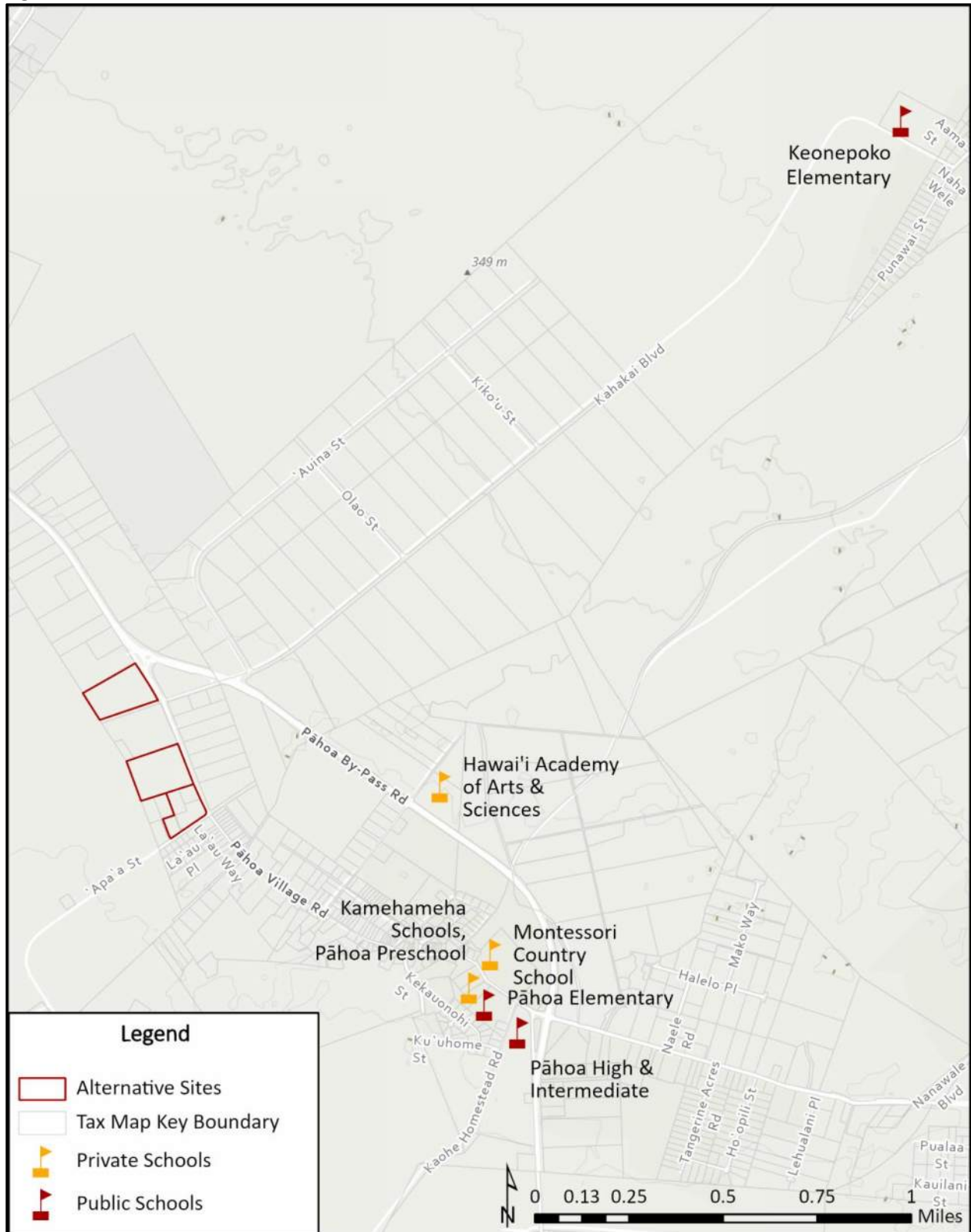


Figure 16. Schools



Operation

Alternatives 1, 2, and 3

Operation of Alternative 1, 2, or 3 is not anticipated to impact or increase demand on nearby police, fire, and medical services. The proposed transit station would include a police substation which would increase police presence in the area and provide additional security.

Operation of Alternative 1, 2, or 3 is not anticipated to impact or increase demand on nearby public schools. The proposed amenities offered at the Transit Hub and Library would provide greater access and opportunity to participate in community gathering activities, programming, and services. Redirecting library patronage and traffic to the district Pāhoa Public Library and away from the Pāhoa High and Intermediate School Campus, would provide benefits to the school such as reducing traffic congestion and improving campus security.

The operation of Alternative 1, 2, or 3 is not anticipated to impact or increase demand on nearby recreational facilities. Conversely, the amenities and services provided by Alternative 1, 2, or 3 could complement the activities at the nearby Billy Kenoi Park, easing congestion and providing a greater variety of options for residents.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be constructed. The benefits associated with the police substation and greater access and opportunity to participate in community gathering activities, programming, and services would not be realized.

3.10.3 Avoidance and Minimization Measures

Potential impacts of construction activities on traffic patterns can be minimized through coordination with emergency services to ensure police, fire, and medical services can still operate effectively and efficiently. Construction activities involving the movement of equipment or roadway construction would be limited to non-peak traffic hours to minimize potential impacts. These impacts overall are expected to be short term and minimal. No other avoidance and minimization measures are proposed for potential impacts to public facilities and services, and none are expected to be required.

3.11 Natural Hazards

3.11.1 Affected Environment

Floods

The Federal Emergency Management Agency (FEMA) creates Flood Insurance Rate Maps (FIRM) that delineates flood hazard areas. The FEMA FIRM flood zone designations include the following:

- A – Areas of 100-year flood, base flood elevations not determined
- AE – Areas of 100-year flood, base flood elevation determined

- XS – Areas of 500-year flood; areas of 100-year flood with average depths of less than one foot or within the drainage area less than one square mile, and areas protected by levees from 100-year flood
- X – Areas determined to be outside the 500-year floodplain
- D – Areas in which flood hazard is undetermined
- VE – Areas of 100-year coastal flood with velocity (wave action), base flood elevations determined (Coastal High Hazard District)

As shown in **Figure 17**, Alternatives 1, 2, and 3 are located in Flood Hazard Zone X, or determined to be outside the 500-year floodplain.

Tsunami

A tsunami involves the generation of a series of destructive ocean waves that can affect all shorelines. These waves can occur at any time with limited or no warning and are most commonly generated by earthquakes in marine and coastal regions (National Oceanic and Atmospheric Administration (NOAA), 2017). Alternatives 1, 2, and 3 are not located within the tsunami evacuation zone.

Earthquakes

Strong earthquakes endanger people and property by shaking structures and by causing ground cracks, ground settling, and landslides. The size of an earthquake is commonly expressed by its magnitude on the Richter scale, which is a measure of the relative size of the earthquake wave recorded on seismographs. Thousands of earthquakes occur every year in Hawai'i, most on and around the island of Hawai'i. Many of these earthquakes are directly related to volcanic activity. Several of the significant earthquakes on the Island of Hawai'i have occurred on the east side of the island in the past 100 years. Therefore, it may be concluded that the east side of the island could experience moderate to severe earthquakes and associated ground shaking, depending on the earthquake origin.

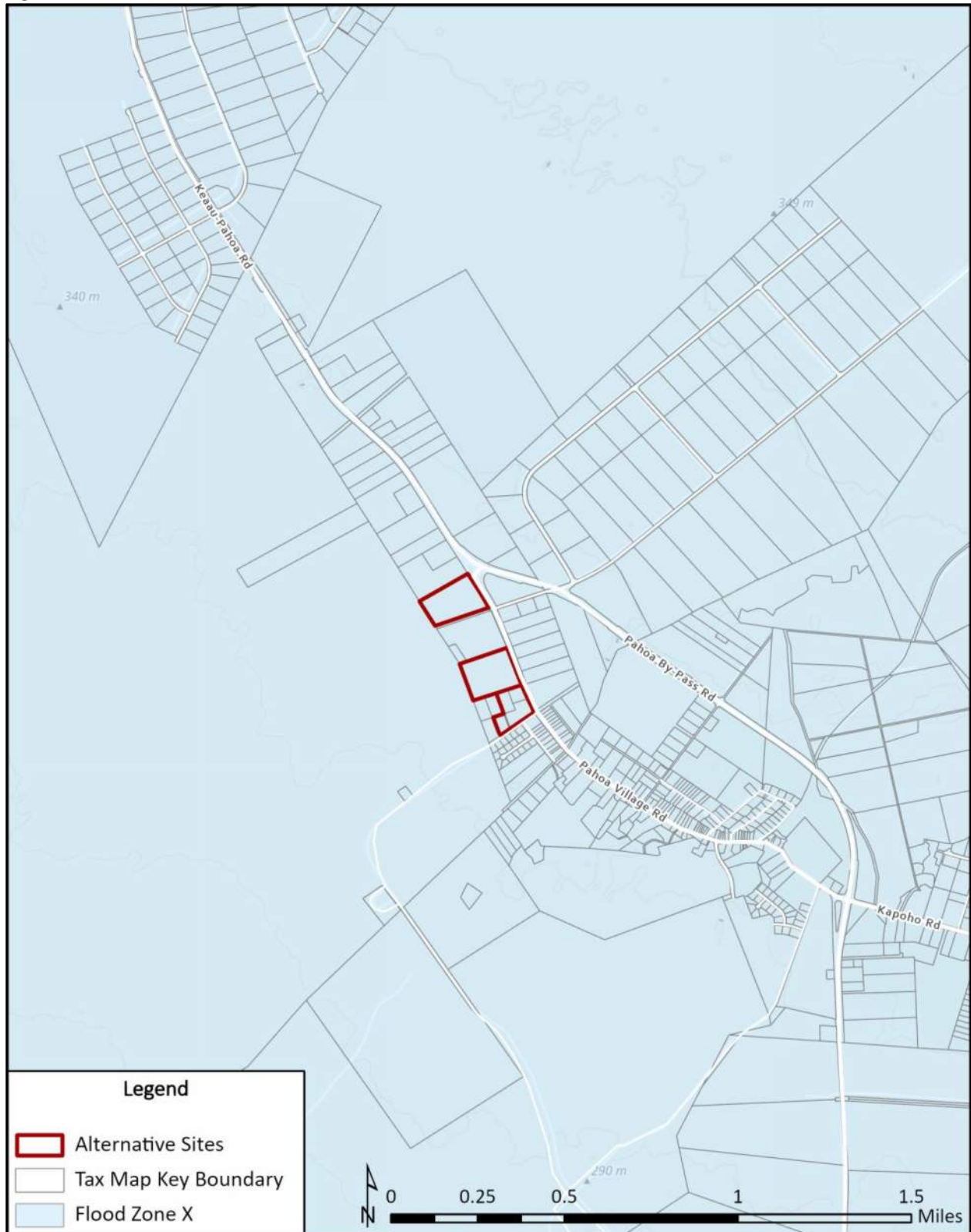
The National Earthquake Hazard Reduction Program (NEHRP) defined five soil types based on their shear-wave velocity, as shown in **Table 17**. One contributor to shaking amplification is the velocity at which the rock or soils transmits shear waves. The potential intensity of shaking is measured using a Modified Mercalli Intensity (MMI) scale. The soil classifications range from "A" to "E" with "A" equating to hard rock and E representing soft soils. The softer a soil is the more that it would amplify ground shaking and increase building damage and losses. Based on the subsurface conditions discussed in **Section 3.5**, Alternatives 1, 2, and 3 would be classified from a seismic analysis standpoint as having "Very dense soil and soft rock" corresponding to a soil classification C.

Table 17. NEHRP Soil Classifications

Soil Classification	Description
A	Hard Rock
B	Rock
C	Very dense soil and soft rock
D	Stiff soils
E	Soft soils

Source: FEMA 2015, accessed via the 2018 State of Hawai'i Multi-Hazard Mitigation Plan

Figure 17. Flood Hazard Zones



Source: Flood Hazard Areas for the State of Hawai'i, FEMA Flood Map Service Center (2021)

Seismic hazards for the state of Hawai'i are based on past earthquakes and corresponding ground shaking and are categorized in Seismic Design Categories (SDCs) that reflect the likelihood of experiencing earthquake shaking of various intensities. SDCs are an indicator of how much attention must be paid to the seismic design and construction of a building. The measure is calculated by weighing the NEHRP Soil Classification against building code classifications for risk categories (See **Table 18**). Based on these categories the Pāhoa Transit Hub and Library would fall under Category III but would be elevated to Category IV if the facility becomes designated as an emergency shelter.

Table 18. Building Risk Categories

Risk Category	Nature of Occupancy
I	Buildings and other structures that represent a low hazard to human life in the event of failure.
II	Buildings and other structures except those listed in Risk Categories I, III, and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure.
IV	Buildings and other structures designated as essential facilities

Source: 2018 International Building Code (abbreviated)

The SDCs range from “A” to “F”. Buildings with an SDC of “A” must be designed for seismic forces, but do not require any special seismic attention. Accordingly, buildings with an SDC of “E” are often near active fault lines and require significant consideration of seismic impacts. The SDC is a classification assigned to a structure based on its occupancy category and the severity of the design earthquake ground motion at the site. Based on the subsurface conditions discussed in **Section 3.5**, Alternatives 1, 2, and 3 would be classified as Seismic Design Category E. SDC descriptions are provided in **Table 19**.

Table 19. Seismic Design Category Descriptions

Seismic Design Category	Building Type and Expected MMI	Seismic Criteria
A	Buildings located in regions having a very small probability of experiencing damaging earthquake effects.	<ul style="list-style-type: none"> No specific seismic design requirements but structures are required to have complete lateral force-resisting systems and to meet basic structural integrity criteria.
B	Risk Category I, II, and III structures that could experience moderate (MMI VI) intensity shaking.	<ul style="list-style-type: none"> Structures must be designed to resist seismic forces.
C	Risk Category I, II, and III structures that could experience strong (MMI VII) shaking and Risk Category IV structures that could experience moderate (MMI VI) shaking.	<ul style="list-style-type: none"> Structures must be designed to resist seismic forces. Some types of structural systems are prohibited. Critical nonstructural components must be provided with seismic restraint.

Seismic Design Category	Building Type and Expected MMI	Seismic Criteria
D	Risk Category I, II, and III structures that could experience very strong shaking (MMI VIII or greater) and Risk Category IV structures that could experience strong (MMI VII) or greater shaking.	<ul style="list-style-type: none"> • Structures must be designed to resist seismic forces. • Only structural systems capable of providing good performance are permitted. • Nonstructural components that could cause injury must be provided with seismic restraint. • Nonstructural systems required for life safety protection must be demonstrated to be capable of post-earthquake functionality. • Special construction quality assurance measures are required.
E	Risk Category I, II, and III structures located within a few kilometers of major active faults capable of producing MMI IX or more intense shaking.	<ul style="list-style-type: none"> • Structures must be designed to resist seismic forces. • Only structural systems that are capable of providing superior performance permitted. • Some types of irregularities are prohibited. • Nonstructural components that could cause injury must be provided with seismic restraint. • Nonstructural systems required for life safety protection must be demonstrated to be capable of post-earthquake functionality. • Special construction quality assurance measures are required.

Seismic Design Category	Building Type and Expected MMI	Seismic Criteria
F	Risk Category IV structures located within a few kilometers of major active faults capable of producing MMI IX or more intense shaking.	<ul style="list-style-type: none"> • Structures must be designed to resist seismic forces. • Only structural systems capable of providing superior performance are permitted. • Some types of irregularities are prohibited. • Nonstructural components that could cause injury must be provided with seismic restraint. • Nonstructural systems required for facility function must be demonstrated to be capable of post-earthquake functionality. • Special construction quality assurance measures are required.

Source: FEMA, 2022

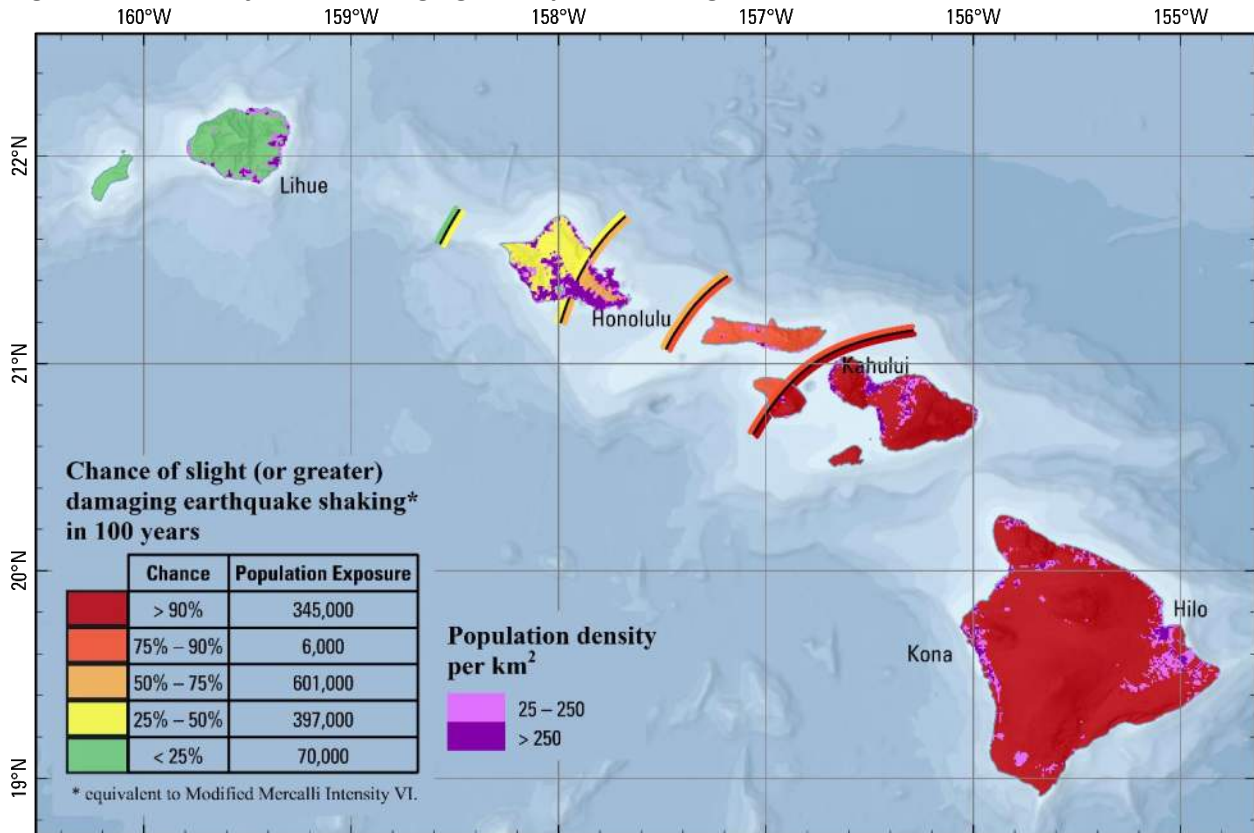
A 2021 US National Seismic Hazard Model (NSHM) for the State of Hawai'i updated the previous two-decade-old assessment by incorporating new data and modeling techniques to improve the underlying ground shaking forecasts of tectonic-fault, tectonic-flexure, volcanic, and caldera collapse earthquakes (Peterson et al. 2021). The earthquake source model is based on (1) declustered earthquake catalogs smoothed with adaptive methods, (2) earthquake rate forecasts based on three temporally varying 60-year time periods, (3) maximum magnitude criteria that extend to larger earthquakes than previously considered, (4) a separate Kīlauea-specific seismogenic caldera collapse model which accounts for clustered event behavior observed during the 2018 eruption, and (5) fault ruptures that consider historical seismicity, GPS-based strain rates, and a new Quaternary fault database (Peterson et al. 2021). **Figure 18** is a map conclusion of this analysis which shows that the entire Island of Hawai'i has a greater than 90 percent chance of experiencing damaging earthquake shaking in 100 years.

Hurricanes and Tropical Storms

The Hawaiian Islands are seasonally affected by Pacific hurricanes from June through November. On average, there are between four and five tropical cyclones observed in the Central Pacific every year. The State has been affected by significant hurricanes and tropical storms over the years. These include Hiki (1950), Nina (1957), Dot (1959), Iwa (1982), 'Iniki (1992), Iselle (2014), Lane (2018), and Olivia (2018).

According to a report presented at the International Union of Conservation of Nature World Conservation Congress, global climate change could mean that Hawai'i may experience more frequent and more severe hurricanes in the future.

Figure 18. Chance of Minor Damaging Earthquake Shaking in 100 Years



Source: Peterson et al. 2021

Volcanic Hazards

Lava flow hazard zones have been mapped for the five volcanoes that comprise the Island of Hawai'i. These lava flow hazard zones are based on the location of eruptive vents, past lava coverage, and topography. There are nine lava flow hazard zones with Zone 1 having the most severity of hazard. Alternatives 1, 2, and 3 are located in Zone 2 (Wright, et.al., 1992).

There were three significant eruption events that occurred in recent years that impacted Hawai'i Island. In June 2014, the Kīlauea volcano erupted from the Pu'u Ō'ō cinder cone and traveled northeast toward Pāhoā Village. It eventually reached the Pāhoā Recycling Facility causing it to be temporarily relocated, destroyed one home, and stopped short of reaching Highway 130. In 2018, another Kīlauea eruption originated from a series of fissures that started near the Leilani Estates and Lanipuna Gardens subdivisions. The eruption resulted in the destruction of over 700 homes and covered several roadways, including the Kapoho-Kalapana road, and caused significant damage to Highway 130. Additionally, in November 2022, the Maunaloa volcano erupted in its northeast rift zone causing a lava flow to run toward and stop just short of the Daniel K. Inouye Highway.

3.11.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Construction of Alternative 1, 2, or 3 would not create conditions that would exacerbate natural hazards. The County of Hawai'i Civil Defense directs and coordinates the County's emergency preparedness and response program to ensure prompt and effective action when natural or man-caused disaster threatens or occurs anywhere in the County of Hawai'i. Construction personnel would respond to any emergency messages or alerts, as appropriate, to ensure their safety during construction.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur and there would be no change in existing conditions as a result of Alternative 1, 2, or 3.

Operation

Alternatives 1, 2, and 3

Alternative 1, 2, or 3 would be designed using the International Building Code (IBC), 2018 Edition as adopted and amended by the County of Hawai'i to ensure it can withstand potential impacts from natural hazards. This facility could be used as a shelter, place of respite, or as a support facility during and/or following natural and man-made emergencies. This would reduce capacity stressors on other nearby shelter facilities or create necessary shelter alternatives/redundancies ultimately providing more options for the community in the event of a disaster.

No-Action Alternative

Under the No-Action Alternative, the Pāhoa Transit Hub and Library would not be in operation. The Pāhoa community may experience reduced options for gathering places, shelter, and respite in the event of a disaster.

3.11.3 Avoidance and Minimization Measures

To minimize impacts associated with natural hazards, Alternatives 1, 2, and 3 would comply with the following:

- Title 44, Code of Federal Regulations, Chapter 1, Subchapter B, Part 60
- Hawai'i County Code Section 27-18, Floodplain Management
- Hawai'i County Code 5A, Building Code

3.12 Climate and Climate Change

3.12.1 Affected Environment

Climate change is a long-term shift in patterns of temperature, precipitation, humidity, wind, and seasons. Scientific data show that the earth's climate has been warming. This warming is mostly attributable to rising levels of carbon dioxide and other GHG generated by human activity. These changes are already impacting Hawai'i through rising sea levels, increasing ocean acidity, changing rainfall patterns, decreasing

stream flows, and changing wind and wave patterns. While the earth's climate experiences natural change and variability over geologic time, the changes that have occurred over the last century due to human input of GHG into the atmosphere are unprecedented (Hawai'i Climate Change Mitigation and Adaptation Commission (HCCMAC), 2017).

Sea levels are rising at increasing rates due to global warming of the atmosphere and oceans and the melting of glaciers and ice sheets (HCCMAC, 2017). These rising seas and the projection for more increased tropical storms in the Pacific Ocean would increase Hawai'i's vulnerability to coastal inundation and erosion. Alternatives 1, 2, and 3 are far from the coastline and therefore not subject to the risk of sea-level rise.

A changing climate creates conditions that increase the frequency and severity of many natural hazards which is discussed in **Section 3.11**.

3.12.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Construction of Alternative 1, 2, or 3 would result in emissions of GHG from operation of construction equipment. These emissions would be short-term and temporary and would not be substantial; therefore, construction of Alternative 1, 2, or 3 would not have significant impacts that would exacerbate climate change.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no construction-related impacts related to climate change.

Operation

Alternatives 1, 2, and 3

Alternatives 1, 2, and 3 would not add an emission source that could result in climate change impacts. As discussed in **Section 3.7**, Alternatives 1, 2, and 3 would cause an increase in traffic in the area, which would increase emissions from people travelling to and from the park. However, this increase in traffic would not be substantial and would not have a significant impact on GHG emissions which would exacerbate climate change. MTA also anticipates that carbon offsets would occur with increased use of bus transit, of which the agency continues to explore electric and hydrogen power alternatives for the County bus fleet. It is also logical to consider that the demand for and access to programs, services, and amenities would increase regardless of this project and would be developed elsewhere potentially causing the same or more GHG emissions, depending on length of travel required.

The Pāhoa Transit Hub would require a considerable amount of energy consumption to support ongoing onsite operations. It is possible the energy consumption required would vary depending on the final facility design. Utilities for Alternatives 1, 2, and 3 are discussed in **Section 3.14**.

No-Action Alternative

Under the No-Action Alternative, the Pāhoā Transit Hub and Library would not be in operation; therefore, there would be no additional climate change impacts. There would be fewer options for low-emission transit alternatives and reduced access thereof.

3.12.3 Avoidance and Minimization Measures

BMPs would be considered and implemented as applicable to minimize GHG emissions from transit hub operations. This includes turning bus engines off while idle at the transit hub to reduce air emissions and noise impacts. The MTA is currently undergoing an initiative to implement electric vehicles into their fleet with the goal to increase the sustainability of Hawai'i County's transit system. In addition, furthering the use of transit systems is anticipated to decrease vehicular use, reducing overall vehicular miles traveled. In addition, reducing traffic congestion through increased transit operations would reduce engine idling and increase the flow of traffic, which is a proven means of reducing GHG emissions from vehicular traffic.

3.13 Scenic Resources

3.13.1 Affected Environment

Located in the lower Puna district, Pāhoā Village is a small town with a rich history and a distinct rural character. Running through the town is Pāhoā Village Road which is bounded by a mixture of lush greenery and quaint commercial and residential spaces. The charismatic history of Main Street Pāhoā lives on through the upkeep of century-old buildings. The Puna CDP identifies Pāhoā Village as a Regional Town Center and a historic resource. Alternatives 1, 2, and 3 are not located on a scenic corridor.

3.13.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Alternative 1, 2, or 3 would introduce construction equipment and activity along Pāhoā Village Road. Construction activities would be short-term and temporary and would not have significant impacts to the existing scenic and visual environment.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no construction-related impacts to visual resources.

Operation

Alternatives 1, 2, and 3

Alternatives 1 and 2 would be directly adjacent to existing commercial centers, namely the Puna Kai Shopping Center and Pāhoā Marketplace. Alternative 3 would be located closer to Pāhoā Village and would be surrounded by agricultural land on the north side with residences and a church across the street. All three alternatives would provide services for the community, potentially creating a gateway to Pāhoā Village with design features to preserve its historic character. Development of the Pāhoā Transit Hub and

Library would not significantly impact area views. The building and landscaping improvements would be consistent with the Pāhoa Village Design Guidelines. The Pāhoa Transit Hub and Public Library would be low rise and would not have a significant impact on surrounding area views.

No-Action Alternative

Under the No-Action Alternative, the sites for Alternatives 1, 2, and 3 would remain as they are currently, largely undeveloped parcels with existing, small residential building footprints.

3.13.3 Avoidance and Minimization Measures

Minimization measures include designing buildings with a low profile so as not to obstruct possible viewplanes. The building design and landscaping improvements would be consistent with the Pāhoa Village Design Guidelines.

3.14 Utilities

3.14.1 Affected Environment

Water

Water service to Alternatives 1, 2, and 3 would be provided by DWS.

Alternative 1.

There are existing 6-inch and 12-inch waterlines within Pāhoa Village Road fronting the parcel. There are two (2) existing services, each service allows a daily average usage of 400 gallons. There are 12 units of water available, subject to water demand calculations.

Alternative 2.

There are existing 6-inch and two (2) 12-inch (high and low pressure) waterlines within Pāhoa Village Road fronting the parcel. There are 14 units of water available, subject to water demand calculations.

Alternative 3.

There is an existing 60-inch and two (2) 12-inch (high and low pressure) waterlines within Pāhoa Village Road fronting the parcel and there are existing 6-inch, 8-inch, and 12-inch waterlines within 'Apa'a Street. There is an existing service for each parcel and each service allows a daily average usage of 400 gallons. An additional service or one (1) unit of water is available for each parcel.

DWS Water System Standards require that a minimum of 2,000 gallons per minute be available at the site for fire protection for the proposed type of land use for Alternatives 1, 2, and 3.

Wastewater

There is no County sewer system in the vicinity of Alternatives 1, 2, and 3. Alternative 1, 2, or 3, would need to be serviced by an approved Individual Wastewater System consisting of a septic tank and leach field.

The MTA is aware of future sewer infrastructure planned for the Puna district according to the recent Puna Wastewater Programmatic Environmental Impact Statement. The Puna CDP labels Pāhoa as a Regional Town Center. Given this, it is reasonable to anticipate that Pāhoa could have its own wastewater treatment plant servicing the town area in the future. There are numerous environmental benefits to wastewater treatment plants as opposed to septic systems. It can be costly to retrofit wastewater systems after initial construction, however, it may be possible to coordinate with the County of Hawai'i Department of Environmental Management (DEM) to take preliminary steps in the building design to ease that future process. This could include dedicating space for anticipated sewer infrastructure for Alternative 1, 2, or 3 to make future sewer connections accessible to the road. This, and other possible measures, depends on coordination with the DEM and the relative phasing of these two projects.

Electricity

Hawaiian Electric Company is the sole electric utility on the island and would provide service to Alternative 1, 2, or 3.

Broadband

Hawaiian Telcom would provide internet service to Alternatives 1, 2, and 3.

3.14.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Alternative 1, 2, or 3 would include tying into nearby utilities. It is not anticipated that the construction of Alternative 1, 2, or 3 would cause interruptions in service for nearby developments.

No-Action Alternative

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no construction-related impacts to utilities in the area.

Operation

Alternatives 1, 2, and 3

For Alternative 1, 2, or 3, Water service would be supplied by DWS. A two-inch meter for domestic service and a six-inch meter for fire protection would be required.

A new septic system would be required for Alternative 1, 2, or 3. The proposed septic tank and leach field would be designed to handle both the existing and proposed sewer flows. A permit from the DOH, Wastewater Division, would be required.

No-Action Alternative

Under the No-Action Alternative, the facility would not be in operation; therefore, there would be no impacts to utilities in the area.

3.14.3 Avoidance and Minimization Measures

No avoidance and minimization measures are proposed for potential impacts to public utilities, and none are expected to be required.

3.15 Solid and Hazardous Waste

3.15.1 Affected Environment

Myounghee Noh & Associates, dba MNA Environmental, conducted a Phase 1 Environmental Site Assessment (ESA) that included records review, site reconnaissance, and interviews of current property owners in and around Alternatives 1, 2, and 3. The Phase 1 ESA is included with this EA in **Appendix F**.

The purpose of the Phase I ESA was to identify any recognized environmental conditions (RECs) at the subject property, with respect to a range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act and petroleum products. The term recognized environmental condition means (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. A de minimis condition is not a recognized environmental condition (ASTM International, 2021). The assessment was conducted in accordance with the practices described in Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

Alternatives 1, 2, and 3 were not identified on any of the Environmental Data Resources searched environmental databases. A review of tax records, aerial photos, and topographic maps did not indicate any RECs.

Alternative 3 REC

- The owners of the parcels that make up Alternative 3 (parcels 004, 076, 082, and 083), indicated the historical presence of a gasoline pump and storage tank that have been removed on parcel 076. According to DOH Solid and Hazardous Waste Branch (SHWB), there are no records of this underground storage tank. This unregistered storage tank could be considered a REC as there is no knowledge regarding potential past releases or previous violations.
- Historical agricultural activities that took place on the parcels that make up Alternative 3 are likely to have involved the use of pesticides. It is assumed that any pesticides were applied in accordance with the labels approved for the crops, required by the Federal Insecticide, Fungicide, and Rodenticide Act. However, repeated applications over the years may have impacted the soil which could lead to REC.

Surrounding Area Controlled REC (CREC)

A CREC is defined as a known past release that has been addressed, but where contamination still remains and is subject to the implementation of required Activity and Use Limitation, such as institutional or engineering controls. The following SHWS sites are considered a CREC:

- Pāhoa Elementary School Building Exterior Soils, 15-3030 Pāhoa Village Road (4,641ft. southeast, higher elevation)
- Pāhoa High and Intermediate School Building Exterior Soils, 15-3038 Pāhoa Village Road (5,116 ft. southeast, higher elevation)

For both Pāhoa Elementary and Pāhoa High and Intermediate School, soil analytical results identified elevated levels of lead and chlordane exceeding the DOH Environmental Action Level along the perimeter of six buildings. An interim Environmental Hazard Management Plan was prepared providing management of contaminated areas for both schools. Since mitigation measures have been established (physical separation by grass cover) but contamination remains, this site is considered a CREC.

Surrounding Area REC

- The HFD indicated 16 fire incidents at the adjoining properties and surrounding areas. These fires include brush fires, structures, appliances, and electrical lines. Contaminated runoff from these incidents has the potential to cause surface and subsurface contamination to the subject properties, and therefore considered a REC.

Alternatives 1 and 3 have existing residential buildings that were constructed between 1950 and 1970. These buildings could possibly contain hazardous materials like asbestos and lead that would require preventative measures to protect from spreading pollutants that are hazardous to the environment and human health.

The Pāhoa Transfer Station is a County operated solid waste transfer station and is located on Cemetery Road at the end of 'Apa'a Road and is less than one mile away from Alternatives 1, 2, and 3.

3.15.2 Potential Impacts

Construction

Alternatives 1, 2, and 3

Testing and proper management/disposal of environmental hazards such as lead, asbestos, and arsenic would be required in the early stages of construction of Alternative 1, 2, or 3. Construction activities may result in an accidental spill of petroleum or other hazardous products in the event of an accident or equipment malfunction. Impacts would be minimized through the implementation of the measures identified in **Section 3.15.3**.

No-Action Alternative

Under the No-Action Alternative, no construction would occur; therefore, there would be no solid or hazardous waste impacts.

Operation

Alternatives 1, 2, and 3

Alternative 1, 2, or 3 would not use or result in the use of hazardous materials for the operation of the Pāhoa Transit Hub and Library; therefore, the operation of the Pāhoa Transit Hub and Library would not have any impacts associated with hazardous materials.

No-Action Alternative

Under the No-Action Alternative, the Transit Hub and Library would not be in operation; therefore, there would be no related solid or hazardous waste impacts.

3.15.3 Avoidance and Minimization Measures

The following measures would be implemented to minimize potential solid and hazardous waste impacts:

- All project construction-related debris would be removed and disposed of at an approved site.
- A contingency plan for accidental spills of petroleum products would be developed and retained on site. Absorbent pads and other applicable spill containment materials would be stored on site to facilitate with clean-up of accidental petroleum releases.
- Waste materials would be stored in a securely lidded metal dumpster or roll off container with a cover to keep rain out or loss of waste during windy conditions.
- Construction, demolition, and grubbing material would not be deposited at any of the County transfer stations. All wastes generated by construction would be disposed of at the West Hawai'i Sanitary Landfill.
- Asbestos material, if present, would be separated, double-bagged, and disposed of in accordance with regulations of the DEM, Solid Waste Division.
- Grubbed material would be chipped before disposal at the West Hawai'i Sanitary Landfill in accordance with regulations of the DEM, Solid Waste Division.
- Sanitary waste would be collected from the portable units a minimum of once per week, or as required.

3.16 Secondary and Cumulative Impacts

3.16.1 Secondary Impacts

Secondary impacts are those effects that are caused by an action and are later in time or further removed in distance but are reasonably foreseeable. They may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related to effects on air and water or other natural systems.

While the development of the Pāhoa Transit Hub and Library would introduce benefits such as improved transit access and the creation of community gathering spaces, it could also contribute toward increased growth in the regional area of Pāhoa Town. The increase of amenities and services in this area could also attract businesses and patrons away from the historic downtown area of Pāhoa Town. It is possible that negative impacts caused by induced growth could be counteracted by the proposed increase of transit

access and availability, providing improvements that encourage more active transportation. Alternatives 1 and 2 would be considered infill development for an already densely populated commercial area. Therefore, Alternatives 1 and 2 would be consistent with existing land use patterns. Alternative 3 would be close but not adjacent to the same existing commercial centers and would be located across the street from an existing residential neighborhood. Careful consideration is required for impacts on commercial growth close to these residences and would need to be done in collaboration with nearby property owners.

3.16.2 Cumulative Impacts

Cumulative impacts refer to the impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant impacts taking place over time.

There are two major planning projects in the vicinity of Alternatives 1, 2, and 3. Hawai'i County is currently taking preliminary actions to plan for future wastewater improvements for the Puna District. The Puna Wastewater Programmatic Environmental Impact Statement was recently released and details the need to establish wastewater collection, treatment, and disposal infrastructure and services to major town centers in Puna. The alternatives for this project include decentralized systems, subregional wastewater treatment plants, or one regional wastewater treatment plant. Construction of the Pāhoa Transit Hub and Library is not expected to have significant adverse impacts on this infrastructure effort. The Pāhoa Village Master Plan is also anticipated to be developed in the future and would strive to further the vision of a compact and walkable Pāhoa Village Center. The Pāhoa Transit Hub and Library intends to further this effort by encouraging walkable development in appropriate areas through increasing nearby services and promoting transit and active transportation.

Amidst these developments, the planning process for Alternatives 1, 2, and 3 acknowledges the potential of unavoidable impacts, particularly those associated with growth induction in the area. The project is proposed with the consideration that the benefits conferred by the development of a transit hub and public library in Pāhoa would counteract these challenges in terms of enhanced transit accessibility and the creation of community spaces. By enhancing connectivity, supporting sustainable transportation, and aligning with regional planning objectives, the Pāhoa Transit Hub and Library positions itself as part of a broader effort to introduce services to support a more resilient and cohesive community.

4.0 Relationship to Land Use Plans and Policies

4.1 State of Hawai'i Planning Documents

4.1.1 The Hawai'i State Plan

The Hawai'i State Plan, codified as HRS Chapter 226, provides goals, objectives, policies, and priorities for the State. The Hawai'i State Plan also provides a basis for determining priorities, allocating limited resources, and improving coordination of State and County plans, policies, programs, projects, and regulatory activities. It establishes a set of themes, goals, objectives, and policies that are meant to guide the State's long-range growth and development activities. Applicable sections of HRS Chapter 226 to Alternatives 1, 2, and 3 are shown in **Table 20** and discussed below.

Table 20. Summary of Applicability of HRS Chapter 226 to Alternatives 1, 2, and 3

HRS Chapter 226 Hawai'i State Planning Act	Applicability to Project
Part I. Overall Theme, Goals, Objectives, and Policies	
§226-5 Objective and policies for population	Applicable
§226-6 Objectives and policies for the economy--in general	Applicable
§226-7 Objectives and policies for the economy-- agriculture	Not applicable
§226-8 Objective and policies for the economy--visitor industry	Not applicable
§226-9 Objective and policies for the economy--federal expenditures	Not applicable
§226-10 Objective and policies for the economy--potential growth and innovative activities	Not Applicable
§226-10.5 Objectives and policies for the economy--information industry	Applicable
§226-11 Objectives and policies for the physical environment--land-based, shoreline, and marine resources	Applicable
§226-12 Objective and policies for the physical environment--scenic, natural beauty, and historic resources	Applicable
§226-13 Objectives and policies for the physical environment--land, air, and water quality	Applicable
§226-14 Objective and policies for facility systems--in general	Applicable
§226-15 Objectives and policies for facility systems--solid and liquid wastes	Applicable
§226-16 Objective and policies for facility systems--water	Applicable
§226-17 Objectives and policies for facility systems--transportation	Applicable
§226-18 Objectives and policies for facility systems--energy	Not applicable
§226-18.5 Objectives and policies for facility systems--telecommunications	Not applicable
§226-19 Objectives and policies for socio-cultural advancement--housing	Not applicable
§226-20 Objectives and policies for socio-cultural advancement--health	Not applicable
§226-21 Objective and policies for socio-cultural advancement--education	Applicable
§226-22 Objective and policies for socio-cultural advancement--social services	Not applicable
§226-23 Objective and policies for socio-cultural advancement--leisure	Applicable
§226-24 Objective and policies for socio-cultural advancement--individual rights and personal well-being	Not applicable
§226-25 Objective and policies for socio-cultural advancement--culture	Applicable
§226-26 Objective and policies for socio-cultural advancement--public safety	Not applicable
§226-27 Objective and policies for socio-cultural advancement--government	Not Applicable
Part III. Priority Guidelines	
§226-103 Economic priority guidelines	Applicable

HRS Chapter 226 Hawai'i State Planning Act	Applicability to Project
§226-104 Population growth and land resources priority guidelines	Applicable
§226-105 Crime and criminal justice	Not applicable
§226-106 Affordable housing	Not applicable
§226-107 Quality education	Note applicable
§226-108 Sustainability	Applicable
§226-109 Climate change adaptation priority guidelines	Applicable

Section 226-5: Objective and Policies for Population.

- (a) It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter;
- (b) To achieve the population objective, it shall be the policy of this State to:
 - (2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs-and desires.
 - (3) Promote increased opportunities for Hawai'i's people to pursue their socioeconomic aspirations throughout the islands.

Discussion: Alternative 1, 2, or 3 would not result in population growth. However, the operation of a Transit Hub and Library would support the State's goals by providing resources to accommodate the needs of the growing population in lower Puna. Increasing access to safe, reliable, and affordable transportation options would provide a resource for local families to pursue their socioeconomic aspirations through access to nearby job centers and employment opportunities. The library can serve as a resource center for entrepreneurs, small business owners, and jobseekers by providing educational and networking opportunities that support economic development. The daycare center would build on these community resources by allowing families to access reliable childcare services that promote increased access to opportunity and economic mobility.

Section 226-6. Objectives and policies for the economy – in general.

- (a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:
 - (1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.
- (b) To achieve the general economic objectives, it shall be the policy of this State to:
 - (13) Foster greater cooperation and coordination between the government and private sectors in developing Hawai'i's employment and economic growth opportunities.
 - (14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.

Discussion: Operation of the Pāhoa Transit Hub and library, could help promote increased and diversified employment opportunities, and stimulate economic opportunity for local families. The lower Puna area does not have many active job centers and access to opportunity to support its growing population. Many families surrounding the Pāhoa area commute to Hilo for educational and employment access. Providing additional transit opportunities increases access to major employment centers to provide more job choices that improve the living standards of the surrounding population. The library can play a crucial role in providing resources, technology, and training that help individuals develop the skills required for employment in a variety of industries. The library could also provide meeting spaces that create a forum for government agencies or political representatives to connect on workforce, industry, and employment needs in the community. The daycare center would also alleviate the childcare burden on families to support increasing their income potential and job choices.

Section 226-9. Objective and policies for the economy--federal expenditures.

- (a) Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawai'i's economy.
- (b) To achieve the federal expenditures objective, it shall be the policy of this State to:
 - (3) Promote the development of federally supported activities in Hawai'i that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai'i's environment;
 - (6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawai'i;

Discussion: Should this project receive Federal funding for the initial construction or in the future through Federal grant funding opportunities, it will perform all applicable analyses and comply with the corresponding Federal guidelines. Such opportunities would signify Federal support for projects that are sensitive to community needs, minimizes adverse impacts to the environment and would serve to strengthen Federal-State-County communication and coordination.

Section 226-10.5. Objectives and policies for the economy – information industry.

- (a) Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawai'i as a leader in broadband and wireless communications and applications in the Pacific Region.
- (b) To achieve the information industry objective, it shall be the policy of this State to:
 - (1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai'i and between Hawai'i and the world, and make high speed communication available to all residents and businesses in Hawai'i;

Discussion: The proposed Pāhoa Public Library would provide the community with access to high-speed internet through computer stations and free, public WiFi. This would ensure that residents without internet connectivity at home could access fast and reliable internet services. This would do much to bridge the digital divide experienced in many areas of Puna, which is especially important where necessary

information and services, such as those provided by government agencies, are increasingly offered through online platforms and applications.

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

- (a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:
 - (1) Prudent use of Hawai'i's land-based, shoreline, and marine resources.
 - (2) Effective protection of Hawai'i's unique and fragile environmental resources.
- (b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:
 - (3) Take into account the physical attributes of areas when planning and designing activities and facilities.
 - (8) Pursue compatible relationships among activities, facilities, and natural resources.

Discussion: Construction of the Alternative 1, 2, or 3 would incorporate BMPs to minimize impacts to natural resources. The facility would also be designed using the International Building Code, 2018 Edition (IBC, 2018) to ensure the building can withstand potential impacts from natural hazards. Activity on Alternative 1, 2, or 3 would be consistent with surrounding or nearby land uses, and use of the new facility would not have adverse impacts to natural resources. The Pāhoa Transit Hub would encourage active forms of transportation and transit use, which are preventative measures to protect surrounding environmental resources and maintain rural community character through reduced vehicle congestion in anticipation of continued population growth.

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

- (a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources.
- (b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:
 - (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
 - (5) Encourage the design of developments and activities that complement the natural beauty of the islands.

Discussion: An Archaeological Literature Review and Field Inspection was completed for the Alternatives 1, 2, and 3 in June 2023 by ASM Affiliates, Inc. This study, which is included in Appendix C, was conducted in order to provide MTA with information regarding the general nature, density, and distribution of archaeological and historic resources that may be expected in the location of Alternatives 1, 2, and 3. The study provided recommendations and guidance on future historic preservation work to support the

agency in complying with the applicable state laws and any future County of Hawai'i development permitting that may be required.

The presence of archaeological features on Alternatives 1, 2, and 3 are not anticipated due to the lack of archaeological resources identified by previously conducted AIS in the surrounding area.

The Alternative 1 parcel currently contains two three-bedroom agricultural dwellings, one built in 1959 and the other in 1955. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Alternative 3 is made up of four parcels which collectively contain a four-bedroom agricultural dwelling built in 1970 and a two-bedroom agricultural dwelling built in 1968. The MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

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

- (a) Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:
 - (1) Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.
- (b) To achieve the land, air, and water quality objectives, it shall be the policy of this State to:
 - (5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
 - (6) Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.
 - (7) Encourage urban developments in close proximity to existing services and facilities.

Discussion: Alternative 1, 2, or 3 would be designed to be compatible with the surrounding area and conform to the International Building Code, 2018 Edition (IBC, 2018) to ensure it can withstand potential impacts from natural hazards. The Transit Hub and Library design would include drainage improvements, which are expected to eliminate flooding on the site and drainage off-site onto adjacent properties. The facility would also be designed consistent with the Pāhoa Village Design Guidelines to ensure that it maintains the community character of Pāhoa Village. This may include the incorporation of green spaces and landscaping to enhance the visual appeal of the facility, create a welcoming atmosphere for residents, and enhance/activate the experience for pedestrians. Related to encouraging density within the Pāhoa Village commercial area, Alternatives 1 and 2 would offer services directly adjacent to the existing shopping centers. Alternatives 1, 2, and 3 would offer a convenient means for commuters to switch between different modes of transportation to encourage the increased bicycle use and walkability within the commercial area.

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

- (a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, sustainable development, climate change adaptation, sea level

rise adaptation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

- (b) To achieve the general facility systems objective, it shall be the policy of this State to:
 - (1) Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

Discussion: Alternatives 1, 2, and 3 are in alignment with existing State and County plans. The Hawai'i County General Plan, the Puna CDP, and the TMMP all envision regional facilities in Pāhoa to service surrounding Puna communities to include increased mass-transit options, concentrating development around the Regional Town Center. The State Strategic Plan for TOD Development offers strategies and opportunities for TOD development in various communities across the State. A detailed review of these plans in connection to Alternatives 1, 2, and 3 may be found throughout **Section 4.0**.

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

- (a) Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:
 - (2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.
- (b) To achieve solid and liquid waste objectives, it shall be the policy of this State to:
 - (1) Encourage the adequate development of sewerage facilities that complement planned growth.

Discussion: There is no County sewer system in the vicinity of Alternatives 1, 2, and 3. Alternative 1, 2, or 3 would include the installation of a new septic system. The proposed septic tank and leach field would be designed to handle projected sewage flows. A permit from the DOH, Wastewater Division, would be required.

The MTA is aware of future sewer infrastructure planned for the Puna district according to the recent Puna Wastewater Programmatic Environmental Impact Statement. It can be costly to retrofit wastewater systems after initial construction; however, it may be possible to coordinate with the DEM to take preliminary steps in the building design to ease that future process. This could include dedicating space for anticipated sewer infrastructure for Alternative 1, 2, or 3 to make future sewer connections accessible to the road. This, and other possible measures, depends on coordination with the DEM and the relative phasing of these two projects.

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

- (a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.
- (b) To achieve the facility systems water objective, it shall be the policy of this State to:
 - (1) Coordinate development of land use activities with existing and potential water supply.

Discussion: Water service to Alternative 1, 2, or 3 would be provided by DWS.

Alternative 1: According to DWS, there is an existing six-inch waterline and a twelve-inch waterline within Pāhoa Village Road fronting the parcel. There are two existing services, each service allows a daily average usage of 400 gallons. Furthermore, there are 12 units of water available, subject to water demand calculations.

Alternative 2: According to DWS, there are existing 6-inch and two 12-inch (high and low pressure) waterlines within Pāhoa Village Road fronting this parcel. There are 14 units of water is available, subject to water demand calculations.

Alternative 3: According to DWS, there is an existing 60inch and two 12-inch (high and low pressure) waterlines within Pāhoa Village Road and there are existing 6-inch, 8-inch and 12-inch waterlines within 'Apa'a Street. There is an existing service for each parcel and each service allows a daily average usage of 400 gallons. An additional service or one unit of water is available for each parcel.

DWS Water System Standards require that a minimum of 2,000 gallons per minute be available for fire protection for the proposed type of land use. The existing water system for Alternatives 1, 2, and 3 would need to be upgraded to satisfy these fire protection requirements. Coordination with DWS and the Fire Department will be necessary once estimated maximum daily water usage calculations have been submitted and considered.

Section 226-17. Objectives and policies for facility systems—transportation

- (a) Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:
 - (1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.
 - (2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.
- (b) To achieve the transportation objectives, it shall be the policy of this State to:
 - (5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;
 - (6) Encourage transportation systems that serve to accommodate present and future development needs of communities;
 - (10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i's natural environment;
 - (11) Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;
 - (12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and
 - (13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.

Discussion: Alternatives 1, 2, or 3 would promote State transportation objectives by providing transit services to meet present needs in the community while accommodating for future growth needs. This increased accessibility to transit services would service communities in the Puna district through low-cost, safe, reliable, and convenient transportation options. The MTA continues to explore the incorporation of energy-efficient means of transportation through the use of hydrogen and electric busses. Additionally, the continued implementation of a walkable town center area encourages active forms of transportation that reduce GHG and traffic congestion. The Puna district population trends have observed Puna to be the fastest growing district in Hawai'i County and also an area that experiences a high level of socioeconomic vulnerability (for more information see **Section 3.6**). Vulnerable populations are more likely to rely on or utilize public transit options. These factors make the implementation of additional transit options a valuable feature to support the future growth of the Pāhoa area.

Section 226-21. Objectives and policies for socio-cultural advancement – education.

- (a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.
- (b) To achieve the education objective, it shall be the policy of this State to:
 - (1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.
 - (2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.
 - (4) Promote educational programs which enhance understanding of Hawai'i's cultural heritage.
 - (7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.

Discussion: Alternatives 1, 2, and 3 would support holistic opportunities for educational services and development for the Puna community. The Pāhoa library would provide resources and learning spaces for the acquisition of basic skills listed in this State objective. This facility would serve as a community resource where people from all walks of life can congregate around the basic necessities that the facility would provide (such as transit services and the daycare facility) to arts and cultural events that provide a sense of community identity and expression. It would be a safe place where keiki (children), kūpuna (elders), mākua (parents), and 'ohana (families) can gather. In particular, the cultural center would provide a space for educational programs, workshops, performances, classes, and exhibits to enhance understanding of Hawai'i cultural heritage and promote a deeper connection and appreciation for culture and place. The proximity of these different services and activities only adds to the value of the facility through incorporating these community and cultural services into everyday commuting activities.

Section 226-23. Objective and policies for socio-cultural advancement – leisure.

- (a) Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.
- (b) To achieve the leisure objective, it shall be the policy of this State to:
 - (1) Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.
 - (2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.
 - (3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.
 - (6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.
 - (8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.

Discussion: Alternatives 1, 2, and 3 would provide several amenities and services intended to fulfil this object for socio-economic advancement and leisure. The facility would serve as a community resource where people from all walks of life can congregate around the basic necessities that the facility would provide (such as transit services and the daycare facility) to arts and cultural events that provide a sense of community identity and expression. It would be a safe place where keiki (children), kūpuna (elders), mākua (parents), and 'ohana (families) can gather. In particular, the cultural center would provide a space for educational programs, workshops, performances, classes, and exhibits to enhance understanding of Hawai'i cultural heritage and promote a deeper connection and appreciation for culture and place. The proximity of these different services and activities only adds to the value of the facility through incorporating these community and cultural services into everyday commuting activities. The Hawai'i State Library System frequently hosts activities and events that celebrate culture and the arts, many of which highlight keiki and kupuna activities. Examples of the activities that can be experienced at State Libraries across Hawai'i Island to include story-time sessions and oral histories, baby and toddler story/social time, hula and 'ukulele classes, cultural practitioner classes, art events and classes, and much more. They host homework tutoring help, classes and resources for college preparation, financial literacy, and language classes. Some libraries provide services from loanable musical instruments like 'ukuleles to passport renewals and tax forms. Librarians also serve as a wealth of information to make these programs and services open and accessible for all.

Section 226-25. Objective and policies for socio-cultural advancement – culture

- (a) Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawai'i's people.
- (b) To achieve the culture objective, it shall be the policy of this State to:

- (1) Foster increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and the history of Hawai'i.
- (2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai'i's people and which are sensitive and responsive to family and community needs.

Discussion: The Pāhoā Public Library and Cultural center would provide a venue for arts and cultural events that create a sense of community identity and expression. It would be a safe place where keiki (children), kūpuna (elders), mākuā (parents), and 'ohana (families) can gather. In particular, the cultural center would provide a space for educational programs, workshops, performances, classes, and exhibits to enhance understanding of Hawai'i cultural heritage and promote a deeper connection and appreciation for culture and place. The proximity of these different services and activities only adds to the value of the facility through incorporating these community and cultural services into everyday commuting activities. The Hawai'i State Public Library System frequently hosts activities and events that celebrate culture and the arts, many of which highlight keiki and kupuna activities. Examples of the activities that can be experienced at State Libraries across Hawai'i Island include story-time sessions and oral histories, baby and toddler story/social time, hula and 'ukulele classes, classes by cultural practitioners, art events, and much more.

The following themes of Part I of the Hawai'i State Plan are not applicable to Alternatives 1, 2, or 3 for the following reasons:

- **Section 226-7.** Objectives and policies for the economy – agriculture: Alternatives 1, 2, and 3 would have no impacts on agriculture.
- **Section 226-8.** Objectives and policies for the economy – visitor industry: Alternatives 1, 2, and 3 would not involve the visitor industry.
- **Section 226-10.** Objective and policies for the economy – potential growth and innovative activities: Alternatives 1, 2, and 3 would not provide employment opportunities or innovate the economy.
- **Section 226-18.** Objectives and policies for facility systems – energy: Alternatives 1, 2, and 3 do not involve energy generation.
- **Section 226-18.5.** Objective and policies for facility systems – telecommunications: Alternatives 1, 2, and 3 would not include new telecommunication facilities.
- **Section 226-19.** Objectives and policies for socio-cultural advancement – housing: Alternatives 1, 2, and 3 would not include development of housing.
- **Section 226-20.** Objectives and policies for socio-cultural advancement – health: Alternatives 1, 2, and 3 would not include health facilities or services.
- **Section 226-22.** Objectives and policies for socio-cultural advancement – social services: Alternatives 1, 2, and 3 would not include social services or activities.

- **Section 226-24.** Objectives and policies for socio-cultural advancement – individual rights and personal well-being: Alternatives 1, 2, and 3 would have no impact to personal rights and personal well-being.
- **Section 226-26.** Objectives and policies for socio-cultural advancement – public safety: Alternatives 1, 2, and 3 would not include public safety programs.
- **Section 226-27.** Objectives and policies for sociocultural advancement – government: Alternatives 1, 2, and 3 would have no impact on government services.

Section 226-103. Economic priority guidelines.

- (a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai'i's people and achieve a stable and diversified economy:
- (3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.
 - (9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i business.
- (f) Priority guidelines for energy use and development:
- (4) Encourage the development and use of energy conserving and cost-efficient transportation systems.
- (g) Priority guidelines to promote the development of the information industry:
- (1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability, that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawai'i.

Discussion: The Hawai'i State Public Library System routinely provides services for people and organizations to access government services and applications. They provide Public Review Lists of various State and County documents and forms and can provide assistance to help point people in the right direction for what they are searching for. They assist with career growth and development with educational resources to learn technical skills and trades.

The MTA continues to explore the incorporation of energy-efficient means of transportation through the use of hydrogen and electric busses. Additionally, the continued implementation of a walkable town center area encourages active forms of transportation that reduce GHG and traffic congestion.

Additionally, while Alternatives 1, 2, and 3 would not specifically add to broadband and wireless infrastructure or capability of the district, it would provide access to such services for the community and therefore contribute toward economic growth and diversification that comes from individual access to information and skill development through internet services.

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

- (a) Priority guidelines to effect desired statewide growth and distribution:
- (1) Encourage planning and resource management to insure [sic] that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.
 - (3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.
 - (4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.
- (b) Priority guidelines for regional growth distribution and land resource utilization:
- (1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.
 - (2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.
 - (9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.
 - (12) Utilize Hawai'i's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.
 - (13) Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.

Discussion: Population projections indicate that the Puna district has been and will continue to experience a higher-than-average population growth rate in the foreseeable future. Alternatives 1, 2, and 3 would provide services that would support an anticipated higher demand to ensure a healthy and thriving community in the future. Alternatives 1, 2, and 3 would locate the facility in an area of existing urban growth. This ensures that Alternatives 1, 2, and 3 would not contribute to the encroachment of urban land uses on important agricultural lands and would maintain the rural character of the surrounding area.

Section 226-108. Sustainability.

- (a) Priority guidelines and principles to promote sustainability shall include:
- (1) Encouraging balanced economic, social, community, and environmental priorities;
 - (3) Promoting a diversified and dynamic economy;
 - (4) Encouraging respect for the host culture;

Discussion: Alternatives 1, 2, and 3 would merge transit infrastructure with community, education, and cultural facilities that support State guidelines on sustainability. It would promote a diversified and dynamic economy through advancing transit access and reliability and ensure that Puna residents can

transit to job centers and other services. The cultural center would provide a space to celebrate culture and a gathering space to enrich the community more generally.

Section 226-109. Climate change adaptation priority guidelines.

- (a) Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:
- (8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;
- (10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.

Discussion: Climate change adaptation strategies may include efforts to reduce the amount of vehicular travel to achieve projected reductions in GHG emissions. Having safe, effective, and reliable public transportation access is a crucial element to ensuring continued access to employment and services while still working toward these climate change minimization goals. Encouraging population growth patterns that centralize resources, reduce sprawl, and ensure equitable access are all important considerations. **3.11**, related to hazards, outlines how the Pāhoa Transit hub and Public Library could be used as an emergency shelter from natural hazard events, which are projected to become more intense and frequent as global temperatures rise and weather patterns change.

The following themes of Part III of the Hawai'i State Plan are not applicable to Alternatives 1, 2, or 3 for the following reasons:

- **Section 226-105.** Crime and criminal justice. Alternatives 1, 2, and 3 would not involve the criminal justice system.
- **Section 226-106.** Affordable housing. Alternatives 1, 2, and 3 do not provide housing.
- **Section 226-107.** Quality education. Although Alternatives 1, 2 and 3 would provide programs for school-aged children, it does not specifically pertain to education and schools.

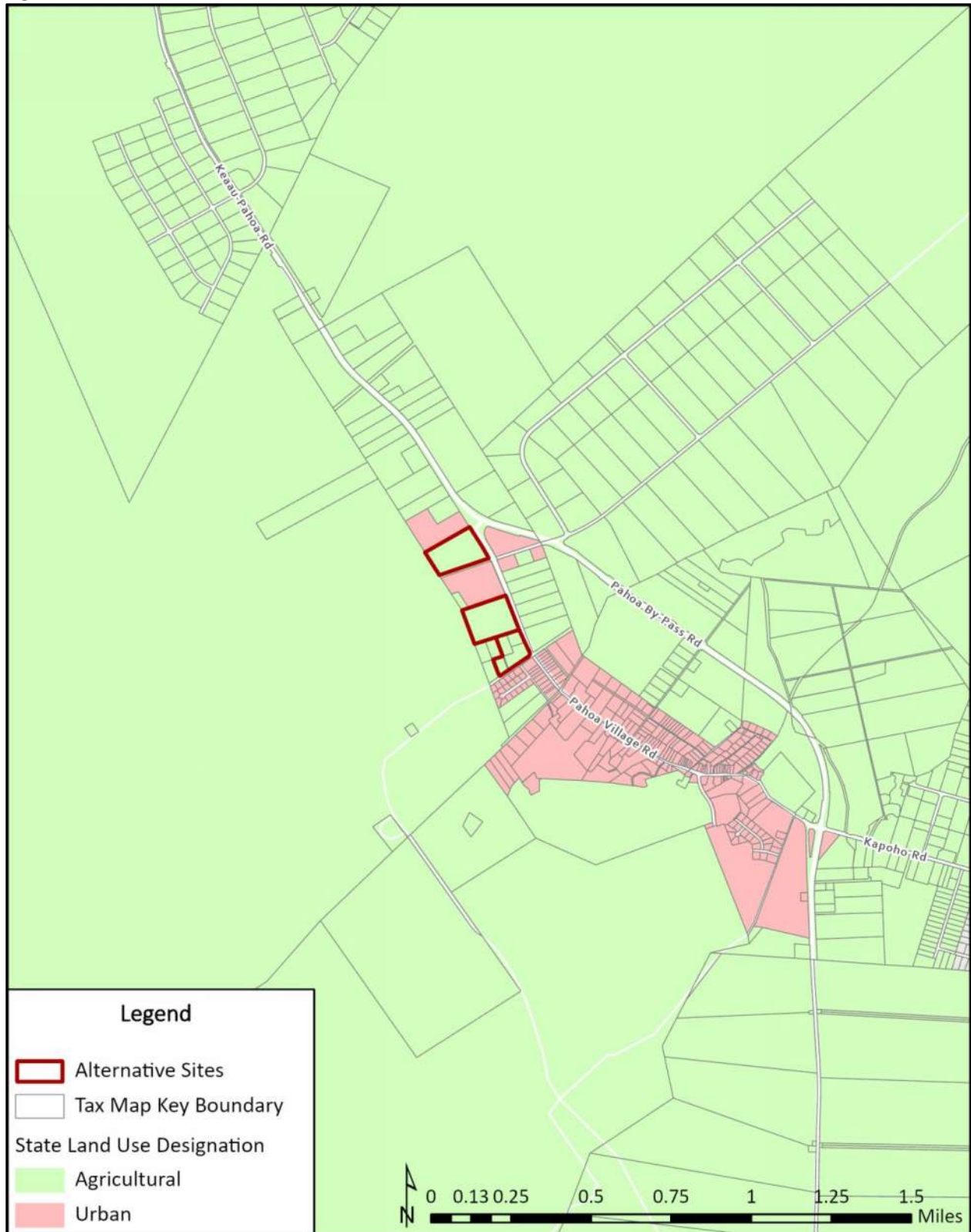
4.1.2 State Land Use Law

Hawai'i was the first of the fifty states to have a State Land Use Law and a State Plan. Today, Hawai'i remains unique among the fifty states with respect to the extent of control that the state exercises in land use regulation. The State Land Use Law, HRS Chapter 205, was originally adopted by the State Legislature in 1961. This law establishes an overall framework of land use management whereby all lands in the State of Hawai'i are classified into one of four land use districts: Urban, Agricultural, Conservation, and Rural.

Discussion: The State Land Use Law is administered by the Land Use Commission. The Commission is "responsible for preserving and protecting Hawai'i's lands and encouraging those uses to which lands are best suited." Alternatives 1, 2, and 3 are located in the Agricultural State Land Use District, as shown in

Figure 19. A Transit Hub and Library is not an allowed use agricultural land per HRS Section 205-4.5. However, HRS provides County discretion through the allowance of special permits issued pursuant to standards laid out in HRS Section 205-5. Therefore, pursuant to Hawai'i County jurisdiction, Alternatives 1, 2, and 3 are consistent with State Land Use Law.

Figure 19. State Land Use Districts



4.1.3 Hawai'i Coastal Zone Management Program

The National Coastal Zone Management (CZM) Program was created with the passage of the Coastal Zone Management Act of 1972 (CZMA). Hawai'i's CZM Program, established pursuant to HRS Chapter 205A, as amended, is administered by the State of Hawai'i Office of Planning and Sustainable Development and provides for the beneficial use, protection, and development in the State's coastal zone. The objectives and policies of the Hawai'i CZM Program encompass a wide array of concerns including impacts to recreational resources, historic and archaeological resources, coastal scenic resources and open space, coastal ecosystems, coastal hazards, and the management of development. The Hawai'i CZM area includes all lands within the State and the areas seaward to the extent of the State's management jurisdiction. Therefore, Alternatives 1, 2, and 3 are located within the CZM area.

Alternatives 1, 2, and 3 are consistent with the following objectives and policies of the Hawai'i CZM Program:

RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

- (A) Improve coordination and funding of coastal recreational planning and management.
- (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
 - (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas.
 - (ii) Requiring restoration of coastal resources that have significant recreational and ecosystem value, including but not limited to coral reefs, surfing sites, fishponds, sand beaches, and coastal dunes, when these resources will be unavoidably damaged by development; or requiring monetary compensation to the State for recreation when restoration is not feasible or desirable.
 - (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.
 - (iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation.
 - (v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources.
 - (vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.
 - (vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing.
 - (viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the

requirements of section 46-6.

Discussion: Alternatives 1, 2, and 3 would not impact shoreline recreational resources and are not located on the coastline; therefore, policies regarding shoreline recreational resources are not applicable. To protect the recreational value of coastal waters, the State of Hawai'i has adopted water quality standards. Generally, these standards require submittal and adherence to the conditions in a NPDES permit. This permit requires compliance with BMPs during construction to minimize soil erosion into adjacent waterways and to maintain water quality during operation. A NPDES permit will be required for Alternatives 1, 2, or 3.

HISTORIC RESOURCES

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

Policies:

- (A) Identify and analyze significant archaeological resources.
- (B) Maximize information retention through preservation of remains and artifacts or salvage operations.
- (C) Support state goals for protection, restoration, interpretation, and display of historic resources

Discussion: An Archaeological Literature Review and Field Inspection was completed for the Alternatives 1, 2, and 3 in June 2023 by ASM Affiliates, Inc. This study, which is included in Appendix C, was conducted in order to provide MTA with information regarding the general nature, density, and distribution of archaeological and historic resources that may be expected in the location of Alternatives 1, 2, and 3. The study provided recommendations and guidance on future historic preservation work to support the agency in complying with the applicable state laws and any future County of Hawai'i development permitting that may be required.

The presence of archaeological features on Alternatives 1, 2, and 3 are not anticipated due to the lack of archaeological resources identified by previously conducted AIS in the surrounding area. An AIS would be conducted of the selected Alternative with SHPD review and acceptance prior to any ground-breaking activity.

The Alternative 1 parcel currently contains two three-bedroom agricultural dwellings, one built in 1959 and the other in 1955. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Alternative 3 is made up of four parcels which collectively contain a four-bedroom agricultural dwelling built in 1970 and a two-bedroom agricultural dwelling built in 1968. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

SCENIC AND OPEN SPACE RESOURCES

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

open space resources.

Policies:

- (A) Identify valued scenic resources in the coastal zone management area.
- (B) Ensure that new developments are compatible with their visual environment by designing and locating those developments to minimize the alteration of natural landforms and existing public views to and along the shoreline.
- (C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources.
- (D) Encourage those developments that are not coastal dependent to locate in inland areas.

Discussion: Alternatives 1, 2, and 3 are not located in an area designated with “valued scenic resources” and are located away from coastal areas. The final design of Alternatives 1, 2, and 3 will be consistent with the visual environment of the surrounding area.

COASTAL ECOSYSTEMS

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

Policies:

- (A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources.
- (B) Improve the technical basis for natural resource management.
- (C) Preserve valuable coastal ecosystems of significant biological or economic importance, including reefs, beaches, and dunes.
- (D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs.
- (E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: Alternatives 1, 2, and 3 do not involve coastal development.

ECONOMIC USES

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

Policies:

- (A) Concentrate coastal dependent development in appropriate areas.
- (B) Ensure that coastal dependent development and coastal related development are located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area.
- (C) Direct the location and expansion of coastal developments to areas presently designated and used for that development and permit reasonable long-term growth at those areas, and permit coastal

dependent development outside of presently designated areas when:

- (i) Use of presently designated locations is not feasible;
- (ii) Adverse environmental effects and risks from coastal hazards are minimized; and
- (iii) The development is important to the State's economy.

Discussion: Alternatives 1, 2, and 3 do not involve coastal development.

COASTAL HAZARDS

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

Policies:

- (A) Develop and communicate adequate information about the risks of coastal hazards.
- (B) Control development, including planning and zoning control, in areas subject to coastal hazards.
- (C) Ensure that developments comply with requirements of the National Flood Insurance Program.
- (D) Prevent coastal flooding from inland projects.

Discussion: Alternative 1, 2, or 3 would be designed using the International Building Code, 2018 Edition (IBC, 2018) to ensure the facility can withstand potential impacts from natural hazards. The facility could be used as a shelter, place of respite or support facility during and/or following natural and man-made emergencies. It would also be designed with drainage improvements to minimize possible flooding onsite and drainage offsite.

MANAGING DEVELOPMENT

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

Policies:

- (A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development.
- (B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements.
- (C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion: The site selection process for this project involved a detailed public review process that provided opportunities for impacted community members to share their thoughts on many aspects of the project design and development.

This Draft Environmental Assessment is being provided for public comment and review. To facilitate the agency review process for the required permits for Alternative 1, 2, or 3, the MTA would meet with the various agencies prior to submitting permit application packages. The permit review process would also provide additional opportunities for public involvement.

PUBLIC PARTICIPATION

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

Policies:

- (A) Promote public involvement in coastal zone management processes.
- (B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities.
- (C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion: The site selection process for this project involved a detailed public review process that provided opportunities for impacted community members to share their thoughts on many aspects of the project design and development. Opportunities for public awareness, education, and participation in coastal management are provided through the regulatory review processes. The Draft Environmental Assessment is being provided for public comment and review. Additional opportunities for review would come during the permit review process.

BEACH PROTECTION

Objective: Protect beaches for public use and recreation.

Policies:

- (A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion.
- (B) Prohibit construction of private shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.
- (C) Minimize the construction of public shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.
- (D) Minimize grading of and damage to coastal dunes.
- (E) Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor.
- (F) Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.

Discussion: Alternatives 1, 2, and 3 are located inland, away from shoreline; therefore, there would be no effect on the use of beaches for public use and recreation.

MARINE RESOURCES

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

- (A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial.
- (B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency.
- (C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone.
- (D) Promote research, study, and understanding of ocean and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources to acquire and inventory information necessary to understand how coastal development activities relate to and impact ocean and coastal resources.
- (E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: Alternatives 1, 2, and 3 are located inland, away from marine resources. To protect marine water quality, Alternative 1, 2, or 3 will be designed and constructed in compliance with all applicable Federal, State, and County regulations pertaining to storm water management.

4.1.4 State of Hawai'i Strategic Plan for Transit-Oriented Development

The *State of Hawai'i Strategic Plan for Transit-Oriented Development* (TOD Strategic Plan) was prepared pursuant to Act 130, Session Laws of Hawai'i (SLH) 2016. Act 130 established the Hawai'i Interagency Council for Transit-Oriented Development (TOD Council) to coordinate TOD planning statewide. One of the TOD Council's primary responsibilities is to "develop and implement a State strategic plan for TOD, including mixed-use and affordable and rental housing." (HRS section 226-63(b)(2)).

The Strategic Plan was developed using the following Seven Principles for TOD Investments:

- 1) *Locate or redevelop facilities first in existing town and growth centers, aligned with county plans, at transportation nodes served by public transportation.*
- 2) *Maximize the co-location of State facilities and services in higher density, compact, mixed use developments and walkable communities.*
- 3) *Invest in critical infrastructure necessary to successfully implement town/growth center development.*
- 4) *Partner more through creative, cost-effective partnerships with other public and private partners.*
- 5) *Look to develop more affordable housing wherever feasible to do so.*
- 6) *Use green building and sustainable development practices as much as possible.*
- 7) *Engage in equitable development that promotes and supports community well-being and active and healthy lifestyles.*

Discussion: Alternatives 1, 2, and 3 align with the principles of the State of Hawai'i Strategic Plan for Transit-Oriented Development. They propose to locate transportation services within an existing town center, co-locating the transit hub with the Pāhoa Public Library and other public services nearby existing commercial areas. This arrangement would foster the growth of a pedestrian-friendly Pāhoa town center. By partnering with HSPLS, the project pursues creative, cost-effective solutions. The design of Alternatives 1, 2, and 3 would follow sustainable development practices by encouraging clustered development while providing regional services to nearby Puna neighborhoods. Overall, Alternatives 1, 2, and 3 would support equitable development and support community well-being and active and healthy lifestyles in the Puna district.

The TOD Strategic Plan discusses TOD and mass transit goals particular to Hawai'i County:

The County of Hawai'i has identified a goal for mass transit on Hawai'i to make riding transit more desirable and easier, making it responsive to the needs of transit-dependent individuals, youth, seniors, individuals with disabilities, and low-income populations. This goal is consistent with developing the areas surrounding transit centers as TOD areas, consistent with the TOD goals of the State, with the transit hubs becoming significant influences on land use development.

The Hawai'i Island community is unified in understanding the need to:

- *Direct growth and increase density towards urban and village centers, and to infill the underutilized areas between exiting urban and village centers;*
- *Focus and prioritize future investments in new infrastructure that will facilitate the opportunity to direct growth to the designated urban areas;*
- *Discourage sprawl outside of designated urban centers;*
- *Provide multi-modal transportation to and within urban and village centers; and*
- *Encourage a mix of uses to build livable communities that provide residents with opportunities for employment near affordable housing, together with access to commercial and recreational opportunities.*

Discussion: The vision for TOD planning for Hawai'i County, as described in the State TOD Strategic Plan includes increasing density in existing urban areas to discourage sprawl and effectively provide transit services for residents. Alternative 1, 2, or 3 would be located in Pāhoa Town in an area planned for future regional services to surrounding Puna neighborhoods. Therefore, Alternatives 1, 2, and 3 are in alignment with the TOD vision for Hawai'i County.

The State TOD Strategic Plan speaks specifically to the development of an eventual Pāhoa Transit Hub that reinforces the alignment of Alternatives 1, 2, and 3 with future transit and urban development planning in Hawai'i County:

The Pāhoa Transit Hub Project in the district of Puna will be the first in the County of Hawai'i's Mass Transit and Multi-Modal Transportation Plan to be built. The Puna Community Development Plan recognizes Pāhoa as a regional town center. The norther portion of Pāhoa straddling Highway 130 before Kahakai Blvd is intended for regional uses. Police, fire, a medical urgent care facility, and retail shops are located in this northern area. The southern area straddling Pāhoa Village Road from 'Apa'a

street to Pāhoa Bypass Road is primarily intended for residents of the Pāhoa community. This area also includes some regional facilities, such as the post office, a 50-acres regional park, and the intermediate and high school. The project will be one of two bus hubs in the Puna district. Construction of the Pāhoa hub will transition the bus route operations in lower Puna to a hub-and-spoke model and add shorter circulation routes to neighboring communities, such as Nānāwale, Hawaiian Beaches, and Kalapana. The longer distance Route #40 will operate with larger buses and fewer stops directly from Pāhoa to Hilo.

The County has partnered with the Hawai'i Public Library System to consider the co-location of a new Pāhoa Public Library with the transit hub. The project is in the planning stages, evaluating potential sites, including sites identified in prior studies. The County will conduct community meetings and prepare an Environmental Assessment and conceptual site design for the preferred site.

4.2 County of Hawai'i Planning Documents

4.2.1 Hawai'i County General Plan

The *County of Hawai'i General Plan*, February 2005 (as amended) (2005 General Plan) is the policy document for the long-range comprehensive development of the island of HI. The purposes of the General Plan are as follows:

- Guide the pattern of future development in this County based on long-term goals;
- Identify the visions, values, and priorities important to the people of this County;
- Provide the framework for regulatory decisions, capital improvement priorities, acquisition strategies, and other pertinent government programs within the County organization and coordinated with State and Federal programs.
- Improve the physical environment of the County as a setting for human activities; to make it more functional, beautiful, healthful, interesting, and efficient.
- Promote and safeguard the public interest and the interest of the County as a whole.
- Facilitate the democratic determination of community policies concerning the utilization of its natural, man-made, and human resources.
- Effect political and technical coordination in community improvement and development.
- Inject long-range considerations into the determination of short-range actions and implementation.

The County's existing 2005 General Plan is currently undergoing revision. The General Plan 2040 will reflect Hawai'i County future growth patterns with consideration of contemporary issues and conditions. A revised timeline of the General Plan has yet to be released; however, the draft plan was released in 2023 for public review. Upon the completion of public review, the recommended plan will undergo Planning Commission review and Hawai'i County Council review and adoption.

The following analyzes the consistency of Alternatives 1, 2, and 3 with the goals and policies of the 2005 General Plan. Alternatives 1, 2, and 3 are consistent with the following applicable goals and policies of the 2005 General Plan:

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.
- (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.

Policies:

- (f) Support all levels of educational, employment and training opportunities and institutions.
- (g) Capital improvements program shall improve the quality of existing commercial and industrial areas.
- (i) Continue to encourage the research, development and implementation of advanced technologies and processes.

Discussion: The Economic Goals and Policies of the 2005 General Plan touch on several important topics that impact local economic development and growth.

A low-cost, reliable transit hub would enhance accessibility and connectivity for residents of lower Puna. This would increase the ability for residents to access job centers, increasing the level of opportunity and upward mobility for families. A transit hub would also benefit its surrounding commercial cluster by providing increased accessibility to the nearby Puna Kai Shopping Center and Pāhoa Marketplace. Creating a cohesive, regional commercial center that is compact and walkable creates not only a community amenity but fosters economic development for the area.

A public library creates the fundamental building blocks that can open access to opportunity for residents from all walks of life. Locating the library close to the commercial town center for Pāhoa would create a neutral, welcoming environment with more open access and visibility. The library would contain informational resources, internet connection, support and guidance navigating government processes, and a community meeting space for civic engagement and other interests. Similar to the transit hub, increasing access to opportunity also creates grounding for a resilient local economy with increased choices for workers and upward mobility.

The inclusion of a daycare center at the Pāhoa Transit Hub and Library would improve the level of opportunity for families with children. The convenient location would enable families to safely drop their

children off for care during their daily commute. Alleviating the child-care burden provides financial independence for single-parent households and increased options and stability for families overall.

The Cultural Center and performance space would create a venue for the celebration and advancement of cultural practices and art forms to support the development and stability of the arts economy. Cultural practitioners can teach classes for interested community members that creates not only an amenity for the local community but an income source for arts and culture practitioners. This supports the 2005 General Plan economic goals to continue diversification of the economy, increased choice in occupation and ensuring the balance of economic development activity with community needs and aspirations.

Environmental Quality

Goals:

- (a) Define the most desirable uses 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.

Policies:

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

Discussion: Alternatives 1, 2, and 3 would have short-term and temporary impacts during construction. BMPs and other measures would be implemented to minimize impacts, as applicable.

Flooding and Other Natural Hazards

Goals:

- (b) Prevent damage to man-made improvements.
- (c) Control pollution.
- (d) Prevent damage from inundation.
- (e) Reduce surface water and sediment runoff.

Policies:

- (g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works (DPW) and in compliance with all State and Federal laws.
- (j) The County and private sector shall be responsible for maintaining and improving existing drainage systems and constructing new drainage facilities.
- (q) Consider natural hazards in all land use planning and permitting.

Discussion: The Pāhoa Transit Hub and Library would be designed using the International Building Code, 2018 Edition (IBC, 2018) to ensure it can withstand potential impacts from natural hazards. The facility

could be used as a shelter, place of respite or support facility during and/or following natural and man-made emergencies.

Alternatives 1, 2, and 3 would include drainage improvements, which are expected to eliminate flooding on the site and drainage off-site onto adjacent properties.

Historic Sites

Goals:

- (a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.
- (g) Collect and distribute historic sites information of public interest and keep an inventory of sites.
- (h) Aid in the development of a program of public education concerning historic sites.

Policies:

- (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.
- (g) Collect and distribute historic sites information of public interest and keep an inventory of sites.

Discussion: An Archaeological Literature Review and Field Inspection was completed for the Alternatives 1, 2, and 3 in June 2023 by ASM Affiliates, Inc. This study, which is included in Appendix C, was conducted in order to provide MTA with information regarding the general nature, density, and distribution of archaeological and historic resources that may be expected in the location of Alternatives 1, 2, and 3. The study provided recommendations and guidance on future historic preservation work to support the agency in complying with the applicable State laws and any future County of Hawai'i development permitting that may be required.

The presence of archaeological features on Alternatives 1, 2, and 3 are not anticipated due to the lack of archaeological resources identified by previously conducted AIS in the surrounding area. An AIS would be conducted of the selected Alternative with SHPD review and acceptance prior to any ground-breaking activity.

The Alternative 1 parcel currently contains two three-bedroom agricultural dwellings, one built in 1959 and the other in 1955. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Alternative 3 is made up of four parcels which collectively contain a four-bedroom agricultural dwelling built in 1970 and a two-bedroom agricultural dwelling built in 1968. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Natural Resources and Coastline

Goals:

- (a) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
- (b) 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.

Policies:

- (p) Encourage the use of native plants for screening and landscaping.
- (u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: This Draft Environmental Assessment has been prepared to analyze the potential impacts of Alternatives 1, 2, and 3 on natural resources. Alternatives 1, 2, or 3 would have short-term and temporary impacts during construction. BMPs and other measures would be implemented to minimize impacts, as applicable.

The Pāhoa Transit Hub and Library would be designed using the International Building Code, 2018 Edition (IBC, 2018) to ensure it can withstand potential impacts from natural hazards. The facility could be used as a shelter, place of respite or support facility during and/or following natural and man-made emergencies.

Alternatives 1, 2, and 3 would include drainage improvements, which are expected to eliminate flooding on the site and drainage off-site onto adjacent properties.

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.

Policies:

- (a) Continue to seek ways of improving public service through the coordination of service and maximizing the use of personnel and facilities.
- (b) Coordinate with appropriate State agencies for the provision of public facilities to serve the needs of the community.

Public Facilities - Education:

Policies:

- (e) Encourage the Hawai'i State Library System to seek alternate sites for public libraries located on the campuses of public schools.

Courses of Action (Puna district):

- (d) Encourage improvements to pedestrian access between the village of Pāhoa and the school and library facilities.

Discussion: The 2005 Hawai'i County General Plan speaks to issues affecting public schools in the district, specifically stating that: "The natural population growth and in-migration into the subdivisions in the area are contributing to the increased pressure on education facilities at the Pāhoa complex. And further, "The Kea'au, Mt. View and Pāhoa branch libraries are joint community-school facilities... Both library facilities are inadequate in size to meet the needs of the students and community. Furthermore, the lack of adequate pedestrian access and parking at these facilities is an ongoing problem." The General Plan encourages public libraries to be located at alternative sites from school campuses and discusses issues of pedestrian access and parking at the existing Pāhoa High and Elementary school.

Recreation

Goals:

- (a) Provide a wide variety of recreational opportunities for the residents and visitors of the County.
- (b) Maintain the natural beauty of recreation areas.
- (c) Provide a diversity of environments for active and passive pursuits.

Policies:

- (a) Strive to equitably allocate facility-based parks among the districts relative to population, with public input to determine the locations and type of facilities.
- (c) Recreational facilities shall reflect the natural, historic, and cultural character of the area.
- (g) Facilities for compatible multiple uses shall be provided.
- (h) Provide facilities and a broad recreational program for all age groups, with special considerations for the handicapped, elderly, and young children.
- (o) Develop facilities and safe pathway systems for walking, jogging, and biking activities.

Discussion: While Alternatives 1, 2, and 3 would not be classified as a recreational facility as parks and gyms are usually defined, it would create a community amenity to serve a similar function. The Library and the Cultural Center would create space for various recreation activities, classes, and celebratory events. It would be a safe place where keiki (children), kūpuna (elders), mākuā (parents), and 'ohana (families) from all walks of life and level of ability would be able to gather and partake in recreational activities that contribute toward the health and wellbeing of the local community as a whole.

Transportation

Goal

- (a) Provide residents with a variety of public transportation systems that are affordable, efficient, accessible, safe, environmentally friendly, and reliable.

Policies

- a. Improve the integration of transportation and land use planning in order to optimize the use, efficiency, and accessibility of existing and proposed mass transportation systems.
- b. Support and encourage the development of alternative modes of transportation, such as enhanced bus services and bicycle paths.
- (d) Provisions to enhance the mobility of minors, non-licensed adults, low-income, elderly, and people with disabilities shall be made.

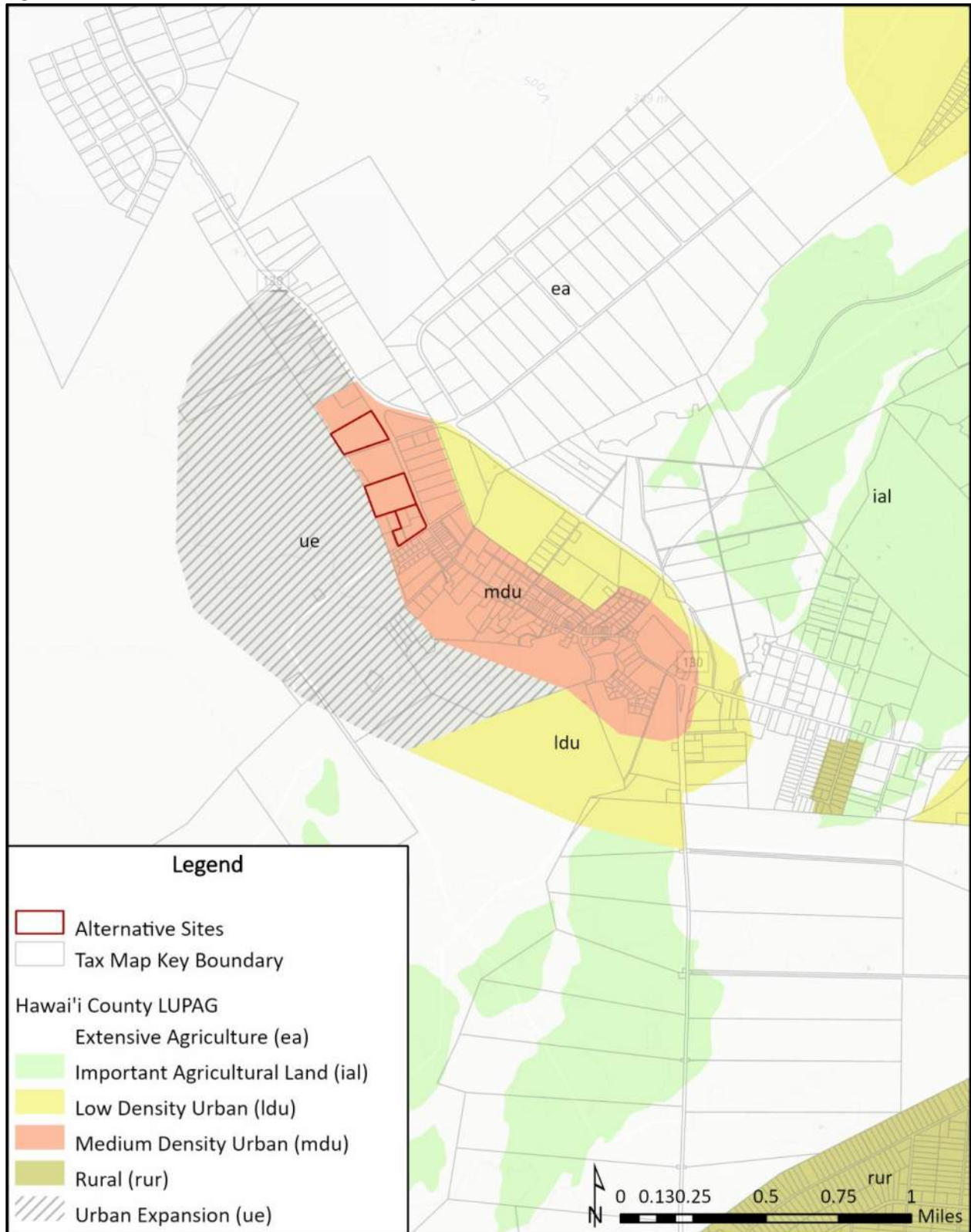
Discussion: Alternatives 1, 2, and 3 are intended to expand access to mass transit services for residents of Puna. It is incorporated with the Public Library and may include a Daycare Center, and Cultural Center (to be constructed by others) to cluster transit services with community gathering events and other amenities or services. This is intended to encourage other alternative forms of transportation such as bicycling and the regional town center walkability. The low-cost services and central location would ensure people from all ages, income levels, and levels of ability can conveniently utilize these public services.

4.2.2 Land Use Pattern Allocation Guide

The Land Use Pattern Allocation Guide (LUPAG) is part of the Hawai'i County General Plan. LUPAG is a land designation that guides the ideal location of various land uses for future developments.

As shown in **Figure 20**, Alternatives 1, 2, and 3 are all located in an area designated Medium Density Urban (mdu). The mdu LUPAG designation falls under the category of "village and neighborhood commercial" areas. The mdu designation is meant to delineate future urban centers/clusters that would "provide physical, social, governmental and economic concentrations so that the total activities of the community can be more readily and easily conducted." It further states that "The future improvement and development objectives are directed toward making urban and rural centers more efficient, livable, and safe. Growth should be encouraged in terms of renewing older areas or extending existing areas." Therefore, Alternatives 1, 2, and 3 would be consistent with the LUPAG designation.

Figure 20. Land Use Pattern Allocation Guide Designations

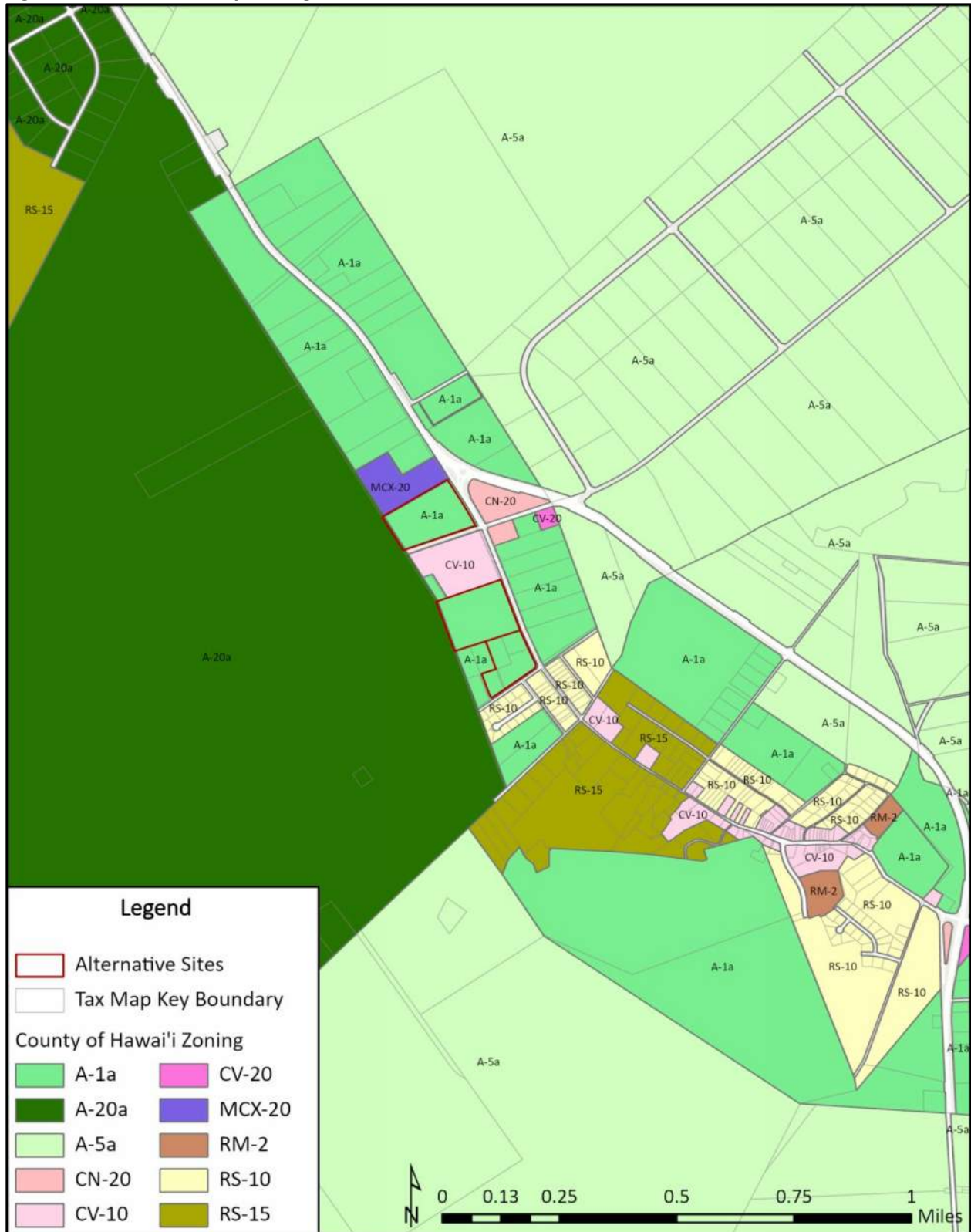


4.2.3 Hawai'i County Zoning Code

The County of Hawai'i did not have island-wide zoning until 1967. Prior to that, only Hilo and some other towns were zoned. Zoning is the main county land use control. All areas on the island, except for Federal lands like national parks and some areas in the conservation district, are zoned. The Zoning Code lists the permitted uses within each zone. Permitted uses are those that are allowed by right, without further Planning Department or Planning Commission approval.

The Hawai'i County Code Chapter 25, Zoning Code, defines permitted land uses within the State Land Use "Urban" and "Agricultural" districts. For each zoning district, the code defines required building setbacks, height limits, and other constraints. As shown in **Figure 21**, Alternatives 1, 2, and 3 are located in Zone A-1a. The agricultural district provides for agricultural and very low density agriculturally based residential use, encompassing rural areas of good to marginal agricultural and grazing land, forest land, game habitats, and areas where urbanization is not found to be appropriate. The primary use of the properties for community services and facilities is consistent with Hawai'i County Code Section 25-5-72(c)(4): "Community buildings, as permitted under section 25-4-11." Section 25-4-11(c) further states "Public uses, structures and buildings and community buildings are permitted uses in any district, provided that the [Planning] director has issued plan approval for such use." Therefore, Alternatives 1, 2, and 3 are consistent with the County of Hawai'i Zoning Code.

Figure 21. Hawai'i County Zoning



4.2.4 Puna Community Development Plan

CDPs were created by the 2005 Hawai'i County General Plan to “translate the broad General Plan statements to specific actions as they apply to specific geographical areas.” The Puna CDP, adopted in 2008 (as amended), has three overarching themes:

- **Mālama I Ka 'Āina** - establishes how the contextual natural, historic and cultural features of Puna should be preserved and respected. The goals, objectives and implementing actions under this theme address cultural and historic sites and districts; forest lands and unique geological features; scenic resources; and drainage, aquifers and coastal water quality.
- **Growth management** - addresses how the future pattern of human settlement and land use should be shaped to respect that context and support the desired quality of life for Puna's residents. The goals, objectives and implementing actions under this theme address the land use pattern; agricultural and economic development; public services, social services and housing; parks and recreation and renewable energy and energy efficiency.
- **Transportation** - focuses on sustainable approaches to transportation to support the goals of the two above themes. The goals, objectives and implementing actions under this theme address mass transit and alternative travel modes, travel demand management and roadway connectivity and safety.

Historic, Cultural and Scenic Resources

2.1.1 Goals:

- b. The design character and natural setting of older communities that are representative of Puna's historic development are perpetuated.

2.1.2 Objectives:

- b. Adopt appropriate location-specific development standards and design guidelines for buildings, landscape treatment and public infrastructure for communities designated for Special Design District status.

2.1.2 Actions:

- a. Propose Special Design Districts with detailed planning, design standards and review procedures for the following areas:
 1. Volcano Village historic core and the separate Biosphere Reserve Buffer Zone;
 2. Pāhoa Village;
 3. Kea'au Town; and
 4. Kurtistown-to-Mountain View corridor.

Discussion: Alternatives 1, 2, and 3 would be designed consistent with the Pāhoa Village Design Guidelines to ensure the facility maintains the community character and historic value of Pāhoa Village.

Managing Growth

3.1.1 Goals:

- 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.

3.1.2 Objectives:

- c. Enhance the role of existing and new village/town centers by allowing expanded commercial uses, facilitating the development of farmers markets and community gathering places, opportunities for special needs housing, and infrastructure to support more compact development form and multi-modal travel.
- e. Target investments in public services and infrastructure to promote the development of village/town centers and, secondarily, to serve the peripheral subdivision areas.
 1. Kea'au, Pāhoa, and Hawaiian Paradise Park shall serve as Regional Town Centers to provide a wide range of services for the Puna district;

The Puna CDP defines Regional Town Centers in *Table 5-1*:

- Service Area: 2,000 – 50,000 residents, more than 30 acres;
- Components: More than 40 tenant spaces for full range of retail and personal services, repair shops and other light industrial uses; regional park; schools (all grades); community hall, theater; outdoor events area; bed-and-breakfast homes and small inns; elderly or other special needs housing; transit hub; medical facility with emergency room; police and fire station; walking and bicycling paths.

3.1.3 Actions:

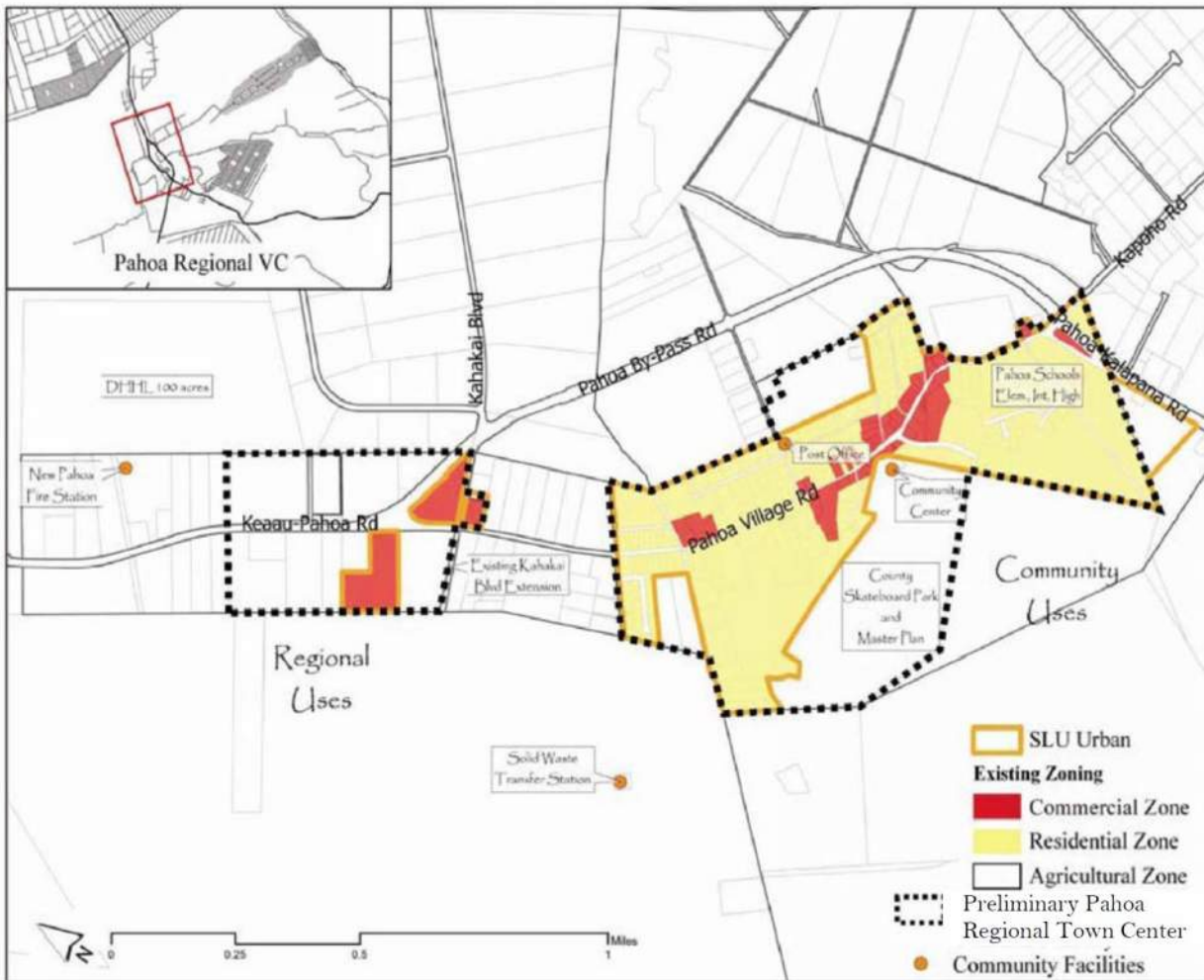
- b. Establish the following general classifications and locations for village and town centers in Puna:
 3. Kea'au, Pāhoa, and Hawaiian Paradise Park shall serve as Regional Town Centers to provide a wide range of services for the Puna district;

Discussion: Pāhoa Village was designated as a Regional Town Center in the Puna CDP, defined as quoted above to provide a broad variety of services to support needs of residents of Pāhoa and its surrounding neighborhoods. Alternatives 1, 2, and 3 would provide increased access to a broad variety of services, described in **1.4**.

The Puna CDP divides the Pāhoa Regional Town Center into two parts with the northern portion straddling Highway 130. This northern portion is intended to serve regional uses and services. This includes police, fire, ambulance, and a proposed transit hub. Alternative 1 would be located within this designated "Regional Use" area of the Pāhoa Village Center. Alternative 2 would be directly adjacent to this "Regional

Use” area, and Alternative 3 would be adjacent to the “Community Use” area of the Pāhoa Village Center, as shown in **Figure 22**.

Figure 22. Pāhoa Regional Town Center



Social Services and Housing

3.3.2 Objectives:

- g. Urge the State to locate its community facilities, such as public schools, in designated village/town centers, and to design them in conformance to the criteria applicable to the type of village/town center at that location.

Discussion: This Puna CDP objective specifically seeks to urge the State to locate community facilities within Village and Town centers. The co-location of the Hawai'i State Public Library meets this Puna CDP objective for Alternative 1. Alternatives 2 and 3 are located adjacent to the two Pāhoa Village Center areas. Alternatives 1, 2, and 3 would be designed consistent with the Pāhoa Village Design Guidelines to ensure the facility maintains the community character and historic value of Pāhoa Village.

Transportation

The Puna CDP recognizes that “It is difficult for the County’s Mass Transit Agency (MTA) to operate an efficient Hele-On Bus service that offers a viable travel option for a large number of Puna residents, especially those in more remote areas”

4.1.1 Goals:

- c. Reliance on fossil fuels for transportation is reduced.

4.1.2 Objectives:

- c. Provide more services and employment within Puna’s village and town centers.

Discussion: Alternatives 1, 2, and 3 would provide transportation services to a centralized area for increased convenience for community members. Doing so would reduce reliance on fossil fuels by providing reliable alternative transportation options. Alternatives 1, 2, and 3 would also meet the objective of providing more services and employment within Pāhoa Village.

Mass Transit

4.2.1 Goals:

- a. Mass transportation options are increased for all Puna residents.
- b. Transit service and improvements reinforce and complement the development of village/town centers.
- c. A greater percentage of commuters use mass transit.

4.2.2 Objectives:

- c. Provide park-and-ride lots at key regional sites to promote commuter ridership.
- e. Ensure that pedestrians can access bus stops safely.

4.2.3. Actions:

- c. Develop transit hubs at the following locations:
 - 3. Pāhoa (Secondary Hub): On County-owned sites, either adjacent to Pāhoa Community Center or on Highway 130 near Kahakai Boulevard where the new fire and police stations are planned;
- d. Provide park-and-ride lots at the transit hubs and within Hawaiian Paradise Park at one or two of the proposed village/town center sites, where the community-owned parcel could serve as a parking lot for commuters, as well as a location for farmers’ markets.

Discussion: The Puna CDP Mass Transit chapter goals, objectives, and actions, call for the development of transit hubs within village and town centers. Alternatives 1, 2, and 3 would implement this and further the goal to increase mass transit usage in general for the district. The design of the Pāhoa Transit Hub and Library includes park-and-ride as well as kiss-and-ride services, increased safety, and proximity to other useful services. The Puna CDP provides specific direction as to the location of a transit hub close in Pāhoa

close to Highway 130, referring to the development of a new fire and police station near Kahakai Boulevard. Alternative 1 would be located along Kahakai Boulevard just off of Highway 130, and Alternatives 2, and 3 would be within close proximity to that general location.

Non-Motorized Travel and Scenic Byways

4.5.1 Goals:

- d. Village/town centers incorporate walking and bicycling paths.

Discussion: While Alternatives 1, 2, and 3 would enhance pedestrian and bicycling facilities along project frontage and internal blocks to promote walking and biking in and around Pāhoa Village. The design would feature services and amenities such as bike storage and possible bike rentals that would further the use of active transportation options.

4.2.5 Kīlauea Recovery and Resilience Plan

The Kīlauea Recovery and Resilience Plan was drafted in response to the 2018 Kīlauea Eruption that resulted in the loss of over 700 structures, along with the agricultural and fishing grounds, and road access. The eruption exacerbated existing socioeconomic challenges in the Puna district by limiting affordable housing options, limiting opportunities for job growth and access to health and social services. The Kīlauea Recovery and Resilience Plan builds upon goals of the Puna community and strategizes on a plan for increased resiliency moving forward.

Project: Transit and Multi-Modal Transportation Master Plan

Recovery Priorities:

- Invest in infrastructure that supports mass transit systems within the Puna region.
- A safe, convenient, accessible, and affordable transportation system.
- Economic revitalization through greater access to jobs and services.

Description:

“Accessible, reliable and affordable public transportation was identified as a top connectivity issue and need for the Puna region during community engagement conducted through the Recovery process. Improvements to the mass transit system within the County of Hawai'i can assist in providing alternative methods of transportation to residents for access to jobs and services within Puna and other districts, creating greater economic opportunity.”

Desired Outcomes:

- Reliable mass transit-oriented system implemented with accessibility for the Puna communities.
- Improved transportation infrastructure to provide social benefits to residents and visitors which include transportation.
- Economic revitalization and financial security through increased access to jobs and services

Action Steps:

- Continued phased approach to establishing the full hub and spoke system recommended to serve Puna.

Discussion: Alternatives 1, 2, and 3 would implement objectives for the establishment of a hub and spoke transportation system in the Puna district. This increased accessibility to transit services would service communities in the Puna district through low-cost, safe, reliable, and convenient transportation options. Operation of the Pāhoa Transit Hub and library would help promote increased and diversified employment opportunities, and stimulate economic opportunity for local families. The lower Puna area does not have many active job centers and access to opportunity to support its growing population. Many families surrounding the Pāhoa area commute to Hilo for educational and employment access. Providing additional transit opportunities increases access to major employment centers to provide more job choices that improve the living standards of the surrounding population.

Project: Broadband Feasibility Study

Recovery Priorities:

- Internet service connectivity.
- Support economic empowerment and self-reliance.
- Diversity of job types and entrepreneurial opportunities.
- Improve access to quality health services.

Desired Outcomes:

- Reliable internet connection and telephone service for communities across Puna.
- Improved access to information, education, and training opportunities.
- Economic revitalization in Puna by promoting new industries and entrepreneurship locally.

Discussion: This priority project from the Kilauea Recovery Plan speaks mainly to a need to improve broadband infrastructure across the Puna district. While Alternatives 1, 2, and 3 would not directly implement broadband infrastructure development, the Pāhoa Public Library would improve access to internet services for the community, which would have numerous positive benefits to support access to services, career advancement, information, learning resources, and much more.

Project: Critical Infrastructure Needs Assessment

Recovery Priorities:

- A safe, convenient, accessible, and affordable transportation system.

Discussion: Alternatives 1, 2, and 3 would provide the necessary infrastructure to further safe, convenient, accessible and affordable transportation for Pāhoa Village.

4.2.6 County of Hawai'i Multi-Modal Transit Master Plan

The TMMP completed in August 2018 identified five (5) goals, including the following: “Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places.” The TMMP recommended a hub and spoke service design to ensure easy access to transit and other community services. This model centralizes these services in one spot to improve accessibility and cluster community amenities. This includes facilities such as shelter, restrooms, benches, and bicycle storage as well as safety improvements such as security and lighting.

The district-specific proposals in the TMMP were developed through a community engagement effort combined with population and employment projects for various areas of the County. An Environmental Justice analysis for the Puna area was conducted that identified a greater need for transit services in correspondence with disproportionately high minority populations and households below the poverty line in the district. More details on socioeconomic impacts and need for the area surrounding Pāhoa may be found in **Section 3.6**.

The inclusion of a transit hub in Pāhoa is noted by the TMMP which recognizes Pāhoa as a vital Town Center providing services to numerous surrounding communities. The plan recognizes key retail and business spaces like the Puna Kai Shopping Center, as well as nearby shopping centers such as the Pāhoa Marketplace and the commercial center at the intersection of Pāhoa Bypass Road and Pāhoa Village Road. These developments create a major commercial area, emphasizing the need for accessible and equitable transit options across the district.

Goal One: Make riding transit easier, reliable, and compatible with other multi-modal options.

Strategy Two: Provide for the needs of island residents whose disability limits their mobility. Allow disabled persons to have mobility options so they can lead full productive lives participating in the community.

Discussion: Alternatives 1, 2, and 3 would be designed to Americans with Disabilities Act (ADA) standards and would provide services to the public without discrimination. Providing affordable and reliable transportation options to the public allows for people of all walks of life, age, or level of ability utilize the services as suits their needs.

Goal Two: Create a transit system to serve the employment and social needs of all people.

Strategy Eight: Provide bike lockers at hubs and racks on all buses.

Discussion: Alternatives 1, 2, and 3 would increase transportation options for the community allowing for ease of access to job centers and services. A wide variety of transportation options accommodate residents with various preferences or necessities for commuting such as the installation of bike lockers at the Pāhoa Transit Hub. This allows users to switch travel modes with comfort and ease, knowing their bike is safely stored for their return.

Goal Four: Create transit hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering.

Strategy Three: Acquire the land for the hub in Pāhoa, plan for the design and construction. Plan the design of the Kea'au satellite hub and park & ride.

Strategy Six: Enter into partnerships with others to provide hub features and shelters.

Discussion: Alternatives 1, 2 and 3 would design the Transit Hub within a cluster of additional services and amenities. The co-location of the Pāhoa Library is an example of utilization of cross-government partnerships for the purpose of increasing the quality of the community space.

5.4.1 Hubs and Transit Centers

Recommended Hubs for Hawai'i County: Pāhoa - "The permanent Pāhoa Hub would be located near the new Puna Kai development and would require more passenger amenities including electronic signage, bike parking, fare machines, restroom."

Discussion: The TMMP recommends the implementation of a transit hub in Pāhoa, located near the Puna Kai shopping center. Alternatives 1, 2, and 3 would all meet this objective.

4.2.7 Special Management Area

The Special Management Area (SMA) is the area of the island that is in close proximity to the shoreline. The SMA permit was established in 1975 with the enactment of Act 176, Shoreline Protection Act. Pursuant to HRS Chapter 205A, all State and County agencies shall enforce the CZM objectives and policies defined in HRS Section 205A-2 (see **Section 4.1.3**). The County of Hawai'i Planning Department administers SMA permits for the island of Hawai'i.

Alternatives 1, 2, and 3 are inland, away from shoreline, and are not located within the SMA.

5.0 Findings and Conclusions

5.1 Significance Criteria

HAR Chapter 11-200.1 provides significance criteria for which all projects in Hawai'i are assessed. These significance criteria and their relationship to Alternatives 1, 2, and 3 are as follows:

(1) Irrevocably commit a natural, cultural, or historic resource.

Alternatives 1, 2, and 3 would not irrevocably commit a natural, cultural, or historic resource. An Archaeological Literature Review and Field Inspection was completed for the Alternatives 1, 2, and 3 in June 2023 by ASM Affiliates, Inc. This study, which is included in **Appendix C**, was conducted in order to provide MTA with information regarding the general nature, density, and distribution of archaeological and historic resources that may be expected in the location of Alternatives 1, 2, and 3. The study provided recommendations and guidance on future historic preservation work to support the agency in complying with the applicable State laws and any future County of Hawai'i development permitting that may be required.

The presence of archaeological features on Alternatives 1, 2, and 3 are not anticipated due to the lack of archaeological resources identified by previously conducted AIS in the surrounding area. An AIS would be conducted of the selected Alternative with SHPD review and acceptance prior to any ground-breaking activity.

The Alternative 1 parcel currently contains two three-bedroom agricultural dwellings, one built in 1959 and the other in 1955. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

Alternative 3 is made up of four parcels which collectively contain a four-bedroom agricultural dwelling built in 1970 and a two-bedroom agricultural dwelling built in 1968. MTA would complete consultation under HRS Chapter 6E-8 to ensure due process to minimize potential impacts.

(2) Curtail the range of beneficial uses of the environment.

Alternatives 1, 2, and 3 would provide public services and amenities within or adjacent to an existing busy commercial center. The development of the Pāhoa Transit Hub and Library would be consistent with future growth plans for the area and would not provide a significant negative environmental impact.

(3) Conflict with the State's environmental policies or long-term environmental goals established by law.

HRS Chapter 344 states that "It shall be the policy of the State, through its programs, authorities, and resources to:

- (1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which

humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai'i.

- (2) Enhance the quality of life by:
- (A) Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;
 - (B) Creating opportunities for the residents of Hawai'i to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;
 - (C) Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and
 - (D) Establishing a commitment on the part of each person to protect and enhance Hawai'i's environment and reduce the drain on nonrenewable resources."

As discussed in **Section 3.0**, Alternative 1, 2, or 3 would have short-term and temporary impacts during construction that would be less than significant to water resources, biological resources, archaeological and historic resources, cultural practices and beliefs, geology and soils, traffic and transportation, air quality, the existing noise environment, and public facilities and services. BMPs and other measures would be implemented to minimize impacts, as applicable.

(4) Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community or State.

Alternative 1, 2, or 3 would have beneficial socioeconomic impacts by providing additional resources and services to the surrounding community. It would provide transportation services that could further sustainability goals of low-carbon transportation and reduced traffic congestion. Alternative 1, 2, or 3 would be designed consistent with the Pāhoa Village Design Guidelines to ensure the facility maintains the community character of Pāhoa Village. This may include the incorporation of green spaces and landscaping to enhance the visual appeal of the facility to create a welcoming atmosphere for residents. Alternative 1, 2, or 3 would further State natural resource conservation goals by contributing to condensed development patterns while providing access to needed services for the surrounding community. The facility could be used as a shelter, place of respite or support facility during and/or following natural and man-made emergencies.

Alternative 1, 2, or 3 would result in temporary, positive economic activity in the form of construction jobs and material procurements.

A CIA was completed for Alternatives 1, 2, and 3 in August 2023 by ASM Affiliates, Inc. The findings of the culture-historical background information revealed limited information regarding the identification of valued cultural or natural resources and traditional customary practices specific to the project area.

The two consulting parties interviewed as part of the CIA expressed a mixture of support and concern for potential impacts of the transit hub and library. Support for the project included the benefit of creating connections to existing developments and supporting increased community services. Parcel-specific cultural impacts were not identified that would stem from known socio-historic resources on the land.

However, a concern was expressed as to possible impacts on the Puna cave system that may extend below the alternative project sites. Alternative 3 in particular was identified to contain a cave entrance on the makai (ocean side) of the corner property. In addition, a concern was noted regarding the potential for these increased services to bring more people to the area, exacerbating existing issues of littering and homelessness. This feedback is noted and an AIS would be conducted on the chosen project site prior to any ground-breaking activity to appropriately minimize possible impacts to cultural and historical resources.

(5) Have a substantial adverse effect on public health.

Construction of Alternative 1, 2, or 3 would have some temporary, short-term, minor impacts to water resources, air quality, and the existing noise environment. However, these impacts would be minimized through the implementation of BMPs and other measures, as applicable, and would not affect public health. Conversely, Alternatives 1, 2, and 3 would have tremendous positive impacts on the community's collective, as well as individuals', health and wellbeing through the services these improvements would provide.

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities.

Alternative 1, 2, or 3 would propose land use that is complementary to nearby and adjacent shopping centers. The improvements would support existing projections of future growth in the area and provide needed public services and facilities to the surrounding community.

(7) Involve a substantial degradation of environmental quality.

As discussed in **Section 3.0**, Alternative 1, 2, or 3 would have short-term and temporary impacts during construction that would be less than significant to water resources, biological resources, archaeological and historic resources, cultural practices and beliefs, geology and soils, traffic and transportation, air quality, the existing noise environment, and public facilities and services. BMPs and other measures would be implemented to minimize impacts, as applicable.

(8) Is individually limited but cumulatively has a considerable effect upon the environment or involves a commitment for larger actions.

There are two major planning projects in the vicinity of Alternatives 1, 2, and 3. Hawai'i County is currently taking preliminary actions to plan for future wastewater improvements for the Puna District. The Puna Wastewater Programmatic Environmental Impact Statement was recently released and details the need to establish wastewater collection, treatment, and disposal infrastructure and services to major town centers in Puna. The alternatives for this project include decentralized systems, subregional wastewater treatment plants, or one regional wastewater treatment plant. Construction of the Pāhoa Transit Hub and Library is not expected to have significant adverse impacts to this infrastructure effort. The Pāhoa Village Master Plan is also anticipated to be developed in the future and would strive to further the vision of a compact and walkable Pāhoa Village Center. The Pāhoa Transit Hub and Library intends to further this effort by encouraging walkable development in appropriate areas through increasing nearby services and promoting transit and active transportation.

Amidst these developments, the planning process for Alternatives 1, 2, and 3 acknowledge the potential of unavoidable impacts, particularly those associated with growth induction in the area. The project is proposed with the consideration that the benefits conferred by the development of a transit hub and public library in Pāhoa would counteract these challenges in terms of enhanced transit accessibility and creation of community spaces. By enhancing connectivity, supporting sustainable transportation, and aligning with regional planning objectives, the Pāhoa Transit Hub and Library positions itself as part of a broader effort to introduce services to support a more resilient and cohesive community.

(9) Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.

No threatened or endangered plant species as listed by the U.S. Fish and Wildlife Service (USFWS) were identified, nor are there uniquely valuable habitats. No existing or proposed federally designated critical plant habitat is present on or near the project site.

There is not suitable habitat for the threatened Hawaiian goose or nēnē (*Branta sandwicensis*) and various endangered waterbirds.

The Pacific golden-plover or kolea (*Pluvialis fulva*) is protected under the Migratory Bird Treaty Act. Although not identified during the biological survey, it is estimated to be the only species of shorebird likely to be seen within the vicinity of Alternatives 1, 2, and 3.

Several listed seabirds may overfly the Hilo area between the months of May and November, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). These seabirds hunt over the ocean during the day and fly to higher elevations at night to nest. Nocturnally flying seabirds, especially fledglings on the way to the sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and become easy targets of predatory mammals including cats and mongooses.

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is found throughout most areas on the island of Hawai'i. Bats may forage for flying insects in the area on a seasonal basis and may roost in trees and large shrubs. Although not identified during the biological survey, it is likely that Hawaiian hoary bats may sometimes be present on the project site and adjacent properties.

Per May 24, 2024 comments received by the Department of Land and Natural Resources (DLNR) Division of Forestry and Wildlife, Hawaiian short-eared owl or pueo (*Asio flammeus sandwichensis*) could potentially nest in the project areas for Alternatives 1, 2, and 3.

(10) Have a substantial adverse effect on air and water quality or ambient noise levels.

Air pollutant emissions from construction activities would include dust or particulate matter and exhaust fumes from vehicular travel to and from the project site and from equipment operations. Potential impacts would be short-term and temporary and would be minimized through the implementation of BMPs and other measures.

There would be no direct impacts to surface waters from Alternatives 1, 2, or 3. Construction activities may produce sediment from soil erosion during and after excavation. In addition, contaminants associated

with equipment during construction may percolate into groundwater. With the implementation of BMPs, potential indirect impacts to water resources during the short-term construction period would be less than significant.

Alternative 1, 2, or 3 would result in a short-term increase in noise levels during construction activities. Noise generated from short-term construction activities and the use of machinery would be minimized by requiring contractors to adhere to State and County noise regulations, including HRS Chapter 342F, Noise Pollution, and HAR Chapter 11-46, Community Noise Control.

(11) 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 site is not located in an environmentally sensitive area and therefore would not have a substantial adverse effect on or likely to be damaged by related causes.

Construction of Alternative 1, 2, or 3 would not create conditions that would exacerbate natural hazards. The County of Hawai'i Civil Defense directs and coordinates the County's emergency preparedness and response program to ensure prompt and effective action when natural or man-caused disaster threatens or occurs anywhere in the County of Hawai'i. Construction personnel would respond to any emergency messages or alerts, as appropriate, to ensure their safety during construction.

The facility would be designed using the International Building Code, 2018 Edition (IBC, 2018) to ensure it can withstand potential impacts from natural hazards. It could be used as a shelter, place of respite, or support facility during and/or following natural and man-made emergencies.

Alternatives 1, 2, and 3 would include drainage improvements to minimize water run off. Each alternative site is located in Flood Zone X or determined to be outside the 500-year floodplain. Therefore, Alternatives 1, 2, and 3 are not anticipated to have any significant negative impact associated with flooding.

(12) Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.

Development of the Pāhoa Transit Hub and Library would not significantly impact area views. The Pāhoa Transit Hub and Public Library would be low rise and would not have a significant impact on the surrounding areas. The Puna Community Development Plan identifies Pāhoa Village as a Town Center and a historic resource. The building and landscaping improvements would be consistent with the Pāhoa Village Design Guidelines. None of the Alternative Sites are located on a scenic corridor.

(13) Requires substantial energy consumption or emit substantial greenhouse gases.

Alternatives 1, 2, and 3 would result in increased energy consumption during the construction and operation stages. HELCO would continue to provide electrical service to the site. Lighting for parking areas and walkways would be provided as per all applicable regulations.

GHG emissions may be reasonably minimized by the increased use of public transit, reducing the number of cars on the road and associated traffic congestion. The MTA also anticipates that carbon offsets would

occur with increased use of bus transit, of which the agency continues to explore electric and hydrogen power alternatives for the County bus fleet. It is also logical to consider that the demand for and access to programs, services and amenities would increase regardless of this project, and would be developed elsewhere potentially causing the same or more GHG emissions, depending on length of travel required.

5.2 Finding of No Significant Impact

Based on the significance criteria set forth in HAR Chapter 11-200.1 and discussed in **Section 5.1**, MTA and the HSPLS have determined that the Proposed Action would not have any significant adverse environmental impacts and that an Environmental Impact Statement is not required for the project. MTA and HSPLS have determined that a Finding of No Significant Impact is appropriate for the Pāhoa Transit Hub and Library project.

6.0 Agency and Public Consultation

6.1 Pre-Assessment Consultation

Table 21 identifies the State and County agencies and elected officials consulted prior to the preparation of the Draft Environmental Assessment, as well as whether a comment was received. All comments received and responses are included in **Appendix G**. In addition, letters were sent to all landowners in the vicinity of the project site.

Table 21. Pre-Assessment Consultation Comments

Agency	Pre-Assessment Consultation Comment Received
State of Hawai'i Agencies	
State of Hawai'i Department of Accounting and General Services	X
State of Hawai'i Department of Business, Economic Development & Tourism	
Hawai'i State Department of Education	X
Office of Hawaiian Affairs	
State of Hawai'i Department of Hawaiian Home Lands	
State of Hawai'i Department of Health – Clean Air Branch	
State of Hawai'i Department of Health – Clean Water Branch	
State of Hawai'i Department of Health – Safe Drinking Water Branch	
State of Hawai'i Department of Health – Solid and Hazardous Waste Branch	
State of Hawai'i Department of Health – Wastewater Branch	X
State of Hawai'i Department of Health – Indoor and Radiological Health Branch	
State of Hawai'i Department of Land and Natural Resources – Land Division	X
State of Hawai'i Department of Land and Natural Resources – Engineering Division	X
State of Hawai'i Department of Transportation – Highways Division	X
State of Hawai'i Office of Planning and Sustainable Development	X
County of Hawai'i Departments	
County of Hawai'i Department of Environmental Management	
County of Hawai'i Fire Department	
County of Hawai'i Department of Parks & Recreation	
County of Hawai'i Planning Department	
County of Hawai'i Police Department	X
County of Hawai'i Department of Public Works	
County of Hawai'i Department of Water Supply	X
Elected Officials	
Senator Joy San Buenaventura, District 2	
Senator Dru Mamo Kanuha, District 3	
Senator Tim Richards III, District 4	
Senator Lorraine Inouye, District 1	

Agency	Pre-Assessment Consultation Comment Received
Representative Greggor Ilagan, District 4	
Representative Chris Todd, District 3	
Representative Kirstin Kahaloa, District 6	
Representative Jeanne Kapela, District 5	
Representative Nicole Lowen, District 7	
Representative Mark Nakashima, District 1	
Representative Richard H. K. Onishi, District 2	
Representative David Tarnas, District 8	
Councilmember Ashley Kierkiewicz, District 4	
Councilmember Matt Kaneali'i-Kleinfelder, District 5	
Councilmember Heather Kimball, District 1	
Councilmember Jenn Kagiwada, District 2	
Councilmember Sue L.K. Lee Loy, District 3	
Councilmember Michelle Galimba, District 6	
Councilmember Rebecca Villegas, District 7	
Councilmember Holeka Goro Inaba, District 8	
Councilmember Cindy Evans, District 9	
Mr. Lee Lord, Managing Director	

6.2 Community Outreach

6.2.1 Communications and Outreach Materials

A thorough communication and outreach program was conducted to engage a wide range of community members, aiming to furnish them with information about the project and gather their input. Maintaining the public's awareness during the site selection and Environmental Assessment processes was of utmost importance. This objective was achieved through a diverse array of approaches, including, but not restricted to, establishing a project website, utilizing email correspondence, distributing informative flyers to local establishments and schools, making announcements in community calendars and newsletters, and setting up an exhibit at the existing Pāhoa Library. These measures offered ample opportunities for individuals to share their comments and feedback.

6.2.2 Community Events

In addition to the previously described communications and outreach materials, the community outreach approach included a combination of pop-up events and community meetings to effectively engage a wide spectrum of the community. Pop-up events took place throughout the site selection process. Community meetings were conducted during the site selection phase with more planned to follow the release of the Draft Environmental Assessment. Feedback, comments, and other input gathered through the community outreach endeavors were systematically compiled and shared with the project team at various stages of

the process. This information played a significant role in guiding the site selection process. Furthermore, this input was incorporated into the Site Selection Report and Draft Environmental Assessment.

Pop-up Events

One pop-up event was conducted at Maku'u Farmer's Market. The pop-up booth featured informative and interactive displays, as well as distributed handouts and comment cards.

Community Meetings

Two community meetings were conducted for the project. The initial community meeting took place during the site selection process, concentrating on discussions about pertinent issues and considerations to aid in the site selection procedure.

On April 17, 2024, the second community meeting for the Pāhoa Transit Hub was hosted at the Pāhoa Neighborhood Center. The project team presented the findings of the Draft EA, explained the environmental review process, and invited questions and discussion on the potential impacts of the project. Attendees received copies of the agenda, a project fact sheet, and instructions on how to access the Draft EA online and provide comments to the project team. The front table at the meeting also hosted two copies of the EA for reference along with comment forms to enable the community to share their feedback on both the project and the meeting itself. The project team shared a presentation, received questions and mana'o from the attendees, and answered inquiries.

Summary reports for both public meetings are included in **Appendix H**.

6.3 Public Review of Draft Environmental Assessment

On March 23, 2024, the MTA and HSPLS published the Draft Environmental Assessment for the Pāhoa Transit Hub and Library Project. As part of the environmental review process, agencies and the public were invited to provide comments on the draft that would be incorporated into the Final Environmental Assessment for the project. A total of 7 comments were received during the public comment period, which ended on May 1, 2024. All comments received and responses to those comments are provided in **Appendix I**.

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Appendix A

Site Suitability Analysis

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Site Suitability Analysis

SITE NUMBER	SITE NAME	TMK	PARCEL SIZE (Acres)	TOTAL AREA (Acres)	SIZE/ CONFIGURATION/EASE OF ACQUISITION (Weighted Factor = 5)	CRITERIA										TOTAL COST (Weighted Factor = 2)	SCORE	RANK									
						Score	Score * Weighted Factor	LOCATION/VISIBILITY (Weighted Factor = 4)	Score	Score * Weighted Factor	INFRASTRUCTURE (Weighted Factor = 3)	Score	Score * Weighted Factor	VEHICLE ACCESS (Weighted Factor = 4)	Score				Score * Weighted Factor	PEDESTRIAN & BICYCLE ACCESS (Weighted Factor = 4)	Score	Score * Weighted Factor	VOLCANIC HAZARD RISKS (Weighted Factor = 2)	Score	Score * Weighted Factor		
2	Between Malama Market & PKSC	1-5-007:007	9.572	9.572	<ul style="list-style-type: none"> Large parcel Good shape Single parcel with cooperative owner 	5	25	<ul style="list-style-type: none"> Close proximity to commercial points of interest Very Good street frontage 	4	16	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Corner site Access on Pahoia Village Road and Kahakali Boulevard 	4	16	<ul style="list-style-type: none"> Wide asphalt shoulder but no raised sidewalk 	3	12	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site partially cleared 	2	4	86	1
8	Abraham	1-5-007:005	10.000	10.000	<ul style="list-style-type: none"> Large parcel Good shape Single parcel 	5	25	<ul style="list-style-type: none"> Close proximity to commercial points of interest Good street frontage 	4	16	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Large street frontage for multiple vehicle access 	4	16	<ul style="list-style-type: none"> Poor pedestrian connectivity; narrow asphalt shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site will need to be cleared 	2	4	78	2
9	Apaa Road	1-5-007:076 1-5-007:004 1-5-007:082 1-5-007:083	1.101 2.164 1.374 1.002	5.641	<ul style="list-style-type: none"> Good parcel size No room for expansion since parcel size just meets basic minimum footprint Requires acquisition of multiple parcels 	3	15	<ul style="list-style-type: none"> Somewhat close proximity to commercial points of interest Good street frontage 	3	12	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Corner site Access on Pahoia Village Road and Apaa Street 	4	16	<ul style="list-style-type: none"> Wide asphalt shoulder but no raised sidewalk 	3	12	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Potential increase in acquisition costs due to existing structures on-site Site mostly cleared 	1	2	70	3
11	Julian & Good Shepherd Foundation	1-5-007:072 1-5-007:023	3.338 5.600	8.938	<ul style="list-style-type: none"> Large combined parcel size Good shape Requires acquisition of multiple parcels 	4	20	<ul style="list-style-type: none"> Somewhat close proximity to commercial points of interest Somewhat good street frontage 	3	12	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Large street frontage for multiple vehicle access 	4	16	<ul style="list-style-type: none"> Poor pedestrian connectivity; narrow asphalt shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site will need to be cleared 	2	4	69	4
4	Akebono Theatre	1-5-012:069 1-5-002:026 1-5-002:024	0.383 0.622 2.365	3.370	<ul style="list-style-type: none"> Total area less than basic minimum footprint Parcels have odd configuration; might offer less than ideal flow/circulation Requires acquisition of multiple parcels 	1	5	<ul style="list-style-type: none"> Close proximity to Pahoia Town points of interest Good street frontage 	3	12	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Corner site Access on Pahoia Village Road and Kahuale Street 	4	16	<ul style="list-style-type: none"> Good pedestrian connectivity; existing sidewalks 	4	16	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Significant land costs due to previous development Existing infrastructure might be adequate Site already cleared 	2	4	66	5
10	Miyatake & Tsubota	1-5-007:059 1-5-007:054	3.213 3.184	6.397	<ul style="list-style-type: none"> Good parcel size Minimal room for expansion since parcel size just meets basic minimum footprint Requires acquisition of multiple parcels 	3	15	<ul style="list-style-type: none"> Close proximity to points of interest Somewhat good street frontage 	4	16	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Short street frontage; limited vehicle access potential 	3	12	<ul style="list-style-type: none"> Poor pedestrian connectivity; narrow asphalt shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Potential increased acquisition costs due to existing structures on-site Site half cleared 	1	2	62	6
12	Santo, Lee & Sugimoto	1-5-013:013 1-5-013:014 1-5-013:015	1.250 3.047 1.310	5.607	<ul style="list-style-type: none"> Parcel size just meets basic minimum footprint Parcels have odd configuration; might offer less than ideal flow/circulation Requires acquisition of multiple parcels 	2	10	<ul style="list-style-type: none"> Not in close proximity to points of interest Somewhat good street frontage 	2	8	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Large street frontage for multiple vehicle access 	4	16	<ul style="list-style-type: none"> Poor pedestrian connectivity; narrow asphalt shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 Site partially covered by 2014 lava flow and in line of steepest descent 	1	2	<ul style="list-style-type: none"> Potential increased land costs due to existing structures on-site Site mostly cleared 	1	2	51	7
13	Across Post Office Road	1-5-013:030 1-5-013:023 1-5-013:024 1-5-013:029 1-5-013:032 1-5-013:034	0.860 0.279 0.606 0.685 0.984 2.259	5.673	<ul style="list-style-type: none"> Parcel size just meets basic minimum footprint Parcels have odd configuration; might offer less than ideal flow/circulation Requires acquisition of multiple parcels 	2	10	<ul style="list-style-type: none"> Somewhat close proximity to Pahoia Town points of interest Limited street frontage 	2	8	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Short street frontage; limited vehicle access potential 	3	12	<ul style="list-style-type: none"> Poor pedestrian connectivity; road has no shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Potential increased land costs due to existing structures on-site Site mostly cleared Site length means large elevation difference so potential for high cost site work 	1	2	49	8
5	Pahoia District Park	1-5-002:020	71.121	71.121	<ul style="list-style-type: none"> Large parcel Large area for transit hub County owned 	4	20	<ul style="list-style-type: none"> Only in close proximity to park uses Poor visibility and street frontage 	1	4	<ul style="list-style-type: none"> Existing infrastructure to park; however, would need to bring in infrastructure from main road 	2	6	<ul style="list-style-type: none"> Access would have to be shared with Park Users Long driveway, not on main road 	1	4	<ul style="list-style-type: none"> Access would have to be shared with Park Users Due to long driveway, pedestrian and bicycle access is poor 	2	8	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Potentially low land costs due to County agency ownership High costs to bring infrastructure to potential site Site for transit hub would need to be cleared/grubbed 	1	2	48	9
7	Post Office Road	1-5-013:022 1-5-013:031 1-5-013:023 1-5-013:030	0.123 1.031 0.279 0.860	2.293	<ul style="list-style-type: none"> Total area less than basic minimum footprint Parcels have odd configuration; might offer less than ideal flow/circulation Requires acquisition of multiple parcels 	1	5	<ul style="list-style-type: none"> Somewhat close proximity to Pahoia Town points of interest Limited street frontage 	2	8	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Short street frontage; limited vehicle access potential 	3	12	<ul style="list-style-type: none"> Poor pedestrian connectivity; road has no shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site is mostly cleared 	2	4	46	10

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Appendix B

Biological Survey Report

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***Biological Survey of Pāhoa Transit Hub Alternative Sites
TMKs (3) 1-5-7: 004-007, 076, 082-083
Puna District, Island of Hawai‘i***

By Ron Terry, Ph.D.
Geometrician Associates, LLC
June 2023

Introduction

This biological survey concerns three sites located on Pāhoa Village Road in the Lower Puna area of the Island of Hawai‘i. Each is being considered by the County of Hawai‘i as alternative sites for a regional Transit Hub (Figure 1). Alternatives 1 and 2 each consist of a single property, while Alternative 3 comprises four separate properties. In order to conduct this development activity responsibly, the County of Hawai‘i committed to identify the location of any sensitive species or habitat, ascertain the potential for biological impacts, and develop mitigation measures to avoid or reduce impacts to minimal levels.

The properties were surveyed by Ron Terry on June 20 and July 4, 2023 after documentary research based on a prior survey of an adjacent area (Geometrician 2019). The objectives of the botanical survey component of the survey were to: 1) describe the vegetation; 2) list all species encountered; and 3) identify the locations of any individual plants of rare, threatened or endangered species. Plant species were identified in the field and, as necessary, collected and keyed out in the laboratory. The faunal portion of the survey consisted of visual/auditory faunal surveys both during and apart from the botanical survey that covered birds and introduced mammals, reptiles, or amphibians, as well as habitat assessment. Although no Hawaiian hoary bat surveys were undertaken, the general value of the habitat for the bat was evaluated. Not included in the survey was systematic invertebrate survey. At the time of the survey, right of entry had not been obtained for Alternative 2 and two of the properties of Alternative 3; these properties were observed from the boundaries.

Vegetation Type and Influences

The properties are located on the flank of Kīlauea, an active volcano. The surface consists of lava flows of the Puna Basalt series of 200 to 750 years in age, originating from the summit of Kīlauea (Wolfe and Morris 1996). The soil on the properties is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) (1973) as pahoehoe Lava Flows (rLW). This inland area contains no lakes, ponds or intermittent or permanent streams. The average maximum daily temperature in Pāhoa is approximately 79 degrees F., with an average minimum of 65 degrees. Annual rainfall averages about 135 inches (U.H. Hilo-Geography 1998:57; Giambelluca et al. 2013).

The natural vegetation of similarly aged lava flows in this part of the Puna lowland rain forest is dominated by ‘ōhi‘a (*Metrosideros polymorpha*) and uluhe (*Dicranopteris*

linearis) (Gagne and Cuddihy 1990). In many places, these original communities have been destroyed or heavily degraded by low-density residential development, farming and cattle grazing, infrastructure, quarries and small urban centers. Consultation of historic U.S. Geological Survey and U.S. Department of Agriculture airphotos and maps indicate that the properties under study were mostly native forest until at least the 1960s. The lack of suitable soil spared them from sugar cane cultivation, but they would certainly have been logged for large trees if any were present. After 1960, portions of each alternative site began to undergo disturbance for homes, quarries or commercial uses.

Findings: Vegetation

The majority of the surface of the 9.57-acre property for Alternative 1 has been disturbed. The southern two-thirds has been mostly graded and/or consists of bulldozer push piles that form large berms. In these dynamically changing areas elephant grass (*Cenchrus purpureus*) and albizia (*Falcataria moluccana*) currently dominate. A large variety of weedy, “trash trees” and alien shrubs are also present, including strawberry guava (*Psidium cattleianum*), macaranga (*Macaranga tanarius* and *M. mappa*), gunpowder tree (*Trema orientalis*), cecropia (*Cecropia obtusifolia*), rattlepod (*Crotalaria* spp.), Asian melastome (*Melastoma candidum*) and autograph tree (*Clusia rosea*). The understory consists of saplings, vines such as pilau maile (*Paederia foetida*) and little bell (*Ipomoea triloba*), Koster’s curse (*Clidemia hirta*), and various grasses, herbs and ferns, all non-native except the sedge pycneus (*Cyperus polystachyos*). A strip on the far north edge appears to never have been graded. It has a heavily invaded native forest of ‘ōhi‘a and uluhe, with some native ‘uki sedge (*Machaerina mariscoides*) as well. Even here, though, non-natives such as Asian melastome actually dominate. A disturbed strip between the somewhat recently bulldozed areas on the south and the disturbed ‘ōhi‘a forest on the north is slightly more open in the sub-canopy layer, with a higher proportion of ferns including laua‘e (*Phymatosorus grossus*), hare’s foot (*Phlebodium aureum*) and the one native fern present, pakahakaha (*Lepisorus thunbergianus*); bamboo orchid (*Arundina graminifolia*) and Philippine ground orchid (*Spathoglottis plicata*); and other plants not seen much elsewhere on the lot including honohono (*Commelina diffusa*). Photographs of the Alternative 1 site are provided in Figures 2a-d.

From what could be seen of the 10-acre Alternative 2, it is similar to the less disturbed portions of Alternative 1, with only the northwest corner where a home is located showing any signs of recent clearing. The same species observed in Alternative 2 are likely present, as well as a few additional ones, notably including mango (*Mangifera indica*), avocado (*Persea americana*), *Podocarpus* sp., and Chinese banyan (*Ficus microcarpa*), all associated with the home. Very little of the property was visible from the borders, and there may be additional native species present. Photographs of the Alternative 2 site are provided in Figures 2e-g.

Although I did not have right of entry to two of the four properties comprising the 5.63-acre Alternative 3, it was largely visible from adjacent roads and properties. It has the longest history of disturbance (airphotos from 1965 show it as fully cleared). Where not occupied by homes and yards, the vegetation consists of elephant grass, guinea grass, bushy bluestem (*Andropogon glomeratus*), macaranga, albizia and toon (*Toonia ciliata*). Photographs of the Alternative 3 site are provided in Figures 2g-j.

Findings: Flora and Rare, Threatened or Endangered Species

Table 1 is a list of plant species detected. Of the 87 species, 88 are native, with 6 being indigenous (native to Hawai‘i and elsewhere) and two endemic (native only to Hawai‘i). Several Polynesian-introduced species are present as well. Of the two endemics, ōhi‘a and hapu‘u, the latter is found only in landscaping (at least in the areas that were able to be observed). All natives are very common on the Big Island and elsewhere in Hawai‘i. No listed, candidate or proposed endangered plant species (USFWS 2023) were found during the survey in either area. No existing or proposed federally designated critical habitat for plants (or animals) is present on or near the properties. In terms of conservation value, no botanical resources requiring special protection are present, although it is recognized that the ‘ōhi‘a forest, despite its moderate to heavy degradation, has intrinsic conservation value.

Findings: Fauna

The survey involved listening and watching for birds. The observed bird fauna was entirely non-native and including a number of Japanese white-eyes (*Zosterops japonicus*) as well as common mynas (*Acridotheres tristis*), northern cardinals (*Cardinalis cardinalis*), spotted doves (*Spilopelia chinensis*), house finches (*Haemorhous mexicanus*), yellow-billed cardinals (*Paroaria capitata*), yellow-fronted canaries (*Serinus mozambicus*), saffron finches (*Sicalis flaveola*), striped doves (*Geopelia striata*), and chickens (*Gallus gallus*). Additional observations at different seasons and times of the day would undoubtedly reveal more bird species, with nearly all likely to be non-native.

The area is generally poor habitat for native forest birds due to the low elevation, mostly non-native vegetation, and intrusive, ongoing human activities. Two native forest birds, the Hawaiian hawk (*Buteo solitarius*) and the Hawai‘i ‘amakihi (*Chlorodrepanis virens virens*), could occasionally be present.

Although not seen during the survey, the native bird most likely to be observed in this area is the Hawaiian hawk. This formerly federally-listed endangered bird (still listed by the State of Hawai‘i) is very commonly seen in forests, agricultural areas, and even towns throughout East Hawai‘i. Hawaiian hawks generally prefer ‘ōhi‘a forest habitat but are known to breed successfully in both native and non-native forests. They occur throughout the island of Hawai‘i from sea level to 8,530 feet in elevation. Hawks often forage in forests near agricultural tracts and nest in tall trees of a variety of species. Most nesting occurs in tall native ‘ōhi‘a trees, although hawks may also nest in non-native trees, including eucalyptus, ironwood, mango, coconut palm and macadamia. Nest construction is protracted, beginning up to two months before the first egg is laid and continuing into the nestling period. Egg-laying generally occurs from March to June, and fledging from July to September. Both sexes contribute to nest-building. Clutch size is nearly always one, although clutches of two and three eggs have been reported. Both sexes incubate but females perform most of the brooding of nestlings, while males provide most of the food to chicks and female. Both adults feed fledglings, which are dependent on adults for up nine months. Hawks are vulnerable to disturbance during the nesting season from March 1 to September 30 of each year.

Bird survey work in Puna documented in Spiegel et al (2006) indicates that in many lowland forests, Hawai'i 'amakihi are the most common and widespread native birds. They are significantly associated with 'ōhi'a. Some populations of this native honeycreeper appear to have adapted to the mosquito-borne diseases of the Hawaiian lowlands. At low elevations there has been widespread recovery of this species and a changing composition of the forest bird community; nevertheless, lowlands dominated by non-native vegetation and bird species continue to have few native forest birds, even this one. The Hawai'i 'amakihi is not a listed T&E species.

Because of the non-coastal location, only one species of shorebird is likely to be seen. The very common native resident migratory bird Pacific golden-plover (*Pluvialis fulvialis*) also utilizes inland habitats, especially patches of short grass, during its winter residency in Hawai'i. The kolea is not a listed T&E species but is protected from killing under the Migratory Bird Treaty Act.

Due to the lack of streams or ponds, the only waterbird likely to occasionally be present is the threatened Hawaiian goose or nēnē (*Branta sandwicensis*). Nēnē have become very common on many Hawaiian islands and can be found at elevations ranging from sea level to sub-alpine areas above 7,000 feet. Historically, flocks moved between high-elevation feeding habitats and lowland nesting areas. Nests consist of a shallow scrape lined with plant material and down. Breeding pairs usually return to the previous year's nest site, typically in dense vegetation. Nēnē have an extended breeding season, and nesting may occur in all months except May, June, and July. Grassy patches on the disturbed portions of the properties may occasionally host nēnē, although I did not observe any signs.

Although they would rarely if ever be visible, several listed seabirds may overfly the Pāhoa area between the months of May and November, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). These seabirds hunt over the ocean during the day and fly to higher elevations at night to nest. The Hawaiian petrel was formerly common on the Island of Hawai'i. This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea, as well as at the mid-to-high elevations of Hualālai. It has within recent historic times been reduced to relict breeding colonies located at high elevations on Mauna Loa, Kohala and, possibly, Hualālai. The Hawaiian petrel (as well as the band-rumped storm petrel) generally nest on the Big Island well above 5,000 feet in elevation. Some Hawaiian petrel nests have recently been found at lower elevations on Kohala volcano. Both the Newell's shearwater and Hawaiian petrel are known to burrow under ferns on forested mountain slopes. These burrows are used year after year, usually by the same pair of birds. Although capable of climbing shrubs and trees before taking flight, they need an open downhill flight path through which they can become airborne. Once abundant on all the main Hawaiian islands, most Newell's shearwater colonies are today found in the steep terrain between 500 to 2,300 feet on Kaua'i. Band-rumped storm petrels have recently been discovered to be nesting on the Mauna Loa side of the saddle between this mountain and Mauna Kea. Although each of these seabirds may fly over Pāhoa on their way to and from mountain nesting areas and the open ocean, no suitable nesting habitat for any of them is present on the properties.

The primary cause of mortality in these seabird species in Hawai‘i is thought to be predation by alien mammals at the nesting colonies. Collision with man-made structures is another significant cause. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals including cats and mongooses.

It is highly likely that Hawaiian hoary bats (*Lasiurus cinereus semotus*), the only native Hawaiian land mammals, are sometimes present on the properties. They have been found throughout Puna and in most areas on the island of Hawai‘i. Bats may forage for flying insects on the properties on a seasonal basis and may also roost in trees and large shrubs. Bats are often visible while they are feeding on flying insects near dusk and dawn at various locations around the island of Hawai‘i. The presence of these bats can also be verified by radar and echolocation detectors. If a bat is detected during a night’s study, this merely indicates that they were present in the area. Determination of bat populations or usage patterns requires much more sophisticated, long term studies. Conversely, the absence of bat detections does not indicate an absence of bats, which may have been absent for only a night, a week, or a season, or may have simply gone undetected. No bats were observed in the survey, which took place in daylight and did not use any detection equipment. For the purposes of this assessment, it is assumed that Hawaiian hoary bats are present at least some of the time, as they have been frequently seen and detected in ‘ōhi‘a and groves of other species. Hawaiian hoary bats are vulnerable to disturbance during the summer pupping season and require special mitigation measures.

Aside from bats, the other mammals in the project area are all introduced species, including feral cats (*Felis catus*), feral pigs (*Sus scrofa*), mongooses (*Herpestes* spp.) and various species of rats (*Rattus* spp.) and mice (*Mus* spp.). I did not observe any mammals during the survey aside from feral cats and mongooses, but sign of feral pigs was present. Coqui frogs (*Eleutherodactylus coqui*) were clearly heard on a biological survey despite it being the middle of the day. Several other species of non-native reptiles and amphibians may also be present. None are of conservation concern and all are deleterious to native flora and fauna.

Although no invertebrate survey was conducted, no likely hosts of the endangered Blackburn’s sphinx moth (particularly tree tobacco or *Nicotiana glauca*) were observed. Similarly, the vegetation did not appear to contain the species necessary to sustain various T&E damselflies (*Megalagrion* spp.) or picture wing flies (*Drosophila* spp.). It should be noted that the vegetation was infested with little fire ant (*Wasmannia auropunctata*), a pest that has become near-universal in settled parts of Puna.

Impacts and Mitigation Measures

No rare, threatened or endangered plant species are present. Some of the properties contain a degraded medium-stature ‘ōhi‘a forest that also contains uluhe fern and ‘uki sedge. Clearing of the properties would destroy many individuals of these and a few other common native plants, but it would not affect rare, threatened or endangered plants, nor would it intrude into a sensitive native ecosystem. Based on what could be assessed given the lack of right-of-entry, Alternative 2 likely contains the greatest extent of this native

forest, and Alternative 3 the least. In the context of the thousands of acres of State land in this area, much of it covered with diverse native forest protected within the Conservation District, the loss of up to 9 acres of somewhat degraded 'ōhi'a forest, although not negligible, is not critical to the preservation of habitat. However, if Alternative 2 were selected, additional plant surveys would be required to verify this assessment.

An issue for construction in properties with 'ōhi'a trees has recently surfaced. Two species of fungus called *Ceratocystis lukuohia* and *C. huliohia* produce a disease that is new to science and new to Hawai'i – Rapid 'Ōhi'a Death (ROD) (Hawai'i Division of Forestry and Wildlife [DOFAW] 2017). This disease has killed hundreds of thousands of 'ōhi'a trees across more than 34,000 acres of the Big Island. It was first discovered in Lower Puna. Projects that harm or relocate 'ōhi'a trees can spread the disease, and certain mitigation measures are recommended, although it is important to recognize that treatment protocols are evolving. The following mitigation protocol is proposed and as should be supplied to DOFAW to ensure it meets current standards as part of the development process:

- Prior to clearing the edges of the properties, 'ōhi'a trees on the boundary should be identified. Any such trees that are not planned for removal on the edges should be protected from disturbance entirely, or cut and chipped or buried, to ensure that they do not present a ready target for ROD infection that could spread to other trees;
- Treat any unavoidable scars on 'ōhi'a trees that result from clearing to prevent infestation of the fungus;
- Stack all removed 'ōhi'a trees and dispose of by burying or chipping; do not remove from the properties. Decontaminate boots and work tools before and after working in an area with 'ōhi'a trees;

Another concern for the movement of products is the spread of invasive species, particularly little fire ants and coqui frogs, both of which are rampant in the general area. A biosecurity plan specifying requirements for construction contractors to clean equipment prior to leaving the Pāhoā area should be instituted in order to reduce the spread of these species. DOFAW and the Big Island Invasive Species Council should be consulted in order to solicit comments and potential additional measures that could reasonably be adopted.

In order to avoid impacts to the endangered but regionally widespread terrestrial vertebrates listed above, I recommend that the project commit to several conditions.

- Construction should refrain from activities that disturb or remove shrubs or trees taller than 15 feet between June 1 and September 15, when Hawaiian hoary bats may be sensitive to disturbance.
- If landclearing occurs between the months of March and September, inclusive, a pre-construction hawk nest search by a qualified ornithologist using standard methods should be conducted. If Hawaiian hawk nests are present, no land clearing should be allowed until October, when hawk nestlings will have fledged.

- All exterior lighting should be shielded from shining upward, in conformance with Hawai‘i County Code § 14–50 et seq., to minimize the potential for seabird disorientation. The project should utilize blue-deficient lighting such as filtered LED lights or amber LED lights, with a Correlated Color Temperature (CCT) of 2700 Kelvin or less, which promotes dark skies and minimizes impacts to seabirds.
- Although no T&E waterbirds or Hawaiian geese are likely to be present, if federal funding is involved, the project should be prepared for the requirement to have a biological monitor verify site conditions prior to construction and institute standard avoidance and mitigation measures should these species be detected.

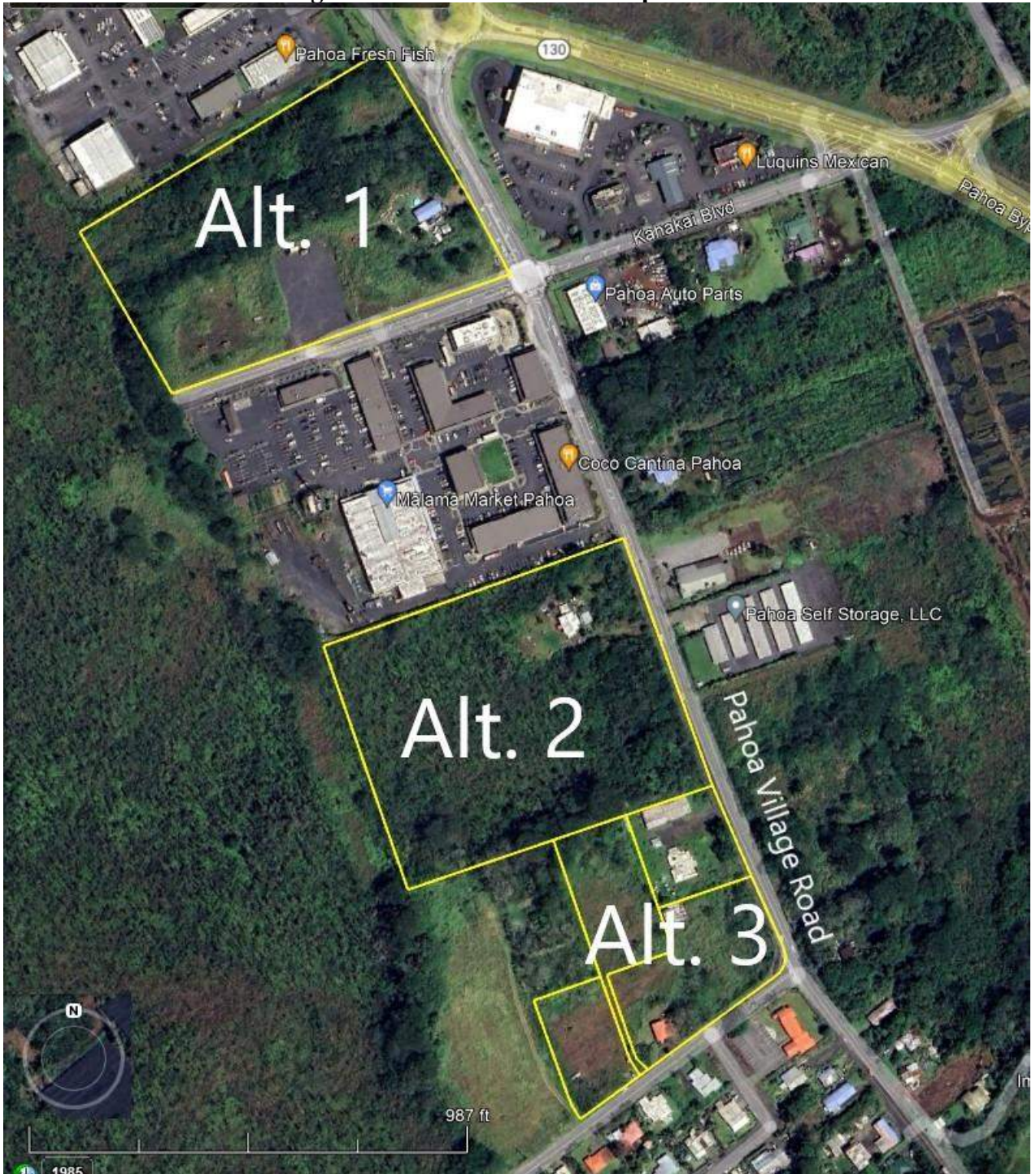
Report Limitations

No biological survey of a large area can claim to have detected every species present. Some plant species are cryptic in juvenile or even mature stages of their life cycle. Dry conditions can render almost undetectable plants that extended rainfall may later invigorate and make obvious. Thick brush can obscure even large, healthy specimens. Birds utilize different patches of habitat during different times of the day and seasons, and only long-term study can determine the exact species composition. The findings of this survey must therefore be interpreted with proper caution; in particular, there is no warranty as to the absence of any particular species.

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Figure 1a. Alternative Sites Map



Aerial Image Base Map © Google Earth

Figure 2. Alternative Sites Vegetation Photos



2a. Alt. 1, cleared area southern edge, overgrown clearing, forest on push pile berm ▲
▼ 2b. Alt. 1, scrub 'ōhi'a-uluhe forest in northern strip



Figure 2. Alternative Sites Vegetation Photos



2c. Alt. 1, Asian melastome understory below tall albizia, center north ▲
▼ 2d. Alt. 2, northern edge with scrub 'ōhi'a-uluhe forest



Figure 2. Alternative Sites Vegetation Photos



2e. Alt. 2, Pahoa Village Road frontage, with mixed forest ▲
▼ 2f. Alt. 2, northeast lot corner



Figure 2. Alternative Sites Vegetation Photos



2g. Alt. 2/Alt. 3 border ▲

▼ 2h. Alt. 3, home and clearing on Pahoa Village Road



Figure 2. Alternative Sites Vegetation Photos



2i. Alt. 3, *Macaranga tanarius* thicket emerging through elephant grass ▲
▼ 2j. Alt. 3, open grassland with emergent non-native trees



Table 1. Plant Species Observed on Alternative Site Properties

Scientific Name	Family	Common Name	Life Form	Status*
<i>Ageratum conyzoides</i>	Asteraceae	Ageratum	Herb	A
<i>Andropogon glomeratus</i>	Poaceae	Bushy Bluestem	Herb	A
<i>Arundina graminifolia</i>	Orchidaceae	Bamboo Orchid	Herb	A
<i>Axonopus compressus</i>	Poaceae	Wide-leafed Carpet Grass	Grass	A
<i>Begonia hirtella</i>	Begoniaceae	Begonia	Herb	A
<i>Bidens pilosa</i>	Asteraceae	Beggar's Tick	Herb	A
<i>Castilleja arvensis</i>	Scrophulariaceae	Indian Paintbrush	Herb	A
<i>Cecropia obtusifolia</i>	Cecropiaceae	Trumpet Tree	Tree	A
<i>Cenchrus purpureus</i>	Poaceae	Napier Grass	Grass	A
<i>Chamaecrista nictitans</i>	Fabaceae	Partridge Pea	Herb	A
<i>Chamaesyce hirta</i>	Euphorbiaceae	Garden Spurge	Herb	A
<i>Christella parasitica</i>	Thelypteridaceae	Cyclosorus	Fern	A
<i>Cibotium glaucum</i>	Cibotiaceae	Hapu'u Pulu	Fern	E
<i>Clidemia hirta</i>	Melastomataceae	Koster's Curse	Herb	A
<i>Clusia rosea</i>	Clusiaceae	Autograph Tree	Tree	A
<i>Cocos nucifera</i>	Arecaceae	Coconut	Tree	PI
<i>Commelina diffusa</i>	Commelinaceae	Honohono	Herb	A
<i>Conyza bonariensis</i>	Asteraceae	Hairy Horseweed	Herb	A
<i>Cordyline fruticosa</i>	Asparagaceae	Ti	Shrub	PI
<i>Crassocephalum crepidioides</i>	Asteraceae	Crassocephalum	Herb	A
<i>Crotalaria spp.</i>	Fabaceae	Crotalaria	Herb	A
<i>Cyperus polystachyos</i>	Cyperaceae	Pycrus	Herb	I
<i>Cyperus sp.</i>	Cyperaceae	Cyperus	Herb	A
<i>Desmodium cajanifolium</i>	Fabaceae	Desmodium	Herb	A
<i>Desmodium tortuosum</i>	Fabaceae	Florida Beggarweed	Herb	A
<i>Desmodium triflorum</i>	Fabaceae	Desmodium	Herb	A
<i>Dicranopteris linearis</i>	Gleicheniaceae	Uluhe	Fern	I
<i>Digitaria sp.</i>	Poaceae	Crab Grass	Grass	A
<i>Dissotis rotundifolia</i>	Melastomataceae	Dissotis	Herb	A
<i>Dracaena fragrans</i>	Asparagaceae	Foliage Plant	Shrub	A
<i>Dracaena marginata</i>	Asparagaceae	Money Tree	Tree	A
<i>Dracaena reflexa</i>	Asparagaceae	Song of India	Tree	A
<i>Dyopsis lutescens</i>	Arecaceae	Areca Palm	Tree	A
<i>Emilia fosbergii</i>	Asteraceae	Pualele	Herb	A
<i>Emilia sonchifolia</i>	Asteraceae	Emilia	Herb	A
<i>Epipremnum aureum</i>	Areaceae	Pothos Vine	Vine	A
<i>Erechtites valerianifolia</i>	Asteraceae	Fireweed	Herb	A
<i>Ficus microcarpa</i>	Moraceae	Chinese Banyan	Tree	A
<i>Hyptis pectinata</i>	Lamiaceae	Comb Hyptis	Herb	A
<i>Ipomoea triloba</i>	Convolvulaceae	Little Bell	Vine	A
<i>Lepisorus thunbergianus</i>	Polypodiaceae	Pakahakaha	Fern	I
<i>Litchi chinensis</i>	Sapindaceae	Lychee	Tree	A
<i>Lycopodiella cernua</i>	Lycopodiaceae	Wawae'iolo	Fern Ally	I
<i>Macaranga mappa</i>	Euphorbiaceae	Bingabing	Shrub	A
<i>Macaranga tanarius</i>	Euphorbiaceae	Macaranga	Tree	A
<i>Machaerina mariscoides</i>	Cyperaceae	'Uki	Herb	I

Table 1, continued				
Scientific Name	Family	Common Name	Life Form	Status*
<i>Mangifera indica</i>	Anacardiaceae	Mango	Tree	A
<i>Megathyrsus maximus</i>	Poaceae	Guinea Grass	Herb	A
<i>Melastoma candidum</i>	Melastomataceae	Melastoma	Shrub	A
<i>Melinis minutiflora</i>	Poaceae	Molasses Grass	Herb	A
<i>Melochia umbellata</i>	Sterculiaceae	Melochia	Tree	A
<i>Metrosideros polymorpha</i>	Myrtaceae	Ōhi'a	Tree	E
<i>Miconia calvescens</i>	Melastomataceae	Miconia	Tree	A
<i>Mimosa pudica</i>	Fabaceae	Sleeping Grass	Herb	A
<i>Monstera deliciosa</i>	Araceae	Monstera	Vine	A
<i>Nephrolepis multiflora</i>	Nephrolepidaceae	Sword Fern	Fern	A
<i>Paederia scandens</i>	Rubiaceae	Maile Pilau	Vine	A
<i>Paraserianthes falcataria</i>	Fabaceae	Albizia	Tree	A
<i>Paspalum conjugatum</i>	Poaceae	Hilo Grass	Herb	A
<i>Passiflora laurifolia</i>	Passifloraceae	Jamaican Lilikoi	Vine	A
<i>Persea americana</i>	Lauraceae	Avocado	Tree	A
<i>Persicaria capitata</i>	Polygonaceae	Knotweed	Shrub	A
<i>Phlebodium aureum</i>	Polypodiaceae	Hare's Foot Fern	Fern	A
<i>Phyllanthus debilis</i>	Euphorbiaceae	Niruri	Herb	A
<i>Phymatosorus grossus</i>	Polypodiaceae	Maile Scented Fern	Fern	A
<i>Pityrogramma calomelanos</i>	Pteridaceae	Silver Fern	Fern	A
<i>Pluchea carolinensis</i>	Asteraceae	Pluchea	Shrub	A
<i>Podocarpus sp.</i>	Podocarpaceae	Podocarpus	Tree	A
<i>Polygala paniculata</i>	Polygalaceae	Milkwort	Herb	A
<i>Polygonum capitatum</i>	Polygonaceae	Polygonum	Herb	A
<i>Psidium cattleianum</i>	Myrtaceae	Strawberry Guava	Tree	A
<i>Psidium guajava</i>	Myrtaceae	Common Guava	Tree	A
<i>Sacciolepis indica</i>	Poaceae	Glenwood Grass	Herb	A
<i>Schizachyrium condensatum</i>	Poaceae	Broom Grass	Herb	A
<i>Spathoglottis plicata</i>	Orchidaceae	Philippine Ground Orchid	Herb	A
<i>Spermacoce assurgens</i>	Rubiaceae	Spermacoce	Herb	A
<i>Sphagneticola trilobata</i>	Asteraceae	Wedelia	Herb	A
<i>Sporobolus africanus</i>	Poaceae	Smutgrass	Grass	A
<i>Stachytarpheta jamaicensis</i>	Verbenaceae	Jamaica Vervain	Herb	A
<i>Tibouchina herbacea</i>	Melastomataceae	Cane Tibouchina	Herb	A
<i>Tithonia diversifolia</i>	Asteraceae	Tree Marigold	Shrub	A
<i>Toona ciliata</i>	Meliaceae	Australian Red Cedar	Tree	A
<i>Trema orientalis</i>	Ulmaceae	Gunpowder Tree	Tree	A
<i>Urochloa mutica</i>	Poaceae	California Grass	Grass	A
<i>Vigna luteola</i>	Fabaceae	Hairy Cowpea	Vine	A
<i>Waltheria indica</i>	Sterculiaceae	'Uhaloa	Herb	I

A=Alien E=Endemic I=Indigenous END=Federal and State Listed Endangered (none)

Appendix C
Archaeological Literature Review and
Field Inspection Report

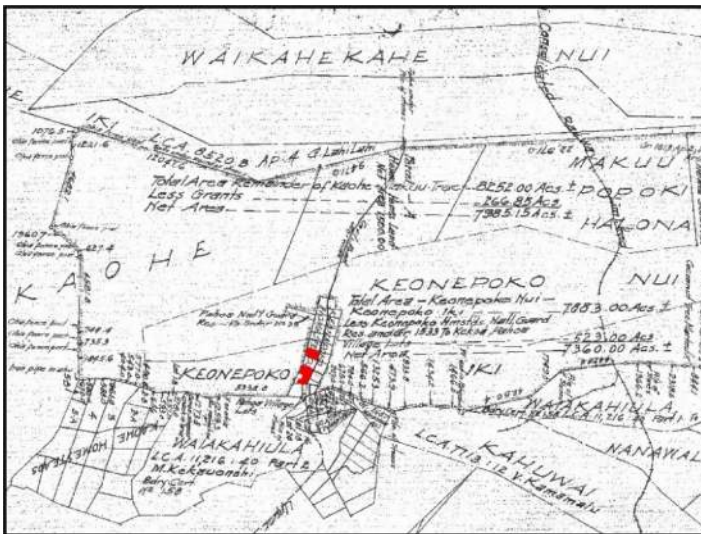
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An Archaeological Literature Review and Field Inspection for the Proposed Pāhoa Public Library and Transit Hub

TMK: (3) 1-5-007:004, 005, 007, 076, 082, and 083

Keonepoko Iki Ahupua‘a
Puna District
Island of Hawai‘i

DRAFT VERSION



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An Archaeological Literature Review and Field Inspection for the Proposed Pāhoa Public Library and Transit Hub

TMK: (3) 1-5-007:004, 005, 007, 076, 082, and 083

Keonepoko Iki Ahupua‘a
Puna District
Island of Hawai‘i



EXECUTIVE SUMMARY

At the request of SSFM International on behalf of the County of Hawai‘i Mass Transit Agency (MTA) and the Hawai‘i State Public Library System (HSPLS), ASM Affiliates (ASM) conducted this literature review and field inspection (LRFI) of three alternative locations for the proposed development of a public library and transit hub in Pāhoia Town, Keonepoko Iki Ahupua‘a, Puna District, Island of Hawai‘i. The study area locations include Alternative 1 (TMK: [3] 1-5-007:007), Alternative 2 (TMK: [3] 1-5-007:005), and Alternative 3 (TMK: [3] 1-5-007:004, 076, 082, and 083), all of which are lots that were created as part of the Keonepoko Iki Homesteads during the turn of the 20th century.

On June 2, 2023, Candace B. Gonzales, B.A., and Olivia Crabtree, B.A. under the supervision of Matthew R. Clark, M.A. (Principal Investigator) conducted a field inspection of Alternative 1 and a portion of Alternative 3 (parcels 082 and 083). Access to the remaining portions of the study areas (the entirety of Alternative 2 and parcels 076 and 004 of Alternative 3) was not granted at the time of the field inspection. As such, no inspection of these areas was conducted.

Given the findings of the current study with respect to archaeological resources, it is concluded that prior to any ground disturbing work, an Archaeological Inventory Survey (AIS) of the selected Alternative should be conducted, and the AIS report submitted to the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) for review and acceptance. Given that Alternatives 1 and 3 contain residential structures that are over 50 years old, DLNR-SHPD may require that an architectural Reconnaissance Level Survey (RLS) of these structures be prepared pursuant to HRS Chapter 6E-8 and in accordance with HAR Chapter 13-275 and DLNR-SHPD’s February 2018 Guidelines: Architectural Historic Resources Survey and Documentation and the National Park Service’s Guidelines for Local Surveys: A Basis for Preservation Planning. It is probable, given the nature of the archaeological resources identified within the study areas, that acceptance of the AIS by DLNR-SHPD and an architectural RLS (only if Alternatives 1 or 3 are selected) will complete the historic preservation review process for the project.

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1. INTRODUCTION

At the request of SSFM International, on behalf of the County of Hawai‘i Mass Transit Agency (MTA) and the Hawai‘i State Public Library System (HSPLS), ASM Affiliates (ASM) conducted an archaeological literature review and field inspection (LRFI) of three alternative sites proposed for a Pāhoa Mass Transit Hub and Public Library (referred to hereafter as the proposed project) in the Town of Pāhoa, Keonepoko Iki Ahupua‘a, Puna District, Island of Hawai‘i (Figures 1, 2, and 3). The three sites under consideration are described throughout this report as Alternative 1 (the preferred location), Alternative 2, and Alternative 3, and for the purposes of this report are referred to collectively as the study areas. Alternative 1 is a 9.572-acre parcel identified at Tax Map Key (TMK): (3) 1-5-007:007; Alternative 2 is a 10-acre parcel identified as TMK: (3) 1-5-007:005; and Alternative 3 is 5.641-acres comprised of TMK: (3) 1-5-007:004, 076, 082, and 083 (see Figure 2).

The proposed project will be subject to Hawai‘i Revised Statutes (HRS) Chapter 343 and Chapter 6E-8 and Hawai‘i Administrative Rules (HAR) Chapter 13-275 review. This study does not fulfill the requirements of an archaeological inventory survey as specified in HAR Chapter 13-276. Rather, the level of effort undertaken in this study is sufficient to provide the agency and its planners with information regarding the general nature, density, and distribution of archaeological and historic resources that may be expected within the study areas. This study is also intended to provide recommendations and guidance on future historic preservation work that will support the agency in complying with the applicable state laws and any future County of Hawai‘i development permitting that may be required.

This report is organized into five main chapters. Chapter 1, the introduction, includes an overview of the proposed project as well as a physical description of the study areas. To generate a set of expectations regarding the nature of cultural resources that may be encountered within the study areas, Chapter 2 includes culture-historical information specific to the study areas, the broader geographical region of Keonepoko Iki Ahupua‘a and the Puna District. This chapter also includes a summary of prior archaeological studies that have been conducted within or nearby the study areas. Chapter 3 synthesizes the archaeological expectations for the study areas based on the culture-historical context and the review of prior archaeological work, and Chapter 4 discusses the results of the current field investigation. Lastly, Chapter 5 includes recommendations regarding the future historic preservation work that may be required for each of the alternatives.

1. Introduction

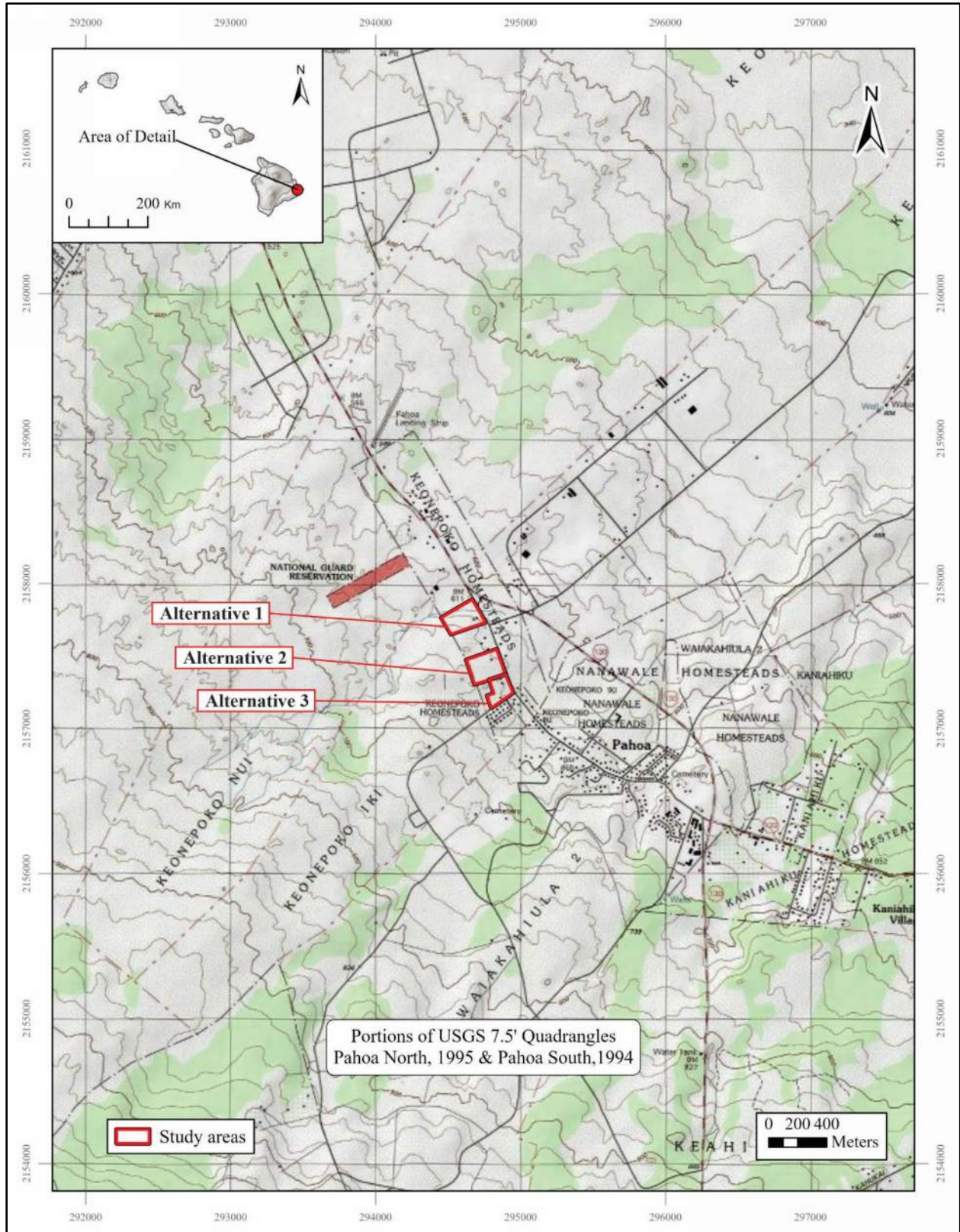


Figure 1. Location of study areas.

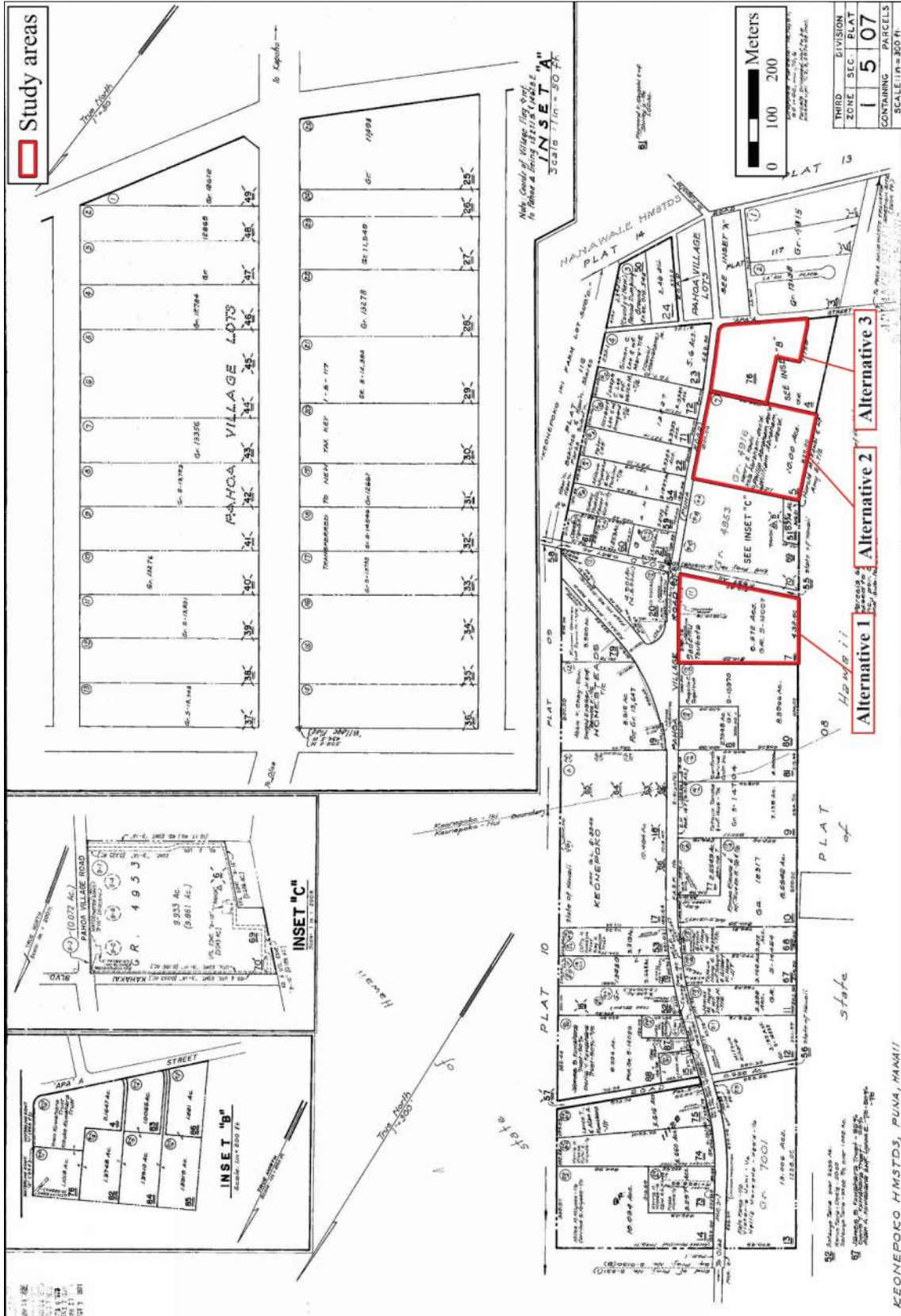


Figure 2. Tax Map Key plat (3) 1-5-007 showing location of the study areas.



Figure 3. 2023 Google Earth image showing study areas.

DESCRIPTION OF THE STUDY AREAS

The study areas are situated at the northern end of Pāhoa Town on the *mauka* (western) side of Pāhoa Village Road on lots that were created as part of the Keonepoko Iki Homesteads during the end of the 19th century. The following section discusses the general characteristics relevant to the study areas followed by site-specific descriptions for each alternative location.

The study areas are situated at elevations ranging from 614 to 663 feet (187 to 202 meters) above mean sea level (amsl). The underlying geology in this portion of the island is generally formed of *pāhoehoe* lava flows comprised of late Holocene “Puna Basalts” (Sherrod et al. 2007:20; Trusdell et al. 2005). The flows underlying the study areas belong to a major eruption of Kīlauea Volcano’s summit. Collectively these flows are known as the “‘Aila‘au lava flows” and they make up a large area of the north flank of Kīlauea and the Kahaualea Forest Reserve. This long-lived eruption happened between 200 and 750 years before present (Sherrod et al. 2007). The study areas are within a lava flow that occurred between 563 to 613 years before present and is labeled in Figure 4 as Qp4. These relatively recent volcanic eruptions have been active for more than sixty years during the 15th century and would have been on full display to the resident Hawaiian population of the time (Clague et al. 1999). As such, these lava flows figure prominently in Puna’s oral histories (Emerson 2013; Fornander 1916-1917). In fact, 400 years of Hawaiian oral tradition correlates well with recent scientific research into the geological history of Kīlauea and the sequence of events leading up to the formation of the current caldera (Swanson 2008).

The soil types identified in the project area vicinity, are influenced by the underlying geology. The study areas are comprised of a single soil type (labeled as #653 in Figure 5), described as Keaukaha highly decomposed plant material, characterized by 2 to 10 percent slopes. It is well-drained and is susceptible to high run-off. This thin organic muck lying on top of the *pāhoehoe* bedrock is less than ten inches thick (Soil Survey Staff 2020).

Rainfall has been measured at a Pāhoa rain gauge since 1902 and this station is located at an elevation of 670 feet amsl, not more than two kilometers away from the study areas. According to these records (Giambelluca et al. 2013) this area receives an average of 3,449 millimeters (135 inches) of rain per year.

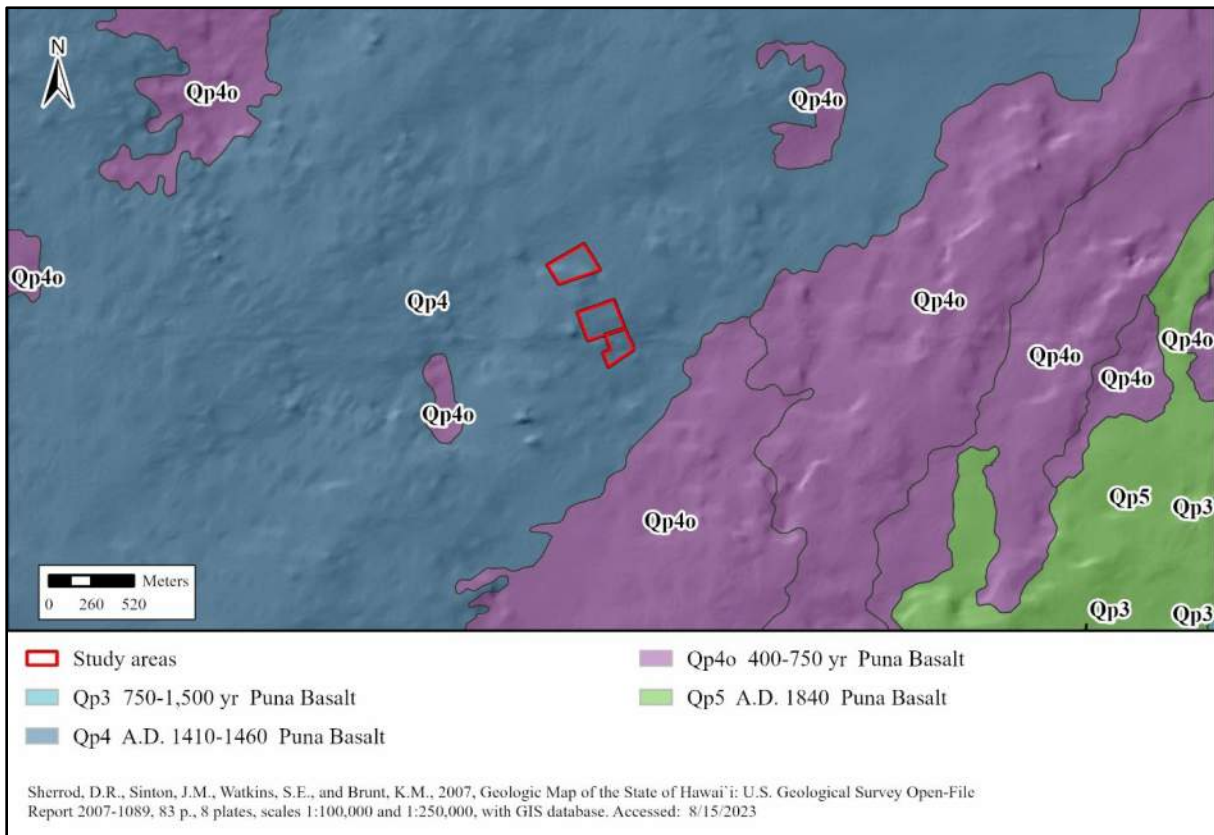


Figure 4. Geology in the study areas.

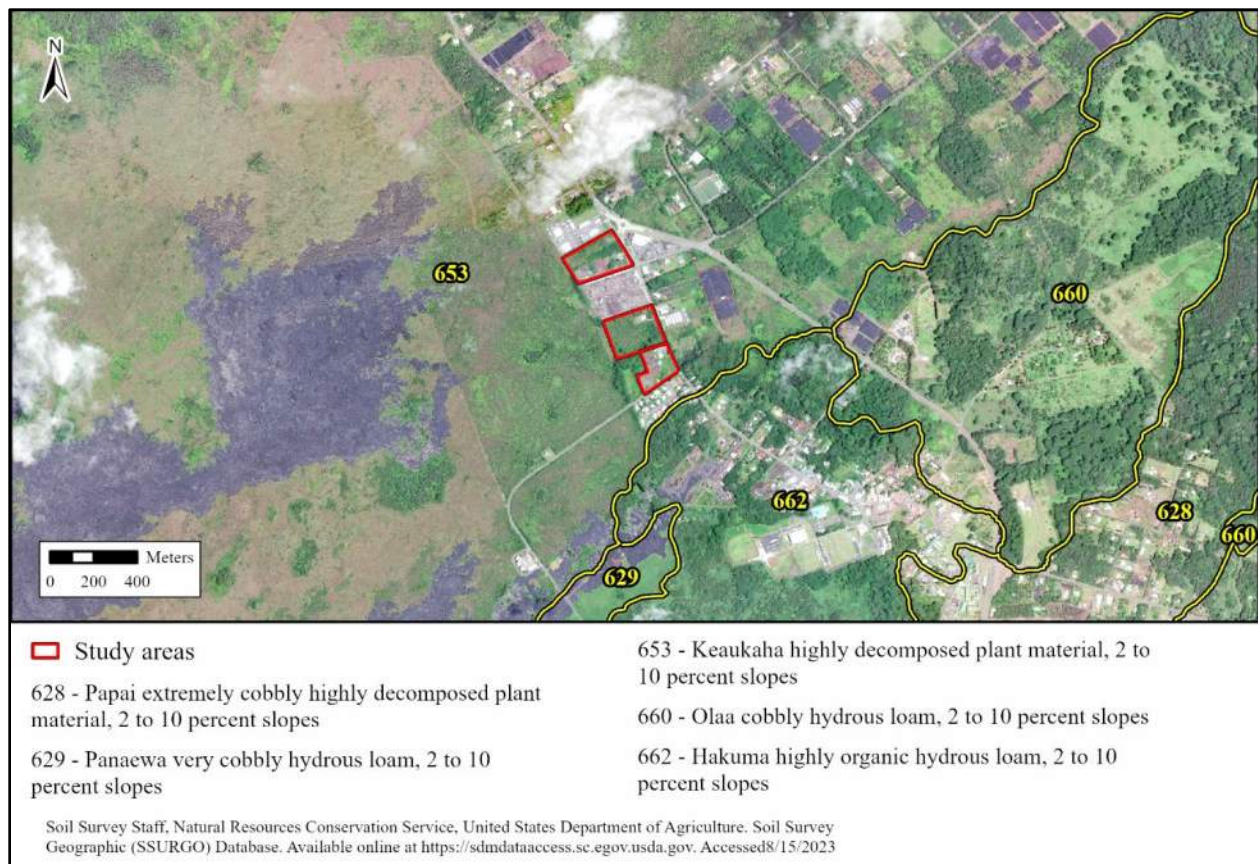


Figure 5. Soil in study areas.

Alternative 1

Alternative 1 occupies a 9.572-acre parcel coterminous with TMK: (3) 1-5-007:007 (see Figure 2). This agriculturally zoned parcel is bound to the north by the Pāhoa Market Place, to the south by Kahakai Boulevard (Figure 6), to the east by Pāhoa Village Road (Figure 7), and the west by undeveloped State-owned lands (see Figure 3). Access to the parcel is from Pāhoa Village Road. A driveway extending west from Pāhoa Village Road leads to a single-family residence along with several ancillary structures situated near the southeastern corner of the parcel. County tax records list two structures one dating to 1955 and the other to 1959. Prior to the construction of the Puna Kai Shopping Center, the land to the south of Alternative 1 was utilized by Bryson's Cinder as a gravel and cinder yard. Some of the activities associated with Bryson's Cinder include mechanical land disturbance throughout the southern portion of this parcel (Figure 8).

The impacts of prior land-disturbing activities have influenced the vegetation pattern on this parcel. The vegetation within the disturbed areas is comprised of mixed grasses (i.e. elephant grass [*Arundo donax*], Guinea grass [*Megathyrsis maximus*]) of various heights (Figure 9), cane ti (*Tibouchina herbacea*), bamboo orchid (*Arundina graminifolia*), and other non-native sedges (*Poaceae* and *Cyperaceae*). Some defunct industrial machinery is also present in these areas. The previously disturbed areas are often bordered by mechanical push piles upon which is an overstory of albezia (*Falcataria moluccana*) and gunpowder trees (*Trema orientalis*), melochia trees (*Melochia umbellata*), Koster's curse (*Clidemia hirta*), cercropia trees (*Cercropa obtusifolia*), with an understory of, Guinea grass (Figure 10). A small undisturbed portions of the property are comprised of expansive thickets of uluhe (*Dicranopteris linearis*) and ferns, interspersed with 'ōhi'a (*Metrosideros polymorpha*), strawberry guava (*Psidium cattleianum*), and other non-native species (Figure 11).



Figure 6. View of the southern boundaries Alternative 1 with Kahakai Boulevard (foreground), view to the north.



Figure 7. View of the eastern boundary of Alternative 1 with Pāhoa Village Road (foreground), view to the west.



Figure 8. View of previously graded portion of Alternative 1, view to the south.



Figure 9. Typical vegetation found in previously disturbed areas of Alternative 1, view to the south.



Figure 10. Typical vegetation at the margins of the disturbed areas of Alternative 1, view to the north.



Figure 11. Typical vegetation in the undisturbed portions of the Alternative 1 parcel, view to the southwest.

Alternative 2

Alternative 2 is a 10-acre agriculturally zoned parcel coterminous with TMK: (3) 1-5-007:005 (see Figure 2). A single-family residence constructed in 1995 is located in the northeast corner of the parcel. This single-family residence is accessible via a driveway extending west from Pāhoia Village Road. This parcel is bound to the north by the Puna Kai Shopping Center, to the south by privately-owned land (TMK parcels 076 and 082 of the Alternative 3 study area), to the east by Pāhoia Village Road, and to the west by undeveloped State-owned lands (see Figure 3). Access to the parcel is from Pāhoia Village Road, however, ASM was not granted access to this parcel during the current field inspection. Therefore this parcel was not inspected.

Alternative 3

Alternative 3 is comprised of TMKs: (3) 1-5-007:004, 076, 082, and 083 and includes a total of 5.641 acres of agriculturally zoned land. Due to access restrictions, only parcels 082 and 083 were inspected for this study. Alternative 3 is bound to the north by an undeveloped portion of TMK parcel 005 (the Alternative 2 study area), to the south by Apa‘a Street (Figure 12), to the east by Pāhoia Village Road, and to the west by undeveloped State-owned lands. Access to Alternative 3 is from both Pāhoia Village Road and Apa‘a Street. There is a single-family residence with access from Apa‘a Street on parcel 004 that was built in 1968 and a wooden shed is present at the northwest corner of parcel 004 (Figure 13). Another single-family residence built in 1968 is located on parcel 076 along with the remnants of several ancillary structures that served as former buildings associated with the Pāhoia Feed and Fertilizer. The perimeter of this parcel (076) is fenced.

The two remaining parcels (082 and 083) have been used for agricultural and industrial activities as evidenced by a review of historic aerial images, the leveled nature of the ground surface, and the presence of defunct industrial machinery (Figure 14). Aerial imagery (see Figure 3) shows that the western side of Alternative 3, specifically parcels 082 and 083, has been mechanically disturbed. The vegetation within parcels 082 and 083 is largely comprised of a ground cover of mixed grass species, bamboo orchids (*Arundina graminifolia*), and various ferns (Figures 15 and 16). Some larger tree species including Albezia, gunpowder, trumpet trees (*Cercopia obtusifolia*) are present along the edges of parcels 082 and 083.



Figure 12. View of the southern portion of Alternative 3 along Apa‘a Street, view to the northeast.



Figure 13. View of wooden shed located on the northwest corner of parcel 004, view to the northeast.



Figure 14. Abandoned industrial equipment on parcel 083 of Alternative 3, view to the west.



Figure 15. View of vegetation with parcel 083 of Alternative 3, view to the northwest.



Figure 16. Typical vegetation within parcels 082 and 083 of Alternative 3, view to the north.

2. BACKGROUND

To generate a set of expectations regarding the nature of archaeological resources that might be encountered within the study areas, and to establish a context within which to assess the significance of any such resources, a regional culture-historical context is presented along with a review of previous archaeological studies in the vicinity of the current study areas.

The culture-historical context and summary of previously conducted archaeological and cultural research presented below are based on research conducted by ASM at various physical and digital repositories. Primary English language resources were found at multiple state agencies, including the State Historic Preservation Division, Hawai‘i State Archives, and the Department of Accounting and General Services Land Survey Division. Digital collections provided through the Office of Hawaiian Affairs Papakilo and Kīpuka databases, Waihona ‘Āina, and the Ulukau Hawaiian Electronic Library provided further historical context and information. Lastly, secondary resources stored at ASM’s Hilo office offer general information regarding the history of land use, politics, and culture change in Hawai‘i, enhancing the broad sampling of primary source materials cited throughout this background.

CULTURE-HISTORICAL CONTEXT

Keonepoko Iki Ahupua‘a is one of fifty traditional land divisions found in the District of Puna on the eastern shores of the Island of Hawai‘i. In the book *Native Planters In Old Hawaii*, Handy and Handy (1991) describe Puna as an agriculturally fertile land repeatedly devastated by lava flows. Writing during the 1930s, they relate that:

The land division named Puna—one of the six major chiefdoms of the island of Hawai‘i said to have been cut (*‘oki*) by the son of the successor of the island’s first unifier, Umi-a-Liloa—lies between Hilo to the north and Ka‘u to the south, and it projects sharply to the east as a great promontory into the Pacific. Kapoho is the most easterly point at Cape Kumukahi. The uplands of Puna extend back toward the great central heights of Mauna Loa, and in the past its lands have been built, and devastated, and built again by that mountain’s fires. In the long intervals, vegetation took hold, beginning with miniscule mosses and lichens, then ferns and hardier shrubs, until the uplands became green and forested and good earth and humus covered much of the lava-strewn terrain, making interior Puna a place of great beauty...

...One of the most interesting things about Puna is that Hawaiians believe, and their traditions imply that this was once Hawaii’s richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land. Unquestionably lava flows in historic times have covered more good gardening land here than in any other district. But the present desolation was largely brought about by the gradual abandonment of their country by Hawaiians after sugar and ranching came in... (Handy et al. 1991:531-542).

The District of Puna is situated largely on the slopes of Kīlauea Volcano within the east rift zone, a broad, low-profile ridge (2-4 kilometers wide) formed by countless eruptions originating from numerous vents along its crest. The zone extends through the district from Kīlauea Caldera to Cape Kumukahi at the eastern tip of the island, a distance of 55 kilometers. The north side of the rift zone, extending to the slopes of Mauna Loa and the northeastern Puna coast, is covered primarily by lavas that erupted from the summit of Kīlauea about 200-750 years ago. In contrast, nearly the entire crest of the rift zone is covered by lava that is less than 200 years old, and most of the young lava flows that emanate from vents along the crest have spread southward towards the southeastern coast of the district, covering the older lava flows in the process (Sherrod et al. 2007; Wolfe and Morris 1996).

Keonepoko Iki includes areas of both the Coastal Settlement Zone (Zone I) and the Upland Agricultural Zone (Zone II) as described by McEldowney (1979:15-18). While this model is largely based on early historical accounts, it also considers environmental variables and human resource needs and offers insights into the prehistoric past. In a refinement of the model as it applies to Puna, Burtchard and Moblo (1994:26) elaborate on McEldowney’s concept:

[The Coastal Settlement Zone] includes coastal terrain to about one half mile inland. This is the zone expected to have the greatest density and variety of prehistoric surface features in the general study area. Primary settlements are expected in places where agriculturally productive sediments (principally well-weathered ‘a‘ā flows) co-occur with sheltered embayments and productive fisheries. Settlements within this zone are expected to be logistically linked to inland agricultural and forest exploitation zones accessed through a network of upslope-downslope (*Mauka-makai*) trails. Larger settlements and resource acquisition areas may have been connected by cross-terrain trail networks.

The current study areas fall within Zone II of McEldowney's (1979) model and might be used as a potential location for the "inland agricultural and forest exploitation zones" described by Burtchard and Moblo (1994:26). The combined *ahupua'a* resources of Keonepoko Iki helped support the *ali'i* that ruled the District of Puna (Maly 1998).

It is within this dynamic environmental context that the following discussion of the history and culture of the study areas are framed. The chronological summary presented below begins with the peopling of the Hawaiian Islands and includes the presentation of a generalized model of Hawaiian Prehistory containing specific legendary references to the study *ahupua'a* and a discussion of the general settlement patterns. The discussion of Prehistory and legendary references is followed by a summary of historical events in the district that begins with the arrival of foreigners in the islands and then continues with the history of land use in Puna after contact. The summary includes a discussion of the changing lifeways and population decline of the early Historic Period, a review of land tenure in the study *ahupua'a* during the *Māhele 'Āina* of 1848, and documentation of the transition to modern industries, agriculture, and residential development during the late nineteenth and twentieth centuries. A synthesis of the Precontact settlement patterns and the historically documented land use, combined with a review of the findings of previously conducted archeological studies, provides a means for predicting the types of archaeological features that may be encountered within the study areas, and a basis for assessing the function, age, and significance of any encountered archaeological sites.

A Generalized Model of Hawaiian Prehistory

The generalized cultural sequence that follows is based on Kirch's (1985) model but is amended to include recent revisions offered by Kirch (2011). Recent re-evaluations of archaeological data (Athens et al. 2014; Wilmshurst et al. 2011) strongly suggest that there is no archaeological evidence for occupation of Hawai'i Island (or perhaps anywhere in Hawai'i) until at least A.D. 1000, but once having arrived in the archipelago, the colonizing populations spread rapidly. The implications of this on the currently accepted chronology would alter the timing of the Settlement, Developmental, and Expansion Periods, possibly shifting the Settlement Period to A.D. 1000 to 1100, the Developmental Period to A.D. 1100 to 1350, the Expansion Period to A.D. 1350 to 1650, and the Proto-Historic Period to A.D. 1650-1795.

The initial settlement in Hawai'i is believed to have occurred from the southern Marquesas Islands. The Settlement Period was a time of great exploitation and environmental modification, when early Hawaiian farmers developed new subsistence strategies by adapting their familiar patterns and traditional tools to their new environment (Kirch 1985; Pogue 1978). Social order was largely assured by kinship principles accounting for genealogical authority through conical clan systems of genealogical seniority linked to the land (Kirch 1985). According to Fornander (1969), for example, the Hawaiians brought from their homeland certain universal Polynesian customs: the major gods Kāne, Kū, and Lono; the *kapu* system of law and order; cities of refuge; the *'aumakua* concept; various epiphenomenal beliefs; and the concept of *mana*. Over a period of several centuries, areas with the richest natural resources became populated and perhaps even crowded, and the population began expanding to the *kona* (leeward side) and more remote regions of the island (Cordy 2000). In Puna, initial settlements were likely established at sheltered bays with access to fresh water and rich marine resources. These small communities would have shared extended familial relations, and there was likely an occupational focus on the collection of marine resources.

The Development Period brought about a uniquely Hawaiian culture. The portable artifacts found in archaeological sites of this period reflect not only an evolution of the traditional tools, but some distinctly Hawaiian inventions. The adze (*ko'i*) evolved from the typical Polynesian variations of plano-convex, trapezoidal, and reverse-triangular cross-section to a very standard Hawaiian rectangular quadrangular tanged adze. A few areas in Hawai'i produced quality basalt for adze production. Mauna Kea, on the island of Hawai'i, possessed a well-known adze quarry. The two-piece fishhook and the octopus-lure breadloaf sinker are Hawaiian inventions of this period, as are *'ulu maika* stones and *lei niho palaoa*. The latter was a status item worn by those of high rank, indicating a trend toward greater status differentiation (Kirch 1985). As the environment reached its maximum carrying capacity, the result was social stress, hostility, and war between neighboring groups (Kirch 1985).

The Expansion Period is characterized by the greatest social stratification, major socioeconomic changes, and intensive land modification. Most of the ecologically favorable zones of the windward and coastal regions of all major islands were settled and the more marginal leeward areas were being developed. The greatest population growth occurred during the Expansion Period. It was during the Expansion Period that a second major migration settled in Hawai'i, this time from Tahiti in the Society Islands. According to Kamakau (1976), the *kahuna* Pā'ao settled in the islands during the 13th century. Pā'ao was the keeper of the god Kū'kā'ilimoku, who had fought bitterly with his older brother, the high priest Lonopele. After much tragedy on both sides, Pā'ao was expelled from his homeland by Lonopele. He prepared for a long voyage and set out across the ocean in search of a new land. On board Pā'ao's canoes were thirty-eight men (*kānaka*), two stewards (*kānaka 'ā'īpu'upu'u*), the chief Pilika'aiea (Pili) and his wife

Hina'aukekele, Nāmau'u o Malaia, the sister of Pā'ao, and the prophet Makuaka'ūmana (Kamakau 1992). In 1866, Kamakau told the following story of their arrival in Hawai'i:

Puna on Hawai'i Island was the first land reached by Pā'ao, and here in Puna he built his first *heiau* for his god Aha'ula and named it Aha'ula [Waha'ula]. It was a *luakini*. From Puna, Pā'ao went on to land in Kohala, at Pu'uepa. He built a *heiau* there called Mo'okini, a *luakini*.

It is thought that Pā'ao came to Hawai'i in the time of the *ali'i* La 'au because Pili ruled as *mo'i* after La'au. You will see Pili there in the line of succession, the *mo'o kū'auhau*, of Hanala'anui. It was said that Hawai'i Island was without a chief, and so a chief was brought from Kahiki; this is according to chiefly genealogies. Hawai'i Island had been without a chief for a long time, and the chiefs of Hawai'i were *ali'i maka'āinana* or just commoners, *maka'āinana*, during this time.

. . . There were seventeen generations during which Hawai'i Island was without chiefs—some eight hundred years. . . . The lack of a high chief was the reason for seeking a chief in Kahiki, and that is perhaps how Pili became the chief of Hawai'i. He was a chief from Kahiki and became the ancestor of chiefs and people of Hawai'i Island. (Kamakau 1992:100-102)

According to Kirch's (1985) model, the concept of the *ahupua'a* was established sometime during the A.D. 1400s, adding another component to a then well-stratified society. This land unit became the equivalent of a local community, with its own social, economic, and political significance. *Ahupua'a* were ruled by *ali'i 'ai ahupua'a*, or lesser chiefs; who, for the most part, had complete autonomy over this generally economically self-supporting piece of land, which was managed by a *konohiki*. *Ahupua'a* are traditional land divisions that, for the most part, incorporated all of the eco-zones from the mountains to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base (Hommon 1986). This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered-to resource management planning. In this system, the land provided fruits and vegetables and some meat for the diet, and the ocean provided a wealth of protein resources (Rechtman and Maly 2003).

Entire *ahupua'a*, or portions of the land were generally under the jurisdiction of appointed *konohiki*, or lesser chief-landlords, who answered to an *ali'i 'ai ahupua'a*. The *ali'i 'ai ahupua'a* in turn answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire district). Thus, *ahupua'a* resources supported not only the *maka'āinana* and *'ohana* who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided fruits and vegetables and some meat for the diet, and the ocean provided a wealth of protein resources. Also, in communities with long-term royal residents, divisions of labor (with specialists in various occupations on land and in the procurement of marine resources) came to be strictly adhered to.

The Precontact population of the Puna District lived in small settlements along the coast where they subsisted on marine resources and agricultural products. The villages of Puna, McEldowney (1979:17) notes, were similar to those of the Hilo District, and they:

...comprised the same complex of huts, gardens, windbreaking shrubs, and utilized groves, although the form and overall size of each appear to differ. The major differences between this portion of the coast and Hilo occurred in the type of agriculture practiced and structural forms reflecting the uneven nature of the young terrain. Platforms and walls were built to include and abut outcrops, crevices were filled and paved for burials, and the large numbers of loose surface stones were arranged into terraces. To supplement the limited and often spotty deposits of soil, mounds were built of gathered soil, mulch, sorted sizes of stones, and in many circumstances, from burnt brush and surrounding the gardens. Although all major cultigens appear to have been present in these gardens, sweet potatoes, ti (*Cordyline terminalis*), noni (*Morinda citrifolia*), and gourds (*Lagenaria siceraria*) seem to have been more conspicuous. Breadfruit, pandanus, and mountain apple (*Eugenia malaccensis*) were the more significant components of the groves that grew in more disjunct patterns than those in Hilo Bay.

People probably began utilizing the agricultural resources of upland Puna during the early Expansion Period of Hawai'i Island (Burtchard and Moblo 1994). As coastal populations increased, the need for food caused people to seek arable land at higher elevations. This trend of increasing population along desirable coastal locations and the expansion into upland regions to support the coastal populations would have continued throughout prehistory, slowly populating more marginal areas of Puna District. As population density increased through A.D.1600-1700s, so did political competition. This competition, undoubtedly, produced conflict, which led to political exiles and further

expansion into upland areas as these refugees sought asylum in more remote places and hidden lava tubes (Burtchard and Moblo 1994).

By the seventeenth century, large areas of Hawai'i Island (*moku* or districts) were controlled by a few powerful *ali'i 'ai moku*. There is island-wide evidence to suggest that growing conflicts between independent chiefdoms were resolved through warfare, culminating in a unified political structure at the district level. It has been suggested that the unification of the island resulted in a partial abandonment of portions of leeward Hawai'i, with people moving to more favorable agricultural areas (Barrera 1971; Schilt and Sinoto 1980). 'Umi a Līloa, a renowned *ali'i* of the Pili line, is often credited with uniting the Island of Hawai'i under one rule (Cordy 2000). According to Kamakau (1992:17-18), at this time, "Hua-'a was the chief of Puna, but Puna was seized by 'Umi and his warrior adopted sons... Hua-'a was killed by Pi'i-mai-wa'a on the battle field of Kuolo in Kea'au, and Puna became 'Umi-a-Liloa's." 'Umi's reign lasted until around ca. A.D. 1620 and was followed by the rule of his son, Keawenui a 'Umi, and then his grandson, Lonoikamakahiki (Cordy 2000).

Kirch (1985) places the beginning of the Proto-Historic Period during the rule of Lonoikamakahiki. This was a time marked by both political intensification and continual conquest by the reigning *ali'i*. Wars occurred regularly between intra- and inter-island polities. It was during this time of warfare that Kamehameha, who would eventually rise to power and unite all the Hawaiian Islands under one rule, was born in the district of North Kohala on the Island of Hawai'i (Kamakau 1992). There is some controversy about the year of his birth, but Kamakau (1992) places the birth event sometime between A.D. 1736 and 1758, most likely nearer to the later date.

In A.D. 1754, after many bloody battles, Kalani'ōpu'u, the *ali'i 'ai moku* of Ka'ū, defeated his main rival Keawe'ōpala in South Kona and declared himself ruler over all of the island of Hawai'i (Kamakau 1992:78). Kalani'ōpu'u was a clever and able chief, and a famous athlete in all games of strength, but according to Kamakau (1992) he possessed one great fault, he loved war and had no regard for others' land rights. According to Barrère (1959), the chiefs of the Puna District did not figure prominently into the Precontact political strife and turmoil on Hawai'i Island. Barrère (1959:15) writes:

Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo.

Legendary References to Keonepoko Ahupua'a

Despite its perceived lack of importance with respect to the emerging political history of Hawaiian leadership, Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne (Maly 1998). Because of the relatively young geological history and persistent volcanic activity, the region's association with Pele has been a strong one. However, the association with Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests (Pukui 1983). It is said that before Pele migrated to Hawai'i from Kahiki, there was "no place in the islands . . . more beautiful than Puna" (Pukui 1983:11). Contributing to that beauty were the groves of fragrant *hala* and forests of '*ōhi'a lehua* for which Puna was famous:

Puna pāia 'ala i ka hala (Puna, with walls fragrant with pandanus blossoms)

Puna, Hawai'i, is a place of *hala* and *lehua* forests.

In olden days the people would stick the bracts of *hala* into the thatching of their houses to bring some of the fragrance indoors. (Pukui 1983:301)

As the Hawaiian people had no written language until Post-contact times, traditional *mo'olelo* were passed down orally through the generations. Plentiful are the myths and legends associated with the beautiful *wahi pana* (significant places) of Puna, which frequently refer to the majestic female fire deity, Pele (Beckwith 1970). Most closely associated with the powerful, temperamental volcanoes of Hawai'i, she was perhaps both feared and respected equally by the people of the islands. Nimmo (1990) relates that "although the actual worship of Pele was most important in the districts of Hawai'i that experienced active volcanism, the mythology of the goddess was widespread throughout the Hawaiian Islands," but that, "there is no evidence that Pele was worshipped extensively beyond the volcano area of Hawai'i, although her mythology was apparently widespread throughout the Hawaiian Islands and members of her family were important in ritual throughout the archipelago" (Nimmo 1990:44).

The Heart Stirring Story of Ka-Miki

A traditional *mo'olelo*, “The Heart Stirring Story of Ka-Miki” (*Kaao Hooniua Puuwai no Ka-Miki*), originally appeared in *Ka Hoku o Hawai'i* (a Hawaiian language newspaper) between 1914 and 1917. This story tells of two supernatural brothers, Ka-Miki and Maka-'iole, who were skilled 'ōlohe (competitors/fighters) and their travels around Hawai'i Island by way of the ancient trails and paths (*ala loa* and *ala hele*), seeking competition with other 'ōlohe. As described by Maly:

The narratives were primarily recorded for the paper by Hawaiian historians John Wise and J.W.H.I. Kihe (with contributions from Steven Desha Sr.). While Ka-Miki is not an ancient account, the authors set the account in the thirteenth century (by association with the chief Pili, who came to Hawai'i with Pā'ao). They used a mixture of local stories, tales, and family traditions in association with place names to tie together fragments of site specific history that had been handed down over the generations. Thus, while in many cases, the personification of individuals and their associated place names may not be “ancient,” the site documentation within the “story of Ka-Miki” is of both cultural and historical value. (Maly 1998:17)

A portion of the legend set in Puna was published between October 21 and November 18, 1915. Translated by Maly (1998:17-25), this portion describes many people and places within the district and mentions a young chief of Puna named Keahialaka. Maly's (1998) translation of the story is summarized below.

During an expedition through the uplands of Puna, Ka-Miki and Maka-'iole encountered a man named Pōhakuloa who was intensely working on a large *koa* log. They were headed to Kea'au, but had lost their way. They stopped and asked Pōhakuloa for directions, but he was startled by the unexpected appearance of the brothers and replied impolitely. Taunts were exchanged between the two parties, which led to a physical altercation. Pōhakuloa soon realized that these two men were extraordinarily skilled as well as spiritually protected, and he admitted his defeat. Pōhakuloa wished to prepare a meal and drink of 'awa with his newfound friends, and solicited the help of his brother-in-law, an 'ōlohe chief named Kapu'euhi. However, Kapu'euhi had plans of his own. He intended to compete with and conquer the brothers but was defeated by them instead. Kapu'euhi was infuriated by his defeat, and also by Pōhakuloa's refusal to aid in retaliation against Ka-Miki and Maka-'iole.

Kapu'euhi invited the brothers back to his house to partake in a meal and a particularly potent type of 'awa, scheming to get them drunk. Unbeknownst to Ka-Miki and Maka-'iole, this was common practice for Kapu'euhi, who often housed weary travelers in his guest house, intoxicated them with 'awa, then killed them and stole their precious belongings. Kapu'euhi waged a bet with the brothers; if they couldn't drink five cups of the 'awa, then he would throw them out and they would be at the mercy of the Puna forest. Ka-Miki and Maka-'iole agreed and counteracted his bet with one of their own; if they were able to drink five cups, they would throw Kapu'euhi out of his own house. The brothers prayed and chanted to their ancestral goddess and were able to consume the entire quantity of 'awa without getting drunk. As agreed upon, Kapu'euhi was thrown out. Stunned, and angered that he was thwarted once again, Kapu'euhi requested assistance from Kaniahiku (a much feared Puna 'ōlohe and forest guardian) and her grandson Keahialaka. “At that time, Keahialaka was under the guardianship of Pānau and Kaimū, and he enjoyed the ocean waters from Nānāwale to Kaunaloa, Puna” (*Ka Hoku o Hawai'i* October 28, 1915; translated by (Maly 1998:20), which Maly (1998) suggests is symbolic of controlling those regions.

Together, Kapu'euhi and Kaniahiku conspired to lead the brothers deep into the Puna forest where Kaniahiku would be able to murder them, all the while maintaining the façade that they were taking them to the 'awa grove of Mauānuikananuha. Once Ka-Miki and Ka-'iole were well within the domain of Kaniahiku, she created a dark and murky environment, spreading gloomy mists and an overgrowth of twisted vegetation intended to ensnare the brothers. Ka-Miki and Ka-'iole were overcome, and left for dead by Kapu'euhi, who made his way back to safety, led by Kaniahiku's sister. They prayed to their ancestor, Ka-uluhe-nui-hihi-kolo-i-uka for help. All at once, her presence became apparent, and the brothers were able to continue on to the 'awa grove. Another attempt by Kaniahiku to kill the brothers was made, however, Ka-uluhe's protection over them was too strong, and the endeavor failed.

Ka-Miki and Ka-'iole realized that Kapu'euhi had deceived them and had been in affiliation with Kaniahiku. They were angered and trapped him in the 'awa grove. In an effort of retaliation, Kaniahiku summoned for her grandson, Keahialaka, and readied herself for a battle. Ka-Miki and Maka-'iole reprimanded Kaniahiku for her deceitful actions, which only served to anger her even further. Aggressively, Kaniahiku attacked Ka-Miki with her tripping club and spear, but Ka-Miki was far too elusive for her. He swiftly evaded each attempt at injury made on his behalf. In desperate need of assistance, Kaniahiku beckoned to Keahialaka by playing her nose flute, urging him to hurry to her side. Although Keahialaka was strong and skillful in the arts of 'ōlohe, he was all too easily overcome by Ka-Miki. His grandmother, in an attempt to free him from Ka-Miki, was also captured.

Kaniahiku was astounded at the dexterity of the brothers. Their skill was incomparable to any other *‘ōlohe* she had ever encountered, and even her own skill paled in comparison, for she had never been defeated. All at once she surrendered to Ka-Miki and Maka‘iole, who in turn released her and her grandson. Back at Kaniahiku’s house, a meal was prepared, the *‘awa* of Kali‘u was enjoyed, and the gods were honored with offerings. Kaniahiku requested that the brothers take Keahialaka with them as they continued their journey on the *ala loa*, declaring that if they did, they would be welcomed wherever their travels took them in Puna. Ka-Miki and Maka‘iole approved of this request and took Keahialaka on as their companion. Together, the three men journeyed throughout various districts of Hawai‘i island and competed in many *‘ōlohe* competitions.

In the legend of Ka-Miki, the land of Keoneopoko Iki was named for an *‘ōlohe* master of Puna, who was the *mokomoko* (rough hand fighting) instructor of the chief Pu‘ula (Maly 1992). According to the story Keoneopoko Iki was a traditional training grounds for the *‘ōlohe* of Puna, who were masters skilled in hand-to-hand combat and other martial arts techniques. In the story, Ka-Miki quickly defeated the Puna master, Keoneopokoiki in an *‘ōlohe* contest. Ka-Miki then threatened to kill Keoneopokoiki, who seeing that there was no one who could defeat Ka-Miki, gave his complete surrender to him and returned to his home. According to the story, Keoneopokoiki lived on the inland side of the *ala loa* (the around the island coastal trail). At his compound was an altar dedicated to his gods (Maly 1992).

History After Contact

The arrival of Western explorers in Hawai‘i signified the end of the Precontact Period, and the beginning of the Historic Period. With the arrival of foreigners, Hawai‘i’s culture and economy underwent drastic changes. Demographic trends during the late Proto-Historic Period/early Historic Period indicate population reduction in some areas, due to war and disease, yet increase in others, with relatively little change in material culture. At first, there was a continued trend toward craft and status specialization, intensification of agriculture, *ali‘i*-controlled aquaculture, the establishment of upland residential sites, and the enhancement of traditional oral history (Kent 1983; Kirch 1985). The Kū cult, *luakini heiau*, and the *kapu* system were at their peaks, although western influence was already altering the cultural fabric of the Islands (Kent 1983; Kirch 1985). By the time Kamehameha I had conquered O‘ahu, Maui, and Moloka‘i, in 1795, Hawai‘i saw the beginnings of a global, market economy (Kent 1983). Some of the work of the commoners shifted from subsistence agriculture to the production of foods and goods that they could trade with early visitors. Introduced foods often grown for trade with Westerners included yams, coffee, melons, Irish potatoes, Indian corn, beans, figs, oranges, guavas, and grapes. (Wilkes 1845). Later, as the Historic Period progressed, Kamehameha I died, the *kapu* system was abolished, Christianity established a firm foothold in the islands, and introduced diseases and global economic forces had a devastating impact on traditional Hawaiians and their traditional lifeways.

The Arrival of Captain James Cook and the End of Kalani‘ōpu‘u’s Reign (1778-1782)

British explorer Captain James Cook, in command of the ships *H.M.S. Resolution* and *H.M.S. Discovery*, landed in the Hawaiian Islands on January 18, 1778. The following January 17 [1779], on a return trip to Hawaiian waters, Cook anchored near Ka‘awaloa at Kealakekua Bay in the South Kona District to resupply his ships. This return trip occurred at the time of the annual *Makahiki* festival, and many chiefs and commoners were gathered around the bay celebrating. According to John Ledyard, a British marine on board Cook’s ship, upward of 15,000 inhabitants were present at the bay, and as many as 3,000 canoes came out to greet the ships (Jarves 1847:59). On January 26, Kalani‘ōpu‘u, the reigning chief of Hawai‘i Island, visited Cook on board the *H.M.S. Resolution*, where they exchanged gifts. Kamehameha, the future ruler of all of Hawai‘i, was present at this meeting (Jarves 1847).

On February 4, Cook set sail from Kealakekua Bay, but a storm off the Kohala coast damaged the mast of the *H.M.S. Resolution*, and both ships were forced to return to Kealakekua to make repairs (Kamakau 1992). On February 13, several natives were discovered stealing nails from the British ships. They were fired upon by the crew, and a chief close to Kalani‘ōpu‘u named Palea was knocked down, and his canoe taken. That night, one of Cook’s boats was stolen and the following morning Cook set ashore at Ka‘awaloa with six marines to ask Kalani‘ōpu‘u for its return. Kalani‘ōpu‘u, however, denied any knowledge of the theft and Cook decided to hold the chief captive until the boat was returned (Kamakau 1992). When Cook tried to seize Kalani‘ōpu‘u, however, a scuffle ensued and Cook was killed (along with four of his men and several natives) there on the shores of Ka‘awaloa, struck down by a metal dagger. When Captain Cook fell, the British ships fired cannons into the crowd at the shore and several more natives were killed. Kalani‘ōpu‘u and his retinue retreated inland, bringing the body of Cook with them.

In March of 1779, after Cook’s death, Captain King sailed along the Puna shoreline and described the district as sparsely populated, but verdant and fertile (Maly 1998). Captain King, provided the following description of the landscape:

...the SE sides of the districts of Opoona & Kaoo [Puna and Ka'ū]. The East part of the former is flat, cover'd with Coco nut trees, & the land far back is of a Moderate height. As well as we could judge this is a very fine part of the Island, perhaps the best. Terreeoboo [Kalani'ōpu'u] has one of his residences here.

On the SW extremity of Opoona the hills rise abruptly from the Sea side, leaving but a narrow border, & although the sides of the hills have a fine Verdure, yet they do not seem Cultivated, & when we sail'd pretty near & along this end of Opoona, we did not observe that it was equally Populous with the Eastern parts; before we reach'd the East point of the Island, & all along this SE side the snowy mountain calls Roa (or extensive) [Mauna Loa] is very conspicuous. It is flattish at the top or makes what we call Table land...(Beaglehole 1967:606)

After the departure of *H.M.S. Resolution* and *Discovery*, Kalani'ōpu'u moved to Kona, where he surfed and amused himself with the pleasures of dance (Kamakau 1992). While he was living in Kona, famine struck. Kalani'ōpu'u ordered that all the cultivated products of that district be seized, and he then set out on a circuit of the island. Kalani'ōpu'u first went to Hinakahua in Kapa'au, North Kohala where he amused himself with "sports and games such as hula dancing, *kilu* spinning, *maika* rolling, and sliding sticks" (Kamakau 1992:106). During his stay in Kohala, around 1780, Kalani'ōpu'u proclaimed that his son Kīwala'ō would be his successor, and he gave the guardianship of the war god Kūkā'ilimoku to Kamehameha (Fornander 1996(Kamakau 1992)). It was during his time in Kohala that an uprising, led by a highly esteemed chief of Puna named 'Īmakakōloa, occurred. Upon hearing of the uprising, Kalani'ōpu'u immediately went to Hilo to quell the rebellion.

Though customary at the time, to furnish the king's court with items such as "pigs, fish, taro, fruits and other forms of wealth" (Elkin 1904), it is said that 'Īmakakōloa rebelled because he was tired of the incessant and exorbitant demands of Kalani'ōpu'u. As a chief who loved the people of Puna, and was beloved by them in return, 'Īmakakōloa refused Kalani'ōpu'u's demands. He felt that "his own people who cultivated the ground should be provided with the necessities of life, before the numbers of the royal court, who lived in idleness" (Elkin 1904:26). Rather than allow Kalani'ōpu'u access to the toils of the people of Puna, 'Īmakakōloa:

...seized the valuable products of his district, which consisted of hogs, gray tapa cloth ('*eleuli*), tapas made of *mamaki* bark, fine mats made of young pandanus blossoms ('*ahu hinalo*), mats made of young pandanus leaves ('*ahuao*), and feathers of the '*o'o* and *mamo* birds of Puna. (Kamakau 1992:106)

This action angered Kalani'ōpu'u, who was insulted by the insubordination. He vowed revenge against 'Īmakakōloa and devised a plan to kill him. A battle between the two men ensued, and although 'Īmakakōloa was a worthy opponent, his army was no match for Kalani'ōpu'u's superior forces. After the battle, the Puna chief fled and was sheltered in the district by his people for more than a year. Kalani'ōpu'u, sworn to vengeance, ruthlessly stalked the fugitive chief for the duration of his emancipation, and in his rage, he ordered that Puna be burned to the ground. Fornander (1969:202) indicates that the district was "literally laid in ashes" as a result of Kalani'ōpu'u's vengeance.

While the rebel Puna chief was sought, Kalani'ōpu'u "went to Ka-'u and stayed first at Punalu'u, then at Waiohinu, then at Kama'oa in the southern part of Ka-'u, and erected a heiau called Pakini, or Halauwailua, near Kama'oa" (Kamakau 1992:108). 'Īmakakōloa was eventually captured and brought to the *heiau*, where Kīwala'ō was to sacrifice him. "The routine of the sacrifice required that the presiding chief should first offer up the pigs prepared for the occasion, then bananas, fruit, and lastly the captive chief" (Fornander 1996:202). However, before Kīwala'ō could finish the first offerings, Kamehameha, "grasped the body of Imakakoloa and offered it up to the god, and the freeing of the tabu for the heiau was completed" (Kamakau 1992:109). Upon observing this single act of insubordination, many of the chiefs believed that Kamehameha would eventually rule over all of Hawai'i. After usurping Kīwala'ō's authority at the sacrificial ritual in Ka'ū, Kamehameha retreated to his home district of Kohala.

The Rule of Kamehameha I (1782-1819)

After Kalani'ōpu'u's death in April of 1782, several chiefs were unhappy with Kīwala'ō's division of the island's lands, and civil war broke out. Kīwala'ō, Kalani'ōpu'u's son and appointed heir, was killed at the battle of Moku'ōhai in South Kona in July of 1782. Supporters of Kīwala'ō, including his half-brother Keōua and his uncle Keawemauhili, escaped the battle of Moku'ōhai with their lives and laid claim to the Hilo, Puna, and Ka'ū Districts. According to 'Īī (Ii 1963) nearly ten years of almost continuous warfare followed the death of Kīwala'ō, as Kamehameha endeavored to unite the Island of Hawai'i under one rule and conquer the islands of Maui and O'ahu. Keōua became Kamehameha's main rival on the Island of Hawai'i, and he proved difficult to defeat (Kamakau 1992). Keawemauhili eventually give his support to Kamehameha, but Keōua never stopped resisting. Around 1790, in an effort to secure

his rule, Kamehameha began building the *heiau* of Pu‘ukoholā in Kawaihae, which was to be dedicated to the war god Kūkā‘ilimoku (Fornander 1996).

Westervelt (1916) related a story of Keōua, Keawemauhili, and Kamehameha that begins after the battle of Moku‘ōhai, but tells of another battle in ca. 1790 when Kamehameha routed Keōua at Waimea and Hāmākua and then sent men to attack Ka‘ū. As Keōua attempted to return to his home district a portion of his army was killed by an eruption of Kīlauea Volcano. Westervelt writes:

... Kiwalao’s half-brother Keoua escaped to his district Ka-u, on the southwestern side of the island. His uncle Keawe-mau-hili escaped to his district Hilo on the southeastern side.

For some years the three factions practically let each other alone, although there was desultory fighting. Then the high chief of Hilo accepted Kamehameha as his king and sent his sons to aid Kamehameha in conquering the island Maui.

Keoua was angry with his uncle Keawe-mau-hili. He attacked Hilo, killed his uncle and ravaged Kamehameha’s lands along the northeastern side of the island.

Kamehameha quickly returned from Maui and made an immediate attack on his enemy, who had taken possession of a fertile highland plain called Waimea. From this method of forcing unexpected battle came the Hawaiian saying, “The spear seeks Waimea like the wind.”

Keoua was defeated and driven through forests along the eastern side of Mauna Kea (The white mountain) to Hilo. Then Kamehameha sent warriors around the western side of the island to attack Keoua’s home district. Meanwhile, after a sea fight in which he defeated the chiefs of the islands Maui and Oahu, he set his people to building a great temple chiefly for his war-god Ka-ili. This was the last noted temple built on all the islands.

Keoua heard of the attack on his home, therefore he gave the fish-ponds and fertile lands of Hilo to some of his chiefs and hastened to cross the island with his army by way of a path near the volcano Kīlauea. He divided his warriors into three parties, taking charge of the first in person. They passed the crater at a time of great volcanic activity. A native writer, probably Kamakau, in the native newspaper *Kuokoa*, 1867, describes the destruction of the central part of this army by an awful explosion from Kīlauea. (Westervelt 1916:140-141)

The untimely eruption of Kīlauea, as Keōua’s army attempted to return to Ka‘ū to stop Kamehameha’s warriors from ravaging their home district, cost him about 400 fighting men along with an untold number of women and children (Fornander 1996). Kamehameha’s prophets said that this eruption was the favor of the gods who rejoiced at his building of Pu‘ukoholā Heiau. According to Westervelt (1916:146), “the people said it was proof that Pele had taken Kamehameha under her special protection and would always watch over his interests and make him the chief ruler.”

Unable to defeat Keōua in battle, Kamehameha resorted to trickery. When Pu‘ukoholā Heiau was completed in the summer of 1791, Kamehameha sent his two counselors, Keaweheulu and Kamanawa, to Keōua to offer peace. Keōua was enticed to the dedication of the Pu‘ukoholā Heiau by this ruse, and when he arrived at Kawaihae, he and his party were sacrificed to complete the dedication (Kamakau 1992). The assassination of Keōua gave Kamehameha undisputed control of Hawai‘i Island by 1792 (Greene 1993). It is widely thought that Keōua knew the likely outcome of his visit to Pu‘ukoholā Heiau but sacrificed himself anyway to spare the people of Ka‘ū further bloodshed.

By 1796, with the aid of foreign weapons and advisors, Kamehameha conquered all of the island kingdoms except Kaua‘i. In 1810, when Kaumuali‘i of Kaua‘i gave his allegiance to Kamehameha, the Hawaiian Islands were unified under a single leader (Kuykendall and Day 1976). Kamehameha would go on to rule the islands for another nine years. He and his high chiefs participated in foreign trade but continued to enforce the traditional *kapu* system.

Early Written Accounts of Puna (1820-1847)

Following the death of Kamehameha I in 1819, the Hawaiian religious and political systems began a radical transformation. Ka‘ahumanu proclaimed herself *Kuhina nui* (Prime Minister), and within six months the ancient *kapu* system was overthrown. Within a year, Protestant missionaries arrived from America (Fornander 1969; Ii 1963; Kamakau 1992). In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai‘i seeking out communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal (Ellis 2004), that offers a glimpse of the Puna District during this time. Walking from Kīlauea to Waiākea along Puna’s southeastern

shore with his missionary companions Asa Thurston and Artemis Bishop, Ellis recorded descriptions of residences and practices that are applicable to the general study area:

The population in this part of Puna, though somewhat numerous, did not appear to possess the means of subsistence in any great variety or abundance; and we have often been surprised to find desolate coasts more thickly inhabited than some of the fertile tracts in the interior; a circumstance we can only account for, by supposing that the facilities which the former afford for fishing, induce the natives to prefer them as places of abode; for they find that where the coast is low, the adjacent water is usually shallow.

We saw several fowls and a few hogs here, but a tolerable number of dogs, and quantities of dried salt fish, principally albacores and bonitos. This latter article, with their *poē* [*poi*] and sweet potatoes, constitutes nearly the entire support of the inhabitants, not only in this vicinity, but on the sea coasts of the north and south parts of the island.

Besides what is reserved for their own subsistence, they cure large quantities as an article of commerce, which they exchange for the vegetable productions of Hilo and Mamakua [Hāmākua], or the *mamake* and other tapas of Ora [‘Ōla‘a] and the more fertile districts of Hawaii. (Ellis 2004:263-264)

Ellis and the ABCFM missionaries travelled along the coast of Kahuwai, Wa‘awa‘a, and Nānāwale and then turned *mauka* toward a village in Honolulu Ahupua‘a (Ellis 2004:294). On August 8, 1823, Ellis and the ABCFM missionaries left Honolulu and visited the village of Waiakahiula. Ellis’ journal provides a brief first-hand description of the village’s location relative to the coast:

We arose early on the 8th, and Mr. Thurston held morning worship with the friendly people of the place [Honolulu]. Although I had been much indisposed through the night, we left Honoruru [*sic*] soon after six a.m. and, travelling slowly towards the sea-shore, reached Waiakeheula [*sic*] about eight, where I was obliged to stop, and lie down under the shade of a canoe-house near the shore. Messrs. Thurston and Bishop walked up to the settlement about half a mile inland, where the former preached to the people...(Ellis 2004:295)

After preaching, Bishop continued on alone toward Waiākea, while Thurston returned to fetch Ellis from the canoe shed. Upon reaching the village, Ellis found its residences to be interspersed among the agricultural fields rather than in a single, nucleated settlement:

The country was populous, but the houses stood singly, or in small clusters, generally on the plantations, which were scattered over the whole country. Grass and herbage were abundant, vegetation in many places luxuriant, and the soil, though shallow, was light and fertile. (Ellis 2004:296)

Other early visitors to Puna provide general descriptions of the conditions in the district during subsequent decades. One year after Ellis’ tour, the ABCFM established a church in Hilo. From that church (Hāili), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman, who came to Hawai‘i in 1832, and Titus Coan, who arrived in 1835 were two of the most influential congregational missionaries in Puna and Hilo. As part of their duties, they compiled census data for the areas within their missions. In 1835, 4,800 individuals were recorded as residing in the district of Puna the smallest total district population on the island of Hawai‘i (Schmitt 1973). In 1841, Titus Coan recorded that most of the 4,371 residents of Puna lived near the shore, though there were hundreds of individuals who lived inland (Holmes 1985).

In 1841, the United States Exploring Expedition under the direction of Commander Charles Wilkes, toured Hawaii Island and traveled through the Puna District. Wilkes produced a map of Puna, which included the coastal trail but showed only a large “Pandanus Forest” covering the lands in the vicinity of the study areas (Figure 17).

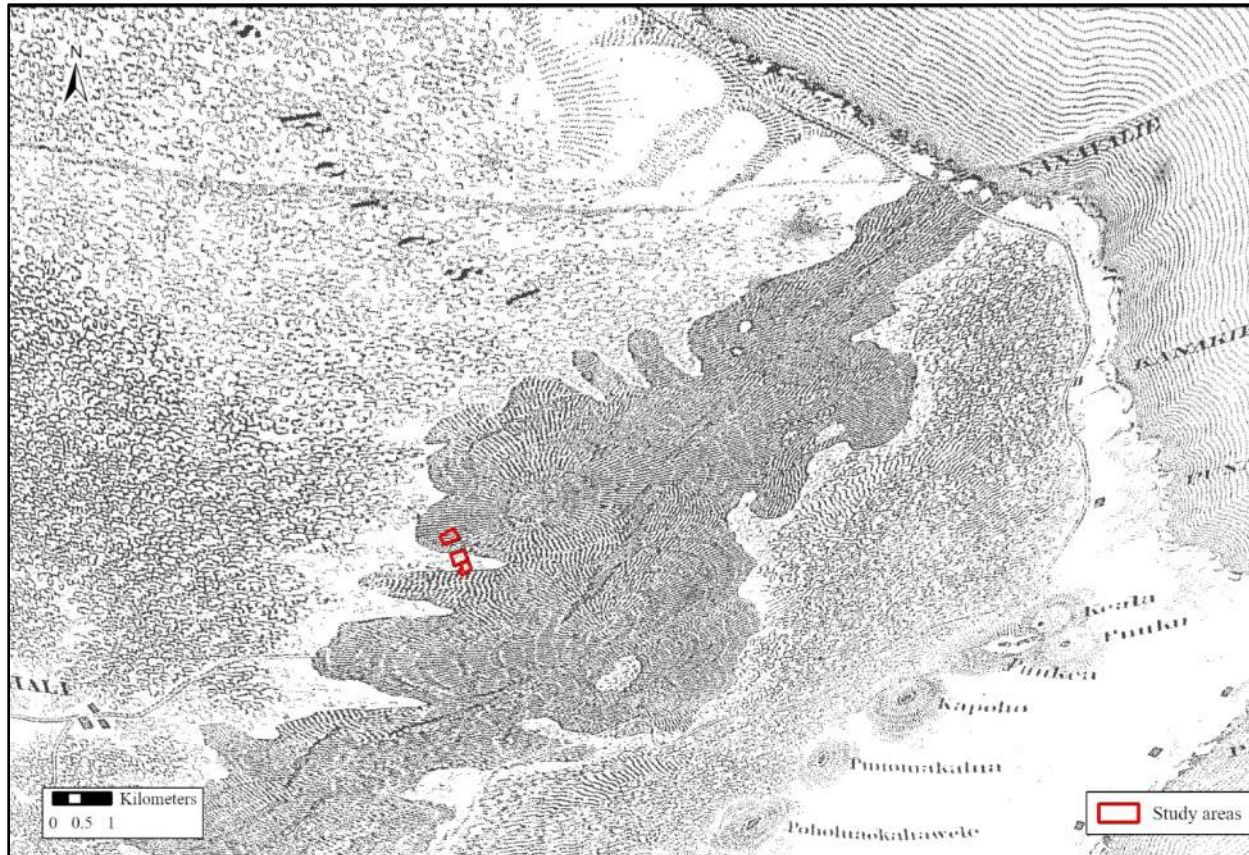


Figure 17. Portion of Hawai'i Registered Map 424 prepared by Wilkes in 1841 showing the approximate location of the study areas (Wilkes 1844:61).

Wilkes, travelling towards Kapoho at the eastern tip of the island, provided the following description of Puna:

...Almost all of the hills or craters of any note have some tradition connected with them; but I found that the natives were now generally unwilling to narrate these tales, calling them “foolishness.”

After leaving the pahoihoi [sic] plain, we passed along the line of cone-craters towards Point Kapoho, the Southeast part of the island.

Of these cone-craters we made out altogether, large and small, fifteen, trending about east-northeast. The names of the seven last are Pupukai, Poholuaokahoweke [Pu'u-hōlua-o-Kahawali], Punomakalua, Kapoho, Puukea, Puuku, and Keala. On some of these the natives pointed out where there had formerly been slides, an amusement or game somewhat similar to the sport of boys riding down hill on sleds. These they termed kolua [sic – *holua*].

This game does not appear to be practiced now, and I suppose that the chiefs consider themselves above such boyish amusements. The manner in which an old native described the velocity with which they passed down these slides was, by suddenly blowing a puff; according to him, these amusements were periodical, and the slides were usually filled with dried grass.

As we approached the sea-shore, the soil improved very much, and was under good cultivation, in taro, sweet-potatoes, sugar cane, and a great variety of fruit and vegetables. At about four o'clock, we arrived at the house of our guide, Kekahunanui, who was the “head man.” I was amused to find that none of the natives knew him by this name, and were obliged to ask him, before they could give it to Dr. Judd...

...The view from the guide's house was quite pretty, the eye passing over well-cultivated fields to the ocean, whose roar could be distinctly heard... [Wilkes 1845: Vol. IV:186]

During the night, one of the heaviest rains I had experienced in the island, fell; but the morning was bright and clear,—every thing seemed to be rejoicing around, particularly the singing-birds, for the

variety and sweetness of whose notes Hawaii is distinguished. Previous to our departure, all the tenantry, if so I may call them, came to pay their respects, or rather to take a look at us. We had many kind wishes, and a long line of attendants, as we wended our way among the numerous taro patches of the low grounds, towards Puna; and thence along the sea-coast where the lava entered the sea, at Nanavalie [Nānāwale]. The whole population of this section of the country was by the wayside, which gave me an opportunity of judging of their number; this is much larger than might be expected from the condition of the country, for with the exception of the point at Kapoho, very little ground that can be cultivated is to be seen. The country, however, is considered fruitful by those who are acquainted with it, notwithstanding its barren appearance on the roadsides. The inhabitants seemed to have an abundance of bread-fruit, bananas, sugar-cane, taro, and sweet-potatoes. The latter, however, are seen to be growing literally among heaps of stones and pieces of lava, with scarcely soil enough to cover them; yet they are, I am informed, the finest on the island...

In some places they have taken great pains to secure a good road or walking path; thus, there is a part of the road from Nanavalie to Hilo which is built of pieces of lava, about four feet high and three feet wide on the top; but not withstanding this, the road is exceedingly fatiguing to the stranger, as the lumps are so arranged that he is obliged to take a long and short step alternately; but this the natives do not seem to mind, and they pass over the road with great facility, even when heavy laden...(Wilkes 1845:188-193, Vol. IV)

In 1846, Chester S. Lyman, a part-time professor at Yale University visited Hilo, Hawai‘i, and stayed with Titus Coan (Maly 1998). Traveling the almost 100-mile-long stretch of the “Diocese” of Mr. Coan, Lyman reported that the district of Puna had somewhere between 3,000-4,000 inhabitants (Maly 1998). Entering Puna from Hilo, and traveling to Kea‘au along the coast, Lyman offered the following observations of the Puna District:

...The groves of Pandanus were very beautiful, and are the principal tree of the region. There is some grass and ferns, and many shrubs; but the soil is very scanty. Potatoes are almost the only vegetable that can be raised, and these seem to flourish well amid heaps of stone where scarcely a particle of soil could be discovered. The natives pick out the stones to the depth often of from 2 to 4 feet, and in the bottom plant the potato—how it can expand in such a place is a wonder.

Nearly all Puna is like this. The people are necessarily poor—a bare subsistence is all they can obtain, and scarcely that. Probably there are not \$10 in money in all Puna, and it is thought that not over one in five hundred has a single cent. The sight of some of these potatoe patches would make a discontented N.E. farmer satisfied with his lot. Yet, I have nowhere seen the people apparently more contented & happy. (Lyman ms. Book III:3 in Maly 1998:35)

Written accounts left by early visitors to the Island of Hawai‘i offer insight into what life may have been like for the earliest residents of Puna. However, by the time Ellis visited Puna, less than fifty years after the arrival of the first Europeans, the population of Hawai‘i was already beginning to decline. By 1850, the population of Hawai‘i Island had dropped to 25,846 individuals (Schmitt 1973:8). Maly (1998:37) summarizes the reasons for the rapid decline of native populations thusly:

Overall, historic records document the significant effect that western settlement practices had on Hawaiians throughout the islands. Drawing people from isolated native communities into selected village parishes and Hawaiian ports-of-call, had a dramatic, and perhaps unforeseen impact on native residency patterns, health, and social and political affairs. In single epidemics hundreds, and even thousands of Hawaiians died in short periods of time.

Legacy of the *Māhele* ‘Āina of 1848 and the *Kuleana* Act of 1850

By the middle of the nineteenth century, the ever-growing population of Westerners in the Hawaiian Islands forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership, and the *Māhele* became the vehicle for determining ownership of native lands. During the *Māhele*, the land interests of the King (Kamehameha III), the chiefs and the *konohiki* were defined. The chiefs and *konohiki* were required to present their claims to the Land Commission to receive awards for lands provided to them by the King. They were also required to provide commutations to the government to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission (Chinen 1961:13).

During the *Māhele* ‘Āina of 1848, all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and *Konohiki* Lands. All lands awarded during the *Māhele* were subject to the

rights of the native tenants therein. As a result of the *Māhele*, Keonepoko Ahupua‘a (assumed to be Keonepoko Nui, but not specified) was claimed by the chief, William Charles Lunalilo but was subsequently relinquished and incorporated into the inventory of Government Land (Soehren 2005). Keonepoko Iki is not listed in the *Buke Māhele* (1848), but it too was designated as Government Land as was Ka‘ohe Ahupua‘a (adjacent to Keonepoko Iki’s southern boundary) and many other *ahupua‘a* in the Puna District. As Government Land, the Hawaiian Kingdom Government had the authority to determine land use activities.

As the King and his *ali‘i* and *konohiki* made claims to large tracts of land, questions arose regarding the rights of the native tenants. In August of 1850, the Kuleana Act was passed which clarified the process by which native tenants could claim fee simple ownership to any portion of land they physically occupied, actively cultivated, or had improved (Garovoy 2005). Lands awarded through the Kuleana Act were and still are, referred to as *kuleana* awards or *kuleana* lands. The Land Commission oversaw the program and administered the *kuleana* as Land Commission Awards (LCA) (Chinen 1958). No *kuleana* awards were granted within Keonepoko Iki or Nui Ahupua‘a. Despite the availability of lands within the district and the presence of native inhabitants, the Puna District is woefully distinguished for having the fewest number of lands awarded to both the *ali‘i* and *konohiki* during the 1848 *Māhele* and native tenants during the *Kuleana* Act of 1850. McGregor (2007:158-159) summarizes this issue thusly:

It is remarkable that in a district with 311,754 acres, only nineteen awards of private land were granted. Of these awards, sixteen grants of 50,876 acres, four ahupua‘a, and two portions of a third ‘ili were given to ten chiefs who lived outside of Puna. Three small parcels totaling 32.33 acres were granted to commoners, Baranaba, Hewahewa, and Haka. The bulk of the Puna lands were designated as public lands either to the monarch, as Crown lands, or to the government of the Hawaiian kingdom. This means that the interest of the majority of the Native Hawaiians in Puna were never separated out from the lands of Puna and remained vested in the lands held by the Crown and the government.

In describing some of the underlying factors that may have influenced the shortcomings of the *Māhele* process for Puna’s native residents, Maly and Maly (2021:94) offered the following:

Puna stands out best example of the *Māhele*’s shortcomings for Native Hawaiians across the pae ‘āina (island chain). Beyond the rapid decline of the native population, other issues such as (1) settlement areas were remote and spread across the district, (2) the fact that private property rights was a foreign concept, one that was not easily adapted to by Hawaiians, and (3) some *konohiki* used intimidation and fear to keep *hoa‘āina* from filing claims.

Furthermore, Maly and Maly (2021) point out that in other areas of the island, mission station representatives (e.g., Lyons, Wilcox, Baldwin, Alexander, Emerson, and others) spent time encouraging area residents to file claims and even assisted them with the land claim process. However, Coan, who oversaw the Puna District during the *Māhele* process, appears to have made little to no effort to assist or advocate for the district’s residents. Despite the unfortunate outcome of the *Māhele* for Puna’s native residents, many managed to maintain their connection to their lands and their traditional lifeways.

Government Land Grant Program

In conjunction with the 1850 Kuleana Act, the King authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The Act resolved that portions of the Government Lands established during the *Māhele* should be set aside and sold as grants. The stated goal of this program was to enable native tenants, many of whom were not or were insufficiently awarded *kuleana* parcels, to purchase lands of their own. Despite the stated goal of the grant program, many of the Government Lands were eventually sold or leased to foreigners. At the coast along the Keonepoko Iki/Ka‘ohe boundary, a single 277.8-acre grant parcel (Grant No. 1533) was purchased by Kekoa in 1855. The grant record is silent regarding Kekoa’s use of the grant lands.

Boundary Commission Testimony and the 1868 Eruption of Mauna Loa

In 1862, the Commission of Boundaries was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded as a part of the *Māhele*. Subsequently, in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were elder *kama‘āina* (native-born or one well-acquainted with an area). This information was collected primarily between 1873 and 1885 and was usually given in Hawaiian and transcribed in English as they occurred.

Although testimony was not heard for Keonpoko Iki, the boundaries of the neighboring Keonepoko Nui, were heard by the Boundary Commission on February 28, 1876, upon the application of Charles Kana'ina (on behalf of his son, William Charles Lunalilo). Two witnesses, Kaumaikai, a resident of Maku'u and Kunewa, a resident of Keonepoko Iki gave their sworn testimony before the Commission. In their testimonies they identified; an *awāwa* (a valley, gulch, or ravine) which ran to a place known as Kaikō, marking the boundary at the shore between Keonepoko Iki and Keonepoko Nui. Moving *mauka*, nearer to the study areas, two tree groves marked the boundaries, concurring with Wilkes' (1844) map of Hilo and Puna in ca. 1841 (see Figure 17). These were the *'ōhi'a* and *hala* forest known as Pupuakoko and the second, an *'ōhi'a* groove known as Mokuo'umi.

In 1868 a volcanic eruption emanating from Mauna Loa volcano shook Hawai'i Island, bringing with it lava flows, earthquakes, and a *tsunami* that transformed the landscape of the southern part of island, and further contributed to the depopulation of the District of Puna. Coan (1882:314-316) recorded that on April 2:

...a terrific shock rent the ground, sending consternation through all Hilo, Puna, and Kau. In some places fissures of great length, breadth, and depth were opened... Stone houses were rent and ruined, and stone walls sent flying in every direction...the sea rose twenty feet along the southern shore of the island, and in Kau 108 houses were destroyed and forty-six people drowned...Many houses were also destroyed in Puna, but no lives were lost. During this awful hour the coast of Puna and Kau, for the distance of seventy-five miles subsided seven feet on average, submerging a line of small villages all along the shore. One of my rough stone meeting houses in Puna [Kapoho-Koa'e], where we once had a congregation of 500 to 1,000 was swept away with the influx of the sea, and its walls are now under water...

The population of Puna continued to decline throughout the first half of the nineteenth century and Hawaiians maintained marginalized communities outside of the central population centers. In the aftermath of the *Māhele*, economic interests in the region swiftly changed from the traditional Hawaiian land tenure system of subsistence farming and regional trading networks to the more European-based cash crops including coffee, tobacco, sugar, timber, and pineapple, and emphasized dairy and cattle ranching.

Keonepoko Iki and Puna during the Twentieth Century and the Rise of Pāhoa Town

By 1900 Puna was on the verge of major economic growth, spurred by the sugar and lumber industries. The rise and fall of these industries can be traced along the former railroad tracks that cross the landscape *makai* of the study area. In 1899, the 'Ōla'a Sugar Company began operating in the Kea'au area. The directors of the company realized early that the lack of mass transportation would hinder the success of their business. As a result, they organized the Hilo Railroad Company and, on April 8, 1899, were granted a 50-year charter (Best 1978). The railroad's infrastructure developed quickly. Rail service to 'Ōla'a (Kea'au) from Hilo began on June 18, 1900. Another sugar company, the Puna Sugar Company, located near the village of Kapoho, had been organized within the Puna District on March 2 of that same year. Puna Sugar had cane fields scattered all over lower Puna from Kapoho to Pāhoa Town itself. Keonepoko Iki's thin, sticky, acidic soils, however, made the lands in the vicinity of the current study areas unsuitable for sugar fields, and in fact, the wide dispersal of suitable agricultural lands also hindered the growth of the sugar industry in Puna. As with 'Ōla'a Sugar's early Kea'au operations, the lack of a reliable transportation system made it expensive to collect and transport the cane from the scattered fields to the mill. So, when Hilo Railroad proposed to lay 4 miles of track from Kapoho to Pāhoa, the Puna Sugar Company paid for half the cost. By March 1, 1902, the Hilo Railroad was making regular stops at the 'Ōla'a Sugar Mill, the town of Pāhoa, and in lower Puna. Meanwhile, by 1905, the harvests of the Puna Sugar Co. were being ground at the 'Ōla'a Mill, and the Puna Sugar Co. was operating as a division of the 'Ōla'a Sugar Co. (Dorrance and Morgan 2000).

Beginning in 1903, *mauka* portions of Keonepoko Nui and Keonepoko Iki *ahupua'a* (a half mile northeast of Pāhoa Town) were subdivided into twenty-three homestead lots that were collectively called the Keonepoko Homesteads (Figure 18). The lots were offered for sale as government grants. The current study areas are within Keonepoko Homestead Lots 5, 7, and 11. Alternative 3 is located within a portion of Lot 5 which was sold to Christantina P. Amaral as Grant No. 11150 in 1943. Alternative 2 is located within Lot 7 which was sold to Kaheakeola Kane in 1905 as Grant 4916. Alternative 1 is located within Lot 11 but the map does not identify the name of the buyer.

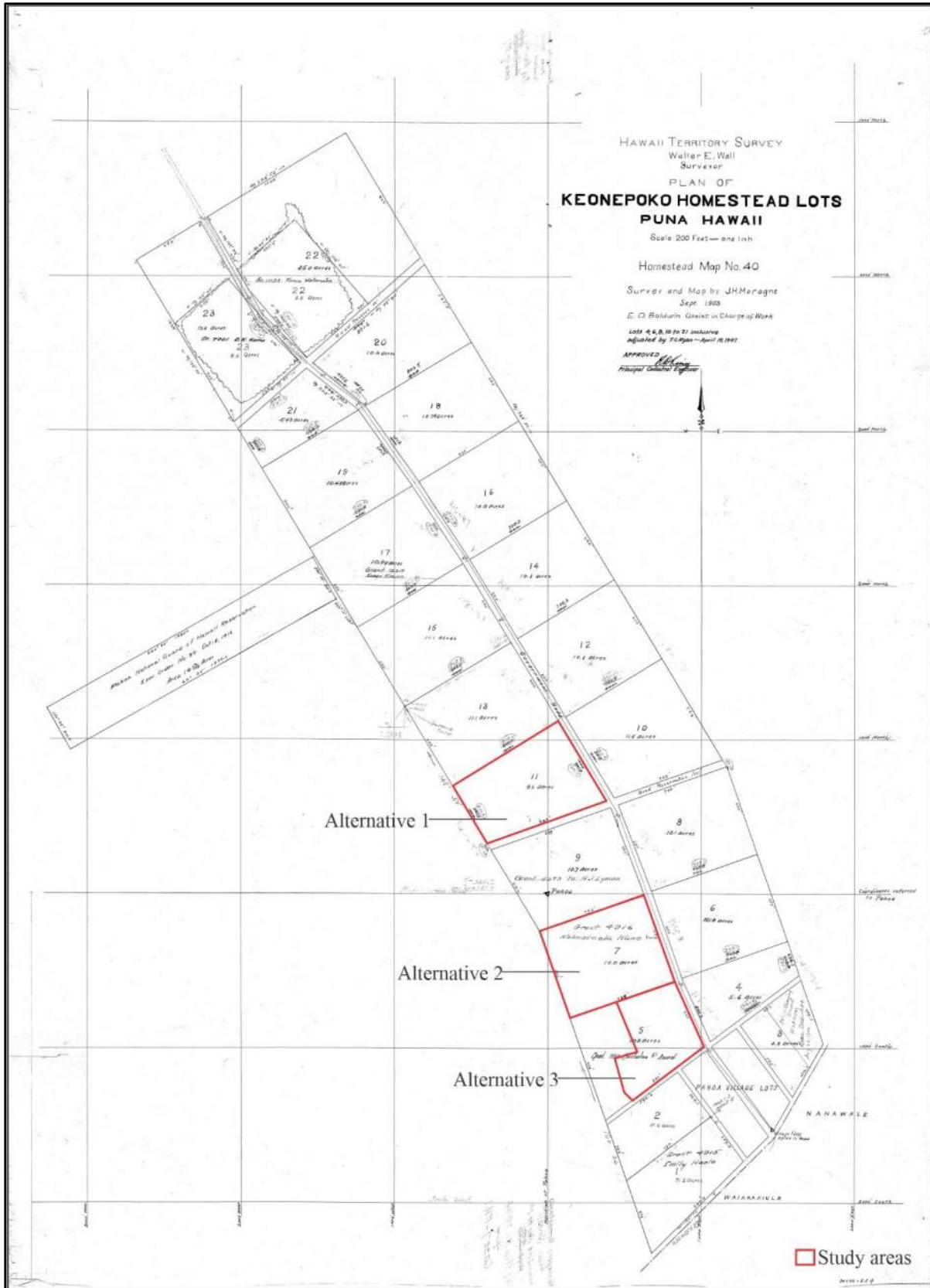


Figure 18. Hawai'i Registered Map No. 2084 of the Keonepoko Homestead lots (Morange 1903).

In 1907, the Hawaiian Mahogany Lumber Company incorporated and signed a five-year contract with the Atchison, Topeka, and Santa Fe Railroads for the delivery of 90,000,000 board feet of ‘ōhi‘a railroad ties from the vast forest reserves of Puna (Clark et al. 2001). Subsequently, in 1908 the company erected a lumber mill at Pāhoā. A network of narrow-gauge railroad tracks, 3 feet wide, went from the lumber mill to the forests above Pāhoā. On March 24, 1909, the Hawaiian Mahogany Company became the Pāhoā Lumber Mill, and James B. Castle, the former managing director of the mill, became the new owner. The company then negotiated a contract with the Santa Fe Railway Company for the delivery of 2,500,000 cross ties and 2,500 sets of switch ties. In addition to railway ties, the Pāhoā Lumber Mill began producing products such as roofing shingles, flooring, paving blocks, and lumber for cars, wagons, and carriages.

On the night of January 28, 1913, a raging fire broke out in the mill and it burned to the ground along with most of the stock of milled lumber. Fortunately for Pāhoā residents, the wind blew the flames and smoke to the north away from the village. Despite this disaster, J. B. Castle rebuilt the mill and by October the mill was operating again under the name of the Hawai‘i Hardwood Company, part of the Hawaiian Development Company. The Santa Fe Railroad found, ultimately, that ‘ōhi‘a wood did not last as long as expected in the dry climate of the American Southwest. They did not renew their contract, and, in 1916, the Hawaiian Hardwood Company, Inc. closed their doors permanently (Burtchard and Moblo 1994).

When the lumber business moved out of Pāhoā in ca. 1916, the mill was leased to ‘Ōla‘a Sugar. Standard gauge railroad tracks replaced the old timber railroad grade tracks, and the timber-producing forests were converted to sugarcane fields. The company used four mogul-type Baldwin locomotives to haul cane from the Puna fields through Pāhoā to their processing plant in Kea‘au. Passenger rail service in the Puna District also started to increase around this time. In 1916 the Hilo Railroad was reorganized as the Hawai‘i Consolidated Railway. The railroad used Baldwin locomotives and Hall-Scott motorcars with passenger trailers to haul freight and passengers. Then, in 1925 the Hawai‘i Consolidated Railway ordered and received three rail busses from the White Motor Company, which they used in Puna and Hilo districts, making daily stops in the town of Pāhoā. The rail bus became an especially popular form of transportation during World War II when mandatory gas rationing was in effect for all residents (Best 1978).

Roughly 7,400 acres of the *makai* lands in Keonepoko Nui and Keonepoko Iki became part of the Shipman Ranch during the early twentieth century when W.H. Shipman, Ltd. obtained General Lease No. 1025 (Figure 19) for an annual rental fee of \$300.00. The lease began on July 12, 1918, and expired on July 31, 1928. W.H. Shipman, Ltd. also held a lease for roughly 14,000 acres of the adjacent *ahupua‘a* of Maku‘u, Holonā, and Pōpōkī (General lease No. 854), which expired on November 25, 1929. On subsequent maps (Figure 20), the general area leased by Shipman is referred to as the Ka‘ohe-Maku‘u-Keonepoko Iki Government Tract. Throughout this period of growth and decline in Puna, industrial and commercial development in the study area vicinity was largely concentrated in Pāhoā Town, (located half a mile southeast of the study areas). The homesteads surrounding Pāhoā Town at Nānāwale, Ka‘ohe, and Keonepoko Iki were slowly developing into single-family residences and small farms. The 1924 U.S.G.S. Maku‘u quadrangle (Figure 21) shows the alignment of the railroad tracks and reveals little of note in the vicinity of the study areas other than the boundaries of the homesteads.

By 1946 rail travel became less popular and profitable, due to improved roads and increased trucking. In March of that year, stockholders of Hawai‘i Consolidated Railway voted to abandon all railroad operations. This decision was further reinforced on April 1, 1946, when a devastating *tsunami* destroyed Hilo Bay, including all the rail lines, a drawbridge in the bay, and part of the Waiākea freight yards. On November 20, 1946, the company shut down its remaining lines, including all Puna railroad operations, and began auctioning off all its assets. The ‘Ōla‘a railroad line remained in operating condition and continued to be used for hauling sugar until December 1948. In that year the sugar industry began phasing out its operations in Puna and closed the tracks permanently (Best 1978).

Pāhoā Town proper, during the second half of the twentieth century, remained a quaint plantation town lined with numerous family-owned businesses and homes. An aerial photograph taken in 1965 (Figure 22) shows a building within what is now TMK parcel 076 (a portion of Alternative 3) and three buildings in parcel 007 (Alternative 1). The remainder of the study areas appear undeveloped. County tax records indicate that TMK parcel 004 (portion of Alternative 3) was once a larger 9.6-acre parcel that was subsequently subdivided into seven parcels, including the four that comprise Alternative 3 (004, 076, 082, and 083). An aerial photograph taken in 1977 (Figure 23) shows a dwelling and workshop (listed in county tax records as built in 1970) within parcel 076 and the former building shown in the 1965 aerial is no longer present. The 1977 aerial photo also shows a dwelling (listed in county tax records as built in 1968) in the southwestern corner of parcel 004, undeveloped land in the southeastern corner, and parcels 082 and 083 under agricultural use. Parcel 005 appears as undeveloped land within the 1977 image and parcel 007 shown the same buildings (listed in county tax records as built in 1955) seen previously in the 1965 aerial.

2. Background

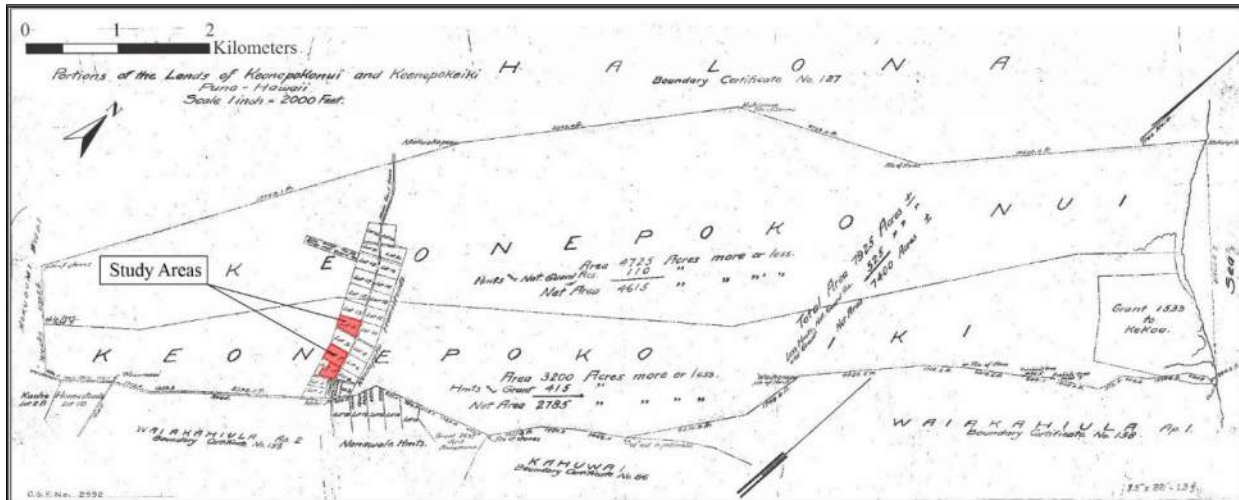


Figure 19. Map accompanying C.S.F. 2,292 for General Lease No. 1025 to W.H. Shipman Ltd.(Arioli 1918).

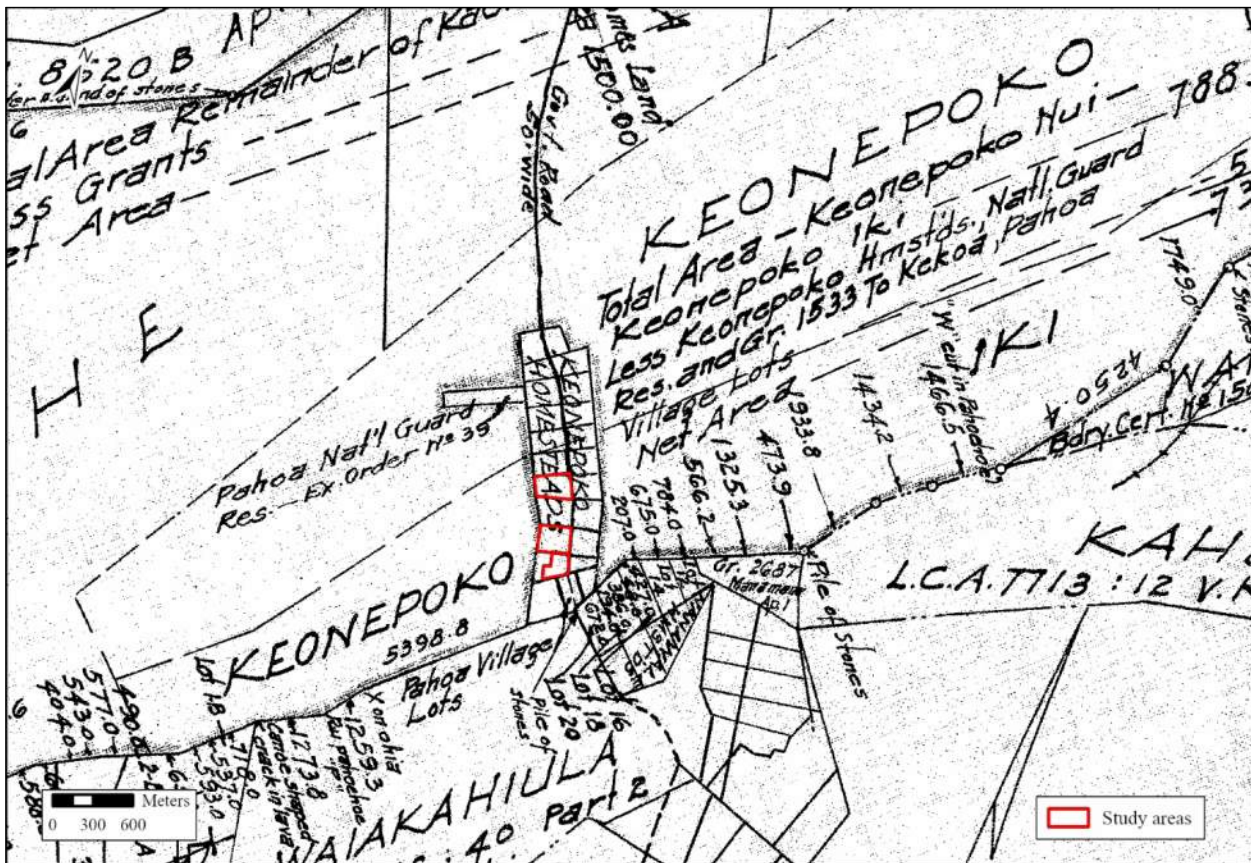


Figure 20. Portion of map accompanying C.S.F 5,261 for the Ka'ohē-Maku'u-Keonepoko Iki Government Tract (Coff 1929).

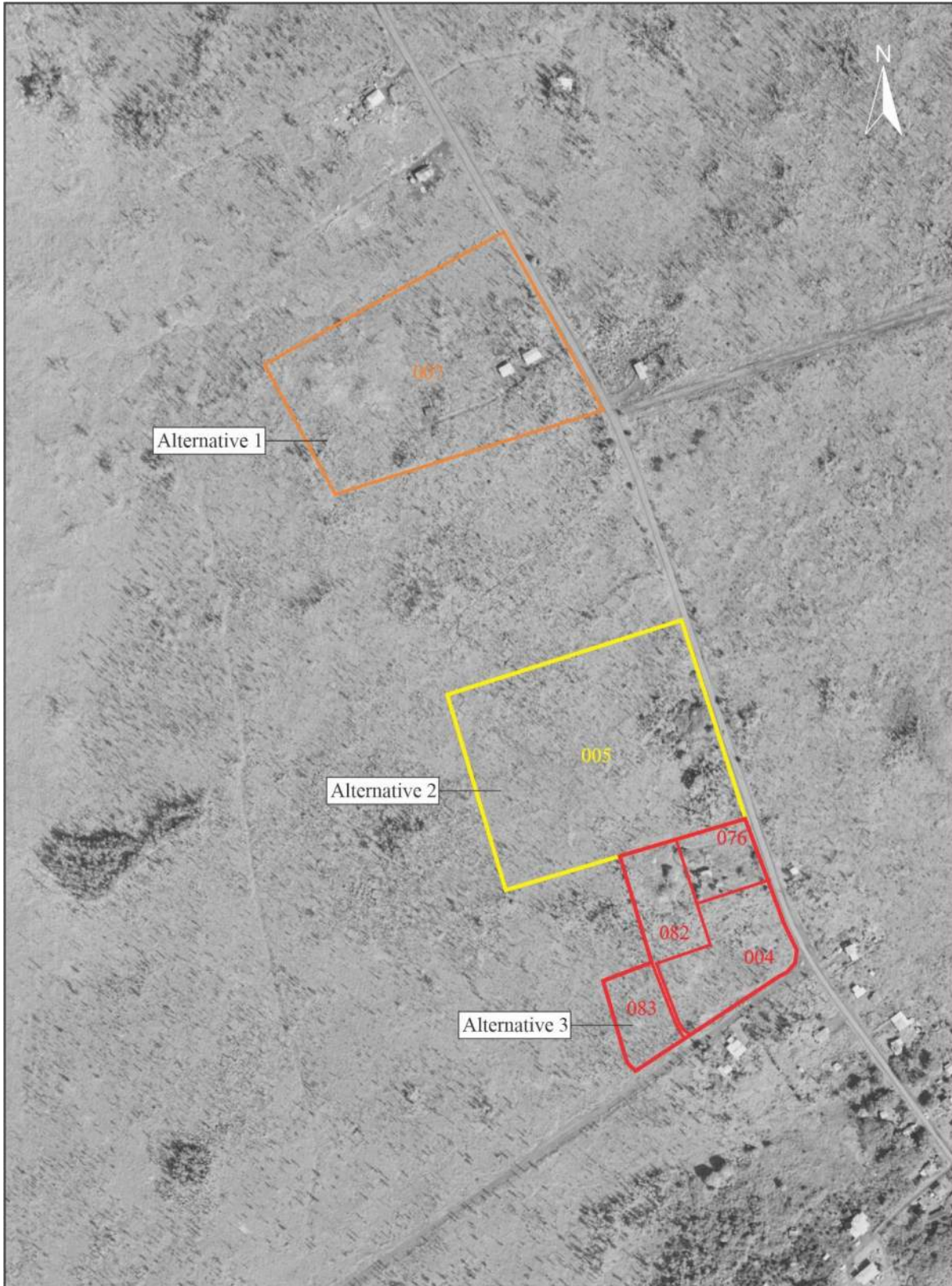


Figure 22. 1965 aerial photograph showing Alternatives 1-3, labeled with the TMK parcel numbers.



Figure 23. 1977 aerial photograph showing Alternatives 1-3, labeled with the TMK parcel numbers.

Throughout the remainder of the 20th and 21st centuries, the population of the Puna District steadily grew which was directly associated with the rapid development of large-scale subdivisions throughout the district following Statehood in 1959 (Black 1960). The 1960 Kapoho Eruption decimated the village towns of Kapoho and Koa‘e thereby making Pāhoa the central town center for this region. With Pāhoa Town proper operating as the main center, the area north inclusive of the Keonepoko Iki Homesteads slowly transformed into quaint residences and family-owned farms and businesses. With the resident population steadily increasing during the later 20th and 21st centuries, the ethnic makeup of Pāhoa grew more diverse. In the late 1990s and early 2000s, efforts to expand Pāhoa Town to accommodate the growing needs of the community spurred a series of development projects which has been focused near the northern termination of the Pāhoa Village Road. Development in this area has included the construction of the Pāhoa Marketplace Shopping Center (ca. 2004), Long’s Drugs (ca. 2009), Burger King, two gas stations, a restaurant, and most recently the Puna Kai Shopping Center, a sprawling 9.9-acre shopping center that opened in 2020.

PREVIOUS ARCHAEOLOGICAL STUDIES

Since the early 1900s, several archaeological studies have examined the Keonepoko area of Puna, though these studies have largely focused on the coast where Precontact and early Historic populations tended to concentrate. The earliest relevant survey of archaeological resources was conducted by Hudson (1932). Hudson attempted to inventory the sites of East Hawai‘i Island from Waipi‘o Valley to the Ka‘ū District for the B. P. Bishop Museum. He recorded a wide range of archaeological features including *heiau*, burials, caves, habitations, trails, and agricultural features during his survey. The route of the survey took him through the coastal portion of Keonepoko Iki Ahupua‘a. Hudson (1932) noted that it was difficult to obtain information about sites in Puna because “most of them are located along the coast between Keaau and Kapoho where no one now lives, and it is difficult to locate descendants of the former Hawaiian population of the area who might be able to shed light on the nature and function of certain sites,” and that, “back from the sea the land is under cultivation in cane, used for pasture, or covered with dense vegetation which can be penetrated only with difficulty.” Hudson (1932:309) did not record any specific features in the immediate vicinity of the current study areas, although he did note a coastal trail (Site 83) in Keonepoko Nui Ahupua‘a consisting of flat stones from the beach.

Forty-two years later, Ewart and Luscomb (1974) of the B. P. Bishop Museum conducted a six-mile long archaeological reconnaissance survey of a proposed Kapoho-Keaukaha Highway route from Waiakahiula Ahupua‘a to Kea‘au Ahupua‘a. The survey area consisted of a 2,000-foot wide corridor roughly following the route of the old Government Road (Site 21273) along the coast. Ewart and Luscomb (1974) recorded sixty sites within combined Keonepoko Nui and Iki *ahupua‘a* (designated *Ahupua‘a* 4 or A4). These sites, which included mounds, feature complexes, platforms, walls, a trail, *ahu*, c-shapes, stone alignments, faced depressions, pits and ravines, were interpreted as having been used for habitation, burial, ceremonial, and agricultural purposes.

Other more recent coastal studies in Keonepoko Iki have included six private property developments that required archaeological survey for permitting within the Conservation District (Barna and Bibby 2018; Clark et al. 2016; Farrell and Dega 2013; Glennon and Barna 2020; Knapp 2003; Rechtman 2012). Collectively, these parcels contain a dearth of archaeological sites. Features identified at the coast have included an Historic rock wall (SIHP Site 50-10-45-30571) built as a windbreak (Clark et al. 2016), Historic boundary walls associated with the Old Government Road (Site 50-10-45-18759), and minor complexes of agricultural features (Site 50-10-45-18758) (Farrell and Dega 2013 see also Knapp 2003). These surveys have noted disturbance and bulldozing, resulting in very few remaining Precontact or Historic sites.

As the town of Pāhoa has grown, the necessity for archaeological investigation and identification of resources prior to development has prompted survey of both large and small properties within Keonepoko Iki. There have been six archaeological surveys over the last nineteen years in the immediate vicinity of the current study areas (Table 1; Figure 24). No historic properties of any kind were identified during these six archaeological surveys. Rechtman (2004) did however note a culturally sterile lava tube system within their project area.

Table 1. Previous archaeological studies in the vicinity of the current study areas.

<i>Author</i>	<i>TMK:</i>	<i>Acres</i>	<i>Proposed Project</i>
Rechtman 2004	(3) 1-5-007:017	19.5	Pāhoa Fire Station
Rechtman 2005	(3) 1-5-007:053	3.3	Puna self-storage facility
Rechtman 2008	(3) 1-5-008:007	3.8	Pāhoa Solid Waste Transfer Station
Rechtman 2013	(3) 1-5-007:055	1.0	Extension of Kahakai Blvd
Rechtman and Zenobi 2013	(3) 1-5-008:005	4.92	Puna Community Medical Center
Scheffler and Clark 2021	(3) 1-5-008:001	5.0	Puna Kai employee parking lot

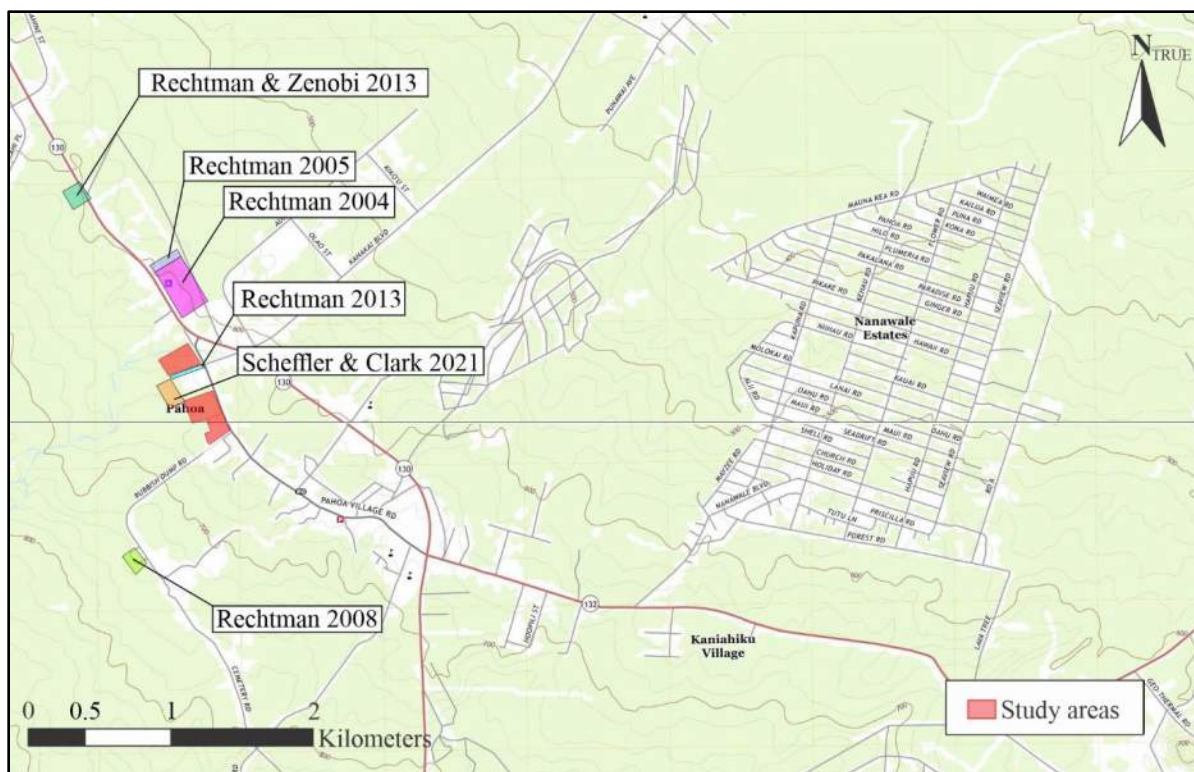


Figure 24. Previous archaeological studies in the vicinity of the current study areas.

Lastly, there have been multiple attempts to document a well-known, large pyroduct (“lava tube”) that extends the length of Keonepoko Iki and Keonepoko Nui to the north of the current study areas. In fact, Pāhoa Cave (SIHP Site 50-10-45-14900), as it is known, may represent the pre-historic boundary between these Puna land divisions (Scheffler and Clark 2016). The caves were visited by Martha Yent (1983) and again by McEldowny and Stone (1991), who documented multiple parallel passages dubbed the southern, middle and northern branches of the system. The main (middle) trunk extended continuously with dozens of “skylight” entrances for well over 7.5 miles into the Kauhaalea Forest Reserve from 470 to 1,620 feet in elevation. Both reports documented fortifications, burials, internal platforms, signs of “refuge” use, and major structural modifications for both the sacred and mundane. The southern tube in particular contained a high density of burials, “at least 100” including both extended individual and in bundles in very deteriorated condition (Yent 1983). The middle tube differed in that the “less than 20” burials were mainly restricted to the upper reaches of the cave and seemed segregated from other uses (McEldowny and Stone 1991).

Lower (*makai*) portions of the pyroduct system and a ground corridor were surveyed by Bishop Museum in the 1990s for power line installation. Dixon and Major (1992) reported a similar extension of archaeological features and burials in the cave leading towards the coast. This portion of the cave was interpreted as an integral part of a coherent *ahupua‘a*, consisting of the coastal village of Kahuwai and connections to the Kahuhali *mauka* settlement (current Pāhoa). They described a unique inland pattern of agricultural fields arranged in a pattern of small arable patches, Kīpohopoho (cf. Kīpuka), surrounded by inhospitable lava. These were found far from shore on gradually sloping land. These results reinforce McEldowny’s (1979) and Burtchard and Moblo’s (1994) models of land use presented above.

Under the threat of the “June 27” series of lava flows that began in 2014, a salvage survey of approximately a mile-long portion of the main “middle branch” trunk between 570 and 720 feet elevation was undertaken (Scheffler et al. 2015; Scheffler and Clark 2016). This project served to document in greater detail the proposed refuge function of the cave and elaborate on possible (non-burial) ritual features found within the deep reaches of the cavern. In addition, paired AMS radiocarbon dates from separate short-lived materials, found in definitively cultural contexts, confirmed Precontact occupation (Scheffler and Clark 2016).

3. STUDY AREA EXPECTATIONS

Within the *ahupua'a* of Keonepoko Iki, the current study area falls in a zone likely to be characterized by dispersed, though possibly intense, agricultural pursuits and not by Precontact habitation. These general models are based on early historical accounts that consider environmental variables and human resource needs. Archaeological study has largely supported these patterns and refined them for specific areas.

Previous archaeological studies have documented a Precontact settlement pattern along the coast that includes dispersed habitation sites and agricultural complexes along with ceremonial and burial areas, all associated with a fairly dense (but not necessarily nucleated) population. Areas inland of the coast were exploited for agricultural purposes and the collection of forest resources, but were not generally chosen for habitation. Keonepoko Iki does not appear to have been a population center during Precontact times, and by early Historic times, as drastic population reduction occurred throughout Hawai'i and traditional sites along the coast were abandoned, settlement appears to have become even less dense (Maly 1998). The later Historic Period saw a minor expansion of settlement in this area of both transplanted Hawaiians and non-Hawaiians alike. This was primarily due to Government grant programs, sugarcane cultivation, and logging. Grantees often modified their lands obscuring if not obliterating prior residential and agricultural sites. The influx of people during this period waned by the early twentieth century as a result of commercial economic failures, and the population once again dipped.

Given the above overview of regional and local archaeological research we are well-positioned to offer some predictions concerning the potential of the current study areas for yielding significant archaeological or historical material remains. Overall, the probability in this area seems very low as no historic properties have been identified during archaeological investigations on nearby TMK parcels. Alternatives 1 and 3 have supported residences and/or small-scale agricultural production since the mid-twentieth century. Those activities have likely left features within these locales such as rubbish, abandoned machinery, and any land modifications necessary for habitation or agriculture use such as bulldozer push piles and cobble mounds. Additionally, Alternatives 1 and 3 have undergone extensive mechanical disturbance, therefore limiting the likelihood of Precontact surface features. Any archaeological features that might have escaped this disturbance could include agricultural features typical of this part of Puna (e.g., modified depressions, modified outcrops, alignments, and/or mounds associated), and possibly, but not likely, scattered habitation features (platforms, terraces, pavements, walls, and/or enclosures), though they would not be expected to maintain much integrity. Lava tubes, both culturally sterile and those containing cultural material, have been recorded in the vicinity of the study areas. There is a moderate possibility that lava tube openings exist within the study areas.

4. FIELDWORK AND RESULTS

On June 2, 2023, Candace B. Gonzales, B.A., and Olivia Crabtree, B.A. under the supervision of Matthew R. Clark, M.A. (Principal Investigator) conducted an archaeological field inspection of Alternative 1 and a portion of Alternative 3 (Figure 25). Access to Alternative 2 as well as portions of Alternative 3, specifically TMK (3) 1-5-007: 082, and 083 was not granted at the time of the inspection. Specific field methods and observations made during the inspection for each Alternative location are presented below.

Alternative 1 (TMK: [3] 1-5-007:007)

During the field inspection, the entire ground surface of the 9.572-acre study area Alternative 1 was inspected for historic properties. Fieldworkers walked meandering pedestrian transects orientated east/west with approximately 10-meter spacing. The survey began near the central portion of the study area with avoidance of the single-family home located in the southeastern corner. The vast majority of the Alternative 1 study area has been mechanically disturbed (see Figures 8, 9, and 10) and these areas are covered in introduced plant species such as strawberry guava (*Psidium cattleianum*), gunpowder trees (*Trema orientalis*), melochia trees (*Melochia umbellata*), Koster's curse (*Clidemia hirta*), cercropia trees (*Cercropia obtusifolia*), albizia trees (*Albizia* sp.), bamboo orchid (*Arundina graminifolia*), elephant grass (*Arundo donax*), Guinea grass (*Megathyrsis maximus*) and other non-native grasses and sedges (*Poaceae* and *Cyperaceae*). However, a small undisturbed area of vegetation located about midway along the northern boundary and extending towards the interior of the parcel was observed (see Figure 11). This vegetation community consist of low tangles of the native *uluhe* (False Staghorn, *Dicranopteris linearis*) fern intermixed with cane ti (*Tibouchina herbacia*) and limited 'ōhi'a trees (*Metrosideros polymorpha*). This relatively intact plant community stands in stark contrast to the prevalence of invasive weeds and grasses, particularly the tall cane-like grasses that have encroached upon the disturbed areas within the parcel.

The use of portions of the parcel by Bryson's Cinder as a cinder and gravel yard coupled with the development of the Puna Kai Shopping Center have resulted in the formation of bulldozer push piles and numerous berms along the outside edges and throughout the south-southwestern portions of the parcel. In the northwestern corner of the parcel possible remnant features were observed (see Figure 25). These include three cobble mounds (Figure 26) and a cobble filled area (Figure 27). These features may represent former agricultural features, but they are of very poor quality and lack integrity. They may also be remnant features associated with the cinder and gravel yard.

Alternative 2 (TMK: [3] 1-5-007:005)

At the time of the current field inspection access to the Alternative 2 study area was not granted and was therefore not inspected. County tax records indicate a house was constructed within the TMK parcel in 1995 and aerial imagery (see Figure 3) shows a house in the northeast corner. Based on information presented above, it appears that other than the northeast corner of the parcel, the area has never been mechanically altered and retains a mix of native and non-native plant species (Figure 28).

Alternative 3 (TMK: [3] 1-5-007:004, 076, 082, and 083)

During the current field inspection ASM was only granted permission to enter TMK parcels 082 and 083 within the Alternative 3 study area. The entire ground surface of both parcels, a combined acreage of 2.37, was inspected for historic properties. The survey began in the southwestern corner of parcel 083 and progressed in a northeasterly direction with fieldworkers walking meandering transects spaced 10-meters apart. These two parcels have been mechanically cleared and have a leveled ground surface covered in grasses (see Figures 15 and 16). No historic properties were observed within parcels 082 and 083 of the Alternative 3 study area. Industrial debris consisting of a large pile of concrete (Figure 29), rebar, along with several discarded vehicles and vehicle parts (Figure 30) was observed along the northern boundary of parcel 082 (see Figure 25) where thick strawberry guava and autograph trees are encroaching from the parcel to the north. The pile appears to be the remains of a possible former garage or carport. A wooden shed located at the northwest corner along the boundary of parcel 004 and 076 was observed from parcel 082 (see Figure 13)



Figure 25. Site location map overlaid on a 2013 Google Earth aerial image with TMK parcels indicated.



Figure 26. Cobble mound within northwestern corner of Alternative 1, view to the west.



Figure 27. Cobble-filled area in the northwestern corner of Alternative 1, view to the east.



Figure 28. East boundary of Alternative 2 study area, view to the west.



Figure 29. Concrete and rebar pile located along the northern boundary of TMK parcel 082 within the Alternative 3 study area, view to the southwest.



Figure 30. Abandoned vehicle observed along the northern boundary of in Alternative 3, view to the southwest.

5. CONCLUSION AND RECOMMENDATIONS

Given the findings of the current study, with respect to Alternative 1, the likelihood of encountering surface archaeological features is limited to the undisturbed area that extends from the northern boundary into the interior of the parcel. There are at least two Historic Era residential structures (built in 1955 and 1959) near the eastern boundary of the parcel.

With respect to Alternative 2 which was not surveyed, no specific details regarding archaeological resources were ascertained. The background research indicates that aside from the area surrounding the existing residential structure (built in 1994) in the northeast corner, the majority of the parcel has not been subject to prior mechanical disturbance. As such, there is a likelihood, albeit limited, of encountering surface archaeological features.

With respect to Alternative 3, no archaeological resources were identified in Parcels 082 and 083. While no archaeological survey was conducted of Parcels 076 and 004, County of Hawai'i records list one Historic Era residential structure (built in 1968) on Parcel 004. This residence is located near the westernmost boundary of the parcel. A second Historic Era residential structure (built in 1970) is located on Parcel 076 along with several ancillary structures associated with the former Pāhoa Feed and Fertilizer and likely prior agricultural activities that occurred on Parcels 082 and 083.

The findings from prior archaeological investigations conducted nearby suggest a low likelihood of encountering surface archaeological features with a higher probability of encountering subterranean lava tubes that may contain cultural material and or human remains. It is therefore concluded that prior to any ground disturbing work, an Archaeological Inventory Survey (AIS) of the selected Alternative should be conducted, and the AIS report submitted to the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) for review and acceptance. Given that Alternatives 1 and 3 contain residential structures that are over 50 years old, DLNR-SHPD may require that an architectural Reconnaissance Level Survey (RLS) of these structures be prepared pursuant to HRS Chapter 6E-8 and in accordance with HAR Chapter 13-275 and DLNR-SHPD's February 2018 *Guidelines: Architectural Historic Resources Survey and Documentation* and the National Park Service's *Guidelines for Local Surveys: A Basis for Preservation Planning*. It is probable, given the nature of the archaeological resources identified within the study areas, that acceptance of the AIS by DLNR-SHPD and an architectural RLS (only if Alternatives 1 or 3 are selected) will complete the historic preservation review process for the project.

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Appendix D

Cultural Impact Assessment

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Cultural Impact Assessment for the Pāhoā Transit Hub and Public Library

TMK: (3) 1-5-007: 004, 005, 007, 076, 082, and 083

Keonepoko Iki Ahupua‘a
Puna District
Island of Hawai‘i

DRAFT VERSION



Grass hut at Pāhoā, Puna, Hawai‘i. Photo from the Hawai‘i State Archives, Bertram Collection.

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ASM Project Number 43140.01

Cultural Impact Assessment for the Pāhoā Transit Hub and Public Library

TMK: (3) 1-5-007: 004, 005, 007, 076, 082, and 083

Keonepoko Iki Ahupua‘a
Puna District
Island of Hawai‘i



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1. INTRODUCTION

At the request of SSFM International on behalf of the County of Hawai‘i Mass Transit Agency (MTA) and the Hawai‘i State Public Library System (HSPLS), ASM Affiliates (ASM) has prepared this Cultural Impact Assessment (CIA) to inform a Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment (EA) being prepared for the proposed development of the Pāhoia Mass Transit Hub and a Public Library (referred to hereafter as the ‘proposed project’) at one of three alternative locations located along the northern fringes of Pāhoia Town. This CIA evaluates cultural impacts on three alternative sites plus a no-action alternative. The three sites under consideration are: Alternative 1—the preferred alternative—includes the entirety of the 9.572-acre Tax Map Key (TMK) (3) 1-5-007:007; Alternative 2 includes the 10-acre TMK: (3) 1-5-007:005; and alternative 3 is the 5.641-acre TMK: (3) 1-5-007:004, 076, 082, and 083. All three alternative sites (referred to hereafter as study areas) are situated on the northern edge of Pāhoia Town, in Keonepoko Iki Ahupua‘a, Puna District, Island of Hawai‘i. Maps showing the location of the study areas are included below as Figures 1, 2, and 3, and a comprehensive project background and project area description are provided below.

This CIA, which is intended to inform an EA conducted in compliance with HRS Chapter 343, is being prepared pursuant to Act 50 and in accordance with the Environmental Review Program (formerly the Office of Environmental Quality Control [OEQC]) *Guidelines for Assessing Cultural Impacts*, adopted by the Environmental Council, State of Hawai‘i, on November 19, 1997 (OEQC 1997). Act 50, which was proposed and passed as Hawai‘i State House of Representatives Bill No. 2895 and signed into law by the Governor on April 26, 2000, specifically acknowledges the State’s responsibility to protect native Hawaiian cultural practices. Act 50 further states that environmental studies “. . . should identify and address effects on Hawaii’s culture, and traditional and customary rights” and that “native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the ‘aloha spirit’ in Hawai‘i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on governmental agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.”

This report is divided into four main chapters. Chapter 1, the introduction, includes an overview of the proposed project as well as a physical description of the study areas. To provide a cultural context of the study areas, Chapter 2 includes cultural-historical background information specific to the broader geographical region of Keonepokonui, and at times the greater Puna District as well as each of the study areas. This chapter also includes a summary of prior archaeological and cultural studies that have been conducted within or near the study areas. The methods and results of the consultation process are then presented in Chapter 3. Lastly, Chapter 4 includes a discussion of potential cultural impacts as well as actions and strategies that may help to mitigate any identified impacts.

1. Introduction

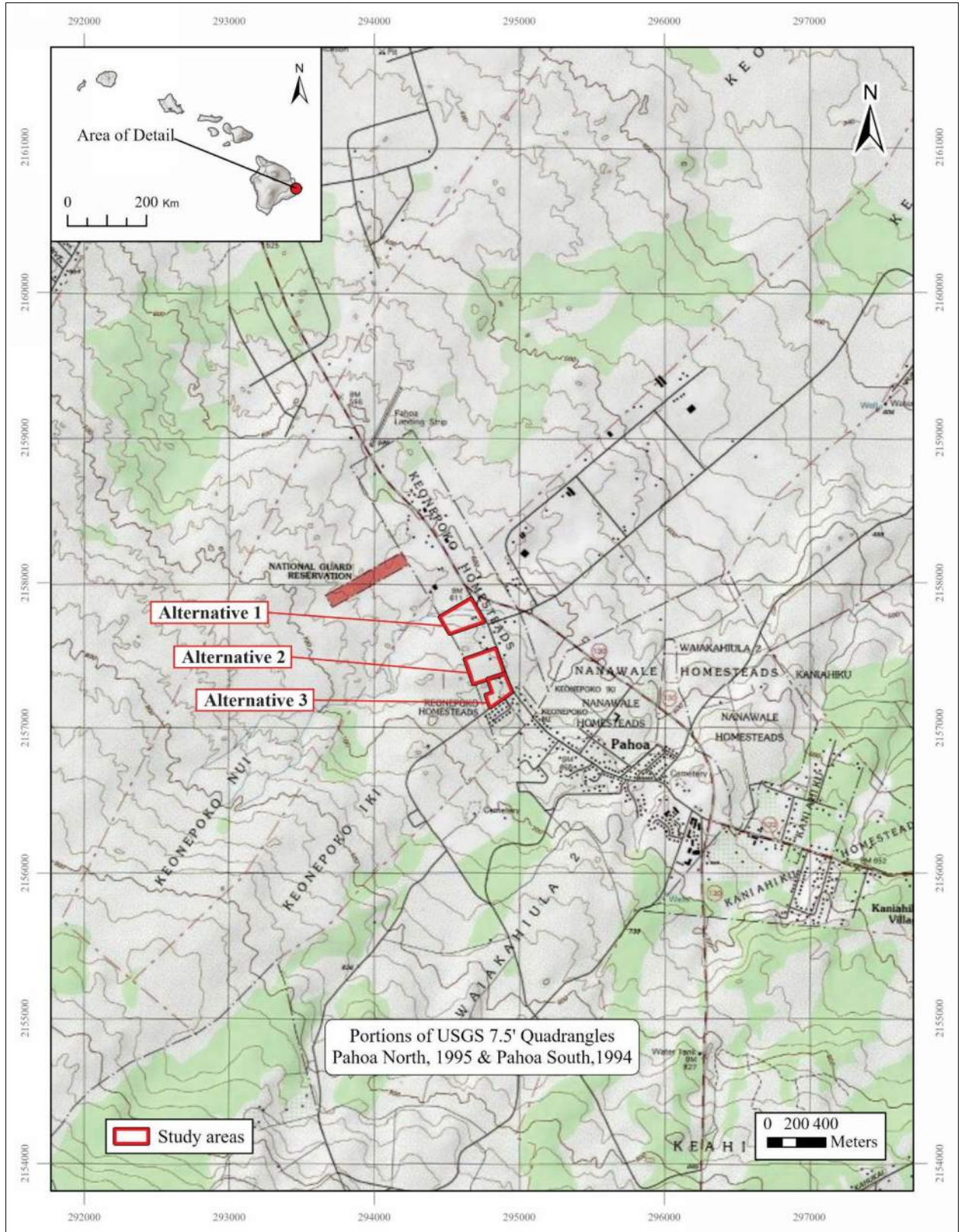


Figure 1. Location of study areas.

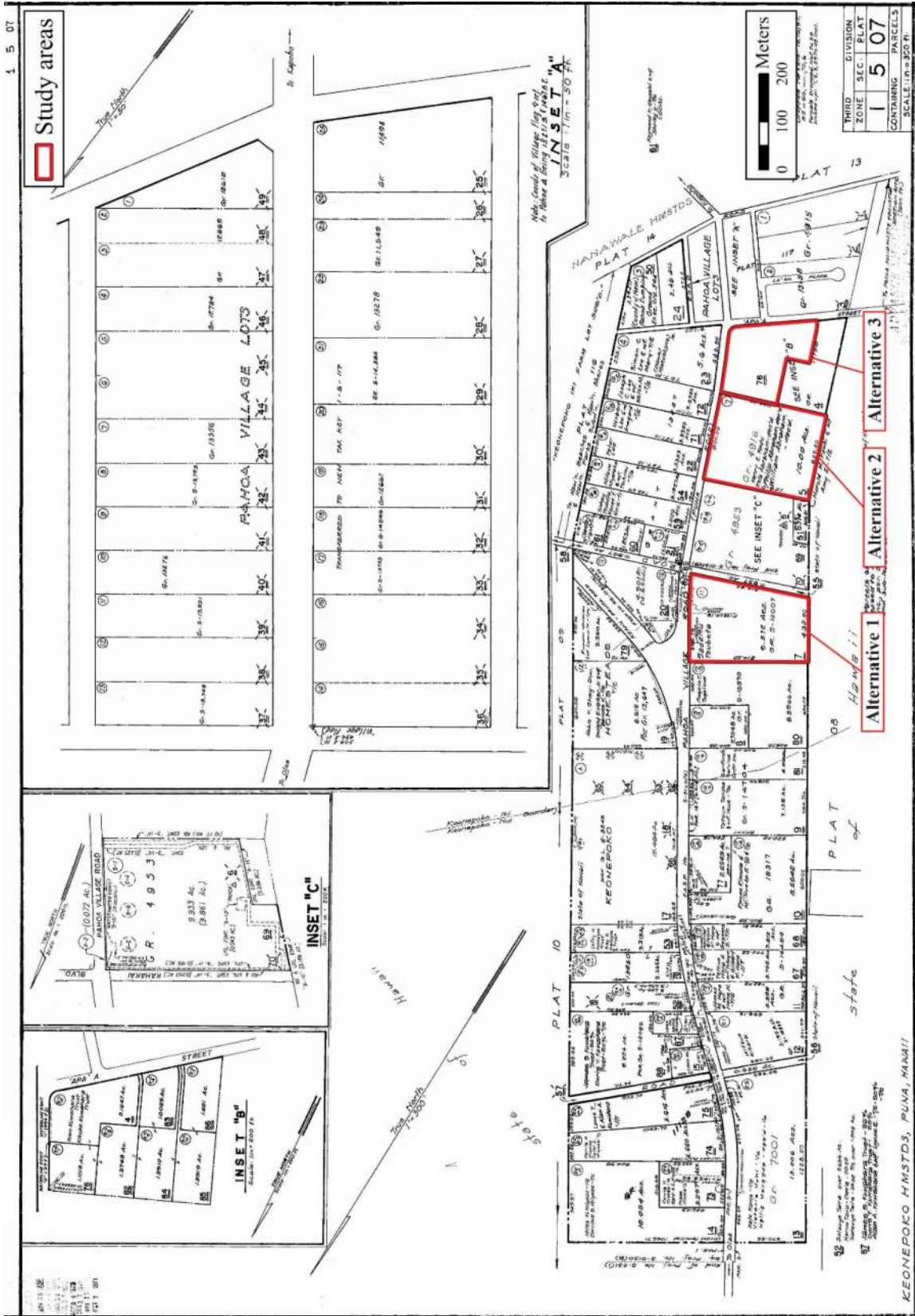


Figure 2. Tax Map (3) 1-5-07 showing study areas located within Parcels 007, 005, and 004, 076, 082, and 083.



Figure 3. Google Earth™ satellite image showing location of study areas.

PROJECT BACKGROUND AND DESCRIPTION

In 2018, the County of Hawai‘i (CoH) completed its Transit and Multi-Modal Transportation Master Plan (Master Plan). One of the goals of the Master Plan was to “create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places.” To implement this goal, the CoH Planning Department and MTA are initiating the planning phase of a Transit hub in the Pāhoā region. In addition, the CoH entered discussions with HSPLS regarding the co-location of the proposed transit hub with a new State Library. HSPLS intends to construct a new library in the Pāhoā region and desires to support the County’s Transit-Oriented-Development (TOD) initiatives and explore the possibility of co-locating the library with the future transit center. Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoā community and advance TOD principles.

Overview of the Transit Hub Site Selection Process

The MTA initiated public outreach in 2019 along with the initial identification of locations for consideration of a transit hub.

- A community meeting was held in March 2019, where four possible locations were proposed, along with parcel ownership, address TMK, size (in acres), and zoning.
- A second community meeting was held in July 2019, where two additional sites were added by the CoH Planning Department.
- A seventh location was added after research results were presented, and site advantages and disadvantages were discussed by attendees.

After the public outreach in 2019, the CoH Planning Department and MTA added additional locations and ranked a total of thirteen potential sites based on the following criteria: 1) size/configuration/ease of acquisition; 2) location/visibility; 3) vehicle access; 4) pedestrian and bicycle access; 5) infrastructure; 6) volcanic hazard risk; and 7) total cost. Of the thirteen evaluates sites, three were removed from consideration. In 2022, a site suitability analysis was completed on the remaining ten sites, resulting in three preferred sites (the study areas).

Pāhoā Public Library Site Selection

The Department of Accounting and General Services (DAGS) consultant, G70, completed an EA for the Pāhoā Public Library Site Selection in September 2021 with a Finding of No Significant Impact (FONSI). That document identified six State-owned and County-owned sites in Pāhoā. The identified sites were not satisfactory for HSPLS to proceed with the design phase. HSPLS began coordinating with State/County TOD efforts to explore the possible co-location of the library with the transit hub.

Community Outreach for the Co-Located Transit Hub and Library

A pop-up event was held on February 26, 2023, at the Māku‘u Farmers Market to share information about the project and gather community input on the three preferred sites and potential design features of the transit hub and library. Hundreds of people stopped by the farmers market booth to look at the boards, ask questions, and provide input. A community meeting was held on March 1, 2023, at the Pāhoā Neighborhood Facility. The purpose of the meeting was to present information and findings about the project as well as to gather community input on the preferred sites and potential design features of the transit hub and library. The community meeting resulted in one of the three sites being identified as the preferred location for the transit hub and library. Summaries of the community outreach are available on the project website at <http://pahoatransithub.info/>.

DESCRIPTION OF STUDY AREAS

The three study areas, all of which are privately-owned parcels that were created as part of the Keonepoko Homestead are located at the northern end of Pāhoā Town in the area between the existing Pāhoā Marketplace and Apaa Street on the *mauka* (western) side of Pāhoā Village Road (see Figures 1, 2, and 3). Table 1 below is a breakdown of each project area including TMK parcel number, acreage, and CoH zoning designation all of which were retrieved from the CoH Planning Department website. The following paragraphs discusses physical characteristics such as the underlying geology and soils that pertain to all three locations followed by specific descriptions for study area.

Table 1. CoH Planning Department data for the study area locations.

<i>Site</i>	<i>TMK No.</i>	<i>Acres</i>	<i>Zoning</i>
Alternative 1 (Preferred Alternative)	(3) 1-5-007:007	9.572	A-1a
Alternative 2	(3) 1-5-007:005	10.0	A-1a
Alternative 3	(3) 1-5-007:004, 076, 082, 083	5.641	A-1a

Climate, Geology, and Soils

The study areas are situated at elevations ranging from 614 to 663 feet (187 to 202 meters) above mean sea level (amsl). The climate in the study areas is relatively warm with temperatures fluctuating mildly between 67° Fahrenheit (from September to April) to 73° Fahrenheit (from May through August) (Giambelluca et al. 2014). Rainfall has been measured at a Pāhoā rain gauge since 1902. This station is located at an elevation of 670 feet above sea level, not more than two kilometers away from the study areas. According to these records (Giambelluca et al. 2013) this area receives an average of 3,449 millimeters (135 inches) of rain per year.

The District of Puna is situated largely on the slopes of Kīlauea Volcano. The volcanically active east rift zone of the volcano is a broad, low-profile ridge (2-4 kilometers wide) formed by countless eruptions originating from numerous vents along its crest. The zone extends east through the district from the Kīlauea Caldera to Cape Kumukahi at the easternmost point of the island, a distance of 55 kilometers. The north side of the rift zone, extending to the slopes of Mauna Loa and the northeastern Puna coast, is covered primarily by lavas that erupted from the summit of Kīlauea about 200-750 years ago. In contrast, nearly the entire crest of the rift zone is covered by lava that is less than 200 years old, and most of the young lava flows that emanate from vents along the crest have spread southward towards the southeastern coast of the district, covering the older lava flows in the process (Sherrod et al. 2007; Wolfe and Morris 1996).

The underlying geology in this portion of the island (Figure 4) is generally formed of *pāhoehoe* lava flows comprised of late Holocene “Puna Basalts” (Sherrod et al. 2007:20; Trusdell et al. 2005). The flows underlying the specific study areas originate from a major eruption of Kīlauea Volcano’s summit. Collectively these flows are known as the “Aila’au lava flows” and they make up a large area of the north flank of Kīlauea and the Kahaualea Forest Reserve. This long-lived eruption happened between 200 and 750 years before present (Sherrod et al. 2007). The study areas are within a lava flow that occurred between 563 to 613 years before present and is labeled in Figure 4 as Qp4. These relatively recent volcanic eruptions have been active for more than sixty years during the 15th century and would have been on full display to the resident Hawaiian population of the time (Clague et al. 1999). As such, these lava flows figure prominently in the oral histories of Puna (Emerson 2013; Fornander 1916-1917). In fact, 400 years of Hawaiian oral tradition correlates well with recent scientific research into the history of Kīlauea volcanism and the sequence of events leading up to the formation of the current caldera (Swanson 2008).

The soil types identified in the project area vicinity, are influenced by the underlying geology. The study areas are comprised of a single soil type (labeled as #653 in Figure 5) and is described as Keaukaha highly decomposed plant material, characterized by 2 to 10 percent slopes. It is well drained and is susceptible to high run-off. This thin organic muck lying on top of the *pāhoehoe* bedrock is less than ten inches thick (Soil Survey Staff 2020).

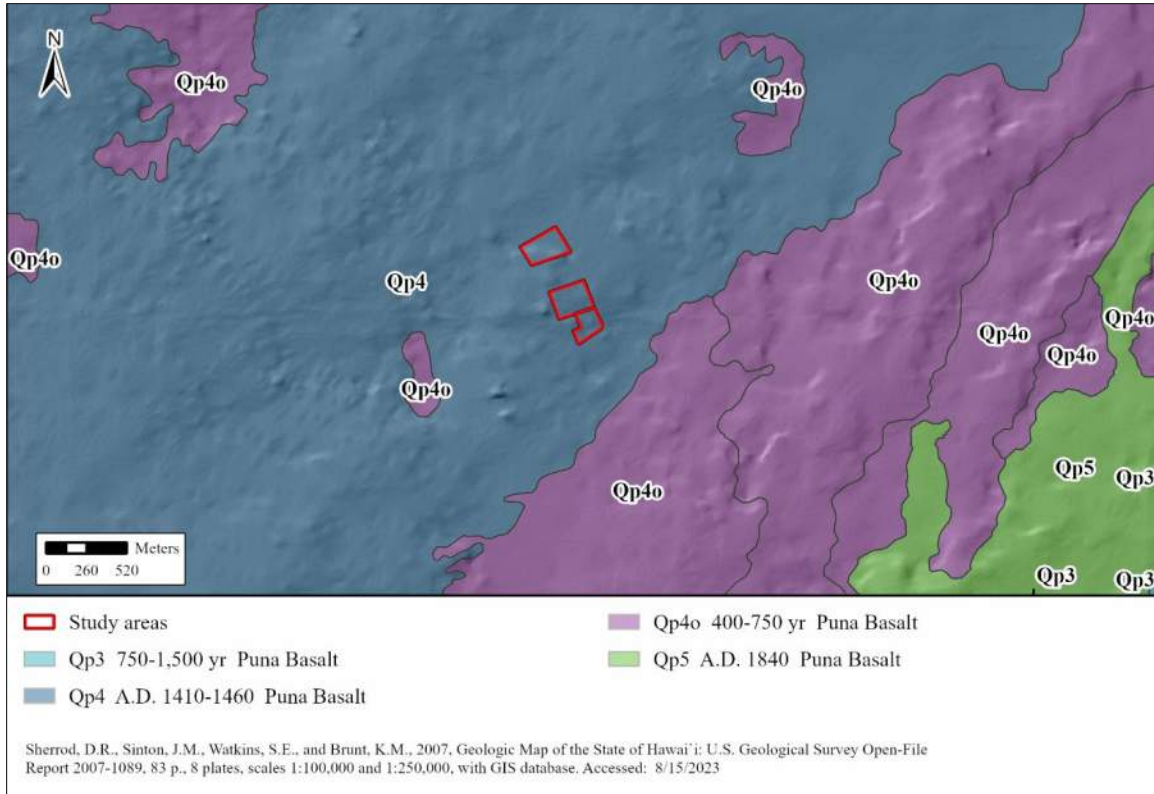


Figure 4. Geology in the study areas.

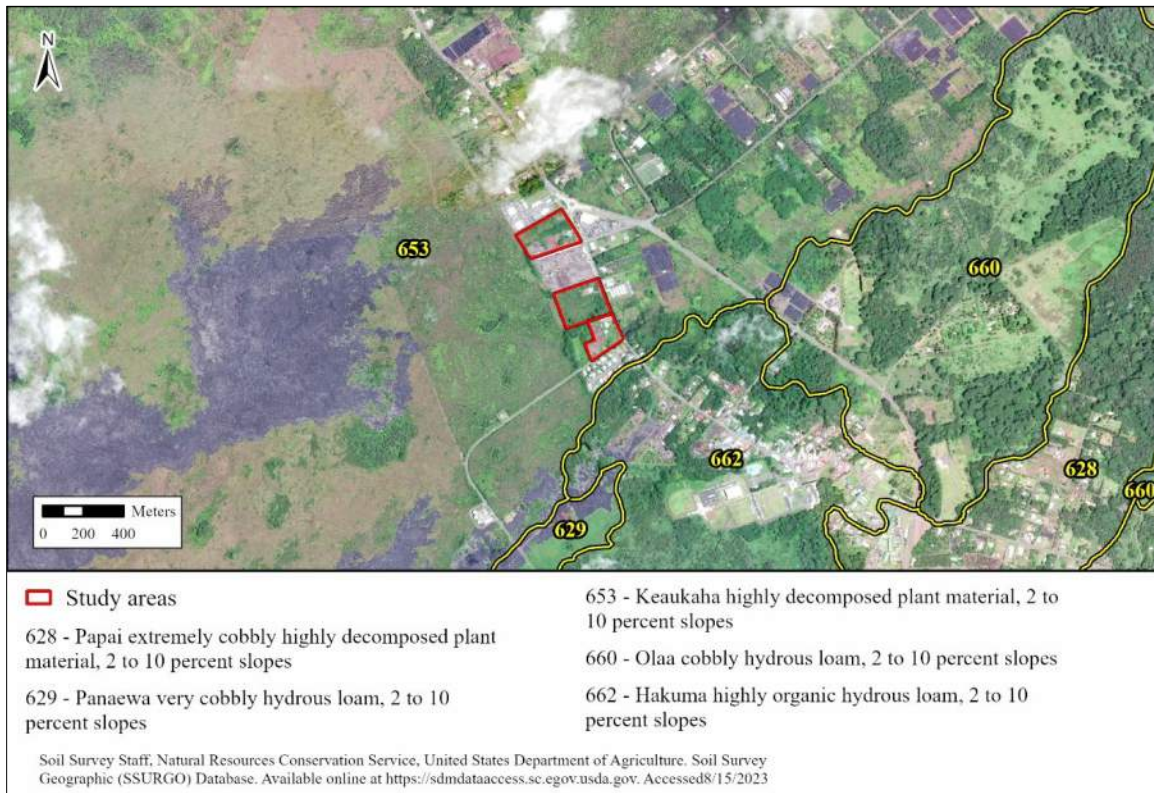


Figure 5. Soils in the study areas.

Alternative 1 Description

Alternative 1 occupies a 9.572-acre parcel located at TMK: (3) 1-5-007:007 (see Figure 2). A single-family residential home is located in the southeastern corner of the parcel. This parcel is bound to the north by the Pāhoia Market Place, to the south by Kahakai Boulevard, to the east by Pāhoia Village Road (Figure 6), and to the west by undeveloped State-owned lands (see Figure 3). Access to the parcel is via the Pāhoia Village Road. Prior to the development of the Puna Kai Shopping Center, the area to the south of Alternative 1 was occupied by a cinder and gravel yard (Bryson's Cinder). Activities associated with Bryson's Cinder, including mechanical land disturbance, extended into the southern portion of TMK parcel 007.



Figure 6. View of the eastern boundary of Alternative 1 study area along Pāhoia Village Road (foreground), view to the northwest.

Alternative 2 Description

Alternative 2 occupies a 10-acre parcel located at TMK: (3) 1-5-007:005 (see Figure 2). A single-family residential home is located in the northeast corner of the parcel. This parcel is bounded to the north by the Puna Kai Shopping Center, to the south by privately owned land (TMK parcels 076 and 082 of the Alternative 3 study area), to the east by Pāhoia Village Road, and to the west by undeveloped state lands (see Figure 3). Access to the parcel is via the Pāhoia Village Road.

Alternative 3 Description

Alternative 3 occupies TMKs: (3) 1-5-007:004, 076, 082, and 083 comprises a total of 5.641-acres (see Figure 2). Alternative 3 is bounded to the north by an undeveloped portion of TMK 005 (Alternative 2 study area), to the south by Apa'a Street, to the east by Pāhoia Village Road, and to the west by undeveloped state lands. Access to Alternative 3 is via the Pāhoia Village Road and at Apa'a Street. There is a single-family home on TMK parcel 004, the former building associated with the Pāhoia Feed and Fertilizer on TMK parcel 076, and the two remaining TMK parcels (082 and 083) appear to have been used for agricultural purposes. The field inspection and aerial imagery (see Figure 3) shows that the western side of Alternative 3 has been mechanically altered, likely associated with agricultural development.

2. BACKGROUND

As specified in the OEQC *Guidelines for Assessing Cultural Impacts* (1997:1), “...the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment.” For this CIA, the *ahupua‘a* of Keonepoko Iki is considered the ‘study area’, while the locations of the proposed development activities are referred to collectively as the ‘study areas’.

To generate a set of expectations regarding the nature of cultural resources and customary practices that might be encountered within the current study areas and to establish a context within which to assess the significance of such resources, the background section begins with a general culture-historical context. This is followed by culture-historical background information concerning the history of Keonepoko Iki. Some background information for Puna, the broader regional designation in which Keonepoko Iki is situated, also falls within the parameters of the OEQC guidelines and ensures that a broader set of cultural practices and histories are considered. Following this background section is a discussion of relevant prior archaeological and cultural studies that have been conducted within and near the study areas.

RESEARCH METHODS

The culture-historical context and summary of previously conducted archaeological and cultural research presented below are based on research conducted by ASM Affiliates at various physical and digital repositories. Primary English language and Hawaiian language resources were found at multiple state agencies, including the State Historic Preservation Division, Hawai‘i State Archives, the Department of Accounting and General Services Land Survey Division, and the County of Hawai‘i Planning Department. Digital collections provided through the Office of Hawaiian Affairs Papakilo and Kīpuka databases, Waihona ‘Āina, the Ulukau Hawaiian Electronic Library, and Newspapers.com were also utilized throughout this study. Lastly, secondary resources curated at ASM Affiliates’ Hilo office offer general information regarding the history of land use, politics, and culture change in Hawai‘i, enhancing the broad sampling of source materials cited throughout this CIA.

CULTURE-HISTORICAL CONTEXT

While the question of when Hawai‘i was first settled by Polynesians remains contested, scholars working in the fields of archaeology, folklore, Hawaiian studies, and linguistics have offered several theories. With advances in palynology and radiocarbon dating techniques, Kirch (2011), Athens et al. (2014), and Wilmshurst et al. (2011) have argued that Polynesians arrived in the Hawaiian Islands sometime between A.D. 1000 and A.D. 1200. This initial migration on intricately crafted *wa‘a kaulua* (double-hulled canoes) to Hawai‘i from Kahiki, the ancestral homelands of Hawaiian deities and peoples from southern Pacific islands, occurred at least from initial settlement to the 13th century. According to Fornander (1969), Hawaiians brought from their homeland certain Polynesian customs and beliefs: the major gods Kāne, Kū, Lono, and Kanaloa (who have cognates in other Pacific cultures); the *kapu* system of political and religious governance; and the concepts of *pu‘uhonua* (places of refuge), *‘aumakua* (ancestral deity), and *mana* (divine power). Archaeologist Kenneth Emory who worked in the early to mid-20th century reported that the sources of early Hawaiian populations originated from the southern Marquesas Islands (Emory in Tatar 1982). However, Emory’s theory is not universally accepted, as Hawaiian scholars in the past and present have argued for a pluralistic outlook on ancestral Hawaiian origins from Kahiki (Case 2015; Fornander 1916-1917; Kamakau 1866; Kikilo 2010; Naka 1893; Poepoe 1906).

While stories of episodic migrations were widely published in the Hawaiian language by knowledgeable and skilled *kū‘auhau* (individuals trained in the discipline of remembering genealogies and associated ancestral stories), the cultural belief that living organisms were *hānau ‘ia* (born) out of a time of eternal darkness (*pō*) and chaos (*kahuli*) were brought and adapted by ancestral Hawaiian populations to reflect their deep connection to their environment. As an example, the *Kumulipo*, Hawai‘i’s most famed *ko‘ihonua* (a cosmogonic genealogical chant), establishes a birth-rank genealogical order for all living beings (Beckwith 1951; Liliuokalani 1978). One such genealogical relationship that remains widely accepted in Hawai‘i is the belief that *kalo* (taro) plants (in addition to all other plants, land animals, and sea creatures), are elder siblings to humans (Beckwith 1951). This concept of hierarchical creation enforces the belief that all life forms are intimately connected, evidencing the cultural transformations that occurred in the islands through intensive interaction with their local environment to form a uniquely Hawaiian culture.

In Hawai‘i’s ancient past, inhabitants were primarily engaged in subsistence-level agriculture and fishing (Handy et al. 1991). Following the initial settlement period, communities clustered in the *ko‘olau* (windward) shores of the

Hawaiian Islands where freshwater was abundant. Sheltered bays allowed for nearshore fisheries (enriched by numerous estuaries) and deep-sea fisheries to be easily accessed (McEldowney 1979). Widespread environmental modification of the land also occurred as early Hawaiian *kanaka mahi'ai* (farmers) developed new subsistence strategies, adapting their familiar patterns and traditional tools to work efficiently in their new home (Kirch 1985; Pogue 1978). Areas with the richest natural resources became heavily populated over time, resulting in the population's expansion to the *kona* (leeward) side of the islands and more remote areas (Cordy 2000).

Overview of Traditional Hawaiian Land Management Strategies

Adding to an already complex society was the development of traditional land stewardship systems, including the *ahupua'a*. The *ahupua'a* was the principal land division that functioned for taxation purposes and furnished its residents with nearly all subsistence and household necessities. *Ahupua'a* are land divisions that typically include multiple ecozones from *mauka* (upland mountainous regions) to *makai* (shore and near-shore regions), assuring a diverse subsistence resource base (Hommon 1986). Although the *ahupua'a* land division typically incorporated all of the eco-zones, their size and shape varied greatly (Cannelora 1974). Noted Hawaiian historian and scholar Samuel Kamakau (1976:8-9) summarized the ecozones that could be found in a given *ahupua'a*:

Here are some names for [the zones of] the mountains—the *mauna* or *kuahiwi*. A mountain is called a *kuahiwi*, but *mauna* is the overall term for the whole mountain, and there are many names applied to one, according to its delineations ('*ano*). The part directly in back and in front of the summit proper is called the *kuamauna*, mountaintop; below the *kuamauna* is the *kuahea*, and makai of the *kuahea* is the *kuahiwi* proper. This is where small trees begin to grow; it is the *wao nahele*. Makai of this region the trees are tall, and this is the *wao lipo*. Makai of the *wao lipo* is the *wao 'eiwa*, and makai of that the *wao ma 'ukele*. Makai of the *wao ma 'ukele* is the *wao akua*, and makai of there is the *wao kanaka*, the area that people cultivate. Makai of the *wao kanaka* is the '*ama'u*, fern belt, and makai of the '*ama'u* the '*apa'a*, grasslands.

A solitary group of trees is a *moku la'au* (a "stand" of trees) or an *ulu la'au*, grove. Thickets that extend to the *kuahiwi* are *ulunahale*, wild growth. An area where *koa* trees suitable for canoes (*koa wa'a*) grow is a *wao koa* and mauka of there is a *wao la'au*, timber land. These are dry forest growths from the '*apa'a* up to the *kuahiwi*. The places that are "spongy" (*naele*) are found in the *wao ma 'ukele*, the wet forest.

Makai of the '*apa'a* are the *pahe'e* [*pili* grass] and '*ilima* growths and makai of them the *kula*, open country, and the '*apoho* hollows near to the habitations of men. Then comes the *kahakai*, coast, the *kahaone*, sandy beach, and the *kalawa*, the curve of the seashore—right down to the '*ae kai*, the water's edge.

That is the way *ka po'e kahiko* [the ancient people] named the land from mountain peak to sea.

The *maka'ainana* (commoners, literally the "people that attend the land") who lived on the land had rights to gather resources for subsistence and tribute within their *ahupua'a* (Jokiel et al. 2011). As part of these rights, residents were required to supply resources and labor to *ali'i* (chiefs) of local, regional, and island chiefdoms. The *ahupua'a* became the equivalent of a local community with its own social, economic, and political significance and served as the taxable land division during the annual *Makahiki* procession (Kelly 1956). During the time of *Makahiki*, the paramount *ali'i* sent select members of his/her retinue to collect *ho'okupu* (tribute and offerings) in the form of goods from each *ahupua'a*. The *maka'ainana* brought their share of *ho'okupu* to an *ahu* (altar) that was marked with the image of a *pua'a* (pig) and served as a visual marker of *ahupua'a* boundaries. In most instances, these boundaries followed mountain ridges, hills, rivers, or ravines (Alexander 1890). However, Chinen (1958:1) reports that "oftentimes only a line of growth of a certain type of tree or grass marked a boundary; and sometimes only a stone determined the corner of a division." These ephemeral markers, as well as their more permanent counterparts, were oftentimes named as evidenced in the thousands of boundary marker names that are listed in Soehren (2005).

Ahupua'a were ruled by *ali'i 'ai ahupua'a* or chiefs who controlled the *ahupua'a* resources. Generally speaking, *ali'i 'ai ahupua'a* had complete autonomy over the *ahupua'a* they oversaw (Malo 1951). *Ahupua'a* residents were not bound to the land nor were they considered property of the *ali'i*. If the living conditions under a particular *ahupua'a* chief were deemed unsuitable, the residents could move freely in pursuit of more favorable conditions (Lam 1985). This structure safeguarded the well-being of the people and the overall productivity of the land, lest the chief loses the principal support and loyalty of his or her supporters. In turn, *ahupua'a* lands were managed by an appointed *konohiki*, oftentimes a chief of lower rank, who oversaw and coordinated stewardship of an area's natural resources (Lam 1985). In some places, the *po'o lawai'a* (head fisherman) held the same responsibilities as the *konohiki* (Jokiel et al. 2011).

When necessary, the *konohiki* took the liberty of implementing *kapu* (restrictions and prohibitions) to protect the *mana* of an area's resources from environmental and spiritual depletion.

Many *ahupua'a* were divided into smaller land units termed '*ili* and '*ili kūpono* (often shortened to '*ili kū*). '*Ili* were created for the convenience of the *ahupua'a* chief and served as the basic land unit which *hoa'āina* (caretakers of particular lands) often retained for multiple generations (Jokieli et al. 2011; MacKenzie 2015). As '*ili* were typically passed down in families, so too were the *kuleana* (responsibilities, privileges) that were associated with it. The right to use and cultivate '*ili* was maintained within the '*ohana*, regardless of the succession of *ali'i 'ai ahupua'a* (Handy et al. 1991). Malo (1951) recorded several types of '*ili*, including the '*ili pa'a* (a single intact parcel) and '*ili lele* (a discontinuous parcel dispersed across an area). Whether dispersed or wholly intact, '*ili* required a cross-section of available resources, and for the *hoa'āina*, this generally included access to agriculturally fertile lands and coastal fisheries. '*Ili kūpono* differed from other '*ili* lands because they did not fall under the jurisdiction of the *ahupua'a* chief. Rather, they were specific areas containing resources that were highly valued by the ruling paramount chiefs, such as fishponds (Handy et al. 1991).

Ali'i 'ai ahupua'a, in turn, answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire *moku* or district) (Malo 1951). Hawai'i Island is comprised of six *moku* (districts) that include Kona, Ka'ū, Puna, Hilo, Hāmākua, and Kohala. Although a *moku* comprises multiple *ahupua'a*, *moku* were considered geographical subdivisions with no explicit reference to rights in the land (Cannelora 1974). While the *ahupua'a* was the most common and fundamental land division unit within the traditional Hawaiian land management structure, variances occurred, such as the existence of the *kalana*. By definition, a *kalana* is a division of land that is smaller than a *moku*. *Kalana* was sometimes used interchangeably with the term '*okana* (Lucas 1995; Pukui and Elbert 1986), but Kamakau (Kamakau 1976) equates a *kalana* to a *moku* and states that '*okana* is merely a subdistrict. Despite these contending and sometimes conflicting definitions, what is clear is that *kalana* consisted of several *ahupua'a* and '*ili 'āina*.

This form of district subdividing was integral to Hawaiian life and the product of advanced natural resource management systems. As populations resided in an area over centuries, direct teaching and extensive observations of an area's natural cycles and resources were retained, well-understood, and passed down orally over the generations. This knowledge informed management decisions that aimed to sustainably adapt subsistence practices to meet the needs of growing populations. The *ahupua'a* system and the highly complex land management system that developed in the islands are but one example of the unique Hawaiian culture that developed in these islands.

Intensification and Development of Hawaiian Land Stewardship Practices

Hawaiian philosophies of life in relation to the environment helped to maintain both natural, spiritual, and social order. In describing the intimate relationship that exists between Hawaiians and '*āina* (land), Kepā Maly writes:

In the Hawaiian context, these values—the “sense of place”—have developed over hundreds of generations of evolving “cultural attachment” to the natural, physical, and spiritual environments. In any culturally sensitive discussion on land use in Hawai'i, one must understand that Hawaiian culture evolved in close partnership with its' natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture and nature begins.

In a traditional Hawaiian context, nature and culture are one in the same, there is no division between the two. The wealth and limitations of the land and ocean resources gave birth to, and shaped the Hawaiian world view. The '*āina* (land), *wai* (water), *kai* (ocean), and *lewa* (sky) were the foundation of life and the source of the spiritual relationship between people and their environs. (Maly 2001:1)

The '*ōlelo no 'eau* (proverbial saying) “*hānau ka 'āina, hānau ke ali'i, hānau ke kanaka*” (born was the land, born were the chiefs, born were the commoners), conveys the belief that all things of the land, including *kanaka* (humans), are connected through kinship links that extend beyond the immediate family (Pukui 1983:57). '*Āina* or land, was perhaps most revered, as noted in the '*ōlelo no 'eau* “*he ali'i ka 'āina; he kauwā ke kanaka*,” which Pukui (Pukui 1983:62) translated as “[t]he land is a chief; man is its servant.” The lifeways of early Hawaiians, which were dependent entirely from the finite natural resources of these islands, necessitated the development of sustainable resource management practices. Over time, what developed was an ecologically responsive management system that integrated the care of watersheds, natural freshwater systems, and nearshore fisheries (Jokieli et al. 2011).

Disciplined and astute observation of the natural world became one of the most fundamental stewardship tools used by the ancient Hawaiians. The vast knowledge acquired through direct observation enabled them to detect and record the subtlest of changes, distinctions, and correlations in the natural world. Examples of their keen observations are evident in the development of Hawaiian nomenclature to describe various rains, clouds, winds, stones, environments, flora, and fauna. Many of these names are geographically unique or island-specific, and have been

recorded in *oli* (chants), *mele* (songs), *pule* (prayers), *inoa* *‘āina* (place names), and *‘ōlelo no ‘eau* (proverbial sayings). Other Hawaiian arts and practices such as *hula* (traditional dance), *lapa ‘au* (traditional healing), *lawai ‘a* (fishing), *mahi ‘ai* (farming) further aided in the practice of knowing the rhythms and cycles of the natural world.

Comprehensive systems of observing and stewarding the land were coupled by the strict adherence to practices that maintained and enhanced the *kapu* and *mana* of all things in the Hawaiian world. In Hawaiian belief, all things natural, places, and even people, especially those of high rank, possessed *mana* or “divine power” (Pukui and Elbert 1986:235; Pukui et al. 1972). *Mana* was believed to be derived from the plethora of Hawaiian gods (*kini akua*) who were embodied in elemental forces, land, natural resources, and certain material objects and persons (Crabbe et al. 2017). Buck (1993) expanded on this concept noting that *mana* was associated with “the well-being of a community, in human knowledge and skills (canoe building, harvesting) and in nature (crop fertility, weather etc.)” (c.f. Else 2004:244).

To ensure the *mana* of certain resources, places, and people, *kapu* of various kinds were implemented and strictly enforced to limit over-exploitation and defilement. Elbert and Pukui (1986:132) defined *kapu* as “taboo, prohibitions; special privilege or exemption.” Kepelino noted that *kapu* associated with *akua* (deities) applied to all social classes, while *kapu* associated with *ali ‘i* were applied to the people (in Beckwith 1971). As *kapu* dictated social relationships, they also provided “environmental rules and controls that were essential for a subsistence economy” (Else 2004:246). The companion to *kapu* was *noa*, translated as “freed of taboo, released from restrictions, profane, freedom” (Pukui and Elbert 1986:268). Some *kapu*, particularly those associated with maintaining social hierarchy and gender differentiation were unremitting, while those *kapu* placed on natural resources were applied and enforced according to seasonal changes. The application of *kapu* to natural resources ensured that such resources remained available for future use. When the *ali ‘i* or the lesser chiefs (including *konoiki* and *po ‘o lawai ‘a*) determined that a particular resource was to be made available to the people, a decree was proclaimed indicating that *kapu* had been lifted, thereby making it *noa*. Although transitioning a resource from a state of *kapu* to *noa* allowed for its use, people were expected to practice sustainable harvesting methods and pay tribute to the paramount chief and the *akua* associated with that resource. *Kapu* were strictly enforced and violators faced serious consequences including death (Jokieli et al. 2011). Violators who escaped execution sought refuge at a *pu ‘uhonua*, a designated place of refuge or an individual who could pardon the accused (Kamakau 1992). After completing the proper rituals, the violator was absolved of his or her crime and allowed to reintegrate back into society. In summary, the layering and interweaving of beliefs, land stewardship practices, and the socio-political system form the basis of the relationship shared between the Hawaiian people and the land. It is through the analysis of these dynamic elements that we develop an understanding of the complexity of place.

CULTURE HISTORY OF KEONEPOKO IKI

Located along the northern fringes of present-day Pāhoa Town, the study areas are all within the traditional *ahupua ‘a* of Keonepoko Iki (historically referred to as Keonepoko 2nd, Figure 7). Historically, Keonepoko Iki and its geographically larger counterpart, Keonepoko Nui (also known as Keonepoko 1st) were known simply as Keonepoko, but as a result of the 1848 *Māhele ‘Āina*, Keonepoko was divided into two distinct *ahupua ‘a*. The name Ke-one-poko has been translated as “the short sand beach” (Andrews and Parker 1922). Keonepoko Iki is one of at least sixty-two *ahupua ‘a* that make up the roughly 311,754-acre Puna District. Handy et al. (1991:539) provided the following description of the Puna District:

The land division named Puna—one of the six chiefdoms of the island of Hawaii said to have been cut (*‘oki*) by the son and successor of the island’s first unifier, Umi-a-Liloa—lies between Hilo to the north and Ka‘u to the south, and it projects sharply to the east as a great promontory into the Pacific. Kapoho is its most easterly point, at Cape Kumukahi. The uplands of Puna extend back toward the great central heights of Mauna Loa, and in the past its lands have been built, and devastated, and built again by that mountain’s fires. In the long intervals, vegetation took hold, beginning with minuscule mosses and lichens, then ferns and hardier shrubs, until the uplands became green and forested and good earth and humus covered much of the lava-strewn terrain, making interior Puna a place of great beauty.

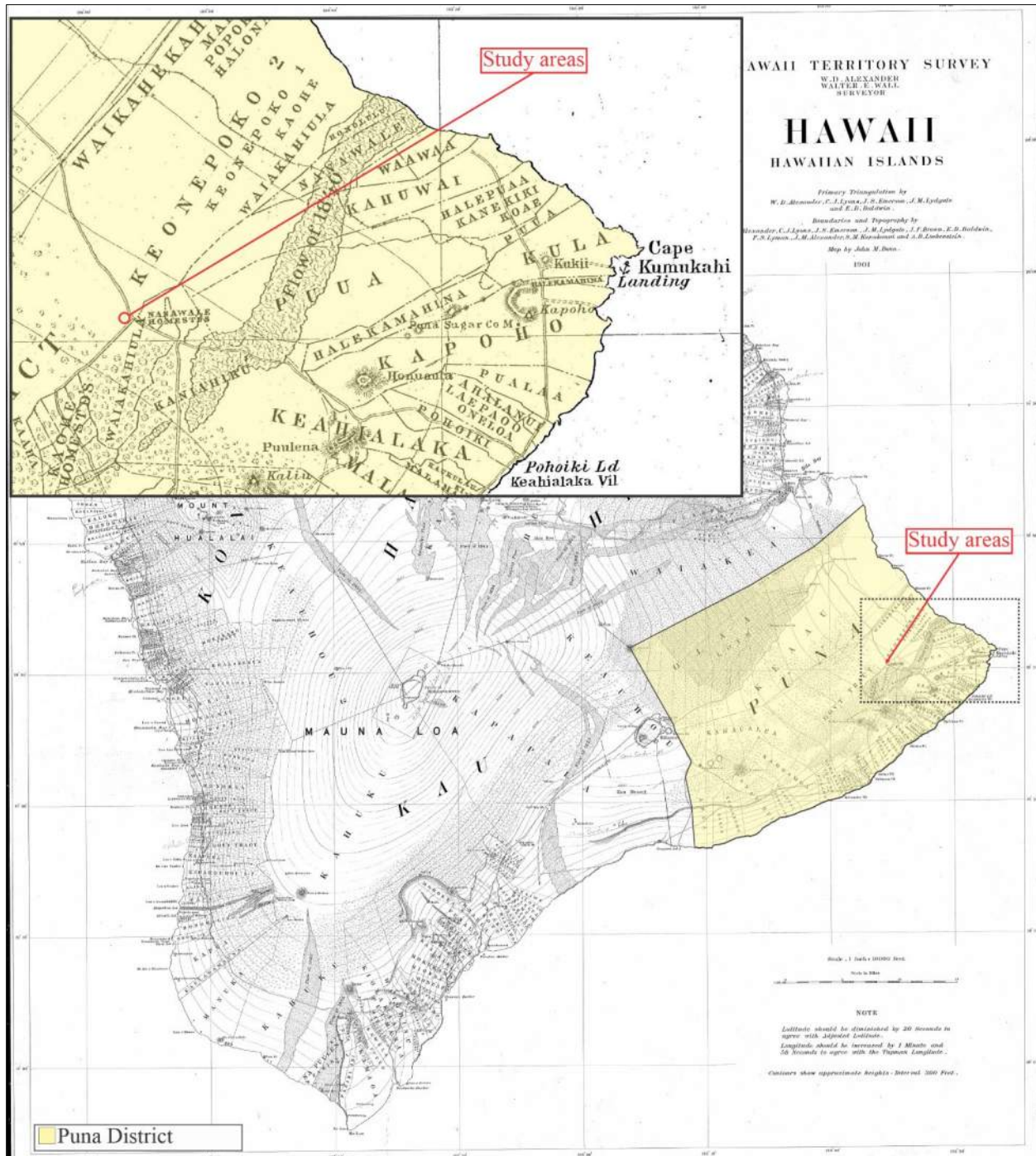


Figure 7. Hawai'i Registered Map No. 2060 by J. M. Donn (1901) showing the three alternative site locations within Keonepoko Nui Ahupua'a.

The *ōlelo no'eau*, "*Puna, mai 'Oki'okiaho a Māwae*" describes the extent of the district, spanning from 'Oki'okiaho (lit. to sever the cord) at its southern boundary, to Māwae (lit. fissure) in the north. Concerning the district name, McGregor (2007:143-144) wrote:

The name Puna means wellspring and derives from observations by Native Hawaiian ancestors of how the forest of Puna attract the clouds to drench he [sic] district with its many rains, such as "*ka ua moaniani lehua o Puna*" (the rain that brings fragrance of the lehua of Puna). The rains refresh

and enrich the Puna water table and sustain the life cycle of all living things in Puna and the entire island of Hawai‘i.

As the easternmost district in the Hawaiian archipelago, Puna is the district most closely associated with the rising sun, and as Hawaiian scholar, Kekuewa Kikilo (2010:89) explained, “the rising of the sun in the east symbolically represents the opening stages, birth, and a new beginning of life.” Because of its geographical placement and the presence of certain elemental forces, Puna is closely associated with the regenerative powers of the *akua* (deity, god) Kāne and the destructive and creative forces of the *akua* Pelehonuamea (Pele). While Pele’s presence in the form of molten lava or expanses of hardened black lava fields is most evident on the land today, the ancient *mo‘olelo* (accounts, stories, history) of Puna tell a different story as it honors the district’s connection to the sun and describes its once lush and verdant landscape, both of which are associated with Kāne.

It is imperative to note that the countless *mo‘olelo* telling of Puna’s association with Kāne, Pele, and other deities are not merely fragments of an ancient and fanciful tale. Rather these *mo‘olelo*, as handed down over the generations, are important mnemonic devices that tell us of the complex interactions in the natural world, as they were understood by the indigenous inhabitants of this land. In Puna, these interactions play out daily as part of a living and ever-changing landscape. These *mo‘olelo* convey the beliefs and practices that Hawaiians developed in response to living in this dynamic landscape we know today as Puna.

Kāne and Pelehonuamea

Due to its association with the east and the rising sun, the Puna District is synonymous with the *akua* (god, deity) Kāne. The sun is regarded as a manifestation of Kāne and his domain extended over the east where the sun rises (Kanahele 2011; McGregor 2007). Maly (1998:13) noted that “[t]he god Kāne in his attributes as giver of light and life, plays an important role as healer, and many native customs and practices of healing are associated with the sun rising from the east in Puna.” In addition to his affiliation with the sun, Kāne also manifested as freshwater resources, both surface and subsurface waters, and is precisely the resource from which the Puna District—*puna* translated as “spring”—derives its name (McGregor 2007; Pukui and Elbert 1986). Kāne’s association with Puna is interwoven with the *mo‘olelo* of the Pele clan. According to McGregor (2007:145), it is “believed that the waters of the Puna District are sacred to Kāne and that the steam generated by the heat of Pelehonuamea [Pele] is sacred to her.” In some Puna traditions, Kāne in his fiery hot sun form (Kānehoalani) is said to have guided the migration of the Pele clan from the islands in the west to the east landing in Puna where Pele established her residence (Kanahele 2011). Kanahele (2011:49) added that “Kānehoalani, the sun, is the purest and ultimate form of the volcano” and the “sun is the source of her [Pele’s] persona.” Writing about the Puna District during the 1930s, Handy et al. (1991:542) shared that:

One of the most interesting things about Puna is that Hawaiians believe, and their traditions imply that this was once Hawaii’s richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land. Unquestionably lava flows in historic times have covered more good gardening land here than in any other district. But the present desolation was largely brought about by the gradual abandonment of their country by Hawaiians after sugar and ranching came in...

Handy’s sentiments may have been inspired by the traditional stories that suggest that prior to Pele’s arrival in Puna, the district was closely associated with Kāne. This belief is conveyed in several of Puna’s *‘ōlelo no‘eau* one of which states “*Aina i ka houpo o Kāne*,” translated as “land on the bosom of Kāne” (Pukui 1983:11). Similar sentiments are found in another *‘ōlelo no‘eau*, “*Ke one lau‘ena a Kāne*,” translated as “the rich, fertile land of Kāne” (Pukui 1983:190).” Pukui (1983:190) explained that before Pele, Puna “was said to have been a beautiful, fertile land loved by the god Kāne.” With Pele’s arrival and subsequent settlement, the district was transformed “into a land of lava beds, cinder, and rock” (Pukui 1983:190). Geological changes brought about to the Puna District by Pele are well documented in Hawaiian historical genres and literature. It is believed that these accounts reflect the geological changes of Kīlauea, with Pele representing geologic instability and Kāne representing a state of volcanic inactivity and quietness (Maly 1998).

Kalākaua (1888) indicates that active worship of Pele was ongoing since at least the 12th century and that the abolition of the traditional *kapu* system in 1820 had little to no effect on this practice, which remains ongoing. In addition to being revered as a goddess, Pele was also worshipped as an *‘aumakua* (family/personal god) by her descendants. According to Nimmo (1990:43), “most Hawaiians living in the volcano areas of Hawai‘i, the districts of Ka‘ū, Puna, and Kona, at the time of European contact traced their ancestry to Pele”. Pele is frequently and comprehensively referenced in historical and mythological literature, and traditional tales of Pele’s migration to Hawai‘i from Kahiki are many and varied. Several versions of the Pele migration legend exist. According to one

version of the migration legend, Pele, the daughter of Haumea and Moemoe-a-alii, was tempted by the urge to travel. Nestling her favorite sister who was born in the shape of an egg, Hi'iaka-i-ka-poli-o-Pele, safely under her bosom, Pele traveled to the Hawaiian Islands with the aid from her brothers Pu-ahiuhiu (whirlwind), Ke-au-lawe/Ke-au-miki (tide), and Ke-au-kā (current). She landed on the island of Kaua'i and became enamored with a young chief named Lohi'au. She then continued her journey through the islands to secure a location where she could dig a home for herself and her new lover (Beckwith 1970). Beckwith (1970:172-173) presented the following *mele* (song) that recounts the migration of Pele and her family from their homeland, Polapola to Hawai'i:

<i>No Kahiki mai ka wahine o Pele</i>	The woman Pele comes from Kahiki,
<i>Mai ka aina mai o Polapola</i>	From the land of Polapola,
<i>Mai ka punohu a Kane mai ke ao lapa</i>	From the ascending mist of Kane, from the
<i>i ka lani</i>	clouds that move in the sky
<i>Mai ka opua lapa i Kahiki</i>	From the pointed clouds born at Kahiki.
<i>Lapa ku i Hawai'i ka wahine o Pele</i>	The woman Pele was restless for Hawai'i.
<i>Kalai i ka wa'a o Honua-ia-kea</i>	'Fashion the canoe Honua-ia-kea,
<i>Ko wa'a, e Kamohoali'i, hoa mai ka moku</i>	As a canoe, O Kamohoali'i, for venturing to
<i>Ua pa'a, ua oki, ka wa'a o ke 'kua</i>	the island.'
<i>Ka wa'a o kalai Honua-mea o- holo</i>	Completed, equipped, is the canoe of the gods,
<i>Mai ke au hele a'e, ua a'e ka lani</i>	The canoe for (Pele)-of-the-sacred-earth to
<i>A i puni mai ka moku, a e a'e kini</i>	sail in.
<i>o ke 'kua</i>	From the straight course the heavenly one
<i>Iawai ka hope, ka uli o ka wa'a?</i>	turned
<i>I na hoali'i a Pele a e hue, e</i>	And went around the island, and the multitude
<i>Me la hune ka la, kela ho'onoho kau hoe</i>	of the gods stepped ashore.
<i>O luna o ka wa'a, o Ku ma laua o Lono</i>	'Who were behind at the stern of the canoe?'
<i>Holo i honua aina, kau aku</i>	'The household of Pele and her company,
<i>I ho'olewa ka moku, a'e a'e Hi'iaka na'i au</i>	Those who bail, those who work the paddles,
<i>ke 'kua</i>	On the canoe were Ku and Lono.'
<i>Hele a'e a komo I ka hale o Pele</i>	It came to land, rested there,
<i>Huahua'i Kahiki lapa uila</i>	The island rose before them, Hi'iaka stepped
<i>Uila Pele e hua'i e</i>	ashore seeking for increase of divinity,
<i>Hua'ina hoi e</i>	Went and came to the house of Pele.
	The gods of Kahiki burst into lightning flame
	with roar and tumult,
	Lightning flames gushed forth,
	Burst forth with a roar.

Kalākaua (1972:140) places the arrival of Pele and Hi'iaka during the reign of Kamiōle, or more specifically, in approximately A.D. 1175, and noted that "every tradition refers to them as deities at the time of their arrival at Hawai'i." When Pele arrived on the shores of Hawai'i, she discovered a fire god by the name of 'Ai La'au already had jurisdiction over the island. Westervelt (1916:3) related the following narrative which tells of how Pele managed to scare 'Ai La'au out of Puna and establish Kīlauea as her home:

When Pele came to the island Hawai'i, she first stopped at a place called Ke-ahi-a-laka in the district of Puna. From this place she began her inland journey towards the mountains. As she passed on her way there grew within her an intense desire to go at once and see Ai-laau, the god to whom Kīlauea belonged, and find a resting-place with him as the end of her journey. She came up, but Ai-laau was not in his house. Of a truth he had made himself thoroughly lost. He had vanished because he knew that this one coming toward him was Pele. He had seen her toiling down by the sea at Ke-ahi-a-laka. Trembling dread and heavy fear overpowered him. He ran away and was entirely lost. When Pele came to that pit she laid out the plan for her abiding home, beginning at once to dig up the foundations. She dug day and night and found that this place fulfilled all her desires. Therefore, she fastened herself tight to Hawai'i for all time.

According to Kalākaua (1972:139), Pele's "favorite residence was the vast and ever-seething crater of Kīlauea, beneath whose molten flood, in halls of burning adamant and grottoes of fire, she consumed the offerings of her worshippers and devised destruction to those who long neglected her or failed to respect her prerogatives".

2. Background

Ho‘oulumāhiehie (2006a), who penned a version of the epic tale of Pele’s younger sister, Hi‘iakaikapoliopole indicates that on her way to Kīlauea, Pele carved out Malama a crater located inland of her landing place at Keahialaka in Puna. Pele was dissatisfied with this crater and proceeded to feverishly excavate two more craters, Pu‘ulena and Poho-iki, both of which she was also displeased with and abandoned as she continued her pursuit for a suitable home which she found at Halema‘ūma‘u. However ancient such legends describing Pele’s arrival and settlement in Puna are, her presence persists today, and the old Puna families continue to respect and honor her role as the earthly creator.

Puna Paia ‘A‘ala I Ka Hala

Celebrated for its lush vegetation, there are several plants for which the Puna District is most famous, one of which included its expansive *hala* (pandanus) groves (Figure 8) that fringe the district’s coastal and *kula* (open plain) regions. Because of the abundance and widespread availability of *hala*, the natives of Puna learned to utilize nearly all parts of the plant for various purposes. As indicated by Handy (1940:194), Puna’s vast *hala* groves are honored in this ‘*ōlelo kaulana* (famed saying) “*Puna paia ala i ka hala*” (Puna hedged with fragrant *hala*). Additional details are given by Pukui (1983:301) about this saying, “in the olden days the people would stick the bracts of *hala* into the thatching of their houses to bring some of the fragrance indoors.” Indeed, the presence of Puna’s sweet-smelling famed *hala* groves is prevalent throughout written historic literature and celebrated in countless ‘*ōlelo no ‘eau* and *mele*. The ‘*ōlelo no ‘eau* “*Ka makani hali‘ala o Puna*” boast of the fragrance-bearing winds of Puna scented with *maile* (*Alyxia spp.*), ‘*ōhi‘a lehua* (*Metrosideros polymorpha*), and *hala* (Pukui 1983:158). Pukui (1983:158) explained that “it was said that when the wind blew from the land, fishermen at sea could smell the fragrance of these leaves and flowers.”



Figure 8. *Hala* grove in Puna, Hawai‘i in 1888 (Brigham and Stokes 1906:28).

Exalted for its pleasing scent, *hala* was also exploited for utilitarian purposes. The dried *hala* leaves (*lauhala*) were used to plait mats, or used for thatching onto house rafters (Figure 9)—a method typically employed in Puna and the neighboring district of Hilo in the absence of *pili* (*Heteropogon contortus*) grass—and house walls, pillows, fans, floor coverings, canoe sails, baskets, and occasionally as clothing (Handy 1940; Handy et al. 1991; Summers 1999). In 1864, William T. Brigham, of the Bernice Pauahi Bishop Museum, observed the natives of Puna weaving mats in caves where the moist conditions made weaving the dried leaves which were prone to cracking favorable:

Puna was a famous region for *hala* mats, and in 1864, the author, when journeying through the district with that noble missionary the Reverend Titus Coan, saw many a party in the curious open caves (caused by a breakdown of the lava crust in some of the many streams of lava, ancient and recent, that form much of the surface of Puna) busily engaged in weaving mats, a work for which

the comparative coolness and dampness of the caves was most suited. A quarter of a century later in traveling the same road with a younger companion the scene was greatly changed: the caves were there, the hala trees were there, but the inhabitants had gone, and for sixty miles there was nothing but a few deserted churches and some aged breadfruit trees to tell that once people had lived there. Fifteen years later the scene had again changed owing to the opening of roads and the cultivation of sugarcane, but the present inhabitants were not the old natives, and the mat making is only here and there continued when there is a chance to sell to the foreigner. (Brigham and Stokes 1906:29)



Figure 9. Traditional *lauhala* thatched house in Pahoā, Puna (ca. 1883-1905). Photo by Gabriel Bertram. (HAS PPBET-1-8-014)

The practice of weaving *lauhala* in caves during the early 20th century was described in detail by Emma Kapūhonu‘ulaokalani Kauhi, a native of Kapa‘ahu, Puna who in an ethnographic study, shared:

‘O ka manawa maika‘i e ulana ‘ia ai ka lauhala, aia i ke kakahiaka, a i ‘ole i ke ahiahi, ai i ‘ole i ka pō me ke kukui ‘aila māhu—no ka mea, ‘o nā manawa ma‘ū kēlā. Inā e ulana ‘ia ana ka lauhala i ka wā wela ‘o ‘ole‘a, i kekahi manawa hakahaka a i ‘ole keke‘e ka moena. No laila, inā nui ka moena kaiho a ‘Anakē Kuliana, hele ‘o ia me ‘Anakē Luika e hana i ko lāua ana. Hiki iā lāua ke ulana i ke ao a me ka pō.

The best time for *lauhala* weaving was during mornings or late evenings or at night with a lantern, because it was damp then. If you weave when it’s hot, the *lauhala* gets hard. The weaving might be crooked or loose, with spaces in between the *lauhala* strips. So when Auntie Kuliana had an order of mats to fulfill, she and Auntie Luika would go to the cave to do their weaving. It was always damp in there, so they were able to weave day and night.

...Hele mākou me lāua. Lawe mākou i ka lauhala, nā mea'ai, nā kapa moe, a moe mākou a pau i loko o ke ana. Noho mākou a pau ka ulana 'ana o 'Anakē mā. I kekahi manawa, he mau lā; i kekahi manawa, piha paha ka pule a 'oi. 'O kēia ana ho'i, ho'okahi 'ao'ao he kapuahi wahie no ke kuke 'ana. 'O kahi o waena, no ka 'ai 'ana me ka hiamoe 'ana. A 'o kekahi 'ao'ao ma 'ō aku, no ka uluna wale nō. Ua pāpā 'ia mākou nā kamali'i mai hele ma kēlā 'ao'ao....Kokoke nō i ke ana, he pūnāwai. Ma laila e loa'a ai kā mākou wai inu, wai kuke. Pau nā hana ulana a 'Anakē mā halihali mākou i nā mea a pau, a ho'i mākou i ko mākou hale, a hiki i kekahi wā aku. (Kauhi 1996:21)

We went with them. We took the lauhala, food, bedding, and we all slept there inside the cave, We stayed until their weaving was finished, sometimes for several days, sometimes for more than a week. One end of the cave had the wood stove for cooking. The center area was for eating and sleeping. And the far side was just for weaving. We children were forbidden to go there...Nearby the cave was a pool where we got our water for drinking and cooking. When Auntie folks finished their weaving, we packed everything and went home, until another time. (Tranlated by Langlas in Kauhi 1996:91)

The inhabitants of Puna were undoubtedly recognized for their expertise and skill in *lauhala* weaving. Maly (1998:6) relates, “to this day, Puna is known for its growth of *hala*, and the floors and furniture of some of the old households are still covered with fine woven mats and cushions. Weaving remains an important occupation of many native families of Puna.” According to Fornander (1918-1919), Puna was famous for two particular styles of *lauhala* mats; the *makali'i*, a braided, small-stranded mat, and the *puahala* or *hīnano* (flower of the male pandanus) which was made by weaving the flower sheaths together to form a silky and fragrant mat. The latter was especially highly valued, and according to Summers (1999:17) “...is only made in Puna where the hala tree is very abundant. It is a regular article of trade among the natives who greatly prize it as a choice mat to sleep on.”

The *hala* tree also carries spiritual connotations, some of which are derived from the literal meaning, “to pass; elapse, as time; to pass away” (Pukui and Elbert 1986:50). *Lei* (garland of flowers or foliage commonly worn around the neck) strewn together from the ripe *'āhui hala* (fruit of the female pandanus) is often gifted to an individual to commemorate the passing of a major life event or given to a deceased individual to help usher their spirit into the afterlife. Additionally, Handy and Pukui (1998) noted that *hala* played a role in the protection of a newborn baby's *'iwe* (placenta) and that some families were known to conceal the *'iwe* high up in the leaves to prevent it from being pilfered. The people of Puna were sometimes referred to as *maka kōkala* (thorny eyes) by the inhabitants of the neighboring district of Ka'ū, who correlated the spined elongated leaves of the *hala* with the long eyelashes of the baby whose *'iwe* it was sheltering, providing a “bright keen look” (Handy and Pukui 1998; Pukui and Elbert 1986:160).

Settlement of the Puna District: An Archaeological and Cultural Perspective

Due to the volcanic activity emanating from what geologists have termed the Kīlauea East Rift Zone and the scant nature of archeological studies conducted throughout the district, archaeological evidence demonstrating long-term occupation is limited or has been impacted by various historical lava flows (Burtchard and Moblo 1994). To this end, understanding Puna's Precontact settlement pattern is often based on historical descriptions (i.e. Coan 1882; Ellis 1827) and predictive models that consider the relative density of archaeological remains against general Precontact patterns to establish settlements in environmental settings that maximize access to critical resources (Burtchard and Moblo 1994). Considering these factors, it is believed that the first settlers of Puna established themselves along the shoreline where there was access to marine resources, inland agriculturally fertile areas, and where shoreline freshwater springs were readily available. Expanding upon McEldowney's (1979) early Historic Period land-use model developed for the Hilo District and later adapted to the Puna District, Keonepoko Iki Ahupua'a includes areas of both Coastal Settlement Zone (Zone I) and an Upland Agricultural Zone (Zone II). In their refinement of the model as it applies to Puna, Burtchard and Moblo (1994:26) elaborate on McEldowney's concept of the Coastal Settlement Zone which they described thusly:

As with her [McEldowney] model, [the Coastal Settlement Zone] includes coastal terrain to about one half mile inland. This is the zone expected to have the greatest density and variety of prehistoric surface features in the general study area. Primary settlements are expected in places where

agriculturally productive sediments (principally well-weathered ‘a‘ā flows) co-occur with sheltered embayments and productive fisheries. Settlements within this zone are expected to be logistically linked to inland agricultural and forest exploitation zones accessed through a network of upslope-downslope (Mauka-makai) trails. Larger settlements and resource acquisition areas may have been connected by cross-terrain trail networks.

Concerning the Upland Agricultural Zone (Zone II), wherein which the study areas are situated, Burtchard and Moblo (1994) expanded McEldowney’s designation to include two additional zones which they identified as the Windward Coastal Margin (2a) and the Windward Inland Terrain (2b). The study area, as is all of Pāhoā Town proper are all located within Burtchard and Moblo’s (1994:26) Windward Inland Terrain (2b) (Figure 10) which they described thusly:

The inland portion of the zone includes low to moderate elevation landforms (circa 200 to 700 ft) extending to approximately five miles inland from the coast. Because of relatively easy access and reliable rainfall, this zone is expected to have been linked to the coast, providing agricultural support throughout the prehistoric period. Land-use intensity should have increased as volcanic destruction of arable ground and/or late prehistoric population demands increased pressure to exploit available agricultural land. Agricultural feature density should be moderate and decrease with distance to the coast.

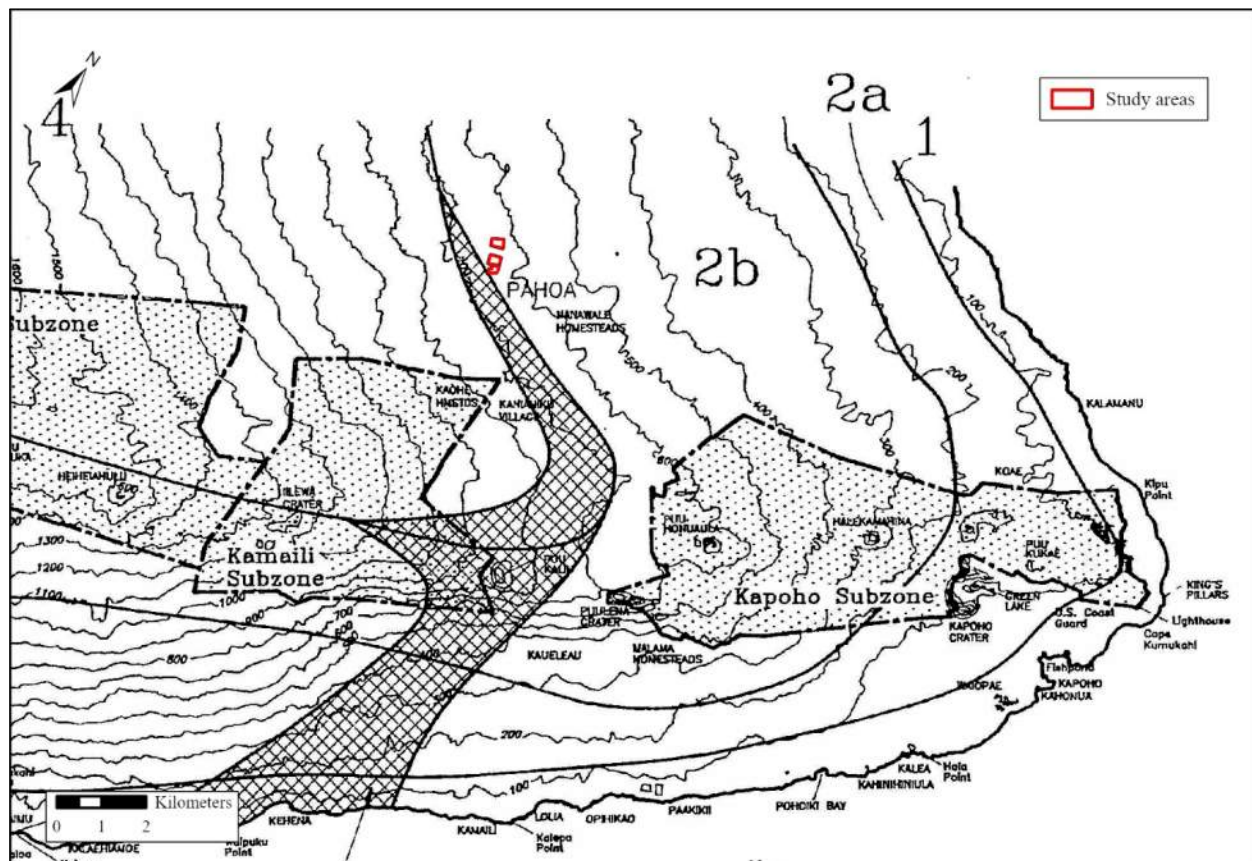


Figure 10. Portion of Burtchard and Moblo’s (1994:27) modeled land use zones showing study areas within zone 2b, the Windward Inland Terrain.

Burtchard and Moblo (1994) concluded that within Puna, the most intensively utilized areas during the Precontact and Early Historic Periods were likely directed toward the coast and clustered around embayments where access to marine resources and agricultural areas could better support aggregated populations. Due to more reliable precipitation patterns, the coastal settlement clusters were likely concentrated in the district’s windward coast between “...Kaimū, around Kumukahi towards Hilo Bay” (Burtchard and Moblo 1994:28). During the early expansion period, people probably began utilizing the agricultural resources of upland Puna (Burtchard and Moblo 1994). As coastal populations increased, the need for food caused people to seek arable land at higher elevations. This trend of increasing

population along desirable coastal locations and the expansion into upland regions to support the coastal populations would have continued throughout prehistory, slowly populating more marginal areas of Puna District. As population density increased through A.D. 1600-1700s, so would political competition. This competition, undoubtedly, produced conflict, which led to political exiles and further expansion into upland areas as these refugees sought asylum in more remote places and hidden lava tubes (Burtchard and Moblo 1994).

While archaeological evidence provides some understanding of the district's settlement, ethnographic research emphasizes a long-standing connection between the *'ohana* (families) from Puna and the adjacent district of Ka'ū. Pukui explained that the families from Puna and Ka'ū shared a close relationship as expressed in the *'ōlelo no 'eau* "*Hilina 'i Puna, kālele ia Ka'ū*" literally translated as "Puna leans and reclines on Ka'ū" (Pukui 1983:107). Pukui (1983:107) added that this saying was:

Said of one who leans or depends on another. The ancestors of these two districts were originally of one extended family. The time came when those of each district decided to have a name of their own, without breaking the link entirely. Those in Ka'ū referred to themselves as the Mākaha and those in Puna as the Kumākaha. These names are mentioned in the chants of the chiefs of Ka'ū.

Another *'ōlelo no 'eau* recorded by Pukui conveying a similar belief reads, "*Hilina 'i Puna kālele ia Ka'ū, hilina 'i Ka'ū kālele ia Puna*" literally translated as "Puna trust and leans on Ka'ū, Ka'ū trusts and leans on Puna" (Pukui 1983:107). This saying has come to mean "the people of Puna and Ka'ū are related" (Pukui 1983:107). Pukui attributes the ancestor named 'Ī as one of the progenitors of the Puna-Ka'ū extended family. The proverb, "*Ka hālau a 'Ī*" literally translated as "the house of 'Ī" describes the spreading of this family throughout Hāmākua, Hilo, Puna, and Ka'ū (Pukui 1983:141).

Chiefly Rule in Puna

The following section presents a summary of the *ali 'i* rule on Hawai'i Island with an emphasis on the Puna District. Unlike other parts of Hawai'i Island where extensive literature on the area's *ali 'i* history is abundant, historical references describing the *ali 'i* history in the Puna District are limited. However, from these few historical accounts, some understanding of Puna's royal lineage can be gleaned.

The years between A.D. 1100 and 1300 are referred to as Hawai'i's Expansion Period. This period is characterized by the dispersal of the population from the windward into the leeward and more marginal areas of Hawai'i. It is also during this period that Tahitian migrations to Hawai'i took place (Kirch 1985). In the Puna District, the Tahitian priest Pā'ao made landfall and constructed Waha'ula Heiau located in Pūlama Ahupua'a. According to Kamakau (1991:100):

Puna on Hawaii island was the land first reached by Pā'ao, and here in Puna he built his first *heiau* for his god Aha'ula and named it Aha'ula [Waha'ula]. It was a *luakini*.

It is thought that Pā'ao came to Hawai'i in the time of the *ali 'i* La'au because Pili ruled as *mō'ī* after La'au...It is said that Hawai'i island was without a chief, and so a chief was brought from Kahiki; this is according to the chiefly genealogies. Hawai'i island has been without a chief for a long time, and the chiefs of Hawai'i were *ali 'i maka 'āinana* or just commoners, *maka 'āinana*, during this time.

Kamakau (1991:97) goes on to explain that Pā'ao came from "...Wawau and 'Ūpolu on an island farther south..." and after a quarrel with his brother Lonopele, left his homeland and sailed for Hawai'i. Once in Hawai'i, Pā'ao established a new religious priesthood that included the practice of human sacrificing at certain *heiau luakini*. Because of Hawai'i Island's apparent lack of royalty, Pā'ao sent back to his homeland for a new ruler and selected Pilika'aiea (Pili). The arrival of Pili to Hawai'i ushered in a new era of ruling chiefs and priesthood order that lasted until the reign of Kamehameha I (Beckwith 1970; McGregor 2007; Westervelt 1915a).

Known as one of the oldest *heiau* found throughout Hawai'i, "Wahaula was a tabu temple of the very highest rank" (Westervelt 1915a:5). According to Westervelt (1915a) the natives of Puna often chanted, "*No keia heiau oia ke kapu enaena*" which translates as "concerning this heiau is the burning tabu." So sacred was Waha'ula that the smoke that billowed from the fires burning within the *heiau* was always watched with great anxiety by the people living in its vicinity. As reported by Westervelt (1915a:6) "this smoke was the shadow cast by the deity worshipped, and was far more sacred than the shadow of the highest chief or king in all the islands" and walking through the smoke was "sufficient cause for death." Westervelt (1915a) related the story of a young chief, who while on a circuit around the island met certain death when he encountered the smoke from Waha'ula. He was clubbed by the Mū, the body snatchers who guarded the *heiau*, placed onto the large sacrificial stone, and killed. To prevent his bones from defilement, the spirit of the young chief visited his father, the high chief of Ka'ū, and instructed him to retrieve his

bones from the *heiau*. The father followed the instructions, arrived at Waha‘ula, retrieved his son’s bones, and returned them to his homeland in Ka‘ū.

In the following narrative by Fornander (1880), he described the *heiau*’s general location and note of the various chiefs who made efforts to rebuild Waha‘ula. Fornander (1880:35-36) also makes an interesting reference to an assemblage of plants that were contained within the *heiau*:

Paao is said to have made his first landfall in the district of Puna, Hawaii, where he landed and built a Heiau (temple) for his god and called it *Wahaula*. The ruins of this Heiau still remain a short distance south of the village of Kahawalea [Kahauale‘a] in Puna, but it is almost impossible now to day what portions of it date back to the time of *Paao*, seeing that it was almost entirely rebuilt by *Imaikalani*, a noted chief over the Puna and Kau districts *tempore Keawenui-a-umi*, some twelve or thirteen generations ago, and was again repaired or improved in the time of *Kalaniopuu*, who died 1782. It was the very last Heiau that was destroyed after the tabus were abrogated by *Kamehameha II* in 1820. It was built in the quadrangular or parallelogram form which characterized all the Heiau build under and after the religious régime introduced by *Paao*, and in its enclosure was a sacred grove, said to have contained one or more specimens of every tree growing on the Hawaiian group, a considerable number of which, or perhaps their descendants, had survived when last the author visited the place in 1869.

In Fornander’s (1916-1917) account of Mo‘ikeha, it is said that when Mo‘ikeha left Tahiti for Hawai‘i, he was accompanied by several families members including his younger brothers, Kumukahi and Ha‘eha‘e. Upon their arrival in Hawai‘i, these two brothers with the permission of Mo‘ikeha were allowed to take up residence, and the places in which they settled bear their names to this day and are considered by some to be a significant *wahi pana* (pulsing site) in Puna. These localities, Kumukahi and Ha‘eha‘e are places found in Kula Ahupua‘a in eastern Puna. In another account associated with Mo‘ikeha recorded by King David Kalākaua (1888), he detailed the journey taken by Mo‘ikeha from Ra‘iatea and their arrival in the eastern part of Ka‘ū where they secured supplies and water. After leaving Ka‘ū, Mo‘ikeha’s party arrived at Kumukahi, the easternmost cape in Puna, “but a recent eruption from the crater of Kilauea, or a subterranean channel connected with it, had devastated a wide strip of country near the coast, and after a brief stay sail was made for Kohala” (Kalākaua 1888:124). In a later part of the Mo‘ikeha story, Fornander (1916-1917:156) noted that after Ulu, the chief of Ka‘ū was sent in search of Olopana who was believed to be in Tahiti, died at sea, Kapukini who was “...a chief of Puna, was made king of Hawai‘i...”

Kamakau (1992) reported that by the time the *ali‘i* Līloa came to power (ca. A.D. 1580-1600) Hawai‘i Island had been divided into six major districts, with each being ruled by an independent *ali‘i*. Kamakau (1992:1) stated that during his reign, Līloa managed to consolidate his rule of Hawai‘i Island and that “the other chiefs all around Hawaii remained under his rule and placed their sons under his rule.” One of Līloa’s contemporaries was Hua-‘ā, the chief of Puna. Fornander (1916-1917), however, stated that Hua-‘ā ruled part of the district while the famed blind chief of Ka‘ū, ‘Imaikalani ruled the other half of Puna. Fornander’s (1916-1917:228) statement concerning Puna’s joint rule with the neighboring districts is also evidenced in the Legend of Halemano which reads:

Concerning Kamalalawalu: she was the daughter of Hanakaulua and Haehae of Kapoho, Puna, Hawaii. The parents of Kamalalawalu were chiefs of the land of Kapoho. She was a very beautiful woman to behold, far superior to all the women of Puna and Hilo, a virgin, brought up under very strict kapu; no person was allowed to see her and she had no companions other than her own brother, Kumukahi. These two had eight hundred dogs for their companions.

At this time Huaa was the king of Puna, and Kulukulua was the king of Hilo. Both of these kings were courting Kamalalawalu, giving her large quantities of properties from Puna and Hilo, with the idea that in time one of them would win her hand and take her to wife.

When Līloa died, his kingdom passed to his eldest son Hākau, however, Hākau’s mistreatment of the chiefs and people led to his demise, and his kingdom was seized by his half-brother ‘Umi A Līloa (Kamakau 1992). ‘Umi A Līloa, using his wit and following the advice of his *kahu hānai* (foster parent) came into power and sought to consolidate his rule of Hawai‘i Island. After seizing the districts of Hilo and Hāmākua, ‘Umi A Līloa went on to capture the Puna District when his adopted warrior son, Pi‘imaiwa‘a killed Hua-‘ā on the battlefield of Kuolo in Kea‘au (Kamakau 1992). Cordy (2000:211) and others have attributed ‘Umi A Līloa as the builder of the *heiau* atop Pu‘u Kūki‘i in Kula Ahupua‘a in eastern Puna stating:

Several other heiau scattered about the island are also associated with ‘Umi, said to have been built when he toured the island after coming to power. Dressed or cut-stone blocks were the hallmark of

their construction. One of these heiau was Kūki'i heiau in Kula Ahupua'a in Puna. It was built atop a cinder cone, Pu'u Kūki'i.

Between A.D. 1640-1660, Hawai'i Island was under the rule of Lonoikamakahiki, a grandson of 'Umi A Līloa (Cordy 2000). Fornander (1916-1917:272) in relating the life history of Lonoikamakahiki noted that he and his wife Kaikilani "Chiefess of Puna" took charge of the government. Later in the story, Fornander (1916-1917:318) mentioned Lililehua, the daughter of the chief Hua-ā as "the chief of Puna." By the early to mid-18th century, the rule of Puna appears to have toggled between the neighboring district chiefs. When the high chief Alapa'inui died in A.D. 1752, he was succeeded by Kalani'ōpu'u. In A.D. 1754, after many bloody battles, Kalani'ōpu'u, the *ali'i 'ai moku* of Ka'ū, defeated his main rival Keawe'ōpala in South Kona and declared himself ruler over all of the island of Hawai'i (Kamakau 1992). Kalani'ōpu'u was a clever and able chief and a famous athlete in all games of strength, but according to Kamakau (1992) he possessed one great fault, he loved war and had no regard for others' land rights. Just before Kalani'ōpu'u died in A.D. 1782, his rule of Puna and portions of Ka'ū were challenged by 'Imakakōloa, a descendant of 'Īmaikalani, both of whom descended from the famed 'Ī line of chiefs. According to Fornander (1878:201-202) after Kalani'ōpu'u arranged "his worldly and spiritual affairs to his satisfaction":

Kalaniopuu started with his chiefs and warriors for Hilo, in order to subdue the rebel chief of Puna. In Hilo *Kalaniopuu* consecrated the Heiau called Kanowa, in Puueo, to the service of his war-god; then took up his abode at Ohele, in Waiakea, and then the war with *Imakakoloa* commenced. The rebel chieftain fought long and bravely, but was finally overpowered and beaten. For upwards of a year he eluded capture, being secreted by the country-people of Puna. In the meantime *Kalaniopuu* moved from Hilo to the Kau district, stopping first at Punaluu, then at Waiohinu, then at Kamaoa, where he built the Heiau of Pakini in expectation of the capture of *Imakakoloa*. Finally, exasperated at the delay, and the refuge given to the rebel chief by the Puna people, *Kalaniopuu* sent *Puhili*, one of his Kahus, to ravage the Puna district with fire, *i.e.*, to burn every village and hamlet until *Imakakoloa* should be found or the people surrender him

According to Barrère (1959), the chiefs of the Puna District did not figure prominently in the Precontact political strife and turmoil on Hawai'i Island. Barrère (1959:15) writes:

Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo.

Agricultural Practices

Historical literature describing Puna's planting traditions and practices are well recorded. In addition to the uses previously discussed above, Puna's famed *hala* groves were also utilized for the cultivation of staple food crops, particularly *kalo* (taro). While the *'ulu* (breadfruit) appears to be the dominant source of sustenance for residents of Puna, *kalo* undoubtedly rivaled it as a staple food source. Unlike the neighboring district of Hilo, Puna lacked continuously flowing streams, which therefore made growing *kalo* using the popular *lo'i* (irrigated fields) method nearly impossible. Despite this, Puna received ample rainfall throughout the year, which according to Handy (1940:126) made the cultivation of dryland *kalo* possible, even "along the coast as far as Hilo". Handy et al. (1991:541) related that "the wet and sometimes marshy pandanus forests from Kapoho through Poho-iki to 'Opihikao used to be planted with taro in places." The method of planting dryland *kalo* in the lowland forests of Puna is described by Handy et al. (1991:104) as the "*pa-hala* (pandanus clearing) method." When used to grow *kalo*, the method involved the following:

. . . Make holes in the *'a'a* (broken lava) by taking out some of the stones. Be sure that the place chosen is in a *pu hala* grove, to save the labor of hauling *hala* branches into the patch later on. Fill the hole with whatever weeds can be found and leave them there for six weeks or more. The weeds will rot and make soil. When the weeds have rotted away, the taro *huli* are wrapped in *lau hala* (*hala* leaves) to keep them moist and are planted. When three or four leaves have appeared on each *huli*, then that is the time to cut down the *pu hala* to let in the sun. The branches of the *hala* are cut off and the patch covered with them until this is not a trace of the taro to be seen. This is left until sufficiently dry to set on fire. The fire does not hurt the taro much as the *huli* are already well rooted. The *hala* reduced to ashes, give the taro the needed nourishment and they grow so tall that a man can be hidden under their leaves. (Handy et al. 1991:104-105)

This method of cultivating dryland *kalo* in Puna could also be practiced on grass-covered slopes rather than directly atop lava. Unlike the previous method, the surface organic matter would undergo an initial burn-off before being planted. Handy (1940:52) elaborates:

On slopes covered with grass, like those of Hamakua on Maui and Hawaii and Kohala on Hawaii, the grass was formerly burned off and the ground cleared (*waele*) of brush and stubble. This was also done in Puna and elsewhere on land covered with staghorn fern. The field then had to be dug over (*ohiki*) and the stubble thrown out. The open soil was left for a few weeks, or until the small rubbish had decayed. On the windy slopes of Kohala the whole field was covered with cut grass to keep the moisture in. In planting, small holes were made in the soft earth several feet apart and a cutting dropped into each. The old procedure, termed *okupe*, was to thrust the digging stick into the soft earth with the right hand, lift the soil to one side, and drop the cutting into the hole with the left. The cuttings were left uncovered until the rootlets showed vigorous growth; then each cutting was straightened and soil pressed down around it. Kamakau (40) advised burning over the whole field again when the plants showed four or five leaves, weeds, taro leaves and all, after which he says the taro springs forth so luxuriantly “that a man could be hidden among the leaves.”

In slightly more elevated regions of Puna such as lands *mauka* of the current study area locations, *kalo* could be planted in the depression left by a toppled over *hāpu‘u* (*Cibotium* spp.) fern trunk:

In *pa pulupulu*, where there were fern-tree (*pulupulu*) forests at relatively low altitudes, as in Hilo and Puna districts on the island of Hawaii, the fern trunks were toppled over. The holes made by the removal of the bulbous bases were suited to planting taros without further excavation. Presumably the discarded trunks, with the starchy core removed for use as food for men or feed for hogs, were heaped around the clearing, making an enclosure (*pa*). (Handy et al. 1991:51)

In addition to *kalo*, *‘uala* (sweet potato) was grown in great quantities throughout Puna, and Handy (1940:190) suggested that although it was indeed cultivated widely, it does not appear to have been a staple food of the district which was “most famous for its breadfruit”:

. . . The sandy soil southeast of Honolulu must have been utilized for sweet potatoes. As to the interior of northern Puna in ancient times, I have no information. There are a few patches now in Koae and the vicinity of Kapoho; the slopes and higher ground inside Kapoho crater are ideal for sweet potatoes. A variety of wild potato with deeply cut leaf, which had obviously gone wild from cultivation, was found near the rich taro land of Malama homesteads. It is safe to assume that sweet potatoes were cultivated throughout southeast Puna both inland and along the coast wherever there were plantations. They are still grown in small patches at Kaimu, Kalapana, and Kapaahu. It is said that on the barren coast beyond Kapaahu, fishermen scraped together piles of broken lava and rubbish when rains came and successfully grew sweet potatoes in them. Despite the fact that sweet potatoes were planted almost universally and many patches are still maintained, the Puna natives seem to regard this vegetable with little interest, probably because Puna people prided themselves upon and relished their breadfruit, and also because potato was nowhere and at no time the staple for this rainswept district. (Handy 1940:165)

The barrenness of surrounding lava flows was not a limiting factor in propagating *‘uala*, which requires practically no soil to flourish. Its propagation is discussed in fair detail by 19th and early 20th-century visitors to the district, who described seeing *‘uala* growing from mounds of lava stones. For example, an account from 1853 related:

There is an increasing attention paid to the culture of the sweet potato, to which our soil and climate are admirably adapted. It grows well in almost every part of the Islands, and no where better than among the dry hot stones of Puna, Kau and Kona on Hawaii,—No one who has ever traveled over those districts can fail to have been struck with astonishment at the sight of beautiful sweet potatoes growing in hills of broken lava with not a particle of earth to be seen in their vicinity. The natives sometimes manure these hills of lava by placing a few boughs upon the lava, then piling stones on them, and when they are partially decayed pulling up the stems or woody part which leaves the leaves and bark to moisten and enrich the hill. The sweet potato is the great article of food in the dry burnt districts of Hawaii, and the cost of raising it is next to nothing. The yield, I am told, is from 50 to 75 lbs. per acre. (Royal Hawaiian Agricultural Society 1853:7)

‘Ulu, another important staple crop was a *kinolau* (physical manifestation) of the goddess Haumea, the “patron of childbirth,” and the principle staple food of Puna where it was most famous (Beckwith 1970:283; Handy et al. 1991). Careful and gentle propagation was required, which entailed the removal and replanting of the root sucker

cutting while ensuring it remained within its original, undisturbed soil casing. Concerning 'ulu as a sustainable food source, Handy et al. (1991:152) explained that "except in Puna, Hawaii, breadfruit was wholly secondary to taro and sweet potato as a staple. I am told that in Puna in a good year, breadfruit may be eaten for 8 months of the year, beginning with May."

In addition to these staples, other crops such as *niu* (coconut) and 'awa (kava) were readily produced in Puna. The uses for *niu* recounted by Handy et al. (1991) were many and varied. It thrived in coastal Puna and is frequently mentioned in historical accounts. Concerning varieties, Handy et al. (1991) listed two: the *niu hiwa*, used primarily for ceremony, medicine, and cooking; and the *niu lelo*, used primarily for nonreligious purposes. The method of propagating *niu* involved burying a sprouted nut on top of an octopus (*he'e*) within a hole deep enough to bury it completely. The buried *he'e* was purported to "give the root a spread and grip like its own and to produce nuts that were bulbous like its head or body (*pu*)" (Handy et al. 1991:172). Water from the *niu* was palatable, flavorful, and rich in nutrients. It was also utilized on a spiritual level by priests practicing divination. The raw meat is edible and could be scraped out of the shell with a large 'opihī shell and eaten as is or incorporated into the preparation of various sweets including *haupia* (*haukō*), *kūlolo*, *koelepalau*, and *pi'epi'e 'ulu*. Besides being utilized for human consumption, coconut meat could also be used as animal feed, a practice of Puna's residents. Handy et al. (1991:174) explained:

In some localities in Puna, pigs were taught to open their own coconuts. When the owners of the pigs expected to be absent for some time, they husked a quantity of the nuts, leaving a strip of husk on each one about two inches in width. When a pig wanted to open a nut, he grasped it by this strip of husk and dashed it against a rock. Thus the pigs were assured of fresh food until the owners returned.

The meat of the coconut could also be crafted into fresh coconut oil. Handy et al. (1991:192) described the process as it was done in Puna thusly:

In Puna, *mano'i* (coconut oil) was made as follows: The fresh gratings, with *maile* or other *kupukupu* (any odoriferous plant) to give fragrance, were placed in a container in the hot sun. When the oil separated away from it, the mass was squeezed through *ahuawa* and the refuse (*oka*) thrown away. The oil was used for anointing the body and hair and washing the hair.

Coconut husk also provided fibers that were plaited to make sennit 'aha (cordage) that was used for lashing items such as house timbers, adzes, and canoe parts. The coconut shell was cleaned and sometimes split in half where it would be fashioned into medicine, food, and drink receptacles, known as 'apu that was used for serving and mixing 'awa. The trunk of the coconut was carved to form the main body of the *pahu hula* drum. Coconut leaf stems and midribs were used to clean pig intestines, make brooms, shrimp snares, and for stringing *kukui* nuts to be burned as candles. The leaves were plaited to make fans and playing balls for children, and the end of the leaf was used as *kapu* markers along the coastline or to frighten fish out from under ocean ledges (Handy et al. 1991)

'Awa, a plant described as the "cherished narcotic" of the Hawaiian people by Handy et al. (1991:192) was utilized by all socioeconomic classes in Hawaiian Prehistory and is mentioned in several *mo'olelo* (traditional accounts) for the Puna District. Pukui (1983) lists the following Hawaiian proverbs describing the district's famed 'awa:

'Awa kau lā'au o Puna.

Tree-growing 'awa of Puna.

Tree-grown 'awa of Puna was famous for its potency. It was believed that birds carried pieces of 'awa up into the trees where it would grow (Pukui 1983:29)

Puna, 'āina 'awa lau o ka manu.

Puna, land of the leafed 'awa planted by the birds. (Pukui 1983:300)

Ka 'awa lena o Kali'u.

The yellowed 'awa of Kali'u.

Refers to Kali'u, Kilohana, Kaua'i. People noticed drunken rats in the forest and discovered some very potent 'awa there. There is a Kali'u in Puna, Hawai'i, where good 'awa is also grown. (Pukui 1983:140)

The 'awa roots were carefully chewed (pounded in later years) into balls (*māna* or *māna 'awa*), strained with the stem fibers of the *ahu 'awa*, and presented as offerings or drunken out of polished *niu* shell ('apu 'awa) cups for pleasure, ceremonial, and relaxation purposes. It was also a principal element in the treatment of both physical and spiritual ailments in living subjects by the *kahuna* (priests) and a crucial ingredient in ritualistic use in which its

procurement and preparation were handled with the utmost care. Of all the districts of Hawai‘i Island, Puna was the most renowned for its ‘awa, producing the finest ‘awa kau lā‘au:

Kau la‘au is the famous *awa* of Puna, Hawaii, which grows in the crotches of trees where, according to the Hawaiians, it becomes planted by birds building pieces of the stem into their nests (M). A line from a mele reads: “*Ka manu ahai kanu awa e*” (The bird clipping the twig of *awa* and planting it elsewhere; see 21, p. 30). Kaaikamanu (Ka) identifies it as the same as *Mokihana*, but Mrs. Pukui, who is very well acquainted with Puna (Kaaikamanu came from eastern Maui) tells me that any variety might be found growing in this way. This Puna *awa* was famous for its strength, which was due, in Mrs. Pukui’s opinion, to the fact that its roots grew in sunlight. (Handy et al. 1991:202-203)

Because of this unique cultivation method, the natives of Puna were renowned across the archipelago for producing the most superior and potent ‘awa. This notion is expressed in several traditional accounts including, *Ka Mo‘olelo o Hi‘iakaikapoliopole* (Ho‘oulumāhiechie 2006b) when the infamous Pele introduced herself to the striking Lohi‘auipo from Kaua‘i. After Pele indicated that she was from Puna, Lohi‘au responded, “*no Puna ‘i‘o o kā ‘oe, no ka ‘āina ‘awa lau a ka manu, ka ‘āina i ka polo hīnano*” (is that so, you are from Puna, from the land of the young ‘awa plant of the birds, the land of the pandanus trees). This *mo‘olelo*, as well as that concerning the highly skilled rat shooter named Pīkoi-a-ka-‘alalā (Kauai 1865-1866), and the legend of Ke-au-nini (Westervelt 1915b), suggest that the ‘awa found growing in the trees of Puna was spread throughout the forest by birds. The story of Ke-au-nini explained that this type of ‘awa was also found growing in the Pana‘ewa forest (Westervelt 1915:198). Westervelt (1915:198) wrote: “he picked up the stones and ran to Pana-ewa and got the awa hanging on the tree...” The intoxicating effects of ‘awa, especially the potent Puna variety, induce a supreme state of physical relaxation and ataraxia and are described in a *mele* sung by Hi‘iaka:

*Ka wai mukiki ale lehua a ka manu,
Ka awa ili lena i ka uka o Ka-li‘u,
Ka manu aha‘i lau awa o Puna:
Aia i ka laau ka awa o Puna.
Mapu mai kona aloha ia‘u—
Hoolaau mai ana ia‘u e moe,
E moe no au, e-e!*

O honey-dew sipped by the bird,
Distilled from the fragrant lehua;
O yellow-barked awa that twines
In the upper lands of Ka-li‘u;
O bird that brews from this leafage
Puna’s bitter-sweet awa draught;—
Puna’s potentest awa grows
Aloft in the crotch of the trees.
It wafts the seduction to sleep,
That I lock my senses in sleep!
(Emerson 1915:31)

Traditional *Mo‘olelo* of Keonepoko Iki

As the Hawaiian people had no written language until Post-contact times, traditional *mo‘olelo* were passed down orally through the generations. Plentiful are the chants, myths, and legends associated with the many beautiful *wahi pana* (storied place) of Puna, which frequently refer to the majestic female fire deity, Pele, as well as other deities and chiefs. However, the only known legend that explicitly features Keonepoko Iki appears in the legend titled *Ke Ka‘ao Ho‘oniua Pu‘uwai no Ka-miki*.

Ke Ka‘ao Ho‘oniua Pu‘uwai no Ka-miki (The Heart Stirring Story of Ka-Miki)

The account, *Ke Ka‘ao Ho‘oniua Pu‘uwai no Ka-Miki*, originally appeared in the Hawaiian language newspaper, *Ka Hōkū o Hawai‘i* between 1914 and 1917 and was later translated by Hawaiian historian and cultural specialist Kepā Maly. The story tells of two supernatural brothers, Ka-Miki and Maka‘iole, who were skilled ‘ōlohe (competitors/fighters) and their travels around Hawai‘i Island by way of the ancient trails and paths (*ala loa* and *ala hele*), seeking competition with other ‘ōlohe. As described by Maly:

The narratives were primarily recorded for the paper by Hawaiian historians John Wise and J.W.H.I. Kihe (with contributions from Steven Desha Sr.). While Ka-Miki is not an ancient account, the authors set the account in the thirteenth century (by association with the chief Pili, who came to Hawai‘i with Pā‘ao). They used a mixture of local stories, tales, and family traditions in association with place names to tie together fragments of site specific history that had been handed down over the generations. Thus, while in many cases, the personification of individuals and their associated place names may not be “ancient,” the site documentation within the “story of Ka-Miki” is of both cultural and historical value. (Maly 1998:17)

That portion of the legend set in Puna was published between October 21st and November 18th, 1915. Translated by Maly (1998:17–25), this portion describes many people and places within the district and mentions a young chief of Puna by the name of Keahialaka. Maly's (1998) translation of the story is summarized below.

During an expedition through the uplands of Puna, Ka-Miki and Maka-'iole encountered a man named Pōhakuloa who was intensely working on a large *koa* log. They were headed to Kea'au, but had lost their way. They stopped and asked Pōhakuloa for directions, but he was startled by the unexpected appearance of the brothers and replied impolitely. Taunts were exchanged between the two parties, which led to a physical altercation. Pōhakuloa soon realized that these two men were extraordinarily skilled and spiritually protected, and he admitted his defeat. Pōhakuloa wished to prepare a meal and drink of 'awa with his newfound friends, and solicited the help of his brother in law, an 'ōlohe chief named Kapu'euhi. However, Kapu'euhi had plans of his own. He intended to compete with and conquer the brothers but was defeated by them instead. Kapu'euhi was infuriated by his defeat, and also by Pōhakuloa's refusal to aid in retaliation against Ka-Miki and Maka-'iole.

Kapu'euhi invited the brothers back to his house to partake in a meal and a particularly potent type of 'awa, scheming to get them drunk. Unbeknownst to Ka-Miki and Maka-'iole, this was common practice for Kapu'euhi, who often housed weary travelers in his guest house, intoxicated them with 'awa, then killed them and stole their belongings. Kapu'euhi waged a bet with the brothers; if they couldn't drink five cups of the 'awa, then he would throw them out and they would be at the mercy of the Puna forest. Ka-Miki and Maka-'iole agreed, and counteracted his bet with one of their own; if they were able to drink five cups, they would throw Kapu'euhi out of his own house. The brothers prayed and chanted to their ancestral goddess, Ka-uluhe-nui-hihi-kolo-i-uka (Ka-uluhe), and were able to consume the entire quantity of 'awa without getting drunk. As agreed upon, Kapu'euhi was thrown out. Stunned, and angered that he was thwarted once again, Kapu'euhi requested assistance from Kaniahiku (a much-feared Puna 'ōlohe and forest guardian) and her grandson Keahialaka. "At that time, Keahialaka was under the guardianship of Pānau and Kaimū, and he enjoyed the ocean waters from Nānāwale to Kaunaloa, Puna" (*Ka Hōkū o Hawai'i* October 28, 1915; translated by Maly (1998:20)), which Maly (1998) suggests is symbolic of controlling those regions.

Together, Kapu'euhi and Kaniahiku conspired to lead the brothers deep into the Puna forest, where Kaniahiku would be able to murder them, all the while maintaining the façade that they were taking them to the 'awa grove of Mauānuikananuha. Once Ka-Miki and Maka-'iole were well within the domain of Kaniahiku, she created a dark and murky environment, spreading gloomy mists and an overgrowth of twisted vegetation intended to ensnare the brothers. Ka-Miki and Maka-'iole were overcome, and left for dead by Kapu'euhi, who made his way back to safety, led by Kaniahiku's sister. The brothers prayed to their grandmother, Ka-uluhe for help. All at once, her presence became apparent, and the brothers were able to continue on to the 'awa grove. Another attempt by Kaniahiku to kill the brothers was made, however, Ka-uluhe's protection over them was too strong, and the endeavor failed.

Ka-Miki and Maka-'iole realized that Kapu'euhi had deceived them and had been in affiliation with Kaniahiku. They were angered and trapped him in the 'awa grove. In an effort of retaliation, Kaniahiku summoned for her grandson, Keahialaka, and readied herself for battle. Ka-Miki and Maka-'iole reprimanded Kaniahiku for her deceitful actions, which only served to anger her even further. Aggressively, Kaniahiku attacked Ka-Miki with her tripping club and spear, but Ka-Miki was far too elusive for her. He swiftly evaded each attempt at injury made on his behalf. In desperate need of assistance, Kaniahiku beckoned to Keahialaka by playing her nose flute, urging him to hurry to her side. Although Keahialaka was strong and skillful in the arts of 'ōlohe, he was all too easily overcome by Ka-Miki. His grandmother, in an attempt to free him from Ka-Miki, was also captured.

Kaniahiku was astounded at the dexterity of the brothers. Their skill was incomparable to any other 'ōlohe she had ever encountered, and even her own skill paled in comparison, for she had never been defeated. All at once she surrendered to Ka-Miki and Maka-'iole, who in turn released her and her grandson. Back at Kaniahiku's house, a meal was prepared, the 'awa of Kali'u was enjoyed, and the gods were honored with offerings. Kaniahiku requested that the brothers take Keahialaka with them as they continued their journey on the *ala loa*, declaring that if they did, they would be welcomed wherever their travels took them in Puna. Ka-Miki and Maka-'iole approved of this request and took Keahialaka on as their companion. Together, the three men journeyed throughout various districts of Hawai'i island and competed in many 'ōlohe competitions.

In the legend of Ka-Miki, the land of Keonepoko Iki was named for an 'ōlohe master of Puna, who was the *mokomoko* (rough hand fighting) instructor of the chief Pu'ula (Maly 1992). According to the story, Keonepoko Iki was a traditional training ground for 'ōlohe of Puna, who were masters skilled in hand-to-hand combat and other martial arts techniques. In the story, Ka-Miki quickly defeated the Puna master, Keonepokoiki in an 'ōlohe contest. Ka-Miki then threatened to kill Keonepokoiki, who seeing that no one could defeat Ka-Miki, completely surrender

and returned to his home. According to the story, Keonepokoiki lived on the *mauka* side of the *ala loa*, and at his compound was an altar dedicated to his gods (Maly 1992).

KEONEPOKO IKI AND PUNA DURING THE LATE 18TH AND EARLY 19TH CENTURY

Knowledge of Keonepono Iki Ahupua‘a and much of Puna during the late 18th and first half of the 19th century is derived mostly from the writings of early explorers and missionaries who documented their experiences and observations. They describe Puna as a sparsely populated country containing villages scattered primarily along the coast. These narratives also describe a surprisingly fertile agricultural landscape thriving among what would appear to be unsuitable fields of lava and thin soils, rife with crops such as *kalo*, sweet potatoes, sugar cane, breadfruit, and bananas. It is evident through these accounts that although Puna natives were still largely rooted in traditional subsistence practices, procurement, and trade, western influence was slowly infiltrating into native lifeways.

Accounts by Early Explorers and Missionaries

One of the earliest foreign descriptions of the Puna District comes from Captain James King, a royal navy officer who was part of Captain James Cook’s crew during his voyage to Hawai‘i in 1778 and again in 1779. In March of 1779, King penned the following description of his observations of the Puna District in which reference is made to eastern Puna:

...the SE sides of the districts of Oppona & Kaoo [Puna and Ka‘ū]. The East part of the former is flat, covered with Coco nut trees, & the land far back is of a Moderate height. As well as we could judge this is a very fine part of the Island, perhaps the best. Terreeobuu [Kalei‘ōpu‘u] has one of his residences here.

On the SW extremity of Opoona the hills rise abruptly from the Sea side, leaving but a narrow border, & although the sides of the hills have a fine Verdure, yet they do not seem Cultivated, & when we saild [sic] pretty near & along this end of Opoona, we did not observe that it was equally Populous with the Eastern parts; before we reachd [sic] the East point of the Island, & all along this SE side the snowy mountain calls Roa (or extensive) [Mauna Loa] is very conspicuous. It is flattish at the top or makes what we call Table land... (Beaglehole 1967:606)

Following the death of Kamehameha I in May of 1819, the Hawaiian religious and political systems began a radical transformation; Ka‘ahumanu, the wife of Kamehameha proclaimed herself “Kuhina nui” (Prime Minister), and within six months the ancient *kapu*—the traditional socio-religious governing system—was abolished. Within a year, Protestant missionaries arrived from North America (Fornander 1969; Ii 1993; Kamakau 2022).

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai‘i seeking out communities in which to establish future church centers to grow Hawai‘i Calvinist mission. Ellis recorded his observations made during this tour in a journal (Ellis 1917). Walking from Kīlauea to Waiākea along Puna’s southeastern shore with his missionary companions Asa Thurston and Artemas Bishop, Ellis recorded descriptions of residences and practices. Although no specific mention is made of Keonepoko Iki or Nui, his writings offer a general glimpse into life in eastern Puna during this period:

The population in this part of Puna, though somewhat numerous, did not appear to possess the means of subsistence in any great variety or abundance; and we have often been surprised to find desolate coasts more thickly inhabited than some of the fertile tracts in the interior; a circumstance we can only account for, by supposing that the facilities which the former afford for fishing, induce the natives to prefer them as places of abode; for they find that where the coast is low, the adjacent water is usually shallow.

We saw several fowls and a few hogs here, but a tolerable number of dogs, and quantities of dried salt fish, principally albacores and bonitos. This latter article, with their poē [poi] and sweet potatoes, constitutes nearly the entire support of the inhabitants, not only in this vicinity, but on the sea coasts of the north and south parts of the island.

Besides what is reserved for their own subsistence, they cure large quantities as an article of commerce, which they exchange for the vegetable productions of Hilo and Mamakua [Hāmākua], or the mamake [*mamaki*] and other tapas of Ora [‘Ōla‘a] and the more fertile districts of Hawaii. (Ellis 1917:203)

Ellis and his companions traveled along the coast passing through the coastal part of Kahuwai, Wa‘awa‘a, and Nānāwale *ahupua‘a* and then turned *mauka* toward a village in Honolulu Ahupua‘a (Ellis 1917:223). After departing Kahuwai, Ellis and the band missionaries arrived at a small village in Honolulu, located to the south of Keonepoko Iki. In detailing their route and the nature of the village, Ellis commented:

... we traveled in an inland direction to Honoruru [Honolulu], a small village situated in the midst of a wood, where we arrived just at the setting of the sun.

Whilst the kind people at the house where we put up were preparing our supper, we sent and invited the inhabitants of the next village to come and hear the word we had to speak to them. They soon arrived; the large house in which we had taken up our lodgings was filled, and a discourse was delivered from John xii. 46... (Ellis 1917:223–224)

On August 8th, 1823, Ellis and his band left Honolulu and visited a village in the *ahupua‘a* of Waiakahiula, located to the south of Keonepoko Iki. Ellis’ journal provides a brief first-hand description of the village’s location relative to the coast:

We afterwards spent a hour in conversation and prayer with the people of these sequestered villages, who had perhaps never before been visited by foreigners, and then lay down on our mats to rest.

We arose early on the 8th, and Mr. Thurston held morning worship with the friendly people of the place [Honolulu]. Although I had been much indisposed through the night, we left Honoruru [Honolulu] soon after six a.m. and, travelling slowly towards the sea-shore, reached Waiakeheula [Waiakahiula] about eight, where I was obliged to stop, and lie down under the shade of a canoe-house near the shore. Messrs. Thurston and Bishop walked up to the settlement about half a mile inland, where the former preached to the people...(Ellis 1917:224)

After preaching, Bishop continued alone toward Waiākea, while Thurston returned to fetch Ellis from the canoe shed. Upon reaching the village, Ellis found its residences to be interspersed among the agricultural fields rather than in a single, nucleated settlement:

The country was populous, but the houses stood singly, or in small clusters, generally on the plantations, which were scattered over the whole country. Grass and herbage were abundant, vegetation in many places luxuriant, and the soil, though shallow, was light and fertile. (Ellis 1917:224)

Ellis and his remaining company almost certainly passed through Keonepoko Iki and Nui as they recorded stopping at Waiakahi‘ula and then at Kea‘au, located north of Keonepoko Iki. Unfortunately, no description of Keonepoko Iki or Nui or its inhabitants was noted in his journal. One year after Ellis’ tour, the ABCFM established a base church in Hilo. From that church, the predecessor of the historic Hāili Church, the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman, who came to Hawai‘i in 1832, and Titus Coan, who arrived in 1835 were two of the most influential congregational missionaries in Puna and Hilo. As part of their duties, they compiled census data for the areas within their missions. In 1835, 4,800 individuals were recorded as residing in the district of Puna, the smallest total district population on the island of Hawai‘i (Schmitt 1973). In 1841, Titus Coan recorded that most of the 4,371 recorded residents of Puna lived near the shore, though there were hundreds of individuals who lived inland (Holmes 1985).

The work of the early missionaries to convert the people of Puna to Christianity proved quite challenging, as evidenced in the writing of Hiram Bingham (ca. 1828). Despite being on the islands for four years, individuals in the Puna and Hilo districts were reluctant to accept the teachings of the missionaries. Some were skeptical about the potential benefits of missionary instruction while others sought tangible advantages or compensation for their participation in this new religious scheme. Bingham’s writing portrays a population that was still deeply rooted in their traditional beliefs and the difficulties faced by the early missionaries working in Puna to promote their religious beliefs:

Though our mission had now been in the islands nearly four years, yet some of Puna and Hilo were as much afraid of the *palapala* [bible], as they had been of Pele. Some retained their superstitious regard to the volcanic deities. Some, in their self-complacency, questioned or doubted whether any benefit equal to the trouble, could be obtained by attention to missionary instruction. Some demanded what temporal advantages could be derived from listening to preaching. Some asked for a *malo* or girdle a day; others a shirt a week, as a compensation for attending school... (Bingham 1848:208-209)

In 1841, the United States Exploring Expedition under the direction of Commander Charles Wilkes, toured Hawaii Island and travelled through the Puna District. Wilkes produced a map of Puna, in which he includes the route of a coastal and inland trail and shows the project area at the margins of lava flows originating from the East Right Zone (Figure 11).



Figure 11. Portion of Hawai'i Registered Map 424 prepared by Wilkes in 1841 showing the approximate location of the study areas.

Wilkes, traveling towards Kapoho at the eastern tip of the island, provides the following description of Puna and made note of the 1840 lava flow that entered the coast at Nānāwale:

...Almost all of the hills or craters of any note have some tradition connected with them; but I found that the natives were now generally unwilling to narrate these tales, calling them “foolishness.”

After leaving the pahoihoi [*pāhoehoe*] plain, we passed along the line of cone-craters towards Point Kapoho, the Southeast part of the island.

Of these cone-craters we made out altogether, large and small, fifteen, trending about east-northeast. The names of the seven last are Pupukai, Poholuakahoweke [Pu‘u-hōlua-o-Kahawali], Punomakalua, Kapoho, Puukea, Puuku, and Keala. On some of these the natives pointed out where there had formerly been slides, an amusement or game somewhat similar to the sport of boys riding down hill on sleds. These they termed kolua [*holua*].

This game does not appear to be practiced now, and I suppose that the chiefs consider themselves above such boyish amusements. The manner in which an old native described the velocity with which they passed down these slides was, by suddenly blowing a puff; according to him, these amusements were periodical, and the slides were usually filled with dried grass.

As we approached the sea-shore, the soil improved very much, and was under good cultivation, in taro, sweet-potatoes, sugar cane, and a great variety of fruit and vegetables. At about four o’clock, we arrived at the house of our guide, Kekahunanui, who was the “head man.” I was amused to find

that none of the natives knew him by this name, and were obliged to ask him, before they could give it to Dr. Judd...

...The view from the guide's house was quite pretty, the eye passing over well-cultivated fields to the ocean, whose roar could be distinctly heard... (Wilkes 1845:186)

During the night, one of the heaviest rains I had experienced in the island, fell; but the morning was bright and clear,—every thing seemed to be rejoicing around, particularly the singing-birds, for the variety and sweetness of whose notes Hawaii is distinguished. Previous to our departure, all the tenantry, if so I may call them, came to pay their respects, or rather to take a look at us. We had many kind wishes, and a long line of attendants, as we wended our way among the numerous taro patches of the low grounds, towards Puna; and thence along the sea-coast where the lava entered the sea, at Nanavalie [Nānāwale]. The whole population of this section of the country was by the wayside, which gave me an opportunity of judging of their number; this is much larger than might be expected from the condition of the country, for with the exception of the point at Kapoho, very little ground that can be cultivated is to be seen. The country, however, is considered fruitful by those who are acquainted with it, notwithstanding its barren appearance on the roadsides. The inhabitants seemed to have an abundance of bread-fruit, bananas, sugar-cane, taro, and sweet-potatoes. The latter, however, are seen to be growing literally among heaps of stones and pieces of lava, with scarcely soil enough to cover them; yet they are, I am informed, the finest on the island...

In some places they have taken great pains to secure a good road or walking path; thus, there is a part of the road from Nanavalie [Nānāwale] to Hilo which is built of pieces of lava, about four feet high and three feet wide on the top; but not withstanding this, the road is exceedingly fatiguing to the stranger, as the lumps are so arranged that he is obliged to take a long and short step alternately; but this the natives do not seem to mind, and they pass over the road with great facility, even when heavy laden... (Wilkes 1845:188-193)

American missionary Titus Coan arrived in Hilo in 1835 and died there in 1882. During his tenure, Coan oversaw the mission work in the districts of Hilo, Puna, and parts of Ka'ū where he carried out three to four annual tours on foot to preach the gospel. Writing of the district's general topographic features, Coan described Puna thusly:

For three miles inland from the sea it is almost dead level, with a surface of pahoehoe or field lava, and *a-a* or scoriaceous lava, interspersed with more or less rich volcanic soil and tropical verdure, and sprinkled with sand-dunes and a few cone and pit-craters. (Coan 1882:39)

Coan made note of the many lava flows he observed and spoke of the inland sections of Puna noting that:

From one to three miles from the shore the land rises rapidly into the great volcanic dome of Mauna Loa (Long Mountain). The highlands are mostly covered with woods and jungle, and scarred with rents, pits, and volcanic cones....The whole district is so cavernous, so rent with fissures, and so broken by fiery agencies, that not a single stream of water keeps above-ground to reach the sea... The rains are abundant, and subterranean fountains and streams are numerous, carrying the waters down to the sea level, and filling caverns, and bursting up along the shore in springs and rills, even far out under the sea. Some of these waters are very cold, some tepid, and some stand at blood heat, furnishing excellent warm baths... (Coan 1882:40)

Of the natural and cultivated plants he observed, Coan wrote:

Puna has many beautiful groves of the cocoa-palm, also breadfruit, pandanus, and ohia, and where there is soil it produces under cultivation, besides common vegetables, arrowroot, sugar-cane, coffee, cotton, oranges, citron, limes, grapes, and other fruit. On the highlands, grow wild strawberries, cape gooseberries, and the ohelo, a delicious berry resembling our whortleberry. (Coan 1882:40)

The difficulties in converting the natives of Puna and the neighboring districts of Hilo and Ka'ū appear to have eased by the time Coan (1882:45) undertook his mission work as he noted that “during all the years of 1837-8, Hilo was crowded with strangers, whole families and whole villages in the country were left, with the exception of a few of the old people, and in some instances even the aged and feeble were brought in on litters from a distance of thirty or fifty miles.” Coan's statement suggests that there was a growing interest in and acceptance of Christian teachings, resulting in people actively seeking out missionary instructions and departing their villages to relocate closer to the main mission center in Hilo.

Coan also wrote of the 1840 eruption of Kīlauea which tracked through the countryside until it reached the shores at Nānāwale (located to the south of Keonepoko Iki). Reaching the coast on June 3rd, this flow extended the shoreline “many yards,” cut off communication between the north and south portion of Puna for more than a month, and created several massive dunes some of which were “greatly reduced by the waves thundering at their bases and the winds and storms beating upon their summits” (Coan 1882:73). Although Coan (1882:74) reported that no lives were lost during this eruption, “a few small hamlets were consumed, and a few patches of taro, potatoes, and banana were destroyed, but the people walked off with their calabashes, kapas, and other chattels to seek shelter and food elsewhere.” During the eruption Coan (1882:74-75) reported that:

...the people of Puna spent much of their time in prayer and religious meetings, some fled in consternation; and others wandered along the margin of the lava stream, at a safe distance, marking with idle curiosity its progress, while others still pursued their daily advocations within a mile of the fiery river, as quietly as if nothing strange had occurred. They ate, drank, brought, sold, planted, builded, slept, and walked apparently indifferent to the roar of consuming forests, the sight of devouring fire, the startling detonations, the hissing of escaping steam, the rending of gigantic rocks, the raging and crashing of lava waves...

In spite of Coan’s capacity to recruit more of Puna’s inhabitants into the new religion, the native residents of “a small village about eighteen miles from Hilo” were indifferent and unwelcoming to Coan and other missionaries. Based on Coan’s writing, it appears that he is referring to the area of Nānāwale. The people of this village consistently refused them food and would make them wait upwards of two hours for a small cup of water. Coan (1882) reported that after the 1840 lava flow, the inhabitants of this village relocated to the edge of the flow in Honolulu Ahupua’a but in 1853, they were killed by the small-pox epidemic.

In 1846, Chester S. Lyman arrived in Honolulu and later visited Hilo where he stayed with Reverend Titus Coan (Lyman 1924). Traveling the roughly 100-mile-long journey following the general route taken by Coan during his quarterly tours through Puna, Lyman reported that the district of Puna had somewhere between 3,000-4,000 inhabitants (in Maly 1998). Entering Puna from Hilo and traveling along a coastal trail Lyman stopped at villages in Kea’au, Maku’u, and Koa’e. In describing their stop at Maku’u and their journey south towards Koa’e, Lyman wrote:

Wed July 8th 1846. Started a little before 6 & walked 2^m to a few houses on the shore, where we breakfasted in the school house. The path most of the way was on a lava bed immediately on the margin of the sea, the surf dashing beautifully at our feet. Five miles further on we came to Makuu, a small scattered village at 9 o’clock AM. Mr Coan held a meeting. Communion, bread in little earthen mug, water in its mate. One infant was baptized. Left about 11½ Soon met a man who wished Mr Coan to visit a woman who had been 3 or 4 days in child birth & was in danger of her life. She was lying on a mat under the shade of a bread fruit tree. Mr Coan ordered medicine to be send for from Hilo.

Went on 4^m & stopped to bathe in the surf. While sitting on a ridge enjoying the dashing of the water a swell a little larger than usual came & unseated me & sent me sprawling backwards, doing no other damage however than bruising my head slightly.

Four or 5 miles beyond the Lava flow & 29 or 30 from Hilo stopped for the night at a place called *Koae*, about 5^m inland from the E. p[oin]t of the Island. The people gave us a hearty greeting, especially Old Abraham, who seems to be a warm hearted Christian & enterprising man. He has a little plantation among the stones & rocks & raises melons, gourds, potatoes, taro, &c &c. A water melon, the first I had tasted on the Island, I found very refreshing. (Lyman 1924:95-96)

Lyman (1924:103) made it all the way to Kealakomo then proceeded into the interior of the Puna District stopping at different villages located along the road to volcano. While traversing through this part of the district, Lyman spoke of his interactions with several native converts one of whom, a priest, spoke about his practices associated with the worship of Pele:

The Priest was a tall, rawboned athletic man & confessed when he became a penitent that he had been a man of blood, had offered human victims to the Goddess of the Volcano, had robbed & oppressed the people taking whatever he wished whenever & wherever he found it; & such was his authority & the fear of the multitude that they durst not resist. Sacrifices of various kinds were offered to Pele by throwing them into the Crater—tapa, pigs, poultry, taro &c &c were thus disposed of in large quantities. (Lyman 1924:105-106)

In 1868, a volcanic eruption emanating from Mauna Loa shook Hawai’i Island, bringing with it lava flows, earthquakes and a localized *tsunami* that transformed the landscape of the southern part of the island. The destruction

caused by this eruption further contributed to the depopulation of Puna. Coan (1882:314-316) recorded that on April 2:

...a terrific shock rent the ground, sending consternation through all Hilo, Puna, and Kau. In some places fissures of great length, breadth, and depth were opened... Stone houses were rent and ruined, and stone walls sent flying in every direction...the sea rose twenty feet along the southern shore of the island, and in Kau 108 houses were destroyed and forty-six people drowned...Many houses were also destroyed in Puna, but no lives were lost. During this awful hour the coast of Puna and Kau, for the distance of seventy-five miles subsided seven feet on average, submerging a line of small villages all along the shore. One of my rough stone meeting houses in Puna [Kapoho-Koa'e], where we once had a congregation of 500 to 1,000 was swept away with the influx of the sea, and its walls are now under water...

Written accounts left by early visitors to the Island of Hawai'i offer insight into the changing religious and socio-cultural aspects of the early 19th-century residents of Puna. From their writings, we also get a glimpse into the population changes caused by epidemics, shifts in religious beliefs, and the effects of lava flows. By the time Ellis visited Puna in 1832, less than fifty years after the arrival of the first Europeans, the indigenous population of Hawai'i was already in decline. By 1850, the population of Hawai'i Island had dropped to 25,846 individuals (Schmitt 1973:8). Maly (1998:36) summarized the reasons for the rapid decline of native populations thusly:

Overall, historic records document the significant effect that western settlement practices had on Hawaiians throughout the islands. Drawing people from isolated native communities into selected village parishes and Hawaiian ports-of-call, had a dramatic, and perhaps unforeseen impact on native residency patterns, health, and social and political affairs. In single epidemics hundreds, and even thousands of Hawaiians died in short period of time.

The mid-19th century brought with it great changes, especially as it relates to the alteration of the traditional Hawaiian land tenure system. During the 1830s and 1840s, the Hawaiian Kingdom was an established center of commerce and trade in the Pacific, recognized internationally as a sovereign nation by the United States and other nations in the Pacific and Europe (Sai 2011). As Hawaiian political elites sought ways to modernize the burgeoning kingdom, and as more Westerners settled in the Hawaiian Islands, major socioeconomic and political changes took place, including the formal adoption of a Hawaiian constitution by 1840, the change in governance from an absolute monarchy to a constitutional monarchy, and the shift towards a Euro-American model of private land ownership. The change in land governance was partially informed by ex-missionaries and Euro-American businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be revoked from them at any time.

The *Māhele* 'Āina of 1848

By the mid-19th century, the ever-growing population of Westerners in the Hawaiian Islands resulted in socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership. Convinced that the feudal system of land tenure previously practiced was not compatible with a constitutional government, the reigning *Mō'ī* (King) Kamehameha III and his high-ranking chiefs decided to separate and define the ownership of all lands in the Kingdom (King n.d.). The change in land tenure was further endorsed by missionaries and Western businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be revoked from them at any time. After much consideration, it was decided that three classes of people each had one-third vested rights to the lands of Hawai'i: the *Mō'ī*, the *ali'i* (chiefs) and *konohiki* (land agents), and the *maka'āinana* (common people or native tenants) (Chinen 1958). In 1845 the legislature created the Board of Commissioners to Quiet Land Titles (more commonly known as the Land Commission), first to adopt guiding principles and procedures for dividing the lands and granting land titles, and then to act as a court of record to investigate and ultimately award or reject all claims brought before them. All land claims, whether by chiefs for entire *ahupua'a* or by tenants for their house lots and gardens, had to be filed with the Land Commission within two years of the effective date of the Act (February 14th, 1848) to be considered. This deadline was extended several times for the *ali'i* and *konohiki*, but not for *ho'a'āina* (native tenants) (Alexander 1920; Soehren 2005).

The *Mō'ī* and some 245 *ali'i* (Kuykendall 1938) spent nearly two years trying unsuccessfully to divide all the lands of Hawai'i amongst themselves before the whole matter was referred to the Privy Council on December 18th, 1847 (King n.d.). Once the *Mō'ī* and his *ali'i* accepted the principles of the Privy Council, the *Māhele* 'Āina (Land Division) was completed in just forty days (on March 7th, 1848), and the names of all of the *ahupua'a* and *'ili kūpono* (nearly independent *'ili* land division within an *ahupua'a*) of the Hawaiian Islands and the chiefs who claimed them, were recorded in the *Buke Mahele* (also known as the *Māhele* Book) (Buke *Māhele* 1848; Soehren 2005). As this

process unfolded the *Mō‘ī*, who received roughly one-third of the lands of Hawai‘i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased by his subjects to live on. Accordingly, the day after the division when the last chief was recorded in the *Buke Māhele*, the King commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike the King, the *ali‘i* and *konohiki* were required to present their claims to the Land Commission to receive their Land Commission Award (LCAw). The chiefs who participated in the *Māhele* were also required to provide commutations of a portion of their lands to the government to receive a Royal Patent that gave them title to their remaining lands. The lands surrendered to the government by the *Mō‘ī* and *ali‘i* became known as “Government Land,” while the lands that were personally retained by the *Mō‘ī* became known as “Crown Land,” and the lands received by the *ali‘i* became known as “*Konohiki* Land” (Chinen 1958:vii; 1961:13). Most importantly, all lands (Crown, Government, and *Konohiki* lands) identified and claimed during the *Māhele* were “subject to the rights of the native tenants” therein (Garovoy 2005:524). Finally, all lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be formally surveyed. This process expedited the work of the Land Commission.

As a result of the *Māhele*, Keonepoko Ahupua‘a (assumed to be Keonepoko Nui, but not specified) was claimed by the chief, William Charles Lunalilo but was subsequently relinquished and incorporated into the inventory of Government Land (Soehren 2005). Keonepoko Iki is not listed in the *Buke Māhele* (1848), but it too was designated as Government Land as was Ka‘ohe Ahupua‘a (adjacent to Keonepoko Iki’s southern boundary) and many other *ahupua‘a* in the Puna District. As Government Land, the Hawaiian Kingdom Government had the authority to determine land use activities. The location of the study areas in Keonepoko Iki is depicted on the 1885 Hawai‘i Registered Map No. 1144 (Figure 12).

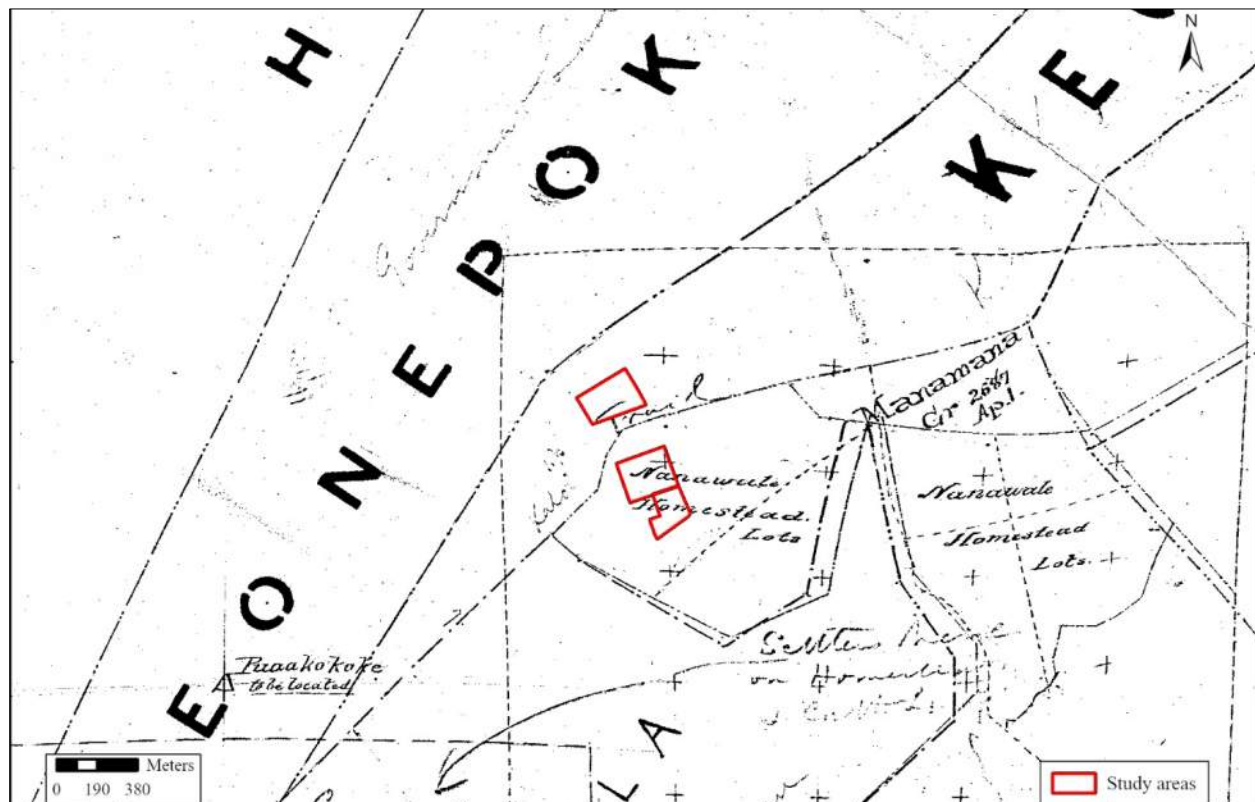


Figure 12. Portion of Hawai‘i Registered Map No. 1411 from 1885 showing Keonepoko Iki and Nui and the location of the study areas.

Kuleana Act of 1850

As the King and his *ali‘i* and *konohiki* made claims to large tracts of land via the *Māhele*, questions arose regarding the protection of rights for the *ho‘ā‘āina*. To resolve this matter, on August 6th, 1850, the Kuleana Act (also known as the Enabling Act) was passed, clarifying the process by which native tenants could claim fee simple title to any portion of lands that they physically occupied, actively cultivated, or had improved (Garovoy 2005). The Kuleana Act also clarified access to *kuleana* parcels, which were typically landlocked, and addressed gathering rights within an

ahupua'a. Lands awarded through the Kuleana Act were and still are, referred to as *kuleana* awards or *kuleana* lands. The Land Commission oversaw the program and administered the *kuleana* as Land Commission Awards (LCA) (Chinen 1958). Native tenants wishing to claim their lands were required to register in writing those lands with the Land Commission, who assigned a number to each claim, and that number (the Native Register) was used to track the claimant through the entire land claims process. The native tenants registering their *kuleana* were then required to have at least two individuals (typically neighbors) provide testimony to confirm their claim to the land. Those testimonies given in Hawaiian became known as the Native Testimony, and those given in English became known as Foreign Testimony. Upon provision of the required information, the Land Commission rendered a decision, and if successful, the tenant was issued the LCA. Finally, to relinquish any government interest in the property, the holder of an LCA obtained a Royal Patent Grant from the Minister of the Interior.

No *kuleana* awards were granted within Keonepoko Iki or Nui Ahupua'a. Despite the availability of lands within the district and the presence of native inhabitants, the Puna District is woefully distinguished for having the fewest number of lands awarded to both the *ali'i* and *konohiki* class during the 1848 *Māhele* and *hoa'āina* during the Kuleana Act of 1850. McGregor (2007:158-159) summarizes this issue thusly:

It is remarkable that in a district with 311,754 acres, only nineteen awards of private land were granted. Of these awards, sixteen grants of 50,876 acres, four ahupua'a, and two portions of a third 'ili were given to ten chiefs who lived outside of Puna. Three small parcels totaling 32.33 acres were granted to commoners, Baranaba, Hewahewa, and Haka. The bulk of the Puna lands were designated as public lands either to the monarch, as Crown lands, or to the government of the Hawaiian kingdom. This means that the interest of the majority of the Native Hawaiians in Puna were never separated out from the lands of Puna and remained vested in the lands held by the Crown and the government.

In describing some of the underlying factors that may have influenced the shortcomings of the *Māhele* process for Puna's native residents, Maly and Maly (2021:94) offered the following:

Puna stands out best example of the *Māhele*'s shortcomings for Native Hawaiians across the pae 'āina (island chain). Beyond the rapid decline of the native population, other issues such as (1) settlement areas were remote and spread across the district, (2) the fact that private property rights was a foreign concept, one that was not easily adapted to by Hawaiians, and (3) some *konohiki* used intimidation and fear to keep *hoa'āina* from filing claims.

Furthermore, Maly and Maly (2021) point out that in other areas of the island, mission station representatives (e.g., Lyons, Wilcox, Baldwin, Alexander, Emerson, and others) spent time encouraging the area residents to file claims and even assisted them with the land claim process. However, Coan, who oversaw the Puna District during the *Māhele* process, appears to have made little to no effort in assisting or advocating for the district's residents. Despite the unfortunate outcome of the *Māhele* for Puna's native residents, many managed to maintain their connection to their lands and their traditional lifeways.

Government Land Grant Program

In conjunction with the *Māhele'Āina* of 1848, the King authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was clarified by the Enabling Act—the same act that established the *kuleana* land claim process—which was ratified on August 6th, 1850. The Act resolved that portions of the Government Lands established during the *Māhele'Āina* should be set aside and sold as grants also dubbed government grants. The stated goal of this program was to enable native tenants, many of whom were not awarded or insufficiently awarded *kuleana* parcels during the *Māhele*, to purchase lands of their own. Despite the stated goal of the grant program many of the Government Lands were eventually sold or leased to foreigners, which was made possible by the passage of the Alien Land Ownership Act which was passed on July 10th, 1850, roughly a month before the Kuleana Act (Van Dyke 2008).

Within Keonepoko Iki, a single, 277.8-acre grant (No. 1533) was purchased by Kekoa in 1855 for the sum of \$69.50 (Office of Hawaiian Affairs 2018). A review of Kekoa's Royal Patent Grant documents indicated that this grant was within both Ka'ohe and Keonepoko but does not specify whether it was in Keonepoko Iki or Nui. Furthermore, Kekoa's grant documents are silent regarding any land use activities. Although Kekoa's grant documents do not specify which of the two Keonepoko that grant was in, a map prepared in 1885 by J. F. Brown (Hawai'i Registered Map No. 1411) places Kekoa's grant within the coastal portion of Keonepoko Iki and Ka'ohe (the latter of whose boundaries are not clearly depicted). A 1903 map, Hawai'i Registered Map No. 2258 (Figure 13) clearly shows Kekoa's grant straddling the coastal section of both Keonepoko Iki and the neighboring Ka'ohe Ahupua'a.

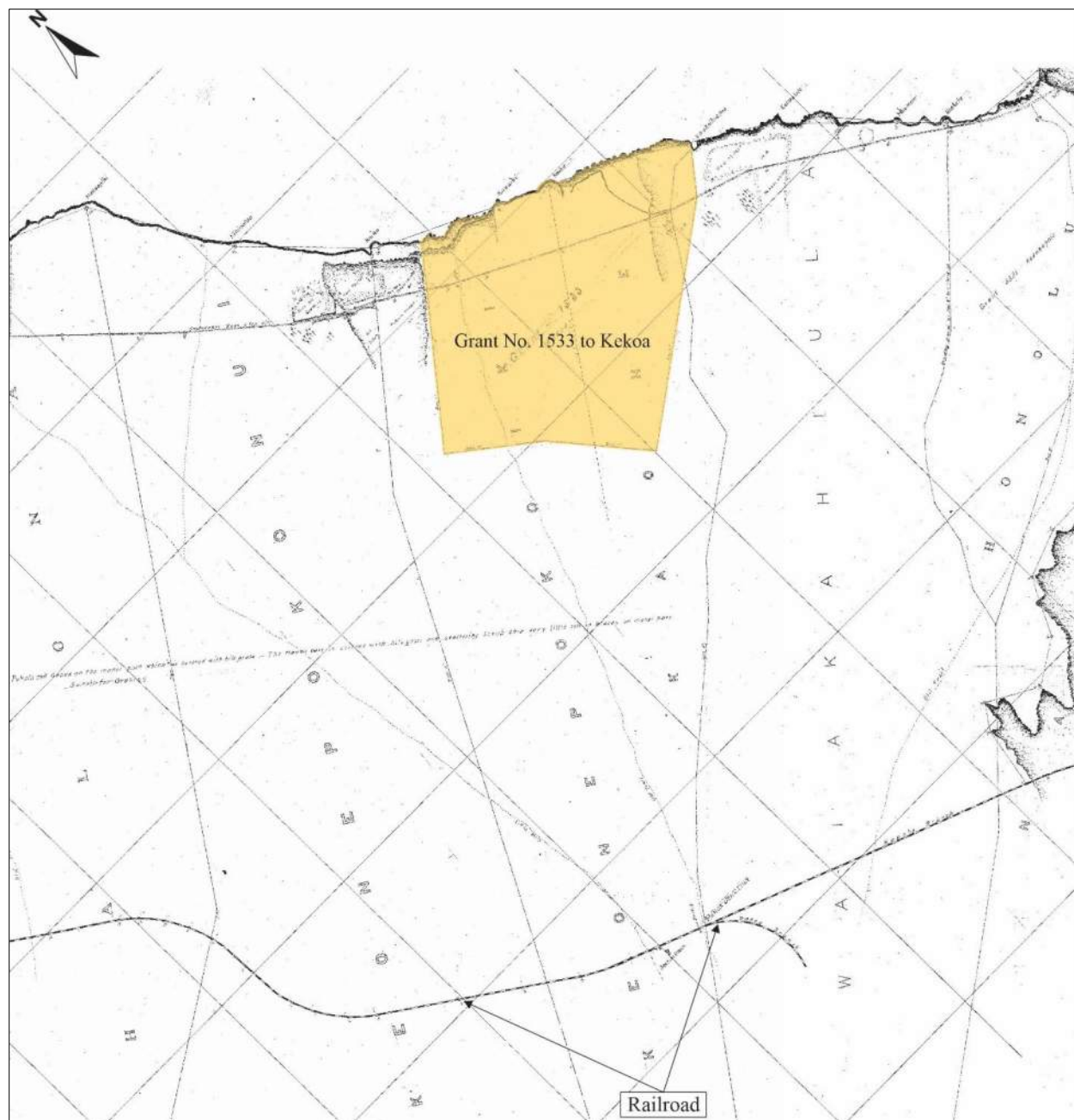


Figure 13. Portion of the 1903 Hawai'i Registered Map No. 2258 showing Kekoa's Land Grant No. 1533 straddling both Keonepoko Iki and Ka'ohē Ahupua'a, project area not included on map extent.

Boundary Commission Testimony

In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai'i to legally set the boundaries of all the *ahupua'a* that had been awarded, by name only, as a part of the *Māhele*. Subsequently, in 1874, the Boundary Commission was authorized to certify the boundaries for lands brought before them. As a part of this process, the Boundary Commission gathered testimony from informants, who were typically elder *kama'āina* (native-born or one well-acquainted with an area) residents who learned of the boundaries from their ancestors, relatives, or neighbors. The boundary information was collected primarily between 1873 and 1885 and was usually given in Hawaiian and simultaneously transcribed into English. Although hearings for most *ahupua'a* boundaries were brought before the Boundary Commission and later surveyed by Government employed surveyors, in some instances, the boundaries were established through a combination of other methods. In some cases, *ahupua'a*

boundaries were established by conducting surveys on adjacent *ahupua'a*. Or in cases where the entire *ahupua'a* was divided and awarded as Land Commission Award(s) and or Government-issued Land Grants (both of which required formal surveys), the Boundary Commission relied on those surveys to establish the boundaries for that *ahupua'a*. Although these small-scale surveys aided in establishing the boundaries, they lack the detailed knowledge of the land that is often found in the Boundary Commission hearings.

Despite the fact that no Boundary Commission hearings were held for Keonepoko Iki, on February 28th, 1876, the Boundary Commission, upon the application of Charles Kana'ina (on behalf of his son William Charles Lunalilo) met at the Hilo Courthouse to hear testimony from *kama'āina* to help settle the boundaries of Keonepoko Nui. Two witnesses appeared before the Commission, Kaumaikai, a resident of Maku'u, and Kunewa, a resident of Keonepoko Iki, both of whom provided testimony regarding their knowledge of the boundaries. Although their testimony does not describe any specific cultural practices, they do identify several place names most of which were located along the coast, and a few located along the inland boundaries. For readability purposes, Hawaiian words have been italicized and within the bracketed text, definitions or other clarifying remarks have been added by the authors of this study. Kaumaikai and Kunewa's testimony reads thusly:

Kaumaikai^k sworn says,

I was born in Kona Hawaii, at time of Kui [illegible]. I came to live at Makuu in Puna a year before the lava destroyed Nanawale [ca. 1839-1840], and have lived there ever since. I know the land of Keonepoko Nui, and a part of the boundaries. Naumai, an old *kamaaina* who is now dead, showed me part of the boundaries. The land of Keonepokoiki bounds this land at the shore on the Puna side. The boundary between then at the shore is at an *awawa* [gulch, ravine] at a place called Kahaiku so I have been told. I know the boundaries on the Hilo of this land. The land of Halona bounds it at the shore on the Hilo side.

The boundary at the shore between this land and Halona [illegible] a rock in the sea, that is called Mokuopihi, thence the boundary between them runs *mauka* to the Hilo side of Mokulaau called Ekuokapuaa, thence the boundary runs *mauka* to grove of *ohia* ['ōhi'a] trees called Mokuoumi on this land, and to the *makai* side of the piece of land I brought from Govt. I do not know the boundaries on the Puna side of this land.

C. X^d Ancient fishing rights extending out to sea.

Kunewa^k sworn says,

I was born at Waiakahiula Puna Hawaii, at time of Ohaikea. I now live on Keonepokoiki. I have always lived on these lands. I know the land of Keonepoko Nui and know a little about the boundaries of the land. I do not know the boundaries on the Hilo side between this land and Halona. I have heard that rock called Mokuopihi is the boundary between them at the shore; have not heard where the boundary runs *mauka* but have heard that it goes to place called Ekuokapuaa, and thence to Mokuoumi. That is as far as I know. I do not know whether it sold to Kaumaikai, the last witness.

The boundary at shore between this land and Keonepokoiki is at an *awawa* running to shore called Kaeko; thence runs *mauka* [illegible] Govt. road and into point of woods. [sentence is cut off and illegible] of woods is on Keonepokoiki.

Thence the boundary runs *mauka* on *pahoehoe* to Pupuakoho (maybe Pupuakoko) an *uluhala* [pandanus grove] and *mokuohia* [grove of 'ōhi'a], the boundary of this land being on the Puna side of it. Thence to a place called Mokuoumi. This is as far as I know anything about it.

C X^d Mokuoumi is a large grove of *ohia* trees.

Ancient fishing rights extending out to sea.

Testimony [illegible] as Manoanoa, the former *konohiki* of the land, says that he knows of no other *kamaaina* and Mr. Kaina says that he has no witnesses.

From the testimony of Kaumaikai and Kunewa, we learn of some of the traditional place names including two coastal boundaries, Kahaiku and Kaeko and an upland boundary, Mokuoumi. The Government Road is described as being just inland of the coast. The testimony of Kunewa noted that the woods were within Keonepoko Iki and that the upland region contained plants such as *hala* and 'ōhi'a.

The Changing Economic Industries and the Rise of Pāhoa Town

The population of Puna continued to decline throughout the 19th century and Hawaiians maintained marginalized communities outside of the main population centers. In the aftermath of the *Māhele*, economic interests in the region swiftly changed from the traditional Hawaiian land tenure system of subsistence farming and regional trading networks to the more European-based cash crops including coffee, tobacco, sugar, timber, and pineapple, and emphasized dairy and cattle ranching. An article published in the June 7th, 1893 edition of *The Daily Bulletin* noted two coffee plantations in Puna, the first, C.M. Coffee Plantation (Figure 14) located “18 miles from Hilo” and the Rycroft Coffee Plantation in Pohoiki (*The Daily Bulletin* 1893:3). The method of growing coffee in the forest of Puna amongst tall stands of *‘ōhi‘a* can be seen in a photo taken by Brother Bertram Bellinghausen ca. 1883-1905 (see Figure 14).



Figure 14. C.M. Coffee Plantation located 18 miles from Hilo ca. 1883-1905. Brother Bertram Collection, Ulukau.org

While large tracts of land in lower Puna were used for cattle grazing and sugarcane cultivation, the project areas do not appear to have been used for either purpose, rather they were developed into the Keonepoko Iki Homestead, a government program developed in 1884. The changing economics of eastern Puna, however, gave rise to a new town, Pāhoa, which became the main center for the sugar plantation and lumber industries. An article published in the November 27th, 1897 edition of the *Hilo Daily Tribune* described the burgeoning Pāhoa Town thusly:

Mr. Geo. Scheible, from Riverside, Cal., has taken up a tract of land at Pahoa and is getting things in shape to start erecting a house, and clearing.

Father Bonaventura held services at Pahoa church on Sunday last. After Mass there was a marriage of a couple of Hawaiians, members of the native Puna “elite.” A grand luau followed and a general good time had.

William Goudie is again to the fore. He is doing a rushing business with his store at Pāhoa, his big coffee drier is a success...

Pāhoa not along keeps ahead of all other settlements in Puna but is fast approaching the dignity of a two in size and importance. In fact it is to Puna what Honolulu is to Oahu, the biggest village. A Japanese has started a very decent looking Hotel at this busy place and a Chinaman a bakery and a restaurant. A large new church is contemplated. There is a private school at Pāhoa but there is irgent need of a Government school as the number of children keep increasing steadily. (Hilo Daily Tribune 1897:7)

Up until the late 1890s, travel through Puna was via foot trails but in 1897, the government began improving and constructing roads, one of which included a new road connecting Hilo to Pāhoa. As articulated in the newspaper article, “when this is completed most of the Puna people will be connected by carriage road with Hilo, which will be of great advantage to both districts” (The Hawaii Herald 1897:5).

In 1899, the ‘Ōla‘a Sugar Company—founded by Dillingham, Lorrin A. Thurston, Alfred W. Carter, Samuel M. Damon, and William H. Shipman—began operating in the Kea‘au on land owned by Shipman where plots of coffee and forest were cleared to make way for sugarcane. Unlike other plantations of this period, The ‘Ōla‘a Sugar Company was developed around the idea of fostering a class of small independent farmers who would grow cane on behalf of the mill on shareholder agreements (Campbell and Ogburn 1988). The directors of the company realized early that the lack of mass transportation would hinder the success of their business. As a result, they organized the Hilo Railroad Company and, on April 8th, 1899, were granted a 50-year charter and the railroad’s infrastructure developed quickly (Best 1978). Rail service to ‘Ōla‘a (Kea‘au) from Hilo began on June 18th, 1900. Another sugar company, the Puna Plantation Company, located near the village of Kapoho, had been organized within the Puna District in the late 1890s. The Puna Plantation Company had cane fields scattered all over lower Puna from Kapoho to Pāhoa Town itself. Coastal Keonepoko Iki’s thin, sticky, acidic soils, however, were spared from the sugar fields, and in fact, the scattered nature of suitable agricultural lands also hindered the growth of the sugar industry in Puna. As with ‘Ōla‘a Sugar’s early Kea‘au operations, the lack of a reliable transportation system made it expensive to collect and transport the cane from the scattered fields to the mill. So, when Hilo Railroad proposed to lay 4 miles of track from Kapoho to Pāhoa, the Puna Plantation Company paid for half the cost. By March 1st, 1902, the Hilo Railroad was making regular stops at the ‘Ōla‘a Sugar Mill, the town of Pāhoa, and in lower Puna (Best 1978). In 1905, the ‘Ōla‘a Sugar Company took over the Puna Plantation Company (Campbell and Ogburn 1988).

In 1907, the Hawaiian Mahogany Lumber Company signed a five-year contract with the Atchison, Topeka, and Santa Fe Railroads for the delivery of 90,000,000 board feet of ‘*ōhi‘a*’ railroad ties from the forest reserves of Puna (Clark et al. 2001). In 1908 the company erected a lumber mill at Pāhoa (Figure 15). A network of narrow-gauge railroad tracks, 3 feet wide, went from the lumber mill to the forests above Pāhoa. On March 24th, 1909, the Hawaiian Mahogany Company became the Pāhoa Lumber Mill, and James B. Castle, the former managing director of the mill, became the new owner. The company then negotiated a contract with the Santa Fe Railway Company for the delivery of 2,500,000 cross ties and 2,500 sets of switch ties. In addition to railway ties, the Pāhoa Lumber Mill began producing products such as roofing shingles, flooring, paving blocks, and lumber for cars, wagons, and carriages. On the night of January 28th, 1913, a fire broke out in the mill and the mill was completely razed along with most of the stock of milled lumber. Fortunately for the roughly 700 area residents, the wind blew the flames and smoke to the north away from the village. Despite this disaster, Castle rebuilt the mill and by October the mill was operating again under the name of the Hawai‘i Hardwood Company, part of the Hawaiian Development Company. The Santa Fe Railroad found, ultimately, that ‘*ōhi‘a*’ wood did not last as long as expected in the dry climate of the American Southwest. They did not renew their contract, and, in 1916, the Hawaiian Hardwood Company, Inc. closed its doors (Bishop 1999; Burtchard and Moblo 1994).

When the lumber business moved out of Pāhoa in ca. 1916, the mill was leased to ‘Ōla‘a Sugar Company. Standard gauge railroad tracks replaced the old timber railroad grade tracks, and the timber-producing forests were converted to sugarcane fields. The company used four mogul-type Baldwin locomotives to haul cane from the fields through Pāhoa to their processing plant in Kea‘au. Passenger rail service in Puna also started to increase. In 1916 the Hilo Railroad was reorganized as the Hawai‘i Consolidated Railway. The railroad used Baldwin locomotives and Hall-Scott motorcars with passenger trailers to haul freight and passengers. Then, in 1925 the Hawai‘i Consolidated Railway ordered and received three railbusses from the White Motor Company, which they used in Puna and Hilo districts, making daily stops in the town of Pāhoa. The railbusses became an especially popular form of transportation during World War II when mandatory gas rationing was in effect for all residents (Best 1978). When the 1946 *tsunami* struck Hilo, the railroad along Hilo and Hāmākua sustained significant damage. The damage coupled with the move towards vehicular transportation of cane, prompted the complete shutdown of the railway line (Bishop 1999).



Figure 15. Photo of the Pahoia Lumber Mill (Hale Olopapa ma Pahoia) (Ka Nupepa Kuokoa 1913).

Roughly 7,400 acres of the *makai* lands in Keonepoko Nui and Keonepoko Iki became part of the Shipman Ranch during the early 20th century when W.H. Shipman, Ltd. obtained General Lease No. 1025 for an annual rental fee of \$300.00. The lease, which began on July 12th, 1918, and expired on July 31st, 1928, excluding the 277.8-acre Grant No. 1533 to Kekoa. W.H. Shipman, Ltd. also held a lease for roughly 14,000 acres of the adjacent *ahupua'a* of Maku'u, Holonā, and Pōpōkī (General lease No. 854), which expired on November 25th, 1929 (Glennon and Barna 2020).

Government Homesteading Program and the Changing Political Landscape

Following the *Māhele 'Āina* and Government Land Grant programs of the mid-1800s, in 1884, Sanford B. Dole, during his brief stint in the Legislature drafted the Homestead Act of 1884. This act allowed the Hawaiian Kingdom Government to initiate a program to create Homestead lots on remaining portions of Government lands. This program “allowed individuals to obtain plots of up to 20 acres, require them to erect a residence and live on the land for at least three years, and gave them ten years to pay the purchase price” (Van Dyke 2008). Although the program was established in 1884, there was so little interest from the Government that the enactment of this law did not occur until 1888 and in many instances later in 1895. In many places including those areas of Puna slated for homesteading purposes, many of the lots were not sold until the early 20th century.

The implementation of the program faced additional complexities due to the changing political landscape and the overthrow of the Hawaiian Kingdom Government in 1893. On January 17th, 1893, a small group of American businessmen and sugar moguls including Sanford B. Dole (many of whom were descendants of early missionaries) backed by a U.S. consul and marines illegally attacked the Hawaiian Kingdom government and the sovereign, Queen Lili'uokalani (Beamer 2014). This group, consisting of thirteen men who referred to themselves as the Committee of Safety, and following the overthrow, proclaimed to be the Provisional Government that would manage the affairs of the Hawaiian Kingdom (Beamer 2014; Van Dyke 2008). The overthrow of the Hawaiian Kingdom government reverberated throughout the nation, resulting in significant instability and disruption to land policies. This event had far-reaching consequences, impacting the administration of various lands, including Crown Lands, as well as programs such as the Homesteading Program, which had been spearheaded by Dole. In his capacity as President of the newly established Republic of Hawai'i (1894-1898), Dole signed the Land Act of 1895, which authorized the government to sell Crown Lands, something previously unallowed, and firmly established the homesteading program which was modeled after “American family farming” (Van Dyke 2008:192)

Within Puna, several tracts of Government lands were developed for homesteading purposes including one in Keonepoko Iki and others nearby in Ka'ohe, and Nānāwale (also known as Kaniahiku)—all of which were centered around the growing Pāhoia Town. The homestead in Keonepoko Iki consisted of twenty-three lots that ranged in size from five to eleven acres with an appraised value of \$2.00 to \$3.00 per acre (The Evening Bulletin 1902). The study areas encompass the entirety of Lots 7, 11, and a portion of Lot 5 as shown in Hawai'i Registered Map No. 2084 from 1903 (Figure 16), the 1916 Plat Map No. 806 (Figure 17), and the 1918 C.S.F. No. 2992 (Figure 18).

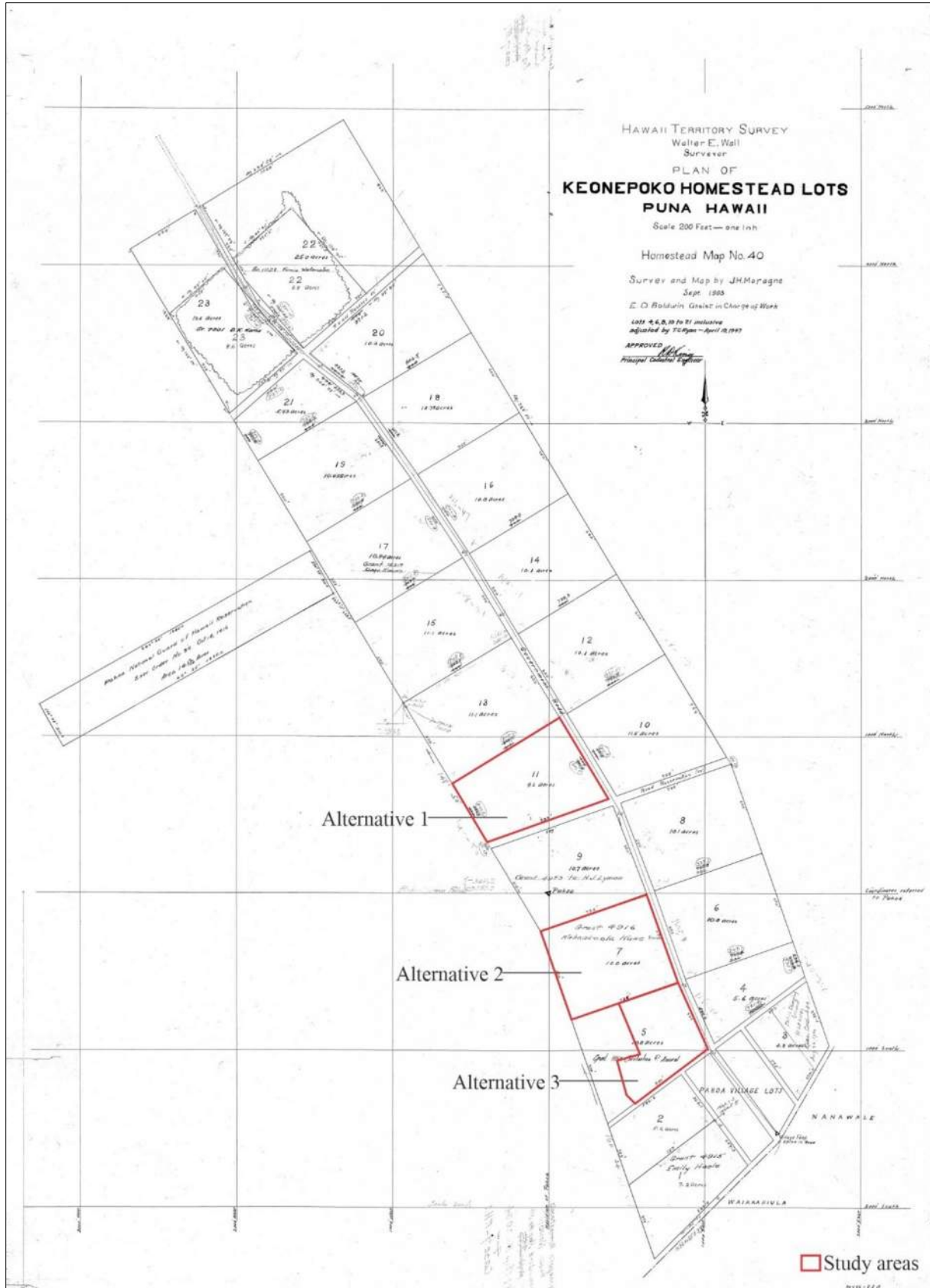


Figure 16. Hawai'i Registered Map No. 2084 of showing study area locations in the Keonepoko Homestead Lots.

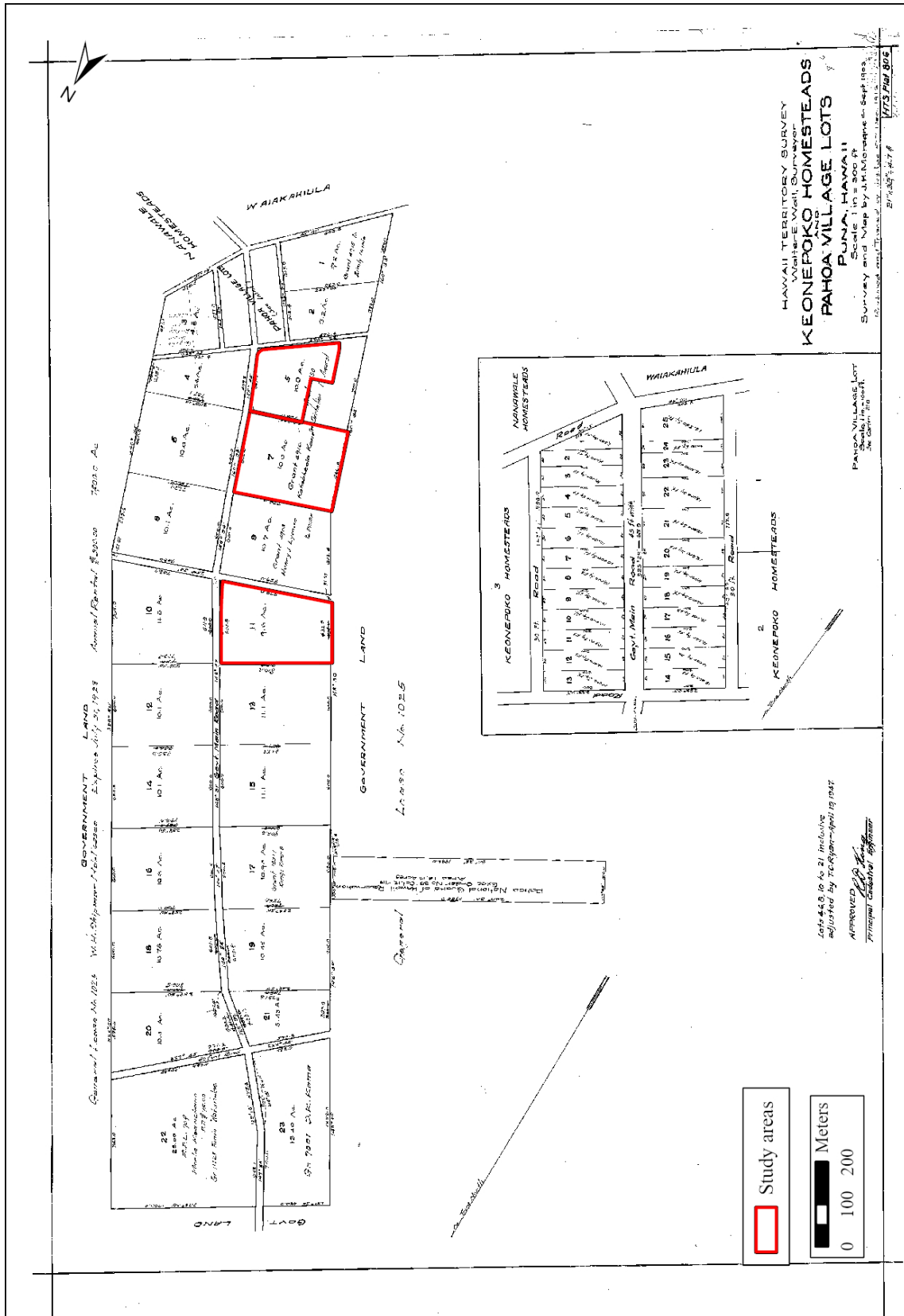


Figure 17. Plat Map 806 from 1916 shows study areas within the Keonepoko Homestead Lots 11 and 7 and a portion of Lot 5.

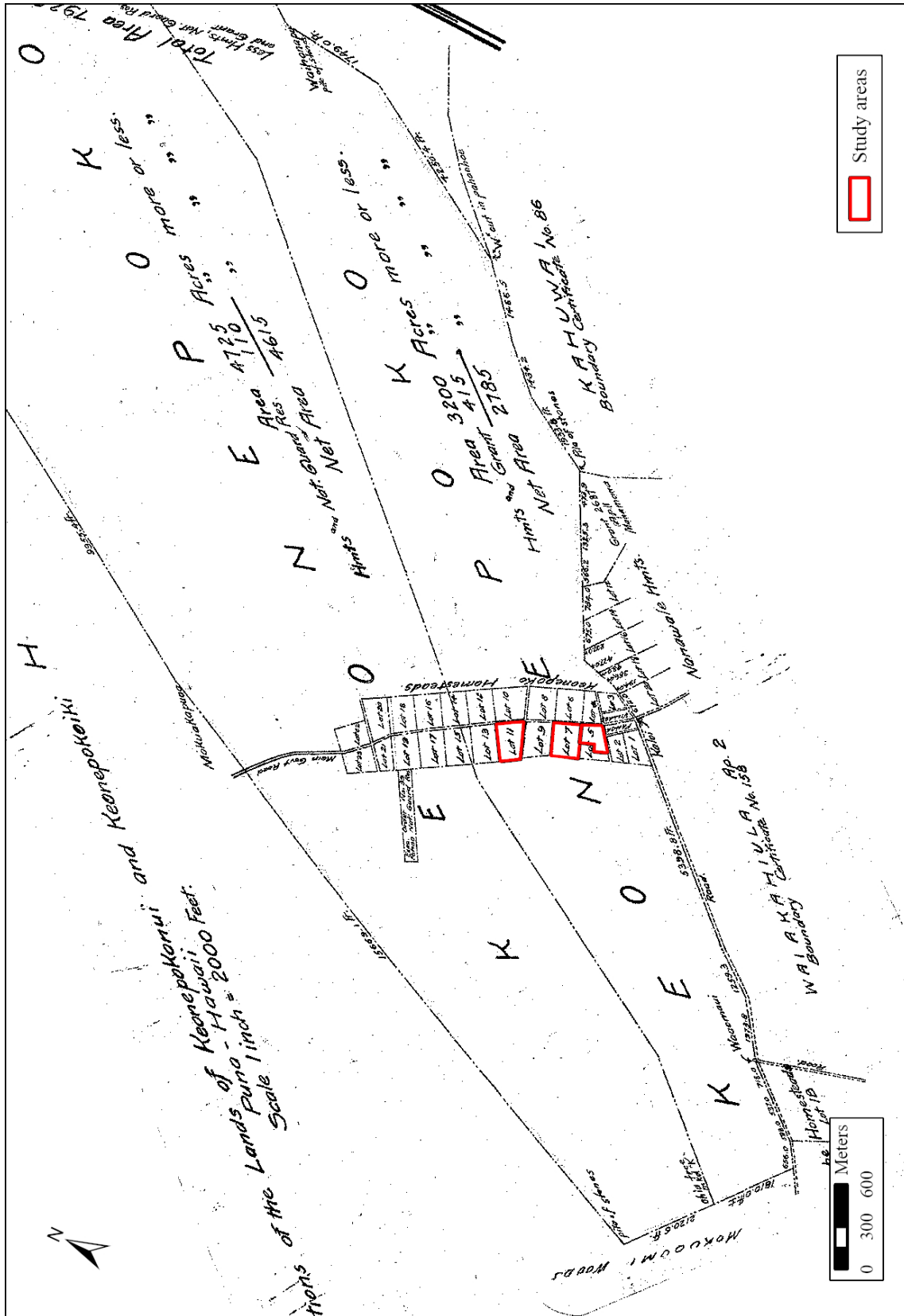


Figure 18. 1918 map (C.S.F. 2992) of General Lease No. 1025 to W.H. Shipman Ltd. in Keonepoko Nui and Iki Ahupua'a.

A Brief History of Alternative 1- TMK Parcel (3) 1-5-007:007

The 1903 Hawai'i Registered Map No. 2084 (see Figure 16) does not identify the name of the owner of Lot 11. However, a review of County of Hawai'i tax appraisal records indicated that Alternative 1 (preferred alternative; TMK: (3) 1-5-007:007) was purchased by Sadamu Tsubota sometime around 1948. Between 1959 and 1964, Tsubota received three County permits to construct an 868-square-foot dwelling along with a 353-square-foot carport on the *mauka* side of present-day Pāhoa Village Road. Behind the main dwelling, Tsubota built a second 704-square-foot dwelling, behind which he built a 400-square-foot pig pen. Born in Pāhoa in 1921, Tsubota was an avid businessman and throughout his lifetime, he operated several businesses in Pāhoa including S. Tsubota Inc., Pāhoa Theatre, the former Puna Tavern, and Drip and Dry Laundromat. He was an Army Veteran who served in World War II (Honolulu Star-Advertiser 2013). Tsubota appears to have held Lot 5 until his death in 2013.

A Brief History of Alternative 2- TMK Parcel (3) 1-5-007:005

The 1903 map (see Figure 16) identifies Kaheakeola Kane as the owner of Lot 7 (Grant No. 4916; Alternative 2; TMK: (3) 1-5-007:005). County of Hawai'i tax appraisal records suggest that the parcel was subsequently sold to a William Abraham. Other names listed as owners in the tax records include Mileka Abraham Kauhi, Kela Abraham, and Philip Abraham. It appears that by 1970, Mileka A. Kauhi may have intended to convey the parcel to the Hawaiian Association of Seventh-Day Adventists, however, the outcome of this is unknown. Mileka Abraham Kauhi was born in Puna in 1892 and was a retired nurse who died in 1979 (The Honolulu Advertiser 1979).

A Brief History of Alternative 3-TMK Parcel (3) 1-5-007:004, 076, 082, 083

Concerning Alternative 3 (TMK: (3) 1-5-007:004, 076, 082, 083), the 1903 map (see Figure 16) identified Christina P. Amaral as the owner of Lot 5. County of Hawai'i Tax Appraisal records indicated that Lot 5 was sold as Grant No. 11150 for \$50.00 in 1943 to Elizabeth Tavares, Jennie K. Bumatay, and Christantina P. Amaral. By 1945, Lot 5 was sold to Yoso Kuwahara who was born in 1924, and his wife Kikuko. In 1968, the Kuwaharas subdivided Lot 5 into two sections, Lot 5-A comprising 0.374 acres, and Lot 5-B comprising 9.564 acres. In 1967, the Kuwaharas gave up the 0.374-acre parcel (Lot 5-A) to the County for road improvement purposes. By 1977, the Kuwahara's remaining Lot 5-B was subdivided into two with Lot 5-B-1 containing 1 acre and Lot 5-B-2 containing 8.648 acres. On Lot 5-B-2 between 1970-74, the Kuwaharas constructed at least two small dwellings, a garage, a carport, a storage and equipment building, and a greenhouse for their anthurium farm. By 2004, the Kuwahara's operated a Christmas tree farm where they grew Portuguese and Mexican Cyprus trees on a two-acre portion of Lot 5 (Harkavy 2004). In 2009, Yoso Kuwahara died at the Hilo Medical Center (West Hawaii Today 2009). Bryson, the son of Yoso and Kikuko Kuwahara also became a businessman and in the 1990s, established a land clearing and cinder company (Bryson's Cinder Inc.) which he operated out of Lot 9 of the Keonepoko Homestead prior to the construction of the Puna Kai Shopping Center commenced in 2017.

Pāhoa During the Second Half of the 20th Century to Present-Day

Pāhoa Town proper, during the second half of the 20th century, remained a quaint plantation town lined with numerous family-owned businesses and homes. During this time, Pāhoa was second to the more populated village at Kapoho. The 'Ōla'a Sugar Company, since its founding in 1899 was plagued by high operating costs and mounting debt which by 1953 was estimated at \$4.1 million. At a stockholders' meeting in March of 1960, it was agreed that a name change might turn the financial tides of the company and the 'Ōla'a Sugar Company became the Puna Sugar Company, Ltd. By 1963, the plantation saw its first profits, and three years later the company was debt free for the first time in its history (Campbell and Ogburn 1988).

As shown in the 1961 aerial photo (Figure 19), the Puna Sugar Company fields were located east and west of Pāhoa Town where soils were most suitable. The area lying north of Pāhoa Town where the study areas are located, however, remained relatively undeveloped except for a few Keonepoko Homestead lots. By 1969, American Factors (AMFAC), the plantation's parent company brought out the minority shareholders, and the Puna Sugar Company, Ltd. was wholly owned by AMFAC. The company's profitability was shortlived as by 1982, AMFAC announced the closure of the Puna Sugar Company. By December 1st, 1984, the company had completed the closure and after eighty-five years, the Puna Sugar Company closed its doors indefinitely (Campbell and Ogburn 1988). During this time, many of the long-time Japanese residents who had worked for the plantation or were business owners were selling their businesses and retiring (Bishop 1999). By the late 1970s, much of the Keonepoko Iki Homesteads were developed with homes and farms as shows in a historic aerial photograph from 1977 (Figure 20).

2. Background

In December 1959, a series of small earthquakes were detected in Pāhoā, by the Hawai‘i Volcanoes Observatory (HVO), followed by a significant increase in seismic activity. Ground fractures were observed in Kapoho Village, with areas dropping several feet along the Kapoho and Koa‘e fault lines. Between January 12th-13th, 1960, around 300 residents undertook a voluntary evacuation. Subsequently, a red glow illuminated the sky as the 1960 Kapoho eruption began, characterized by lava fountains and violent blasts caused by the interaction of groundwater and molten lava. The eruption covered favored recreational areas, such as Waiwelawela warm springs and Ipoho Lagoon. Despite efforts to construct barriers, the lava continued to advance, extending Puna’s easternmost coastline and causing further destruction to the affected community (Sweeney and Burchard 1994; USGS n.d). In all, the 1960 Kapoho eruption lasted just over a month and covered more than four square miles of land, including the addition of roughly 0.75 square miles of new land beyond the original shoreline. Although the lighthouse at Kumukahi was barely spared, the quaint villages of Kapoho and Koa‘e were either completely inundated or irreparably damaged.

By the mid-20th century and shortly after Statehood in 1959, Puna saw a flurry of large-scale residential developments created by outside investors and marketed largely to buyers in California and elsewhere in the United States. By 1960, the subdivision boom resulted in the creation of some 50,000 lots in Puna alone with an average selling price of \$200 to \$2,600 per one-acre (Black 1960). The newly created subdivisions were heavily critiqued because they lacked basic infrastructure including roads and utilities and their locations made them particularly susceptible to volcanic eruptions. However, the developers of these subdivisions believed that the creation of tens of thousands of residential lots in Puna would help boost the island’s economy, particularly in the wake of the 1960 *tsunami*, and lay “the groundwork for future development and population increase” (Black 1960:26). Local reporter, Alan McNarie (2018:1), estimated that 12% of the lots were purchased by residents of Hawai‘i Island, 35% by O‘ahu residents, and the rest by non-Hawai‘i residents. By the 1970s, the County of Hawai‘i was forced to implement stricter ordinances to regulate subdivision development.



Figure 19. 1961 aerial photograph showing the study area and Pāhoā Town.



Figure 20. 1977 aerial photograph showing the study area and Pāhoā Town.

Throughout the 1980s and 1990s, Pāhoā Town’s built environment remained relatively unchanged, however, only a few of the long-time Japanese families continued to operate their businesses. Charlie Kawamoto, whose wife’s family, the Haras, owned and operated Pāhoā Cash & Carry reflected in a 1999 article that “a lot of “mainlanders” have arrived over the years, taking over old businesses and changing the face of the community” (in Bishop 1999:4). Throughout this period, the community endeavored to enhance the negative public image that had been associated with Pāhoā, which many believed were largely influenced by the sensationalized narratives surrounding the area’s crime, drug usage, marijuana cultivation, and the presence of hippies. Community leaders and elected officials worked to rally a new sense of pride in the culturally diverse Pāhoā community (Bishop 1999).

Beginning around 2004 plans to expand Pāhoā town to the area laying north near the junction of the Pāhoā Bypass Road (constructed in 1990) and the present-day Pāhoā Village Road were underway which was led by the construction of Pāhoā Marketplace situated on the north side of the Alternative 1 study area (Bishop 2004). This was soon followed by the development of Longs Drugs, two eateries, and a gas station in 2010 on an adjacent lot (TMK: (3) 1-5-007:020) located to the east.

The plans to further develop the northern section of Pāhoā Town came to an abrupt halt when on June 27th, 2014 an eruption from Pu’u ‘Ō’ō sent several slow-moving lava fingers northeastward placing Pāhoā Town directly in its path. Area residents waited in anticipation for several months as the flow front slowly advanced toward the north section of Pāhoā Town in the vicinity of the study areas. An aerial photograph published in the October 25th, 2014 edition of the *West Hawaii Today* shows the flow front as well as the locations of the current study areas (Figure 21). By late October, the main flow front had advanced towards Apa’ā Street and widened and shortly thereafter destroyed one home, a section of farmland, the Japanese cemetery, and pushed through the fence around the Pāhoā Transfer Station before stalling (Figure 22). A second lava finger located to the north of the main flow continued to tract in an easterly direction and was projected to flow towards the Pāhoā Marketplace. By December 25th, the lava activity waned and ultimately stalled thereby sparing the major roadways and Pāhoā Town (Fujimori 2015).

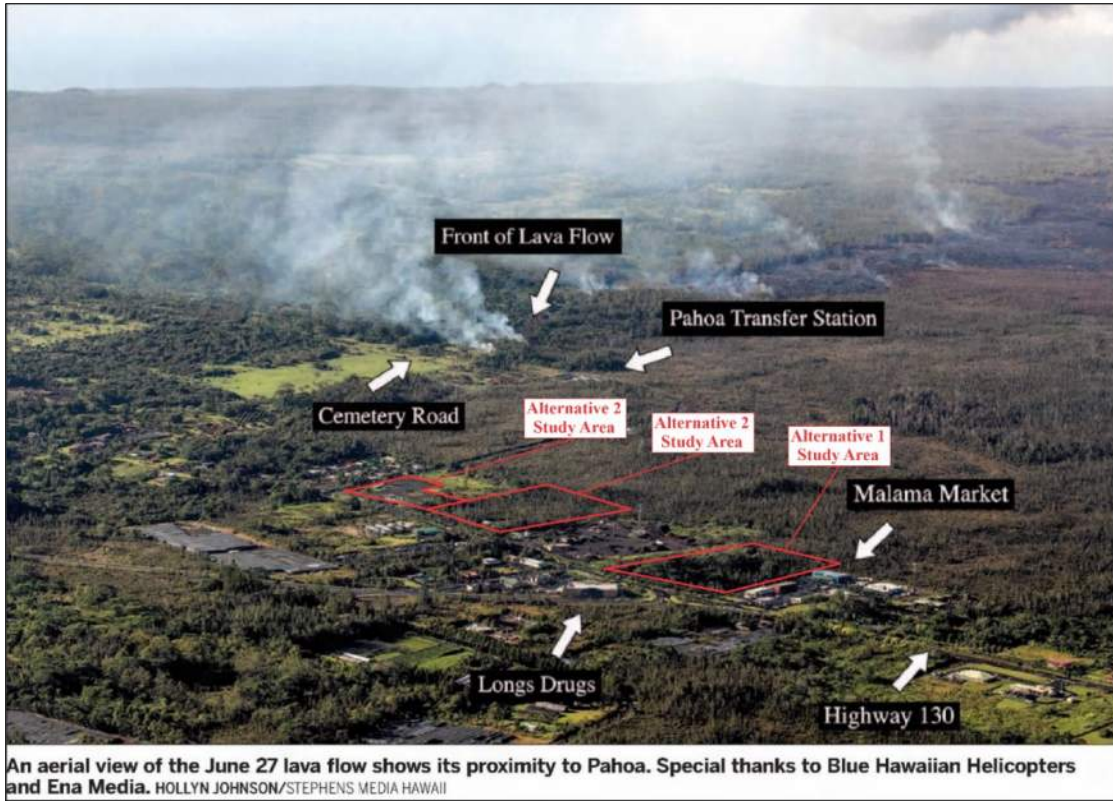


Figure 21. Aerial photograph of the June 2014 eruption advancing toward Pāhoa Town. Photo annotated to show the location of the current study areas (Callis and Stewart 2014:A1).



Figure 22. USGS aerial photograph showing the June 27th, 2014 flow stalled after covering at least one home and farmlands. Photo annotated to show study areas, (photo from the USGS website).

Amidst an altered landscape, life in Pāhoā after the June 27th, 2014 eruption resumed. Area residents, some of whom undertook a voluntary evacuation returned, and businesses that had closed amidst an uncertain future, reopened their doors. In August 2017, construction crews broke ground on 10 acres previously owned by the Hilo-based BT Kuwahara, LLC for the Puna Kai Shopping Center. The estimated \$40 million Puna Kai Shopping Center project was proposed and developed by the real estate development company, Meridian Pacific Ltd (Hansel 2017). As part of this project and to ease traffic congestion, the developer Gary Pinkston built an extension of Kahakai Boulevard on the west side of the Pāhoā Village Road which runs parallel to the southern boundary of the Alternative 1 study area. The Puna Kai development project is shown in an aerial photograph published in the September 27th, 2017 edition of *West Hawaii Today* (Figure 23). The 2017 aerial photograph (see Figure 23) depicts two dwellings on the Alternative 1 study area parcel and shows extensive clearing along the *mauka* end adjacent to the Kahakai Boulevard extension which appears to have been part of the activities associated with Bryson's Cinders. By the end of 2019, the grand opening of the Puna Kai Shopping Center was held and today it serves as a shopping and eating center for Pāhoā Town.

In the Spring of 2018, changes to the magma system beneath Pu'u 'Ō'ō and at the crater floor of Halema'uma'u caused major seismic activities as far east as Highway 130 in lower Puna. The USGS issued warnings of a possible eruption along the lower east rift zone and within a few days, small ground cracks appeared in the Leilani Estates Subdivision, signaling the start of what became a four-month-long eruption. On May 3rd, the first fissure emerged within the subdivision, and by June a total of twenty-four fissures had emerged in a near-continuous row beginning in the area south of the Leilani Estates Subdivision and tracked in a northeasterly direction toward Kapoho (USGS 2018). While each fissure contributed various amounts of lava to the flow, the magma became concentrated at Fissure 8, which first emerged on May 5 (USGS 2018). The lava from Fissure 8 fed volumes of molten rock down a lava river which filled Kapoho Bay on June 4. After four months, the lava at Fissure 8 began to wane, however, in its wake, this eruption reportedly covered some thirteen square miles, added an astounding 875 acres of new land, and destroyed some 700 homes. (Burnett 2018; USGS 2018). An estimated 2,000 displaced residents along with hundreds of emergency rescue and humanitarian aid personnel found refuge and resources at Pāhoā Town. Although the 2018 lava flow did not directly impact the study areas, its impacts on the community and landscape in the area south and southeast of Pāhoā were momentous with recovery efforts still ongoing.

The increase in the number of residential lots in Puna inevitably spurred steady population growth. According to the Hawai'i County General Plan, in 2000, the population in Puna was about 31,000 people, and in 2020, the population increased to nearly 58,000 people. Puna is projected to surpass Hilo as the most populated district (McNarie 2018). The growth of Lower Puna over the past five decades has necessitated numerous improvements to accommodate the expanding population and evolving needs of the community. Infrastructure development, such as road expansions and upgrades, has been essential to enhance transportation connectivity and alleviate congestion. Additionally, the establishment of new schools (and the expansion of previously established schools), healthcare facilities, and public amenities have played a crucial role in meeting the educational, healthcare, and recreational requirements of the growing population. Furthermore, the expansion of utilities, including water and electricity, has been vital to ensure adequate and reliable services for residents and businesses. As Lower Puna continues to experience growth, ongoing improvements, and new developments will remain essential to support the needs of this community.



Kahakai Boulevard will be extended to provide access to Puna Kai, which will be anchored by the largest Malama Market in the state. MERIDIAN PACIFIC LTD./SPECIAL TO WEST HAWAII TODAY

Figure 23. Aerial photo published in the September 27th, 2017 edition of *West Hawaii Today* showing the Puna Kai Development near the Alternative 1 study area (Hansel 2017:A5).

PREVIOUS ARCHAEOLOGICAL AND CULTURAL STUDIES

Since the early 1900s, several archaeological studies have examined the Keonepoko area. However, these studies primarily explored the coastal regions where Precontact and early Historic populations were more commonly found. The earliest relevant survey of archaeological resources was conducted by Hudson (1932). Hudson attempted to inventory the sites of East Hawai'i Island from Waipi'o Valley to the Ka'u District for the B. P. Bishop Museum. He recorded a wide range of archaeological features including *heiau*, burials, caves, habitations, trails, and agricultural

features during his survey. The route of the survey took him through the coastal portion of Keonepoko Iki Ahupua'a. Hudson (1932:304) noted that it was difficult to obtain information about sites in Puna because "most of them are located along the coast between Keaau and Kapoho where no one now lives, and it is difficult to locate descendants of the former Hawaiian population of the area who might be able to shed light on the nature and function of certain sites." Hudson (1932:304) elaborated stating that, "back from the sea the land is under cultivation in cane, used for pasture, or covered with dense vegetation which can be penetrated only with difficulty." Hudson (1932:309) did not record any specific features in the immediate vicinity of the current study areas, although he did note a coastal trail (Site 83) in Keonepoko Nui Ahupua'a consisting of flat stones from the beach.

Forty-two years later, Ewart and Luscomb (1974) of the B. P. Bishop Museum conducted a six-mile long archaeological reconnaissance survey of a proposed Kapoho-Keaukaha Highway route from Waiakahiula Ahupua'a to Kea'au Ahupua'a. The survey area consisted of a 2,000-foot wide corridor roughly following the route of the old Government Road (Site 21273) along the coast. Ewart and Luscomb (1974) recorded sixty sites within combined Keonepoko Nui and Iki Ahupua'a (designated *Ahupua'a* 4 or A4). These sites, which included mounds, feature complexes, platforms, walls, a trail, *ahu*, c-shapes, stone alignments, faced depressions, pits and ravines, were interpreted as having been used for habitation, burial, ceremonial, and agricultural purposes.

Other more recent coastal studies in Keonepoko Iki have included six private property developments that required archaeological survey for permitting within the Conservation District (Barna and Bibby 2018; Clark et al. 2016; Farrell and Dega 2013; Glennon and Barna 2020; Knapp 2003; Rechtman 2012). Collectively, these parcels contain a dearth of archaeological sites. Features identified at the coast have included a Historic rock wall (SIHP Site 50-10-45-30571) (Clark et al. 2016), Historic boundary walls associated with the Old Government Road (Site 50-10-45-18759), and minor complexes of agricultural features (Site 50-10-45-18758) (Farrell and Dega 2013 see also Knapp 2003). These surveys have noted disturbance and bulldozing, resulting in very few remaining Precontact or Historic sites.

As the town of Pāhoa has grown, the necessity for archaeological investigation and identification of resources prior to development has prompted surveys of both large and small properties within Keonepoko Iki. There have been six archaeological surveys over the last nineteen years in the immediate vicinity of the current study areas (Figure 24). No historic properties of any kind were identified during these six archaeological surveys. Rechtman (2004) did however note a culturally sterile lava tube system within their project area.

Lastly, there have been multiple attempts to document a well-known, large lava tube that extends the length of Keonepoko Iki and Keonepoko Nui to the north of the current study areas. In fact, Pāhoa Cave (SIHP Site 50-10-45-14900), as it is known, may represent the pre-historic boundary between these Puna land divisions (Scheffler and Clark 2016). The caves were visited by Martha Yent (1983) and again by McEldowney and Stone (1991), who documented multiple parallel passages dubbed the southern, middle, and northern branches of the system. The main (middle) trunk extended continuously with dozens of "skylight" entrances for well over 7.5 miles into the Kahaualea Forest Reserve from 470 to 1,620 feet in elevation. Both reports documented fortifications, burials, internal platforms, signs of "refuge" use, and major structural modifications for both the sacred and mundane. The southern tube in particular contained a high density of burials, "at least 100" including both extended individual and in bundles in very deteriorated condition (Yent 1983). The middle tube differed in that the "less than 20" burials were mainly restricted to the upper reaches of the cave and seemed segregated from other uses (McEldowney and Stone 1991).

Lower (*makai*) portions of the lava tube system and a ground corridor were surveyed by Bishop Museum in the 1990's for power line installation. Dixon and Major (1992) reported a similar extension of archaeological features and burials in the cave leading toward the coast. This portion of the cave was interpreted as an integral part of a coherent *ahupua'a*, consisting of the coastal village of Kahuwai and connections to the Kahuhali *mauka* settlement (current Pāhoa). They described a unique inland pattern of agricultural fields arranged in a pattern of small arable patches, Kīpohopoho (cf. Kīpuka), surrounded by inhospitable lava. These were found far from shore on gradually sloping land. These results reinforce McEldowney's (1979) and Burtchard and Moblo's (1994) models of land use presented above.

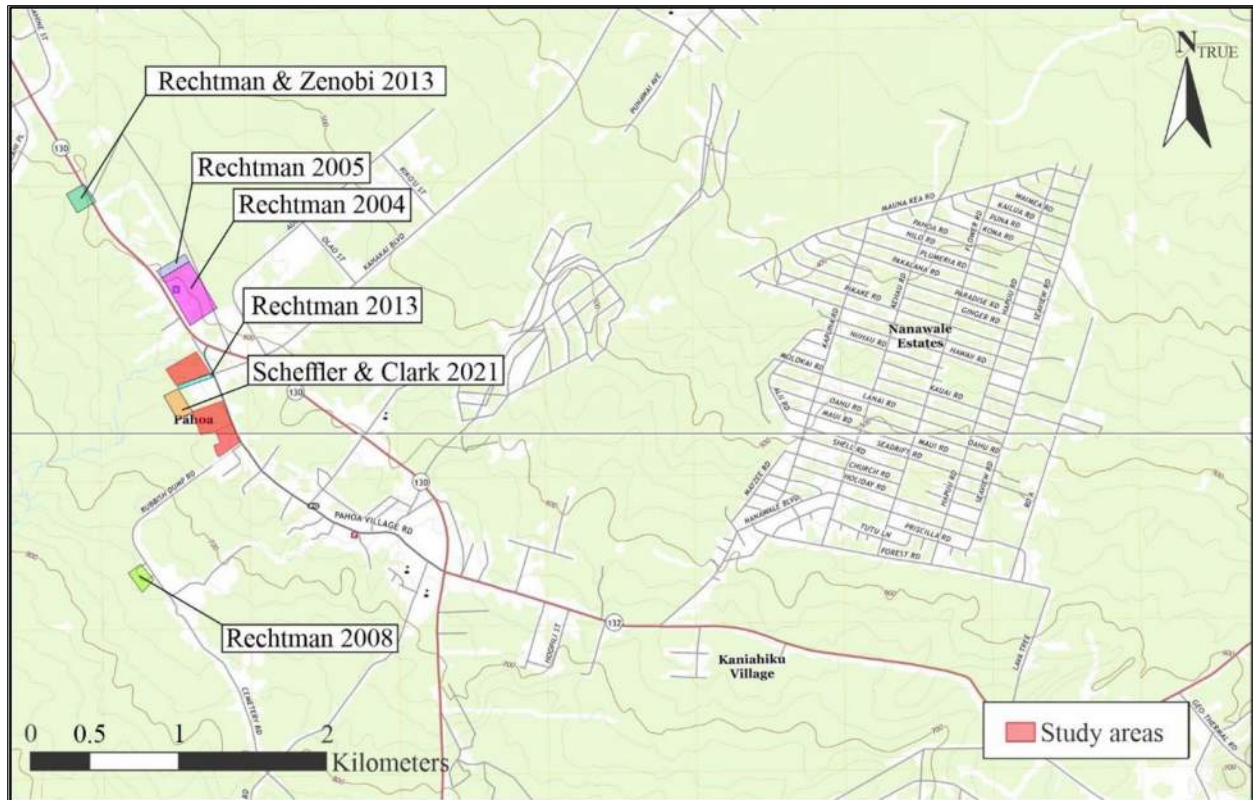


Figure 24. Previous studies conducted in the vicinity of the study areas.

Under the threat of the “June 27” series of lava flows that began in 2014, a salvage survey of approximately a mile-long portion of the main “middle branch” trunk between 570 and 720 feet elevation was undertaken (Scheffler et al. 2015; Scheffler and Clark 2016). This project served to document in greater detail the proposed refuge function of the cave and elaborate on possible (non-burial) ritual features found within the deep reaches of the cavern. In addition, paired AMS radiocarbon dates from separate short-lived materials, found in definitively cultural contexts, confirmed Precontact occupation (Scheffler and Clark 2016).

In June 2023, ASM Affiliates conducted a field inspection (ASM Affiliates, in prep) of Alternative 1 and a portion of Alternative 3. Access to Alternative 2 and parcel 082 and 083 of Alternative 3 was not granted at the time of the inspection, therefore, no archaeological survey was undertaken of these areas. The findings from the Alternative 1 study area found bulldozer push piles and numerous berms along the outside edges and throughout the southern part of the parcel, likely created by activities associated with Bryson’s Cinders Inc. ASM staff also identified three cobble mounds and a cobble-filled area both of which were in poor condition. ASM staff noted that these cobble mounds and filled area may represent former agricultural features or may be associated with the cinder and gravel yard operated by Bryson’s Cinders Inc. Concerning the Alternative 3 study area, ASM staff inspected only Parcels 082 and 083 and did not identify any historic properties and noted that their entire survey area had been mechanically leveled. They also observed a large pile of concrete rebar and several abandoned vehicles along the northern boundary of Parcel 082 which they concluded may be the remains of a former garage or carport. ASM recommended that an archaeological inventory survey of the selected Alternative site be conducted prior to any land disturbing activities.

3. CONSULTATION

Gathering input from community members with genealogical ties and long-standing residency or relationships to the study area is vital to the process of assessing potential cultural impacts on resources, practices, and beliefs. It is precisely these individuals that ascribe meaning and value to traditional resources and practices. Community members often possess traditional knowledge and in-depth understanding that are unavailable elsewhere in the historical or cultural record of a place. As stated in the OEQC (1997) *Guidelines for Assessing Cultural Impacts*, the goal of the oral interview process is to identify potential cultural resources, practices, and beliefs associated with the affected project area. It is the present authors’ further contention that the oral interviews should also be used to augment the

process of assessing the significance of any identified traditional cultural properties. Thus, it is the researcher's responsibility to use the gathered information to identify and describe potential cultural impacts and propose appropriate mitigation as necessary. This section of the report begins with a description of level of effort undertaken to identify persons believed to have knowledge of the study area, followed by the interview methodology. This section of the report concludes with a presentation of the interview summaries that have been reviewed and approved by the consulted parties.

OUTREACH EFFORTS

In an effort to identify individuals knowledgeable about traditional cultural practices and/or uses associated with the current project and study area, a public notice containing (a) locational information about the project area, (b) a description of the proposed project, and (c) contact information was printed in a newspaper with state-wide readership. The public notice was submitted to the Office of Hawaiian Affairs (OHA) on May 17th, 2023, for publication in their monthly newspaper, *Ka Wai Ola*. This notice was published in the June 2023 edition of *Ka Wai Ola* and a copy of the public notice is included in Appendix A of this report. From the public notice, zero responses were received.

Additionally, ASM staff contacted twenty-one individuals/organizations via phone and email, the details of which are listed below in Table 2. These individuals/organizations were identified as persons who were long-time residents of the Keonepoko Iki-Pāhoa area and were believed to have knowledge of past land use, history, or other types of cultural information. Each of the persons/organizations contacted were provided with a consultation packet that contained maps showing the location of the study areas, a description of the proposed project, and contact information of ASM personnel. Of the twenty-one people/organizations contacted, two individuals, Mrs. Leila Kealoha and Mr. Iopa Maunakea, agreed to be interviewed for this study; others offered names of other individuals to be consulted and one, Leialoha Ilae-Kaleimamahu, stated that while she was unaware of anything specific to the parcels within the project area, "there is always something culturally significant in all of Hawai'i."

Table 2. Persons/organizations contacted for consultation.

<i>Name</i>	<i>Organization/Affiliation</i>	<i>Contact Date(s)</i>	<i>Results</i>
Luana Jones	Pāhoa resident, Puna Community Medical Center Foundation - Kīpuka Farmacy	05/18/2023 06/29/2023 07/05/2023 7/21/2023 8/1/2023	no cultural resources identified
Faye Hanohano	Pāhoa resident	05/18/2023	no response
Leila Kealoha	Pāhoa resident; cultural practioner and educator	05/18/2023 06/29/2023	see summary below
Leah Gouker	Pāhoa resident, Pāhoa Highschool graduate and teacher	05/18/2023 06/29/2023	no response
Nicki Konanui	Pāhoa resident	06/29/2023	declined
Howard Konanui	Pāhoa resident and cultural practitioner	06/29/2023	declined
Larry Kuamo‘o	Pāhoa resident and cultural practioner	06/29/2023	no response
Leialoha Ilae- Kaleimamahu	Pāhoa resident; cultural practioner and educator	05/18/2023 06/25/2023	declined
Iopa Maunakea	Pāhoa resident and founder of Men of Pa‘a	05/18/2023 06/29/2023	see summary below
Colleen Thomas	Pāhoa resident	05/18/2023 06/29/2023	no response
Robin Hauanio	Pāhoa resident and cultural practitioner	05/18/2023 06/29/2023	no response
Sam Souza	Solid Rock Church Pāhoa resident	05/18/2023	recommended names of others to be contacted for consultation

Table 2 continues on next page.

Table 2. continued.

<i>Name</i>	<i>Organization/Affiliation</i>	<i>Contact Date(s)</i>	<i>Results</i>
Pua Paglinawan	Ku‘ialuaopuna; Pāhoa resident and cultural practitioner	05/18/2023	declined
Keone Kalawe	Pāhoa resident; cultural practitioner and educator	06/20/2023 07/21/2023	no response
Leilani Waldron	Pāhoa resident	05/18/2023	declined
Renee Rivera	Hui Aloha ‘Āina O Puna Co-Director at He Ho‘omaka Hou Ana O Puna	05/18/2023	no response declined
Hidi Boteilho	Pāhoa resident; Maku‘u Hawaiian Homestead Association	06/21/2023	no response
Ku‘ulei Kealoha Cooper		6/21/2023	no response
Leslie Līhau		6/21/2023	no response
Enriques Rosehill Ana Kapukini Kon	Pāhoa resident	07/07/2023	declined

End of Table 2.

INTERVIEW METHODOLOGY

Prior to the interview, ASM staff provided information about the nature and location of the study areas and informed the potential interviewees about the current study. The potential interviewees were informed that the interviews were completely voluntary and that they would be given an opportunity to review their interview summary prior to inclusion in this report. With their consent, ASM staff then asked questions about their background, their knowledge of past land use, and the history of the project area, as well as their knowledge of any past or ongoing cultural practices. The informants were also invited to share their thoughts on the proposed project and offer mitigative solutions. The interviews were conducted either over the telephone or email correspondence. Below are the interview summaries that have been reviewed and approved by the consulted parties.

LEILA KEALOHA

On June 29th, 2023, Mrs. Leila Kealoha was contacted by ASM staff, Mrs. Candace Gonzales via a follow-up phone call to a May 18th, 2023 email sent by Mrs. Gonzales regarding the proposed project and the nature of the current study. An interview with Mrs. Kealoha was conducted during the follow-up phone call on June 29th, 2023. Mrs. Kealoha is a descendant who was born and raised in Puna. She is currently a resident of Pāhoa as well as the secretary and treasurer for the Maku‘u Farmers’ Hawaiian Homestead Association. Additionally, she is a cultural practitioner and an educator.

While she admits to not knowing much about the study area, she expressed concern about the impact the project could have on the extensive Puna cave system. She admits to not knowing the exact location of the caves within the project area however did state that the cave system extends from Wao Kele down into Keonepoko with a known cave entrance on the *makai* portion of the corner lot of Alternative 3. Mrs. Kealoha suggests avoiding development within Alternative 3 altogether. She agrees with Alternative 1 as the preferred choice, stating that it will have the least impact due to already being developed on either side. She recognized that Alternative 1 also creates the opportunity to have internal access from existing developments rather than to create new access that could potentially increase the traffic coming on and off of the Pāhoa Village Road.

IOPA MAUNAKEA

On June 29th, 2023, Mr. Iopa Maunakea contacted ASM staff, Mrs. Candace Gonzales via telephone, in response to a June 29th, 2023 phone call following up on a May 18th, 2023 email sent by Mrs. Gonzales regarding the proposed project and the current study. An interview with Mr. Maunakea was conducted via telephone on June 29th, 2023. Mr. Iopa Maunakea was born and raised in Nānākuli on O‘ahu and now resides in Pāhoa after having his “heart stolen by Puna”. He is a musician and a community advocate for the Hawaiian people and has created the Men of Pa‘a

organization to support troubled men through the culturally rooted process of *aloha ʻāina* and servant leadership in the community. Mr. Maunakea expressed his support for the proposed Transit Hub and Public Library project.

When asked about other practices of the area, Mr. Maunakea was unable to identify any known cultural practices but did express concern over the increased services bringing more people and with them more problems. He references the already evident *ʻōpala* and homelessness, stating that these are problems that need to be dealt with immediately. Mr. Maunakea suggests doing what is culturally appropriate in today’s society; the development incorporates the practice of holding an opening ceremony to bless the *ʻāina*, the people, and the work before work begins.

4. IDENTIFICATION AND MITIGATION OF POTENTIAL CULTURAL IMPACTS

The OEQC guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include “...subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs” (OEQC 1997:1). The guidelines also identify the types of cultural resources, associated with cultural practices and beliefs that are subject to assessment. These include other types of historic properties, both man made and natural, submerged cultural resources, and traditional cultural properties. The origin of the concept and the expanded definition of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service (Parker and King 1998). An abbreviated definition is provided below:

“Traditional cultural property” means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community’s history and contribute to maintaining the ethnic community’s cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

“Traditional” as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. “Cultural” refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term “Property” defines this category of resource as an identifiable place. Traditional cultural properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them.

It is however with the definition of “Property” wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. However offensive the concept of boundaries may be, it is nonetheless the regulatory benchmark for defining and assessing traditional cultural properties.

As the OEQC guidelines do not contain criteria for assessing the significance of traditional cultural properties, this study will adopt the state criteria for evaluating the significance of historic properties, of which traditional cultural properties are a subset. To be significant the potential historic property or traditional cultural property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- a Be associated with events that have made an important contribution to the broad patterns of our history;
- b Be associated with the lives of persons important in our past;
- c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- d Have yielded, or is likely to yield, information important for research on prehistory or history;
- e Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group’s history and cultural identity.

While it is the practice of the DLNR-SHPD to consider most historic properties significant under Criterion d at a minimum, it is clear that traditional cultural properties by definition would also be significant under Criterion e. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa'akai O Ka 'Āina* v Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical or natural resources are present and/or past or ongoing traditional customary practices; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights will be affected or impaired; and third, specify any mitigative actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

SUMMARY OF CULTURAL-HISTORICAL BACKGROUND INFORMATION

As a result of the culture-historical background, the study areas are located in Keonepoko Iki Ahupua'a (also known as Keonepoko 2nd), a traditional land division in the Puna District of Hawai'i Island. Historically, Keonepoko Iki and its geographically larger counterpart, Keonepoko Nui (also known as Keonepoko 1st) were known simply as Keonepoko, but as a result of the 1848 *Māhele 'Āina*, Keonepoko was divided into two distinct *ahupua'a*. The name Ke-one-poko has been translated as "the short sand beach."

Because of its geographical placement and the presence of certain elemental forces, Puna is closely associated with the regenerative powers of the *akua* (deity, god) Kāne and the destructive and creative forces of the *akua* Pelehonamea (Pele) both of whom are frequently referenced in traditional *mo'olelo* for the eastern part of the Puna District. The many *mo'olelo* featuring Pele along with other deities tell us of the complex interactions in the natural world, as they were understood by the indigenous inhabitants of this land. In Puna, these interactions play out daily as part of a living and ever-changing landscape. Only one specific *mo'olelo*, *Ke Ka'ao Ho'oniua Pu'uwai no Ka-Miki* made explicit reference to the lands of Keonepoko Iki. According to this account, Keonepoko Iki was a traditional training ground for the *ōlohe* of Puna as was also the name of the *ōlohe* who lived in this area on the *mauka* side of the coastal *ala loa* trail.

In addition to the traditional lore of Puna, this district is also culturally celebrated for its extensive groves of *hala*, *ōhi'a*, and *maile*, the uses of which are extensively documented in historical records specific to Puna. Puna's famed *hala* groves were also utilized for the cultivation of various staple food crops including *kalo* which was grown using highly adapted horticultural methods specific to this landscape. While *ulu* appears to be the dominant source of sustenance for residents of Puna, *kalo* undoubtedly rivaled it as a staple food source. In addition to *kalo*, *uala* was grown in great quantities throughout Puna which requires practically no soil to flourish. Aside from these staples, other crops such as *niu* and *'awa* were readily produced in Puna.

The records referring to Puna's *ali'i* history are limited, however, some traditions identify the ancestor named 'Ī as the progenitor of the families from Puna and Ka'ū. Furthermore, oral traditions suggest strong familial ties between the families from these two districts. Other noted *ali'i* associated with Puna included Pa'ao, who constructed Waha'ula Heiau in Pūlama Ahupua'a; Mo'ikeha who was accompanied by his two brothers, Kumukahi and Ha'eha'e during their voyage from Tahiti to Hawai'i and whose names have been retained as culturally significant *wahi pana* in Kula Ahupua'a. Other chiefs included Līloa and Hua'ā, the latter of whom is believed to have co-ruled parts of Puna along with 'Īmaikalani of Ka'ū. Hua'ā was later killed by Pi'imaiwa'a, the warrior son of 'Umi a Līloa, in the battle of Kuolo in Kea'au. 'Umi a Līloa is also credited with building the *heiau* atop Pu'u Kūki'i in Kula Ahupua'a. By the 17th century, Puna came under the control of Lonoikamakahiki and his wife, Kaikilani. By the early to mid-18th century, the rule of Puna appears to have toggled between the neighboring district chiefs.

During the later 18th and early 19th centuries, the Puna District was described by early visitors as a sparsely populated county containing villages scattered primarily along the coast. The writings of these early visitors also described a fertile agricultural landscape and demonstrated how the Puna natives were still largely rooted in traditional subsistence practices, procurement, and trade even with western influences slowly infiltrating into their day-to-day lives. These accounts also make reference to several prominent lava flows including the 1840 flow that descended to the coast of Nānāwale and another from 1868 both of which altered the coastal landscape of Puna.

During the 1848 *Māhele 'Āina*, Keonepoko was surrendered by William Charles Lunalilo to the Kingdom Government. As a result of the subsequent Kuleana Act of 1850, no *kuleana* were awarded within Keonepoko Iki. Despite the availability of land, the Puna District as a whole, is woefully distinguished for having the fewest lands awarded to both *ali'i* and *hoa'āina*. As part of the Government Land Grant Program, a single land grant was awarded in Keonepoko Iki. This grant, No. 1533 which totalled 277.8-acres was purchased by Kekoa in 1855 and is located at the coast along the Ka'ohē-Keonepoko Iki boundaries.

From the Boundary Commission testimony collected in 1876, two *kama'āina*, Kaumaikai who was originally from Kona but was resident in the neighboring Maku'u and Kunewa, who was born at Waiakahi'ula but lived in Keonepoko Iki provided testimony regarding the boundaries of Keonepoko Nui (as no testimony was heard for Keonepoko Iki). From their testimony, we learn of several traditional place names including coastal boundaries, Kahaiki and Kaeko and an upland boundaries, Mokuumi. The Government Road is described as being just inland of the coast. The testimony of Kunewa noted that the woods were within Keonepoko Iki and that the upland region contained plants such as *hala* and *'ōhi'a*.

Throughout the 19th century, the native population continued to decline however they maintained marginalized communities primarily along Puna's coastal areas. In the aftermath of the *Māhele*, economic interests in the region changed from the traditional Hawaiian land tenure system of subsistence farming and regional trading networks to the more European-based cash crops including coffee, tobacco, sugar, timber, and pineapple, and emphasized dairy and cattle ranching. While large tracts of land in lower Puna were used for cattle grazing and sugarcane cultivation, the project areas do not appear to have been used for either purpose, rather they were developed into the Keonepoko Iki Homestead, a government-sponsored program developed in 1884.

The changing economics of eastern Puna, however, gave rise to a new town, Pāhoa, which became the main center for the sugar plantation and lumber industries. Although the homesteading program was established in 1884, there was so little interest from the Government that the enactment of this law did not occur until 1888 and in many instances later in 1895. In many places including those areas of Puna slated for homesteading purposes, many of the lots were not sold until the early 20th century. Within Puna, several tracts of Government lands were developed for homesteading purposes including one in Keonepoko Iki and others nearby in Ka'ohē, and Nānāwale (also known as Kaniahiku)—all of which were centered around the growing Pāhoa Town. The homestead in Keonepoko Iki consisted of twenty-three lots that ranged in size from five to eleven acres with an appraised value of \$2.00 to \$3.00 per acre. The study areas encompass the entirety of Lots 7, 11, and a portion of Lot 5 all of which were sold to private owners of Japanese, Portuguese, and Hawaiian ancestry during the 1940s.

Throughout the remainder of the 20th and 21st centuries, the population of the Puna District steadily grew which was directly associated with the rapid development of large-scale subdivisions throughout the district following Statehood in 1959. The 1960 Kapoho Eruption decimated the village towns of Kapoho and Koa'e thereby making Pāhoa the central town center for this region. With Pāhoa Town proper operating as the main center, the area north inclusive of the Keonepoko Iki Homesteads slowly transformed into quaint residences and family-owned farms and businesses. With the resident population steadily increasing during the later 20th and 21st centuries, the ethnic makeup of Pāhoa grew more diverse. In the late 1990s and early 2000s, efforts to expand Pāhoa Town to accommodate the growing needs of the community spurred a series of development projects including the Pāhoa Marketplace. These efforts were, however, put into limbo when a slow-moving lava flow in 2014 (June-December) left residents and businesses waiting in anticipation. This flow crept slowly towards the northern portion of Pāhoa Town. Although the study areas were spared from any major destruction, some public and privately-owned infrastructure was damaged and at least one house was destroyed.

Although altered, life in Pāhoa resumed and residents that undertook a voluntary evacuation returned home, and businesses that had suspended operations amidst an uncertain future reopened their doors. Continued development of Pāhoa Town resumed when construction crews broke ground in August 2017 for the Puna Kai Shopping Center. By May 2018, Pāhoa Town was the center of another major eruption that broke out within the Leilani Estates Subdivision. Residents, numbering in the thousands, fleeing from the powerful eruption found refuge in Pāhoa Town along with hundreds of emergency rescue and government and community-based humanitarian aid personnel and volunteers. Although the 2018 eruption did not directly impact the study areas, its impacts on the community and landscape in the area south and southeast of Pāhoa were momentous with recovery efforts still ongoing.

The increased development activity in Pāhoa has also led to an increase in compliance-related archaeological studies including several near the vicinity of the study areas. Of the site types documented in the vicinity of the study areas, subterranean caves containing cultural material and burials have been recorded. One of the most prominent and extensive cave systems to be documented in Pāhoa is Pāhoa Cave (State Inventory of Historic Places Site 50-10-45-14900. Portions of this cave, including that section extending south for some 7.5 miles south of Ainaloa Subdivision towards the Kahaualea Forest Reserve, along with a section at the coast have been documented over the past four decades. The full extent of this vast lava tube system, however, remains unclear.

A recent archaeological field inspection of the Alternative 1 and 3 study areas did not identify any surface archaeological resources, however, from the consultation process, at least one of the consulted parties noted the possibility of encountering caves within the study areas.

IDENTIFICATION OF TRADITIONAL AND CUSTOMARY PRACTICES, VALUED CULTURAL RESOURCES

The information from the culture-historical background information in conjunction with the results of the consultation process revealed no past or ongoing traditional customary practices specific to the study areas. No valued plant or other biological resources were identified within the study areas. However, the background research and consultation process did identify the possible presence of subterranean lava tubes in the study areas that may contain cultural material and human remains.

Findings, Recommendations, and Conclusion

It is the findings of this study that ground-disturbing activities associated with the construction of the proposed project on any of the three alternative sites have the potential to encounter subterranean lava tubes that may contain cultural material and human remains. It is, therefore, recommended that an archaeological inventory survey, prepared in compliance with Chapter 6E and meeting the requirements of Hawai'i Administrative Rules Chapter 13-276, be conducted of the chosen alternative site. If archaeological resources, particularly lava tubes, are encountered during the survey, they should be thoroughly investigated for cultural materials and human remains. The archaeological survey should provide appropriate mitigative measures regarding the treatment of any identified sites. The archaeological survey should be submitted to the State Historic Preservation Division for review and acceptance prior to the start of any ground-disturbing work.

Conversely, if the project proponents consider a 'no-action alternative' the proposed project does not have the potential to impact valued surface or subsurface cultural resources. As such, the 'no-action alternative' does not necessitate any recommendations for mitigative strategies.

In conclusion, if the proposed project proceeds, it is recommended that the above-described measures be undertaken prior to any ground-disturbing work. Adhering to the recommended actions will ensure that impacts on any potential surface or subsurface resources are mitigated in compliance with applicable State laws and regulations.

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APPENDIX A. KA WAI OLA PUBLIC NOTICE



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NEWS FOR THE LĀHUI

alternative sites, are all privately-owned parcels zoned A-1a:

- Alternative 1 (Preferred Alternative) inclusive of the 9,572-acre parcel identified as TMK (3) 1-5-007:007; Located at the northwest corner of Pāhoa Village Road and Kahakai Boulevard between Pāhoa Marketplace and the Puna Kai Shopping Center. The site provides a large parcel with a good shape and could provide a gateway opportunity for Pāhoa. Bus access can be placed away from high pedestrian traffic areas. There are opportunities to enhance walkability, connectivity, and pedestrian safety along Kahakai Boulevard and Pāhoa Village Road frontages with opportunities to create a pedestrian friendly environment from Puna Kai Shopping Center to the site.

- Alternative 2 inclusive of the 10-acre parcel identified as TMK: (3) 1-5-007:005; located south of Puna Kai Shopping Center. This site provides a large parcel with a good shape. This site is slightly separated from congested Puna Kai Shopping Center, which might be easier for bus access. There is good street frontage, but the site is adjacent to fewer pedestrian-oriented uses.

- Alternative 3 inclusive of 5.641 acres and comprised of following four parcels, TMK: (3) 1-5-007:004, 076, 082, and 083. Located along Pāhoa Village Road at the northwest corner of Apa'a Street. The site has good street frontage and is close to commercial areas but separate from the congested Puna Kai Shopping Center area. The parcel size just meets the basic minimum footprint with no room for potential expansion. It is also adjacent to single-family development, which is less pedestri-

an-oriented.

More information about the project can also be found on the project website <http://pahoa-transithub.info/> or by scanning the QR Code

ASM is seeking kama'āina familiar with the areas' cultural resources and traditional customary practices. We also seek input regarding strategies to prevent or mitigate impacts on culturally valued resources or traditional customary practices. If you know of such information, please contact Candace Gonzales, cgonzales@asmaffiliates.com, (808) 969-6066.

CULTURAL IMPACT ASSESSMENT FOR THE PROPOSED PĀHOA TRANSIT HUB AND PUBLIC LIBRARY

On behalf of the County of Hawai'i Mass Transit Agency and the Hawai'i State Public Library System, ASM Affiliates is preparing a Cultural Impact Assessment to inform a HRS, Chapter 343 Environmental Assessment being prepared for the proposed Pāhoa Transit Hub and Public Library which is planned to be developed on one of three possible alternative sites. The three alternative sites are located along the northern part of Pāhoa town in the area between the existing Pāhoa Marketplace and Apa'a Street on the mauka side of Pāhoa Village Road. The three

Appendix E

Traffic Impact Assessment Report

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Pāhoa Transit Hub and Library Traffic Impact Analysis Report

Pāhoa, Hawai'i

June 2024

Prepared for:

County of Hawai'i Mass Transit Agency



And

Hawai'i State Public Library System



Prepared by:

SSFM
International

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I. PROJECT DESCRIPTION

The County of Hawai‘i (COH) Mass Transit Agency (MTA) and COH Planning Department plans to construct the Pāhoa Transit Hub and Library development on a parcel in the Pāhoa region on the island of Hawai‘i. The development aligns with the COH’s *Transit and Multi-Modal Transportation Master Plan* (Master Plan) (COH MTA, August 2018) goal to “*Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places.*”

The COH operates the *Hele-On Bus (COH Bus)* throughout the island, of which three routes operate within Pāhoa. In addition to the transit hub, the COH has partnered with the Hawai‘i State Public Library System (HSPLS) to co-locate a new State-owned library on the development’s parcel. Together, this development aims to support the COH’s transit-oriented-development (TOD) initiatives by co-locating key public services as a focal point serving the Pāhoa community.

Previously, the MTA and COH Planning Department conducted public outreach and analyzed 13 potential sites within the Pāhoa region for the proposed development, ultimately recommending three preferred sites in a 2022 site suitability analysis. For clarity throughout this report, they will be referred to as *Alternatives 1, 2, and 3*, although the original *Site* number from the 2022 site suitability analysis are also provided for reference. The three alternatives are as summarized:

- **Alternative 1 (Site #2): Preferred Alternative**
 - Located at the northwest corner of Pāhoa Village Road and Kahakai Boulevard (TMK: (3) 1-5-007:007) between Pāhoa Marketplace and the Puna Kai Shopping Center. The site is 9.6 acres and could provide a gateway opportunity for Pāhoa with opportunities to create a pedestrian friendly environment and connection with the Puna Kai Shopping Center. This is the preferred alternative.
- **Alternative 2 (Site #8)**
 - Located along Pāhoa Village Road immediately south of the Puna Kai Shopping Center (TMK: (3) 1-5-007:005). The site is 10.0 acres, but is slightly separated from the Puna Kai Shopping Center, resulting in it being adjacent to fewer existing pedestrian-oriented uses and design.
- **Alternative 3 (Site #9)**
 - Located along Pāhoa Village Road at the northwest corner of ‘Apa’a Street (TMKs: (3) 1-5-007:076, 004, 082, 083). This site is 5.6 acres, leaving no room for potential future expansion. Given its location adjacent to single-family residential housing, there are less pedestrian-oriented uses and design.

Project location maps for all three alternatives can be seen in Figure 1.

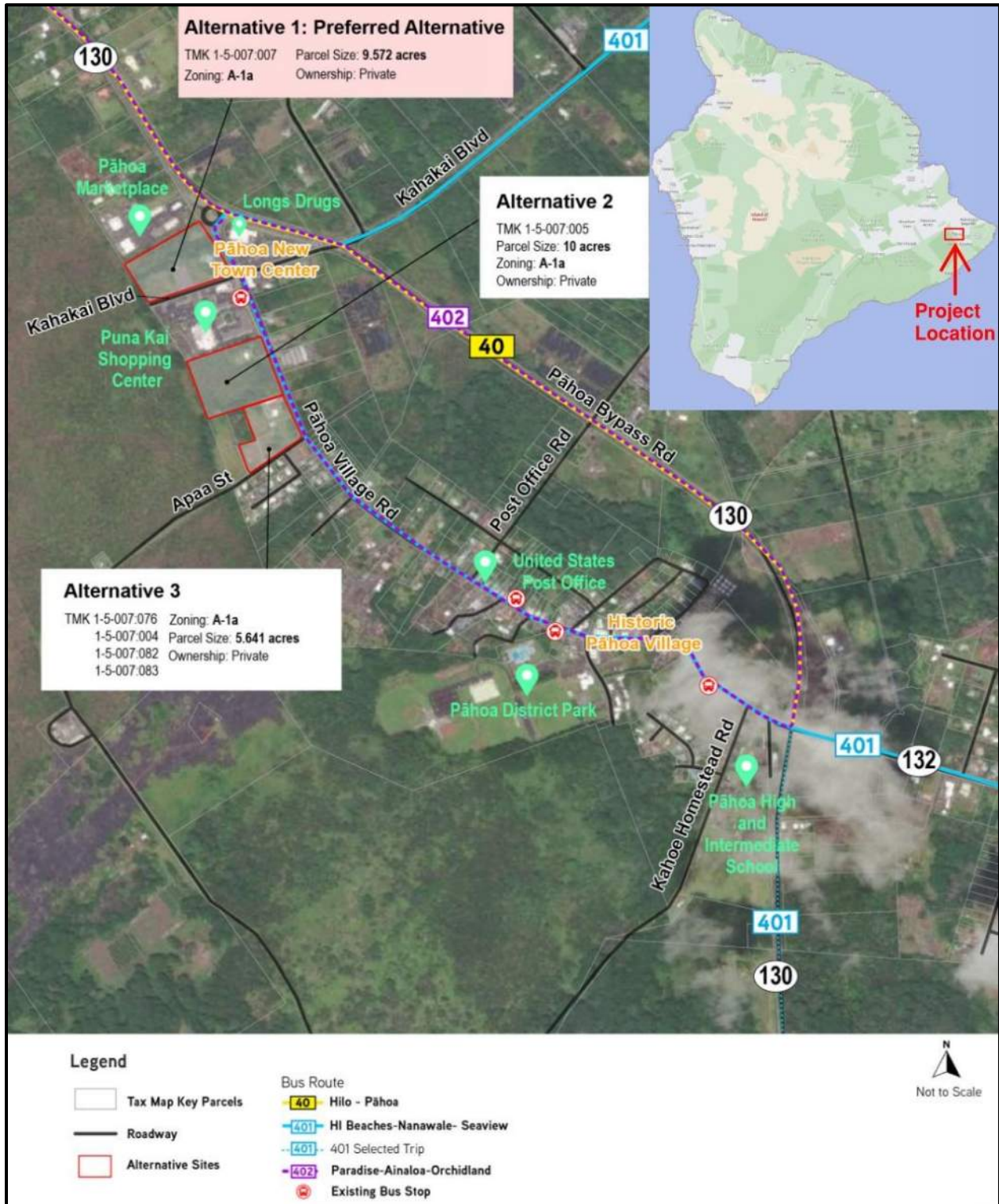


Figure 1: Project Location Map

This traffic impact analysis report (TIAR) analyzed traffic operations and impacts for the AM and PM peak hours in alignment with County Code Section 25-2-46. Analysis was completed for Existing (2023) Conditions, as well as for the Future Without Project, and Future With Project Conditions for periods of five (5), ten (10), and twenty (20) years into the future corresponding to 2028, 2033, and 2043, respectively.

Upon completion of the Environmental Assessment (EA), the project would proceed with the design and permitting followed by construction phases. Future analysis includes anticipated future traffic growth and trips resulting from surrounding area development for Without Project and With Project Conditions. Additionally, trips resulting from the anticipated completion and operation of the proposed development are included in Future (2028) With Project Conditions, given that construction is estimated to conclude by the end of 2027.

The transit hub will include passenger shelters, seating, lighting, and trash receptacles for COH Bus passengers. The transit hub will be designed to provide access for multimodal users (pedestrians and bicyclists), as well as provide off-street parking.

The library is estimated to be 8,000 square-feet (SF) of enclosed, interior space, with an additional 1,000 SF of indoor-outdoor *entry lanai activity area*. The library will provide traditional HSPLS facilities, including multi-purpose rooms, offices, study areas, and lounges. The exterior may include a community garden, courtyard, food truck/concessions, and an outdoor theater/stage area for presentations.

Also being considered for potentially co-locating within the development site are a day care (currently estimated to be 3,800 SF, not inclusive of an outdoor play area) as well as a cultural center (currently estimated to be 3,600 SF, not inclusive of an event lawn space). Various other community amenities including a police sub-station, public restrooms donation drop-offs, ballot drop-boxes, mailboxes, and recycling locations may also be included.

Specific site layouts for each of the three alternatives can be seen in Figures 2-4. Note that the layout of these site plans is conceptual and subject to change heading into design and construction.

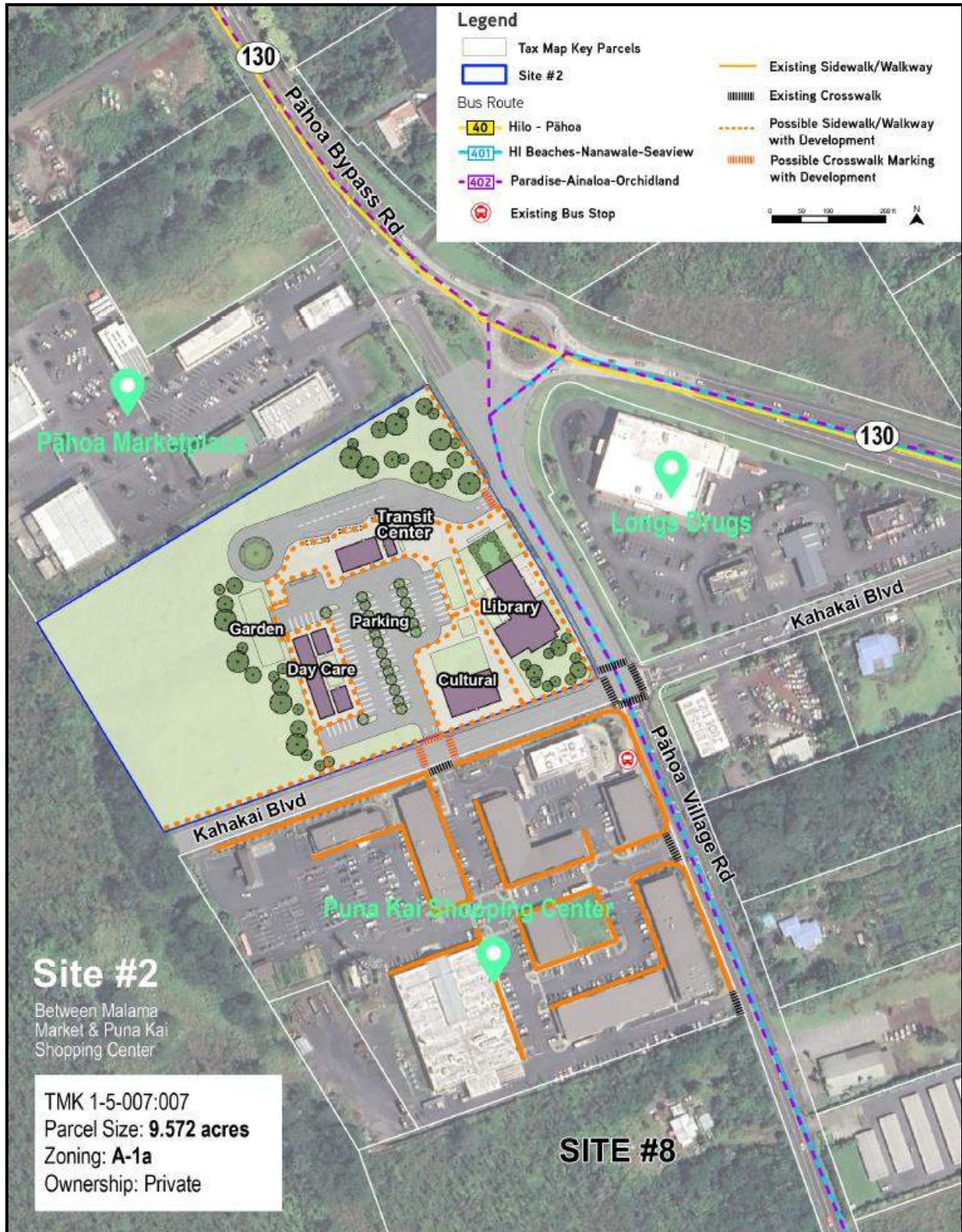
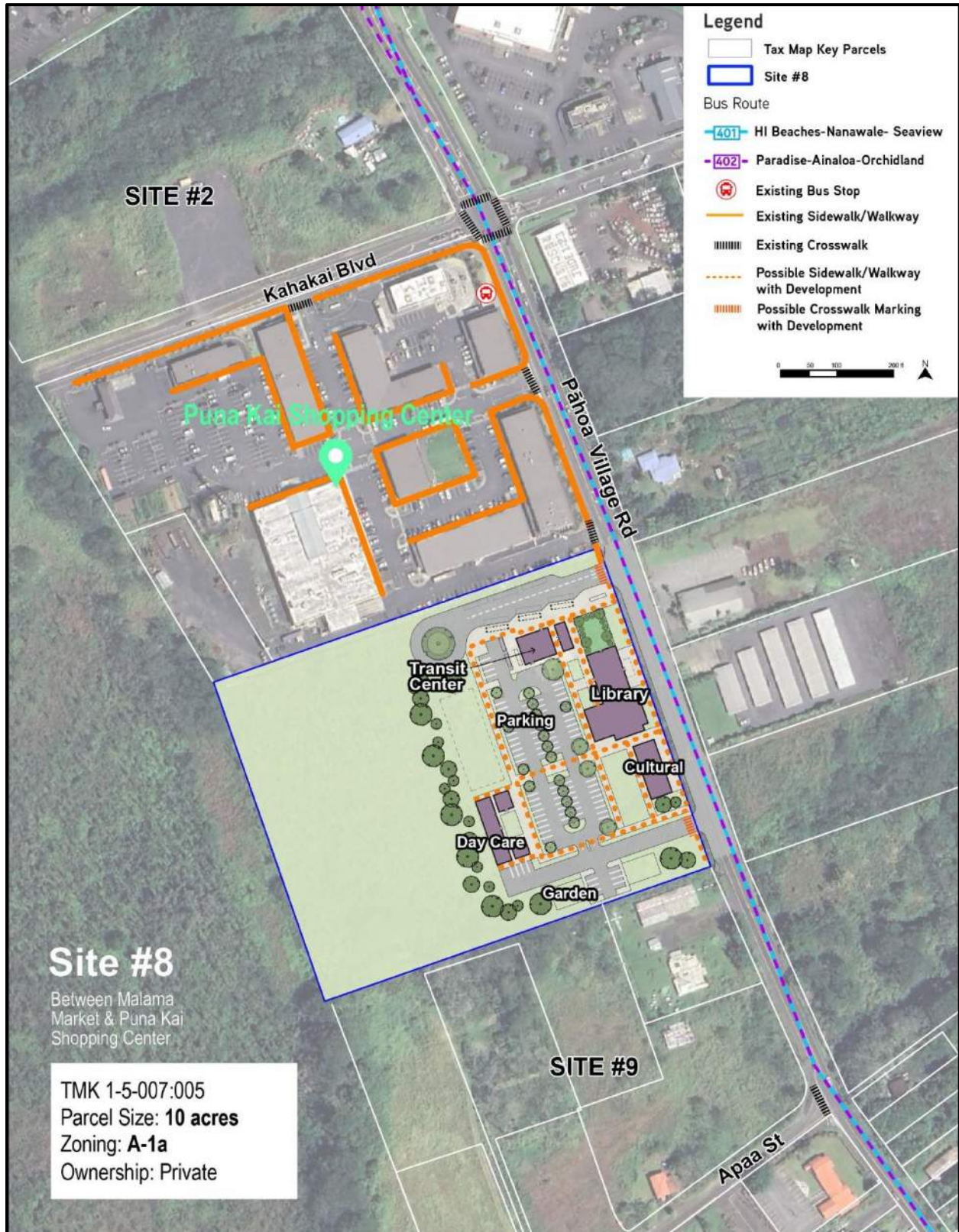


Figure 2: Alternative 1 – Site 2 Layout (Conceptual)



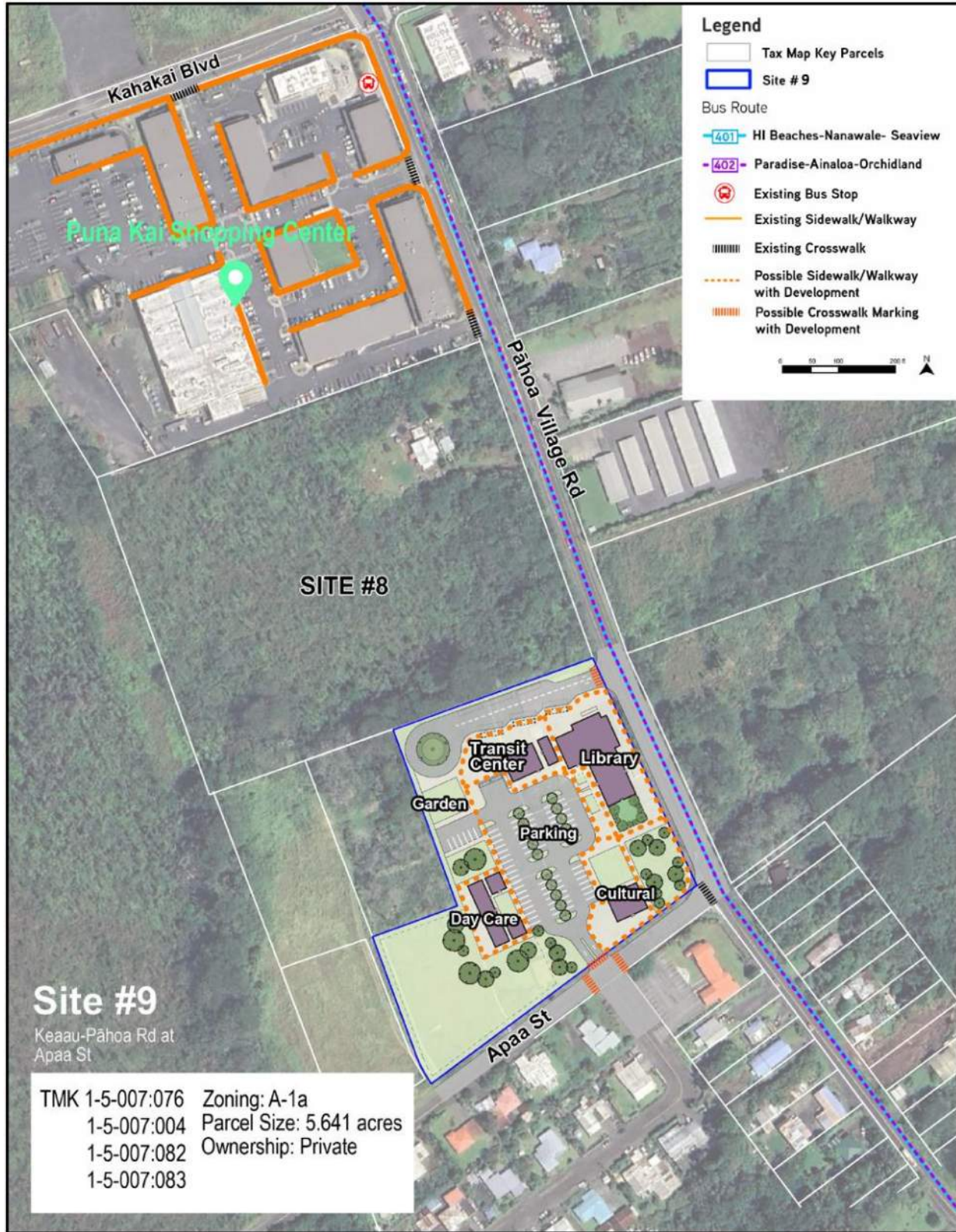


Figure 4: Alternative 3 - Site 9 Layout (Conceptual)

II. EXISTING CONDITIONS

Three alternative site locations are being considered for the proposed development. Surrounding area conditions are as follows:

- **Alternative 1 (Site #2): Preferred Alternative**
 - This site is located at the northwest corner of Pāhoa Village Road and Kahakai Boulevard. The site is located directly between Pāhoa Marketplace and the Puna Kai Shopping Center on private land that is largely undeveloped, except for one single-family residence that has driveway access off Pāhoa Village Road. Future access points for this site could be provided off of Pāhoa Village Road and/or Kahakai Boulevard, which will be discussed in a later section. West of the site is undeveloped land, while various commercial buildings are located to the east of the site (across Pāhoa Village Road).
- **Alternative 2 (Site #8)**
 - This site is located directly south of the Puna Kai Shopping Center along Pāhoa Village Road. The site is located on private land that is largely undeveloped, except for one single-family residence that has driveway access off Pāhoa Village Road. Future access points for this site would need to be provided directly off of Pāhoa Village Road, which will be discussed in a later section. West of the site is undeveloped land, while sections directly to the south and to the east of the site are sparsely developed and rural.
- **Alternative 3 (Site #9)**
 - This site is located at the northwest corner of Pāhoa Village Road and ‘Apa’a Street. The site is located on private land that is largely undeveloped. Future access points for this site could be provided off of Pāhoa Village Road and/or ‘Apa’a Street, which will be discussed in a later section. Sections directly to the north, west, and east of the site are largely undeveloped, while the area immediately south of the site has single-family residences.

A. Geometric Configuration

1. Pāhoa Village Road

Pāhoa Village Road (also referred to as Kea’au-Pāhoa Road), is a COH-owned roadway extending 1.5-miles between the Pāhoa Bypass roundabout in the north and its signalized intersection with the Pāhoa Bypass Road/Pāhoa Kalapana Road and Kapoho Road in the south. The corridor is also referred to as Kea’au-Pāhoa Road, which extends further north of the Pāhoa Bypass roundabout towards Hilo. In the surrounding project area, Pāhoa Village Road has a Federal Highway Association (FHWA) functional classification of a major collector, per the State of Hawai‘i Department of Transportation (HDOT) *Federal-Aid Functional Classification Update* (Federal-Aid Update) (CH2MHill, December 2012).

The corridor is two-way, two-lanes, providing access to major commercial centers such as Pāhoā Marketplace and the Puna Kai Shopping Center in the project area. South of the development is the Historic Pāhoā Village in addition to numerous schools, businesses, and parks. In the surrounding project area, a raised concrete paved sidewalk with curb and gutter exists along the west side of the corridor fronting the Puna Kai Shopping Center, while the east side of the corridor has no curb or gutter. No dedicated bike facilities exist along the corridor, although variable width striped shoulders along the corridor may be used by both bicyclists and pedestrians. Within the study area, parking is not permitted along Pāhoā Village Road. The posted speed limit within the project study area is 30 miles-per-hour (MPH).

2. Kahakai Boulevard

Kahakai Boulevard is a COH-owned roadway extending 6.25-miles between an existing dead-end adjacent to the Puna Kai Shopping Center in the west and its intersection with Welea Street within the Hawaiian Shores Recreational Estates to the east. It does not have a FHWA functional classification per the Federal-Aid Update in the section between the Pāhoā Bypass Road and the existing dead-end adjacent to the Puna Kai Shopping Center. In the project study area, the corridor is two-way, two-lanes, providing access to the Puna Kai Shopping Center, as well as various developments between Pāhoā Village Road and Pāhoā Bypass Road. In the surrounding project area, a paved sidewalk with curb and gutter exists only along the south side of the corridor fronting the Puna Kai Shopping Center. No dedicated bike facilities exist along the corridor, although variable width striped shoulders exist, which may be used by both bicyclists and pedestrians. The corridor currently ends in a stub-out at the western edge of the Puna Kai Shopping Center, allowing for it to be extended further west in the future. Within the study area, parking is not permitted along Kahakai Boulevard. No speed limit is posted along the corridor within the study area.

3. 'Apa'a Street

'Apa'a Street is a COH-owned roadway extending 0.5-miles between Pāhoā Village Road and curves south to become Cemetery Road. It does not have a FHWA functional classification per the Federal-Aid Update. The corridor is two-way, two-lanes, and provides access to Lā'au Way and various single-family residences. The majority of the corridor is largely undeveloped on both sides. No paved sidewalk or bike facilities exist along the corridor, nor are paved or marked shoulders. Parking is not explicitly prohibited through signage along the corridor, although due to its rural nature, it is not prevalent. No speed limit is posted along the corridor within the study area.

4. Pāhoā Bypass Road

Pāhoā Bypass Road (also referred to as State Route 130), is a State-owned roadway extending 1.5-miles between its intersection with Pāhoā Village Road at the roundabout in the north, to its

intersection with Pāhoa Village Road/Kapoho Road in the south, at which point it becomes Pāhoa Kalapana Road. Per FHWA, its functional classification is a small urban minor arterial. It provides an alternative route for vehicles to bypass traffic and developments within Pāhoa town. It is a two-way, two-lane corridor, with limited development on either side. No paved sidewalk, curb and gutter, or bike facilities exist along the corridor. Paved and marked shoulders exist along both sides of the corridor. The posted speed limit within the project study area is 45 MPH.

B. Study Intersections

In the surrounding project area, five study intersections were analyzed, as shown in Figure 5. Existing multimodal facilities are shown in the three conceptual site plans in Figures 2-4, including existing sidewalks and bus stops. Existing intersection lane configurations are shown in Figure 6.

1. Pāhoa Village Road & Pāhoa Bypass Road

The intersection of Pāhoa Village Road and Pāhoa Bypass Road is a three-legged, single-lane roundabout. Pāhoa Village Road is the southern leg (northbound approach) of the roundabout, connecting with Pāhoa town's primary core. Pāhoa Bypass Road bends to form the northern and eastern legs of the roundabout (southbound approach and westbound approach, respectively) providing a bypass of Pāhoa town. There is no western leg of the roundabout. All legs of the roundabout are single-lane, with no right-turn bypass lanes. There is a driveway from the Pāhoa Marketplace onto southbound Pāhoa Bypass Road on the north leg of Pāhoa Bypass Road, offset approximately 150-feet from the edge of the roundabout. Vehicles can only turn right (southbound) onto Pāhoa Bypass Road from this driveway. Drivers exiting Pāhoa Marketplace and using this access point are only allowed to turn right onto Pāhoa Bypass Road, heading south towards the roundabout. Additionally, a driveway from southbound Pāhoa Bypass Road into the Pāhoa Marketplace is located approximately 325-feet from the edge of the roundabout. No turns from the Pāhoa Marketplace onto southbound Pāhoa Bypass Road are allowed. No direct access to the Pāhoa Marketplace is provided for vehicles originating on the southern leg of Pāhoa Village Road (coming from Pāhoa town) or on the eastern leg of Pāhoa Bypass Road. As such, drivers must exit the roundabout heading southbound back towards Pāhoa town before turning right onto the Pāhoa Village frontage road, which provides access into/out of Pāhoa Marketplace. For clarity, these movements are summarized in Figure 7.

Marked crosswalks exist on the outside edge of the roundabout across all three legs. Splitter islands provide pedestrian refuge across all three crossings. All crossings provide curb ramps, both from the sidewalk and within the splitter islands. Paved sidewalks with curb and gutter exist along all sides of the perimeter of the roundabout. A mountable truck apron is present within the center island of the roundabout to accommodate heavy vehicle turning movements. No dedicated bike facilities exist at the roundabout.

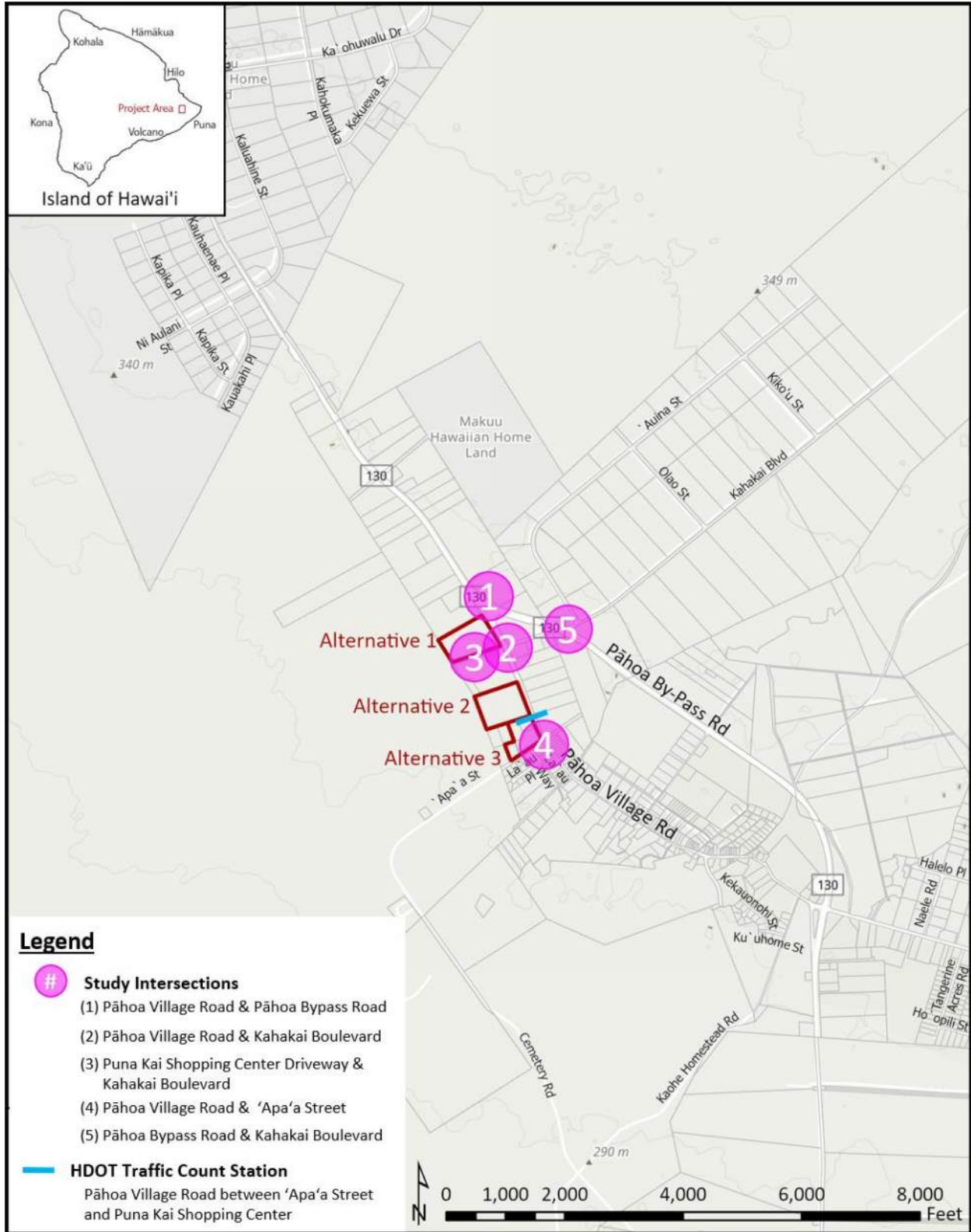


Figure 5: Study Intersections and HDOT Tube Count Station

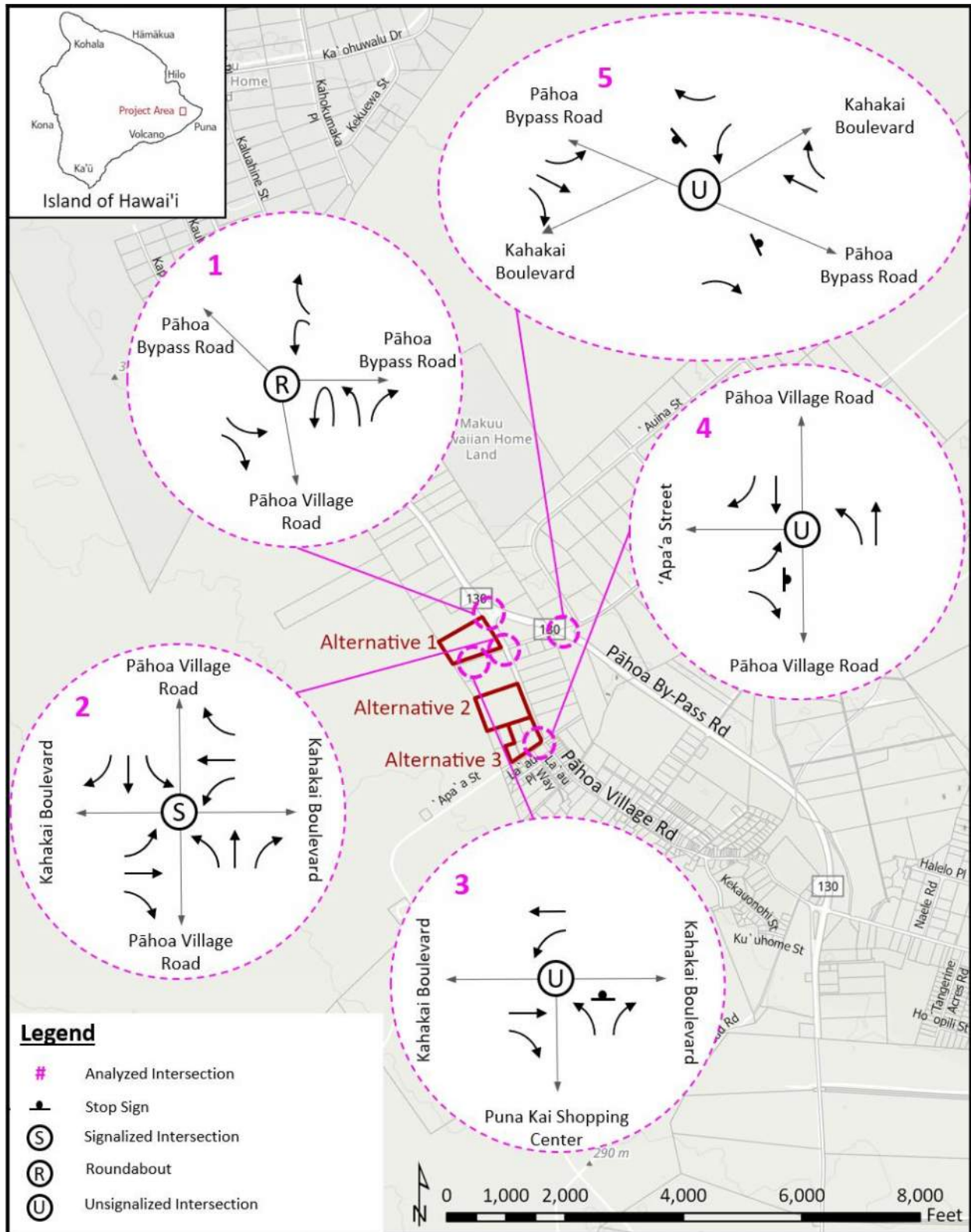


Figure 6: Existing Intersection Lane Configurations

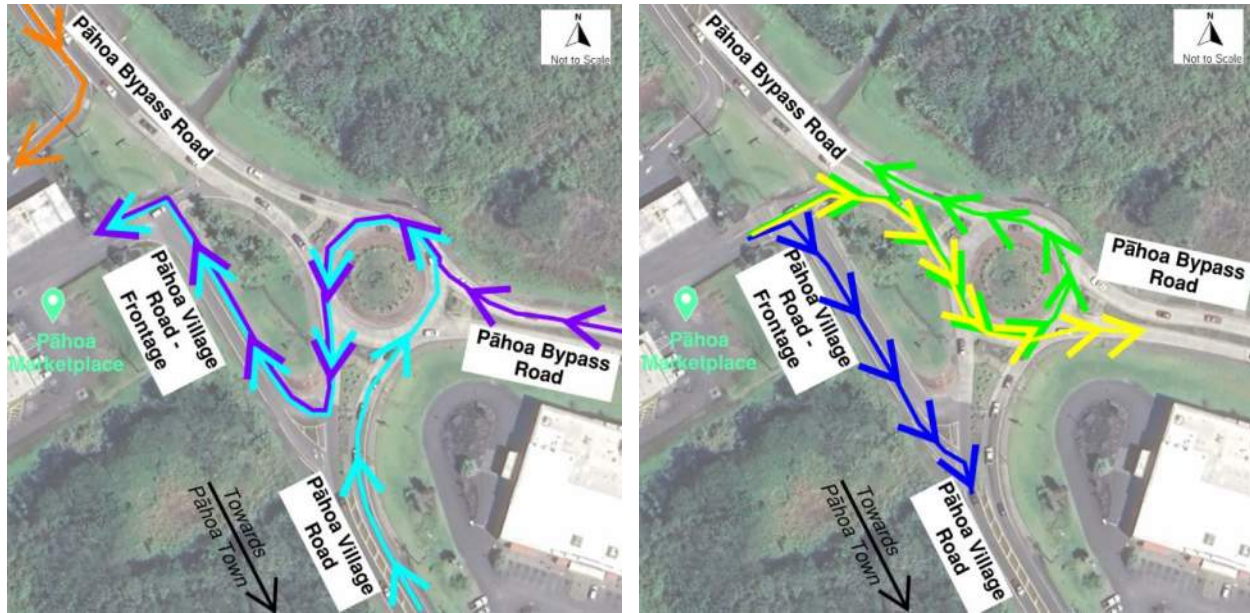


Figure 7: Pāhoa Marketplace Access & Egress

2. Pāhoa Village Road & Kahakai Boulevard

The intersection of Pāhoa Village Road and Kahakai Boulevard is four-legged and signalized. Pāhoa Village Road is aligned in the north-south direction while Kahakai Boulevard is aligned in the east-west direction. Dedicated left-turn lanes are provided on all legs of the intersection while a dedicated right-turn lane is also provided on the north leg of Pāhoa Village Road. All other legs provide a shared through-right lane. All left-turn movements are protected-permitted. There are marked crosswalks on all legs of the intersection, extending west along Kahakai Boulevard and extending south along Pāhoa Village Road. Similarly, a curb ramp exists only in the southwest corner of the intersection. All other corners of the intersection have a paved and striped shoulder, but no physical protection for pedestrians. No dedicated bike facilities exist at the intersection. The intersection's traffic signal controller timing was observed to be fully-actuated, with phase lengths varying during each cycle depending on vehicular demand.

3. Puna Kai Shopping Center Driveway & Kahakai Boulevard

The intersection of Puna Kai Shopping Center Driveway and Kahakai Boulevard is three-legged with stop-control provided along the southern leg of the intersection at the Puna Kai Shopping Center Driveway. A dedicated left-turn lane is provided in the westbound direction of Kahakai Boulevard, along with a through lane, while a shared through-right lane is provided in the eastbound direction. Varying width striped shoulders exist along both sides of Kahakai Boulevard. Separated left- and right-turn lanes are provided in the northbound direction at the Puna Kai Shopping Center Driveway. There are no marked crosswalks at the intersection, nor are there any dedicated bike facilities. A paved sidewalk with curb and gutter exists along the south side of

Kahakai Boulevard at the intersection, with curb ramps at the Puna Kai Shopping Center Driveway. The north side of Kahakai Boulevard has no curb or gutter.

4. Pāhoa Village Road & 'Apa'a Street

The intersection of Pāhoa Village Road and 'Apa'a Street is three-legged with stop-control provided along the western leg of the intersection at 'Apa'a Street. No dedicated left- or right-turn lanes are provided at the intersection and all approaches are single-lanes. A crosswalk is only marked along the western leg of the intersection. No raised sidewalks, curb and gutter, or curb ramps are present at the intersection. Varying width marked shoulders are present along both sides of Pāhoa Village Road. No dedicated bike facilities are present at the intersection.

5. Pāhoa Bypass Road & Kahakai Boulevard

The intersection of Pāhoa Village Road and Kahakai Boulevard is four-legged, two-way stop controlled (TWSC), with stop-control provided along the Kahakai Boulevard western and eastern legs. Pāhoa Bypass Road is aligned in the north-south direction, while Kahakai Boulevard is aligned in the east-west direction. The intersection is skewed, with the western leg of the intersection approximately 125-foot offset to the north of the eastern leg. Dedicated right-turn lanes are provided along all legs of the intersection. The southbound Pāhoa Bypass Road and westbound Kahakai Boulevard dedicated right-turn lanes are both free-flow, uncontrolled movements, with an acceleration lane provided for the westbound Kahakai Boulevard dedicated right-turn lane onto northbound Pāhoa Bypass Road. The northbound Pāhoa Bypass Road dedicated right-turn lane is yield controlled, having to yield to southbound left-turning vehicles from Pāhoa Bypass Road. The eastbound Kahakai Boulevard dedicated right-turn lane is stop-controlled. Dedicated left-turn lanes are provided in the northbound Pāhoa Bypass Road and westbound Kahakai Boulevard directions, with an acceleration lane provided for westbound Kahakai Boulevard left-turning vehicles onto southbound Pāhoa Bypass Road. Additionally, a stop-controlled U-turn slip lane is provided in the eastbound direction of Kahakai Boulevard prior to the intersection. A layout of the intersection can be seen in Figure 8. No marked crosswalks, sidewalks, curb and gutter, curb ramps, or dedicated bike facilities are present at the intersection.

The following movements are restricted at the intersection:

- Northbound Pāhoa Bypass Road left-turn onto Kahakai Boulevard
- Eastbound Kahakai Boulevard left-turn onto Pāhoa Bypass Road
- Eastbound Kahakai Boulevard through-movement
- Westbound Kahakai Boulevard through-movement

However, these illegal turning movements were observed numerous times during traffic data collection, which will be expanded upon in a later section.

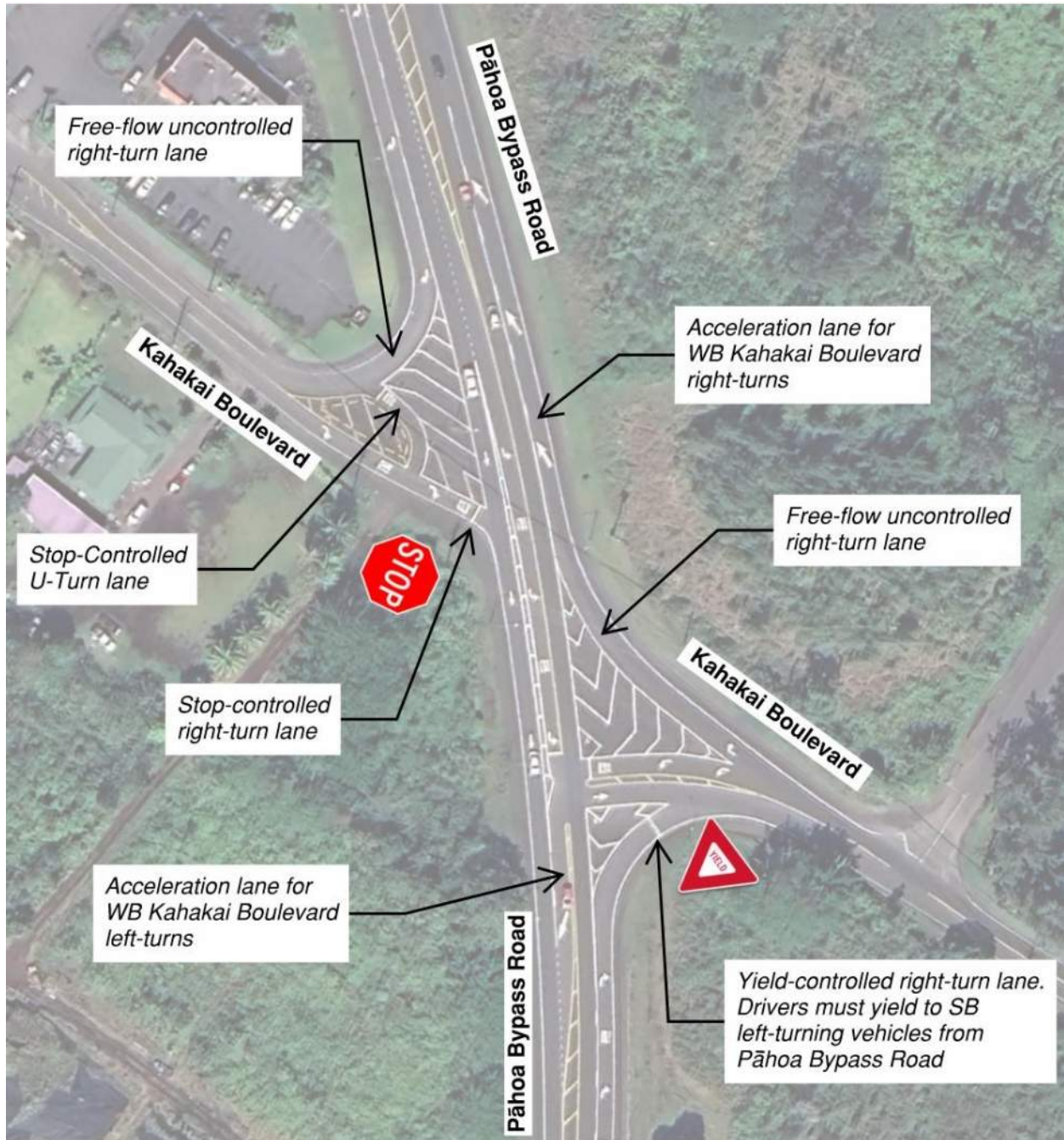


Figure 8: Pāhoā Bypass Road & Kahakai Boulevard Geometric Configuration

C. Transit Facilities

The COH operates the *Hele-On Bus (COH Bus)* throughout the island, of which three routes operate within Pāhoa – Routes 40 (Hilo – Pāhoa), 401 (Hawai‘i Beaches – Nanawale – Seaview), and 402 (Paradise – Ainaloa – Orchidland). COH Bus routes are shown in Figure 1. More detailed bus routes and timetables are included in Appendix A. Route 40 is the primary route to Downtown Hilo, at which point 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.

Currently, the closest COH Bus stops are located on both sides of the street along the southern leg of the Pāhoa Village Road and Kahakai Boulevard intersection, fronting the Puna Kai Shopping Center. The COH Bus stop in the southeast-bound direction along Pāhoa Village Road (Stop ID 968) has a concrete bus pullout outside of the general travel lanes, and a passenger shelter with seating, lighting, and trash receptacles setback from the raised concrete sidewalk (see Figure 9). The COH Bus stop in the northwest-bound direction along Pāhoa Village Road (Stop ID 981) is within a striped and paved shoulder, outside of the general travel lanes, and has a passenger shelter with seating and trash receptacles (see Figure 10).

These existing COH Bus stops will be relocated internal to the Pāhoa Transit Hub with this proposed development.

All three bus routes travel southeast-bound along Pāhoa Village Road from the Pāhoa Village Road and Pāhoa Bypass Road roundabout, stopping at Stop ID 968. However, only Route 401 travels northwest-bound back toward the roundabout, stopping at Stop ID 981, while the other two routes travel along Pāhoa Bypass Road. Various buses operate at the stops between 5:30AM through 9:30PM each day. Each bus route operates once every hour.



Figure 9: Stop ID 968 – Southeast-bound fronting Puna Kai Shopping Center



Figure 10: Stop ID 981 – Northwest-bound fronting Puna Kai Shopping Center

D. Multimodal Circulation

As of the 2020 census, Pāhoa town had a population of 924 and is located within the greater planning district of Puna (population 51,704 as of 2020), which has been noted as the fastest-growing district within Hawai'i over the last decade. Pāhoa town is largely defined between the limits of the Pāhoa Bypass Road and Pāhoa Village Road roundabout in the north, and the Pāhoa Bypass Road and Pāhoa Village Road/Kapoho Road signalized intersection in the south. The majority of Pāhoa town can be accessed directly off of Pāhoa Village Road, an FHWA major collector. The Historic Pāhoa Village, home to numerous small commercial stores, restaurants, and businesses, is located within the southern portion of these limits, closest to the Pāhoa Bypass Road and Pāhoa Village Road/Kapoho Road signalized intersection in the south, as seen in Figure 1. Additionally, the majority of residents live within this portion of Pāhoa, south of 'Apa'a Street. The Pāhoa Regional Town Center, home to numerous larger commercial complexes, including the Pāhoa Marketplace and recently developed Puna Kai Shopping Center, is located within the northern portion of these limits, closest to the Pāhoa Bypass Road and Pāhoa Village Road roundabout in the north.

There are minimal multimodal facilities between the Historic Pāhoa Village in the south and the Pāhoa Regional Town Center in the north. Sidewalks and bikeable shoulders are limited, resulting in unfavorable conditions for pedestrians and people on bikes.

The Puna Kai Shopping Center was recently constructed with the first batch of businesses opening in 2020. As part of the development, the intersection of Pāhoa Village Road and Kahakai Boulevard was reconstructed, and paved sidewalks were constructed along the portions of Pāhoa Village Road and Kahakai Boulevard fronting the development. The aforementioned transit facilities along Pāhoa Village Road fronting the development were put in where previously no stops were provided. Internal to the development, a compact "block structure" was used, connecting to the adjacent corridors of Pāhoa Village Road and Kahakai Boulevard, providing optimal circulation for all modes. Internal crosswalks were marked to guide pedestrians throughout the development, while the newly constructed sidewalks along the adjacent corridors interconnected with internal sidewalks within the development. Additionally, crosswalks were marked at the reconstructed intersection of Pāhoa Village Road and Kahakai Boulevard. These crosswalks provide a potential connection for pedestrians between the Puna Kai Shopping Center and the various commercial businesses located at the northeast corner of the intersection, albeit one that lacks appropriate and safe multimodal facilities outside of the area directly fronting the Puna Kai Shopping Center. Additionally, at this time there is no direct connection for any users between the Puna Kai Shopping Center and Pāhoa Marketplace. Figure 11 shows the internal multimodal circulation provided within the Puna Kai Shopping Center. Many of these features are desired with the proposed Pāhoa Transit Hub development, with the goal of providing multimodal circulation between the two.



Figure 11: Puna Kai Shopping Center Circulation

E. Vehicle Volumes

1. 24-Hour Volume

Historic HDOT annual average daily traffic counts (AADT) were available on Pāhoā Village Road north of ‘Apa’a Street, south of the Puna Kai Shopping Center development, as shown in Figure 5. Volumes were available between 2016-2022, with the exception of 2017-2018, when data was missing. Additionally, 24-hour, two-directional counts were collected on Wednesday, May 17th, 2023, at the same location. Appendix B includes the detailed historical HDOT traffic data and the 2023 24-hour tube count results. A summary of the volumes is shown in Table 1.

Table 1: Pāhoā Village Road 24-Hour Historical Volumes

Year	Historical HDOT AADT
2016	7,600
2017	<i>Not Available</i>
2018	<i>Not Available</i>
2019	7,500
2020*	6,300
2021	8,300
2022	8,300
2023**	9,054
*Collected during Covid-19 Pandemic	
**Non-HDOT 24-Hour Counts	

As seen in Table 1, volumes increased between 2016 and 2019, before dropping in 2020 due to traffic related impacts of the Covid-19 pandemic. Volumes continued increasing in 2021 and were even higher at 9,054 vehicles per the 2023 24-hour tube count. Hourly volume distributions between 2021 – 2023 can be seen in Figure 12.

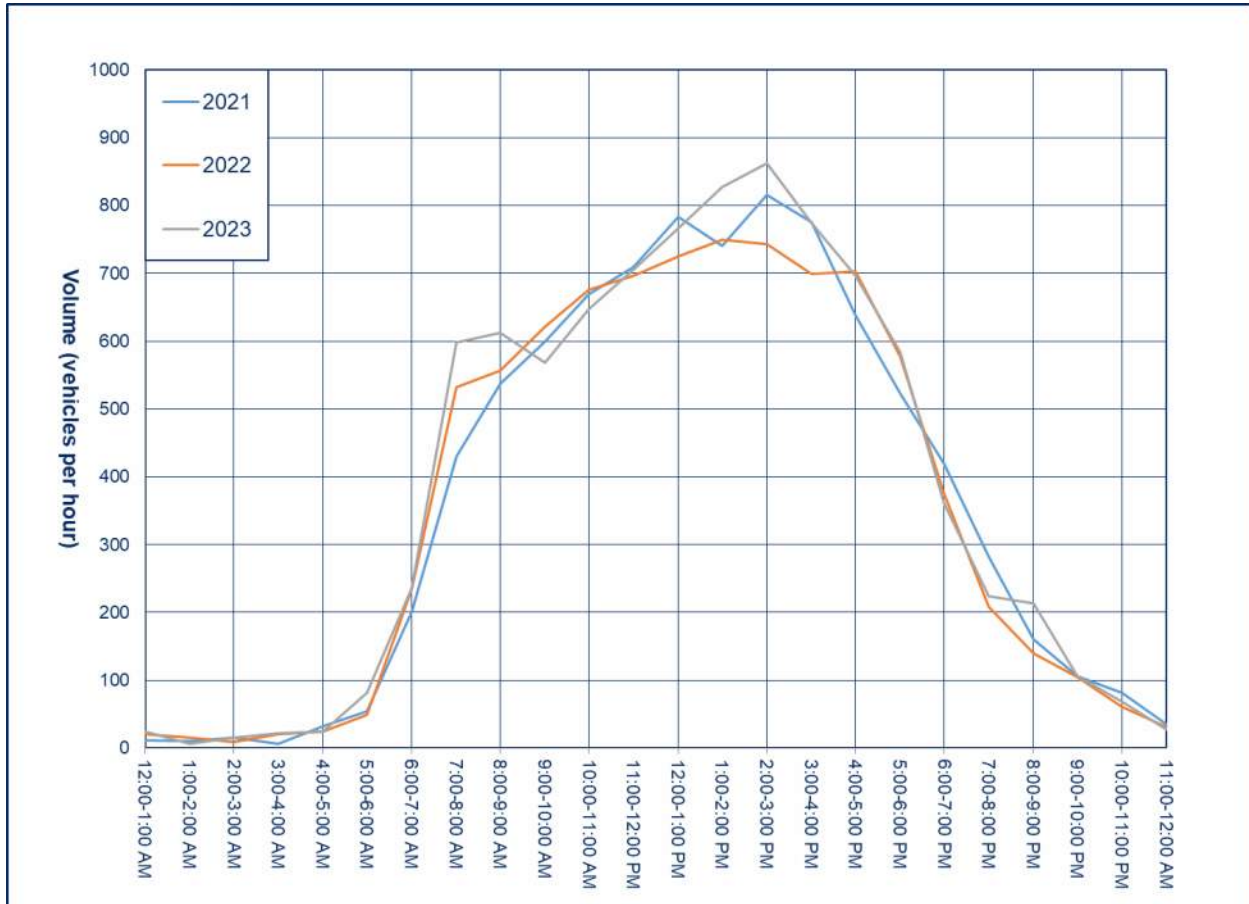


Figure 12: Pāhoā Village Road 24-Hour Volume Historical Distribution

As seen in Figure 12, hourly traffic distributions remained fairly consistent between 2021 – 2023. Unlike a roadway corridor with separate AM and PM commuter peak hours, traffic volumes along Pāhoā Village Road tended to continuously increase throughout the morning into the early afternoon, peaking between 3:00PM – 4:00PM, before decreasing throughout the rest of the day. Midday traffic volumes around 12:00PM were historically higher than AM peak hour volumes. This indicates that Pāhoā Village Road may not primarily serve traditional commuter traffic and may instead primarily serve as access for businesses along the corridor which have greater trip attractions during the afternoon.

2. Intersection Peak Turning Movement Counts

Turning movement counts were taken at the five study intersections on Wednesday, May 17th, 2023, between 7:00AM – 9:00AM and between 3:00PM – 5:00PM. The AM and PM peak hours

occurred between 7:15AM – 8:15AM and 3:00PM – 4:00PM, respectively. Appendix B includes the raw traffic count data at the study intersections. Figure 13 shows the AM and PM peak hour volumes at the study intersections.

At the intersection of Pāhoa Bypass Road and Kahakai Boulevard, various illegal turning movements were observed during traffic count collection, including:

- Illegal Northbound Pāhoa Bypass Road left-turn onto Kahakai Boulevard
- Illegal Eastbound Kahakai Boulevard left-turn onto Pāhoa Bypass Road
- Illegal Eastbound Kahakai Boulevard through-movement
- Illegal Westbound Kahakai Boulevard through-movement

The most prevalent illegal turning movement was an eastbound through-movement along Kahakai Boulevard, cutting through the existing hatched buffer. All other illegal turning movements occurred infrequently. For sake of traffic analysis, only the illegal eastbound through-movement volumes will be included due to their prevalence. A summary of the various illegal turning movements along with visual depictions of these violations can be seen in Figure 14.

3. Pedestrian and Bicycle Volumes

Peak hour intersection pedestrian and bicycle volumes were collected at the existing study intersections on Wednesday, May 17th, 2023, between 7:00AM – 9:00AM and between 3:00PM – 5:00PM. Pedestrian and bike volumes were minimal throughout all analyzed peaks. Pedestrian volumes were highest at the Pāhoa Village Road and Kahakai Boulevard intersection, adjacent to the Puna Kai Shopping Center and COH bus stops. Pedestrian and bicyclist volumes were minimal elsewhere. Table 2 shows a summary of pedestrian and bicycle counts during the vehicular peak hours. Volumes represent the total multimodal volume at the intersection for each given mode.

Table 2: Peak Hour Pedestrian and Bicycle Volumes

Intersection	Pedestrian		Bicycle	
	AM Peak	PM Peak	AM Peak	PM Peak
Pāhoa Village Road & Pāhoa Bypass Road	0	0	0	1
Pāhoa Village Road & Kahakai Boulevard	12	14	2	2
Puna Kai Shopping Center Driveway & Kahakai Boulevard	2	0	0	1
Pāhoa Village Road & 'Apa'a Street	4	5	1	1
Pāhoa Bypass Road & Kahakai Boulevard	0	0	0	0

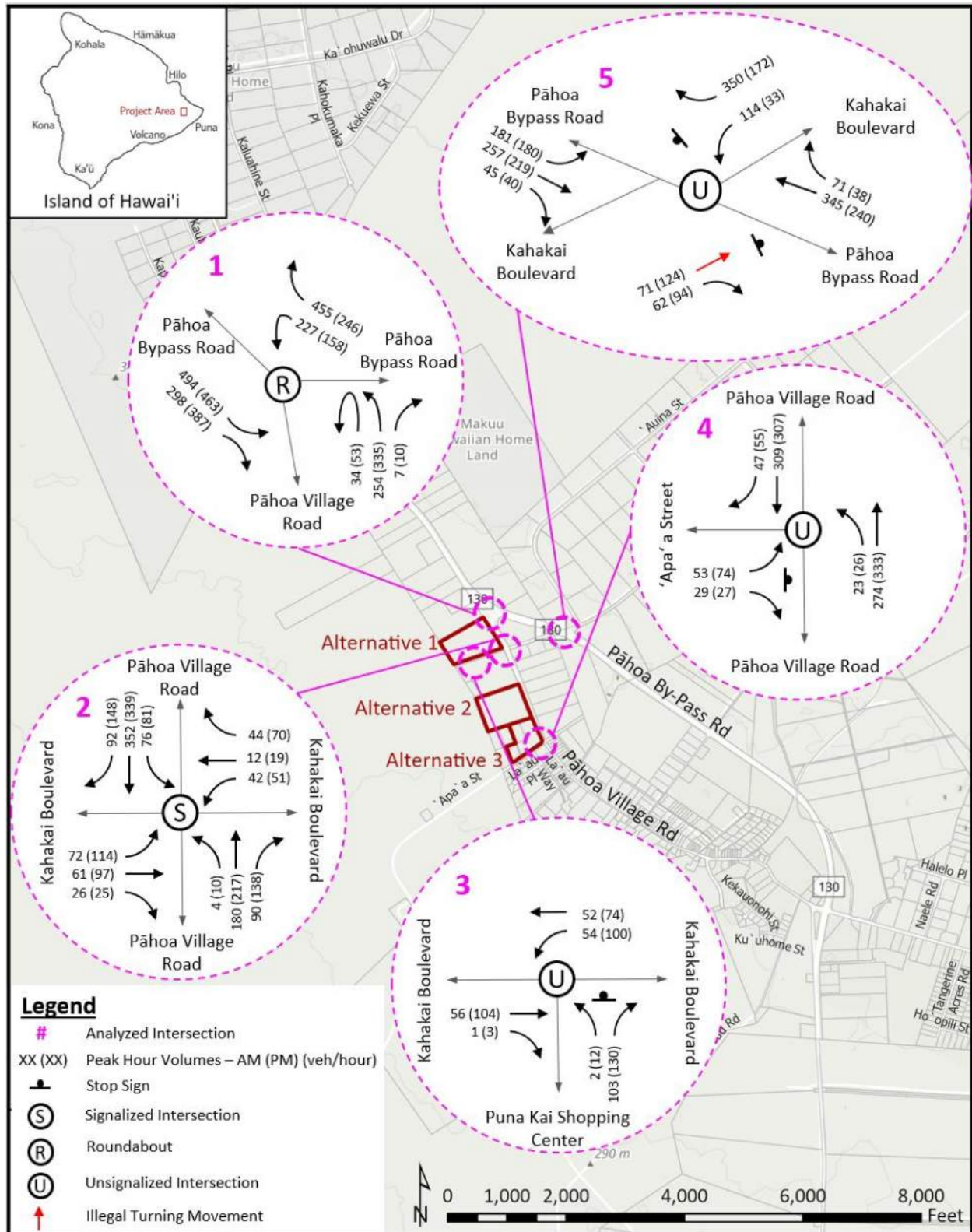


Figure 13: Existing (2023) Intersection Peak Hour Volumes

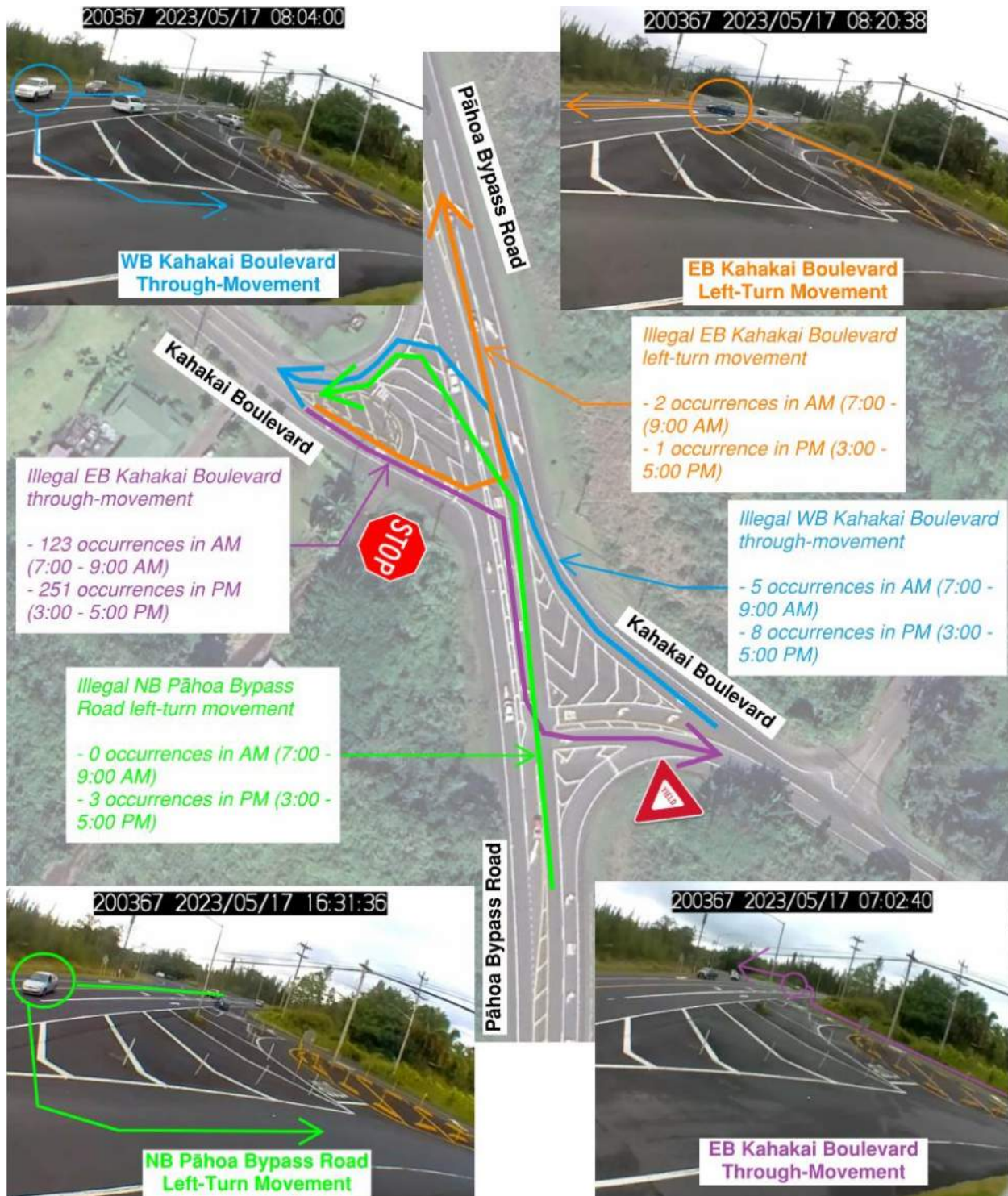


Figure 14: Pāhoā Bypass Road and Kahakai Boulevard Illegal Turning Movements

F. 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 11.0 traffic analysis software.

As stated in the *HCM6* (TRB, 2016), LOS for an all-way stop controlled (AWSC) and a two-way stop controlled (TWSC) intersection is determined by the measured control delay (see Table 3). Delay at an AWSC intersection is defined for the intersection as a whole and for each movement. 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. As stated in the *HCM6* (TRB, 2016), roundabouts share the same control delay thresholds as AWSC and TWSC intersections.

Table 3: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	≤ 1.0	> 1.0
≤ 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

Source: HCM6 (TRB, 2016)

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 4. 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 4: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	≤ 1.0	> 1.0
≤ 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

Source: HCM6 (TRB, 2016)

At the intersection of Pāhoa Bypass Road and Kahakai Boulevard, *SimTraffic* software was used to model westbound left-turns, which more accurately compared to what was observed during data collection than results provided by Synchro 11.0.

Note that due to the skew of the Pāhoa Bypass Road and Kahakai Boulevard intersection, the illegal eastbound through-movement along Kahakai Boulevard was modeled in Synchro 11.0 as a two-part turn: (1) an eastbound right-turn onto Pāhoa Bypass Road, followed by (2) a southbound left-turn onto Kahakai Boulevard.

2. Existing Intersection LOS Results

Existing LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 5 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in yellow. Synchro reports for the Existing (2023) Conditions can be found in Appendix C.

Existing LOS and delay (in seconds per vehicle) for all intersections and movements was an appropriate LOS D or better and $v/c < 1.0$ during the AM and PM peak hours, with the exception of the following:

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 42.8 seconds/vehicle and LOS E using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. Videos recorded during traffic data collection did not corroborate this significant of a delay along this approach. It was observed that queuing in the westbound left-turning direction typically did not exceed three vehicles, and most vehicles cleared in under twenty seconds, even during the peak hour. Given the AM peak hour volume for this turning movement (114 vehicles) a 42.8 second delay per vehicle is not realistic, as that would result in only approximately 84 vehicles being able to complete this movement in an hour. Additionally, it was observed that some Pāhoa Bypass Road southbound left-turning drivers would stop and motion Kahakai Boulevard westbound left-turning drivers to proceed if there was an opening in the northbound Pāhoa Bypass Road direction, even though Pāhoa Bypass Road drivers had right-of-way over Kahakai Boulevard drivers. As such, no mitigation will be considered at this time. However, for sake of future analysis, the following section will discuss traffic signal warrants related to the intersection.

Table 5: Existing (2023) Automobile LOS

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	25.0	-	D	19.0	-	C
Pāhoa Village Road NB	11.0	0.45	B	12.0	0.55	B
Pāhoa Bypass Road SB	28.0	0.88	D	25.0	0.87	D
Pāhoa Bypass Road WB	28.0	0.87	D	12.0	0.54	B
Pāhoa Village Road & Kahakai Boulevard	15.0	-	B	17.1	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	9.2	0.01	A	11.0	0.02	B
Pāhoa Village Road NB Through-Right	12.9	0.42	B	16.6	0.50	B
Pāhoa Village Road SB Left	8.0	0.16	A	10.4	0.19	B
Pāhoa Village Road SB Through	11.0	0.45	B	13.4	0.44	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		A	Uncontrolled		A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.6	0.00	B	12.6	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	17.7	0.32	C	21.1	0.38	C
Pāhoa Village Road NB Left-Through	8.2	0.03	A	8.3	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	11.6	0.24	B	12.1	0.35	B
Kahakai Boulevard WB Left*	42.8	-	E	20.6	-	C
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road NB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Left	9.6	0.29	A	8.8	0.26	A
Pāhoa Bypass Road SB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Right	Free-Flow Slip		A	Free-Flow Slip		A

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

It should be noted that at the Pāhoa Bypass Road and Pāhoa Village Road roundabout, both the Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches exceeded a v/c ratio of 0.85 in the AM peak hour, although they maintained LOS D. This indicates that these

approach legs are approaching capacity. These two legs represented the highest volume approach legs at the intersection. Videos recorded during traffic data collection corroborated the delay on both the Pāhoa Bypass Road southbound and westbound approaches. However, this delay was generally concentrated within a short 30-minute segment between 7:45AM – 8:45AM. Within that period, traffic flowed at minimal speeds approaching the roundabout; however, it generally never resulted in complete standstill, nor was queuing through the roundabout observed. Outside of this concentrated period, even with the AM peak hour, all approaches to the roundabout visually operated with negligible delay. It should be noted that similar delay was observed for the Pāhoa Bypass Road southbound approach for a short 30-minute segment within the PM peak hour around 3:00PM – 3:30PM; however, likewise this cleared outside of that period, and overall resulted in LOS D (v/c ratio of 0.87) for this southbound approach during the PM peak hour.

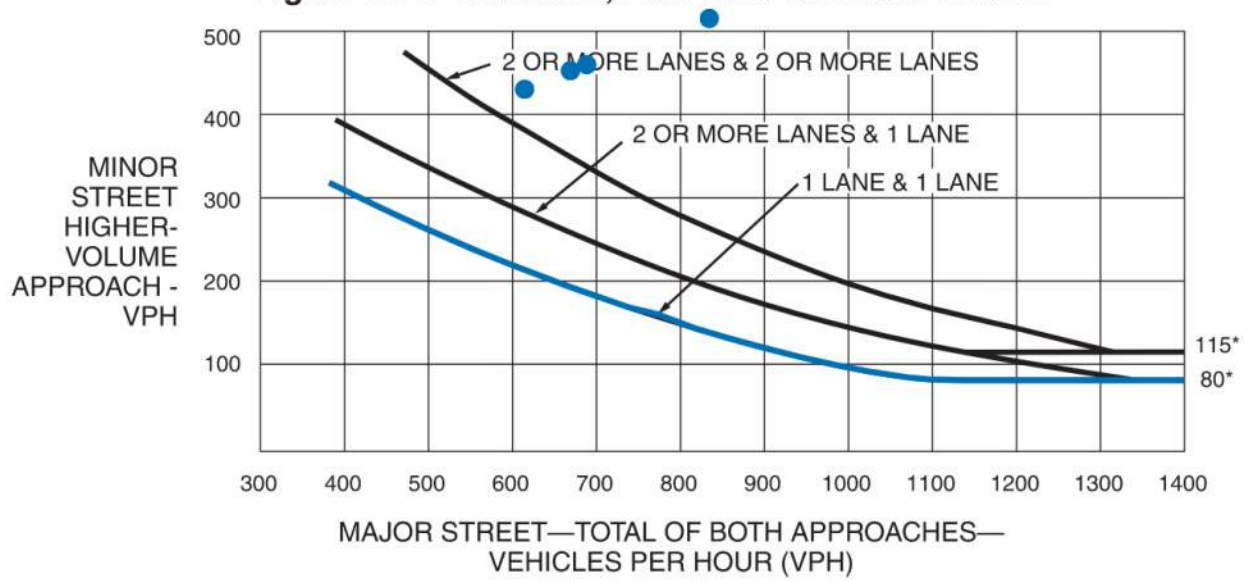
(a) MUTCD Traffic Signal Warrant

Although no mitigation will be considered at this time for the intersection of Pāhoa Bypass Road and Kahakai Boulevard, the *Manual on Uniform Traffic Control Devices (MUTCD)* (FHWA, 2023) was used to perform a traffic signal warrant analysis at the intersection, which may be used as reference for future warrants.

Traffic Signal Warrant 2 (Four-Hour Vehicle Volume) was considered based on the four-hours of peak hour intersection turning movement volumes, collected on Wednesday, May 17th, 2023, between 7:00AM – 9:00AM and between 3:00PM – 5:00PM. To satisfy this warrant and merit the consideration of installing a traffic control signal, volume thresholds must fall above the applicable curve for any four hours throughout the day, as shown in Figure 15. For sake of this analysis, the “1 Lane & 1 Lane” curve was used, representing the through-lane configuration along each movement. Hourly volumes between 7:00 – 8:00 AM, 8:00 – 9:00 AM, 3:00 – 4:00 PM, and 4:00 – 5:00 PM were plotted on Figure 15. All volumes surpassed the appropriate threshold (note that all volumes would surpass even the highest threshold – “2 Or More Lanes & 2 Or More Lanes”).

At this time, no further mitigation at the intersection will be considered for reasons aforementioned. However, given that the intersection passes a traffic signal warrant for Existing (2023) Conditions, it will continue to pass for all Future With and Without Conditions scenarios, if warranted by factors including LOS and delay.

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 15: Four-Hour Signal Warrant – Pāhoa Bypass Road and Kahakai Boulevard

IV. Future Without Project Conditions

A. Upcoming Planned Project

1. STIP

Research was completed on July 13th, 2023, at the Statewide Transportation Improvements Program (STIP) FY 2022-2025 website. The STIP is a four-year forecast that identifies state and county transportation projects to be funded with Federal Highway and Federal transit funds. The following projects were listed within the development area:

- *HS17 – Keaau-Pāhoa Road (Route 130) Improvements between Keaau Bypass to Pāhoa-Kapoho Road*
 - Improvements to traffic circulation and safety along Route 130

No specific improvements were listed along Keaau-Pāhoa Road (Pāhoa Bypass Road). As a result, no changes to the corridor will be modeled in Future Without and Future With Project scenarios.

2. ERP (Previously OEQC)

Research was completed on July 13th, 2023, at the State of Hawaii *Environmental Review Program* (ERP) website, which as of July 2021 took the place of the former *Office of Environmental Quality Control* (OEQC) website. The ERP website provides Environmental Impact Statements (EIS) and Environmental Assessments (EA) available to the public. Projects from the ERP website in the surrounding area over the past five years (2018 – 2023) were reviewed and are as summarized:

- *Pāhoa Public Library Site Selection – Final EA (G70, September 2021)*

Previously, the Department of Accounting and General Services’ (DAGS) consultant, G70, completed an Environmental Assessment for the Pāhoa Public Library Site Selection. The document identified six (6) State-owned and County-owned sites in Pāhoa; however, the identified sites were not satisfactory for HSPLS to proceed with the design phase. Ultimately, this led to HSPLS’ desire to co-locate a new State library on-site of the Pāhoa Transit Hub.

3. Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii

The *Federal-Aid Highways 2035 Transportation Plan* (HDOT, 2014) stated the following as a *community plan land transportation-related goal* for the Puna region, originating from the COH Planning Department in 2008: “Increase mass transit options and complement the development of the villages with transit service.” Additionally, it listed various *Roadway Infrastructure Potential Solutions* on corridors throughout the study area, including:

- *Pāhoa Kalapana Road Reconstruction – reconstruct existing road to current design and safety standards.*
- *Kea’au-Pāhoa Road (Pāhoa Bypass Road) – improve/provide additional 2 travel lanes between Kea’au-Pāhoa Bypass Road and Kapoho Road.*

- Kea'au-Pāhoa Road (Pāhoa Bypass Road) – *signed shared roadway between Bypass segment to Shower Drive.*

As there are no imminent plans for implementation of the aforementioned projects, no changes to the corridor will be modeled in Future Without and Future With Project scenarios.

B. Volumes

1. Background Growth

Historic HDOT AADTs were available on Pāhoa Village Road north of 'Apa'a Street, south of the Puna Kai Shopping Center development between 2016-2022, with the exception of 2017-2018, when data was missing. Additionally, 24-hour, two-directional counts were collected on Wednesday, May 17th, 2023, at the same location. These volumes are shown in Table 1. Using historical AADTs from 2016 and 2022, a compounded average annual growth rate of 1.48% was experienced. The 24-hour 2023 counts only represented a singular day of volumes, while the historic HDOT AADTs are representative of average volume throughout the year, and thus are deemed to be more reflective.

As a result, conservatively a 1.48% background growth rate was applied to high-volume regional traffic movements, as identified with red arrows in Figure 16. Lower-volume minor movements were not adjusted. It is assumed that traffic impacts resulting from regional or other projects not identified in the STIP or ERP are included within the 1.48% annual growth rate. Figures 17-19 show the resulting Future Without Projects volumes forecast for 2028, 2033, and 2043, respectively.

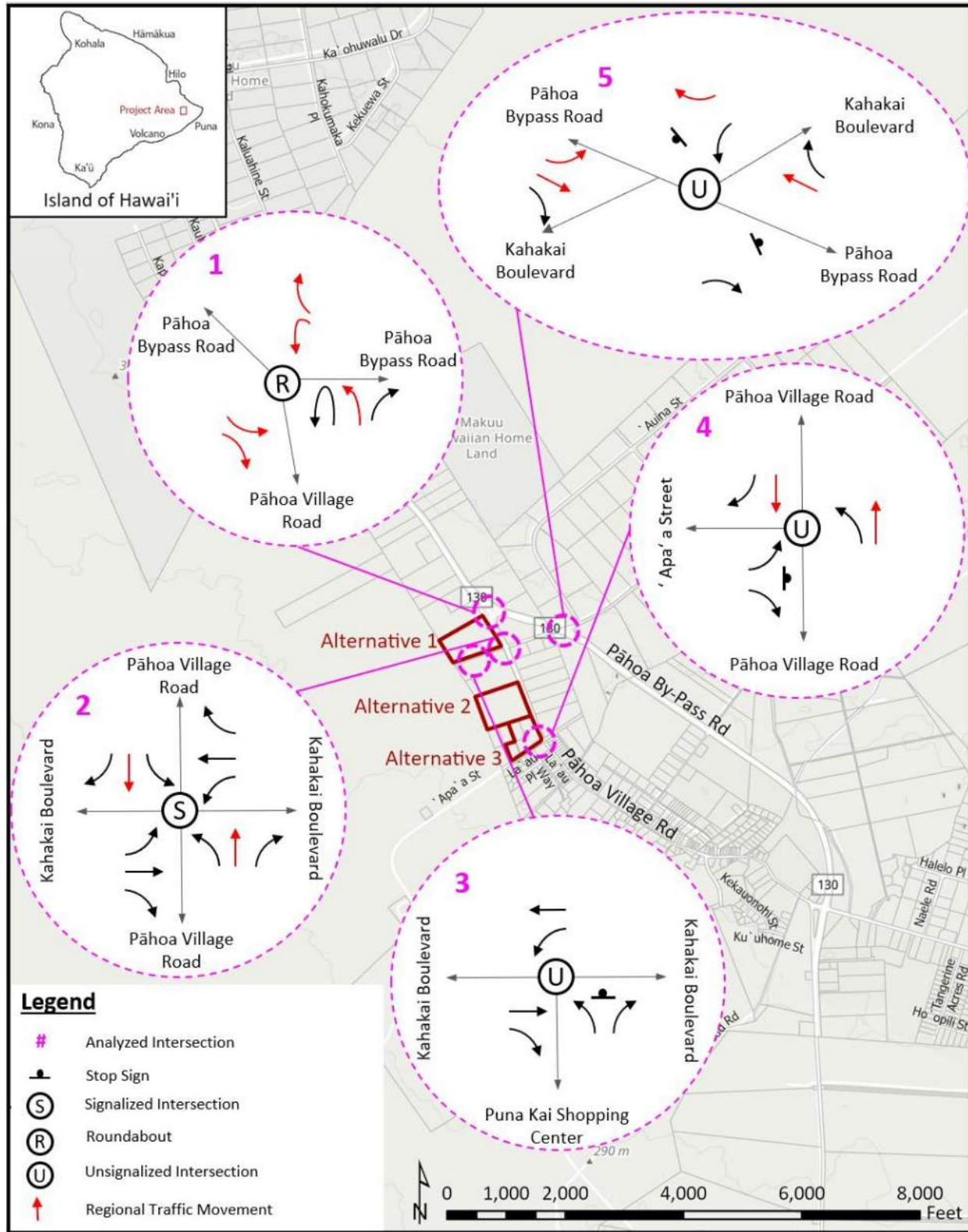


Figure 16: Regional Traffic Movements

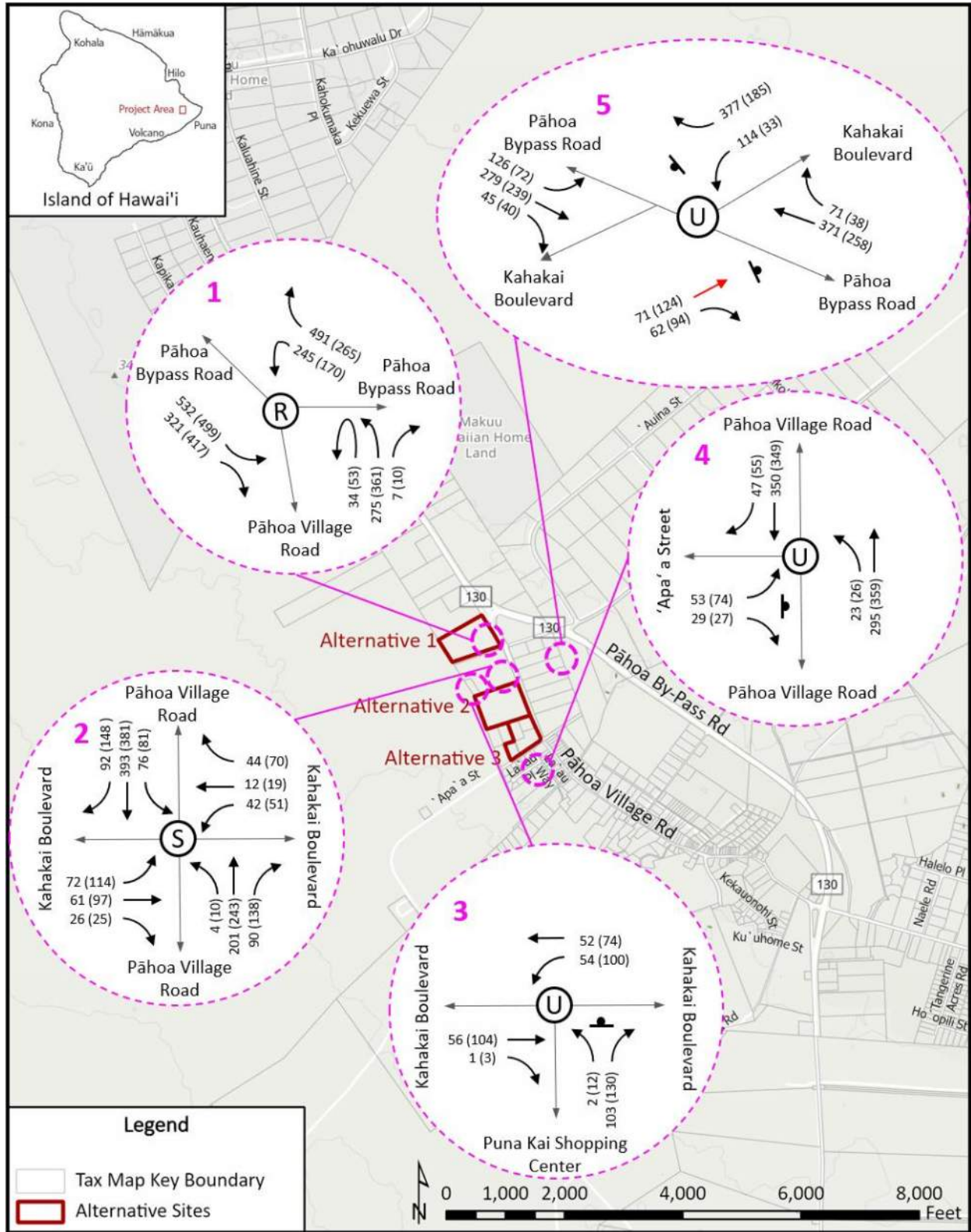


Figure 17: Future (2028) Without Project Peak Hour Volumes

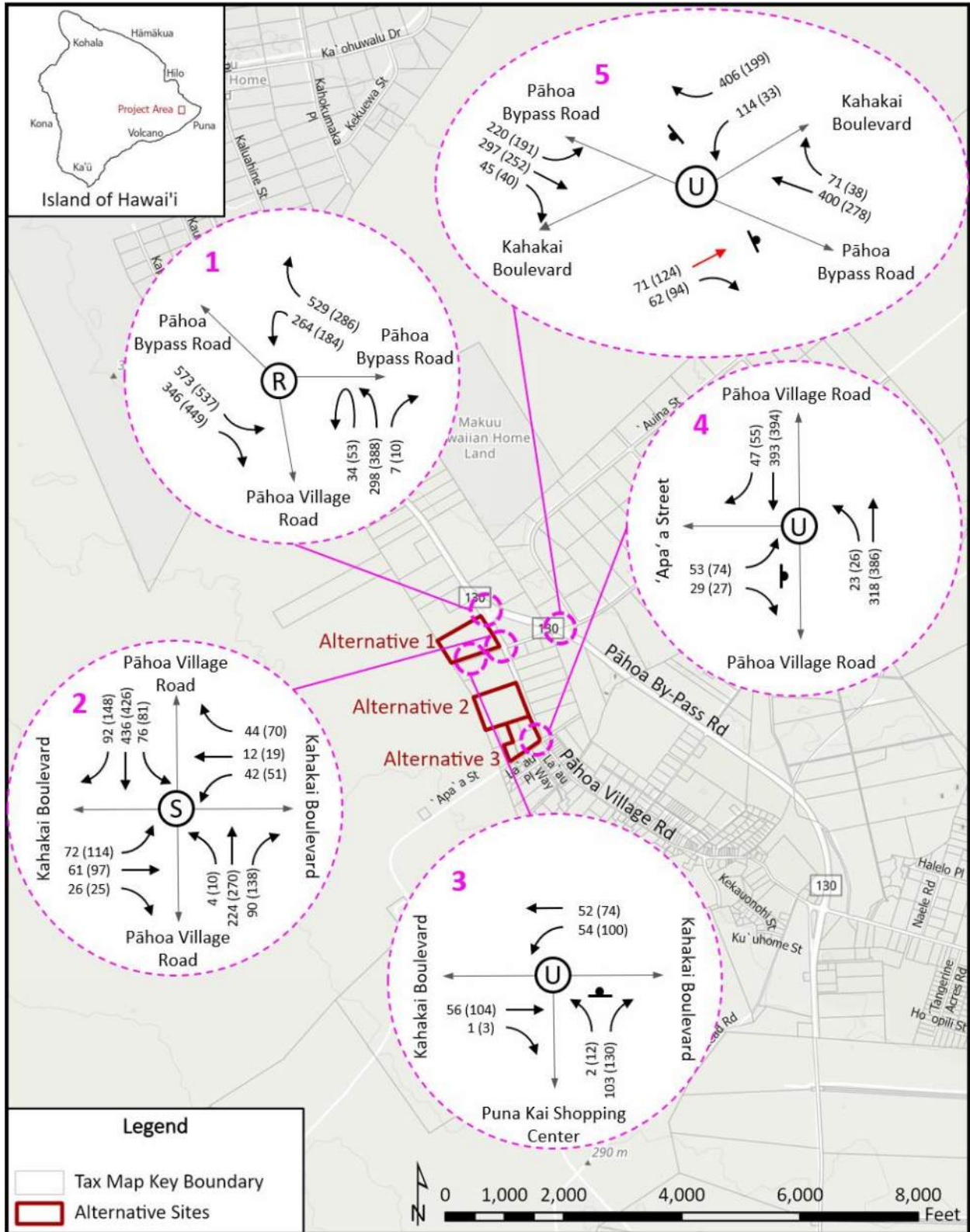


Figure 18: Future (2033) Without Project Peak Hour Volumes

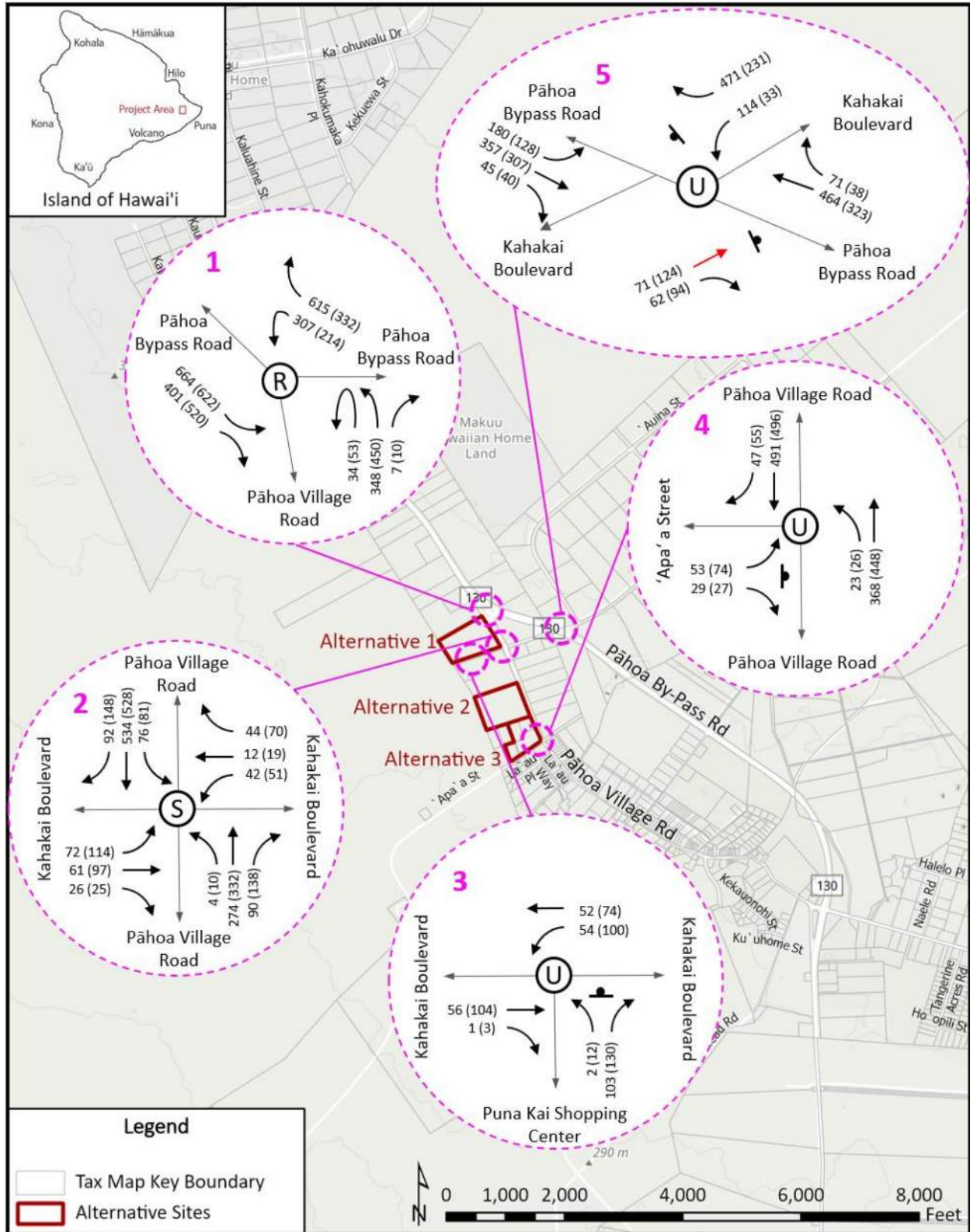


Figure 19: Future (2043) Without Project Peak Hour Volumes

C. Future Without Project LOS

1. Future (2028) Without Project Conditions

Future (2028) Without Project LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 6 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in yellow. Synchro reports for the Future Without Project Conditions can be found in Appendix D.

Future (2028) Without Project LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio over 0.85 and operate at LOS E in the AM peak hour, resulting in projected delays of 42.0 seconds and 43.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio over 0.85 and operate at LOS E, resulting in a projected delay of 37.0 seconds during the PM peak hour. Likewise, these movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. However, similar to Existing (2023) Conditions, it is projected that the majority of delay will be felt within short 30-minute segments between 7:45AM – 8:45AM and 3:00PM – 3:30PM. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard northbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 46.5 second/vehicle and LOS E using *SimTraffic* software (note no v/c ratio is provided) during the AM peak hour. This projected delay is slightly increased compared to the 42.8 second/vehicle delay experienced during the AM peak hour in Existing (2023) Conditions. The increased delay is attributed to the projected increase in volume along Pāhoa Bypass Road due to background growth, reducing the number of gaps turning vehicles have to complete their movement. As noted previously, videos recorded during traffic data collection did not indicate this significant of a delay, with queuing in the westbound left-turning direction not typically exceeding three vehicles, and most vehicles clearing in under twenty seconds. As such, given only a negligible change in projected delay for the Future (2028) Without Project Conditions, it is expected that traffic operations for this movement will remain comparable to Existing (2023) Conditions.

Table 6: Future (2028) Without Project LOS

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	37.0	-	E	25.0	-	D
Pāhoa Village Road NB	12.0	0.50	B	15.0	0.61	B
Pāhoa Bypass Road SB	42.0	0.96	E	37.0	0.95	E
Pāhoa Bypass Road WB	43.0	0.97	E	14.0	0.60	B
Pāhoa Village Road & Kahakai Boulevard	15.2	-	B	17.4	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	0.3	0.01	A	11.2	0.03	B
Pāhoa Village Road NB Through-Right	13.4	0.45	B	17.1	0.53	B
Pāhoa Village Road SB Left	8.1	0.17	A	10.5	0.2	B
Pāhoa Village Road SB Through	11.7	0.50	B	14.2	0.49	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	7.5	0.04	A	12.6	0.03	B
Kahakai Boulevard WB Through	Uncontrolled		A	Uncontrolled		A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.6	0.00	B	9.8	0.18	A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	7.7	0.08	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	19.6	0.35	C	24.2	0.42	C
Pāhoa Village Road NB Left-Through	8.4	0.03	A	8.5	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	11.9	0.25	B	12.4	0.36	B
Kahakai Boulevard WB Left*	46.5	-	E	17.0	-	C
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road NB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Left	10.0	0.32	A	9.0	0.29	A
Pāhoa Bypass Road SB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Right	Free-Flow Slip		A	Free-Flow Slip		A

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

2. Future (2028) Without Project Conditions Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

It is projected that the Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches will exceed a v/c ratio of 0.85 and operate at LOS E during the AM peak hour, while the Pāhoa Bypass Road southbound approach is projected to do the same during the PM peak hour. Currently, the intersection is a single lane roundabout.

The maximum capacity of an approach leg to a single lane roundabout is 1,200 vehicles/hour (vph) per USDOT’s *Roundabouts: An Informational Guide* (USDOT, 2000). Approach capacity decreases as conflicting circulatory flow increases. Approach capacity is also dependent on vehicular volume attributes, such as the heavy-vehicle percentage. The adjusted entry flow of an approach is dependent on factors such as the peak-hour factor (PHF). The less steady traffic flow is during the peak hour, the lower the PHF will be, and the higher the adjusted entry flow will be, resulting in higher v/c ratios and poor LOS.

One way to mitigate this is to separate various turning movements into dedicated approach lanes, creating a multilane roundabout which will increase the capacity of each approach. The following changes to the existing roundabout may be considered (see concept in Figure 20):

- Modifying the Pāhoa Bypass Road westbound approach from a single lane approach to a multilane approach with a left – right lane configuration.
- Modifying the Pāhoa Bypass Road southbound approach from a single lane approach to a multilane approach with a left – through lane configuration.

These modifications would not in and of themselves require widening the Pāhoa Bypass Road, as all exit lanes would only require one lane. Resulting LOS and delay (in seconds per vehicle) is shown in Table 7. All movements at the intersection would result in appropriate LOS D or better. Synchro reports for the Future Without Project mitigation can be found in Appendix E.

Table 7: Future (2028) Without Project Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	37.0	-	E	25.0	-	D
Pāhoa Village Road NB	12.0	0.50	B	15.0	0.61	B
Pāhoa Bypass Road SB	42.0	0.96	E	37.0	0.95	E
Pāhoa Bypass Road WB	43.0	0.97	E	14.0	0.60	B
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	11.0	-	B	10.0	-	B
Pāhoa Village Road NB	12.0	0.54	B	15.0	0.61	C
Pāhoa Bypass Road SB Left - Through	12.0 - 7.0	0.59 - 0.33	B - A	10.0 - 7.0	0.51 - 0.40	A - A
Pāhoa Bypass Road WB Left - Through	7.0 - 12.0	0.30 - 0.60	A - B	6.0 - 8.0	0.22 - 0.34	A - A

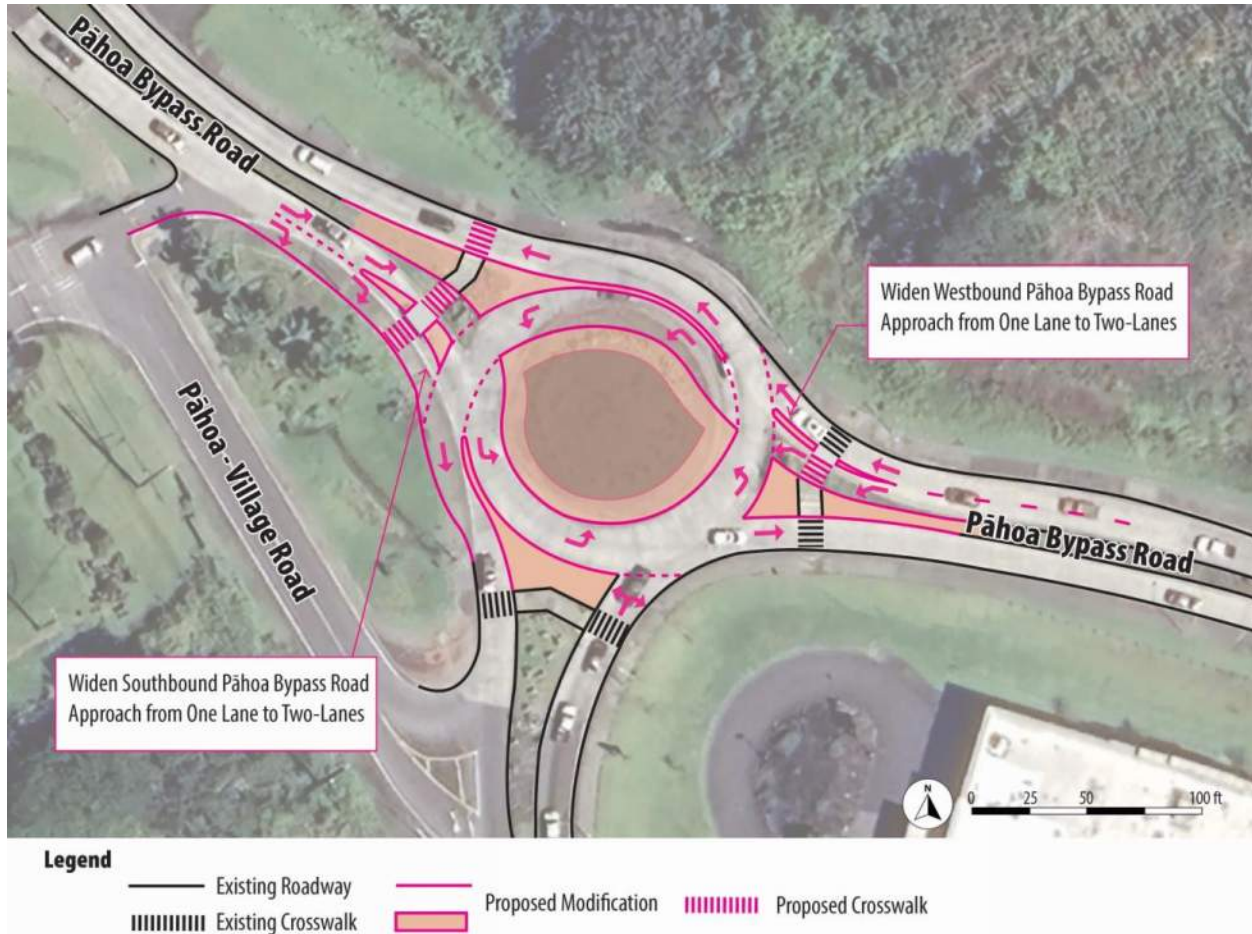


Figure 20: Pāhoia Bypass Road and Pāhoia Village Road Modified Roundabout

3. *Future (2033) Without Project Conditions*

Future (2033) Without Project LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 8 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in yellow. Synchro reports for the Future Without Project Conditions can be found in Appendix D.

Future (2033) Without Project LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions and Future (2028) Without Project. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoia Bypass Road & Pāhoia Village Road**

The Pāhoia Bypass Road southbound and Pāhoia Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in

projected delays of 68.0 seconds and 71.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 59.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. However, similar to Existing (2023) Conditions, it is projected that the majority of delay will be felt within short 30-minute segments between 7:45AM – 8:45AM and 3:00PM – 3:30PM. Traffic operations with modified approach lanes, as discussed in the Future (2028) Without Project mitigative section, will be discussed in the following section.

▪ **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 78.0 second/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. This projected delay is increased compared to the 42.8 second/vehicle delay experienced during the AM peak hour in Existing (2023) Conditions and the 46.5 second/vehicle delay in the Future (2028) Without Project Conditions. The increased delay is attributed to the projected increase in volume along Pāhoa Bypass Road due to background growth, reducing the number of gaps westbound left-turning vehicles have to complete their movement. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

Table 8: Future (2033) Without Project LOS

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	60.0	-	F	38.0	-	E
Pāhoa Village Road NB	14.0	0.56	B	18.0	0.68	C
Pāhoa Bypass Road SB	68.0	1.06	F	59.0	1.04	F
Pāhoa Bypass Road WB	71.0	1.07	F	16.0	0.66	C
Pāhoa Village Road & Kahakai Boulevard	15.5	-	B	17.7	-	B
Kahakai Boulevard EB Left	23.2	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	28.4	0.57	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.3	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	28.5	0.49	C	27.8	0.47	C
Pāhoa Village Road NB Left	9.6	0.01	A	11.4	0.03	B
Pāhoa Village Road NB Through-Right	14.1	0.49	B	17.8	0.57	B
Pāhoa Village Road SB Left	8.4	0.18	A	10.8	0.21	B
Pāhoa Village Road SB Through	12.7	0.56	B	15.1	0.55	B
Pāhoa Village Road SB Right	8.3	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	10.6	0.00	B	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		A	Uncontrolled		A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	9.2	0.12	A	12.6	0.03	A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	7.5	0.04	A	9.8	0.18	B
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	8.5	0.03	A	28.4	0.48	D
Pāhoa Village Road NB Left-Through	22.0	0.39	C	8.6	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.3	0.26	B	12.7	0.37	B
Kahakai Boulevard WB Left*	78.0	-	F	27.3	-	D
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road NB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Left	10.4	0.36	B	9.2	0.31	A
Pāhoa Bypass Road SB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Right	Free-Flow Slip		A	Free-Flow Slip		A

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

4. Future (2033) Without Project Conditions Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2033) Without Project volumes. Resulting LOS and delay (in seconds per vehicle) is shown in Table 9. Synchro reports for the Future Without Project mitigation can be found in Appendix E. All movements at the intersection would continue to result in appropriate LOS D or better.

Table 9: Future (2033) Without Project Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
<i>Existing Configuration - Single Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	60.0	-	F	38.0	-	F
Pāhoa Village Road NB	14.0	0.56	B	18.0	0.68	C
Pāhoa Bypass Road SB	68.0	1.06	F	59.0	1.04	F
Pāhoa Bypass Road WB	71.0	1.07	F	16.0	0.66	C
<i>Potential Mitigation - Multi Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	12.0	-	B	11.0	-	B
Pāhoa Village Road NB	14.0	0.56	B	18.0	0.68	C
Pāhoa Bypass Road SB Left - Through	14.0 - 8.0	0.65 - 0.36	B - A	11.0 - 8.0	0.56 - 0.44	B - A
Pāhoa Bypass Road WB Left - Through	7.0 - 14.0	0.33 - 0.66	A - B	7.0 - 8.0	0.24 - 0.37	A - A

(b) Pāhoa Bypass Road & Kahakai Boulevard

It is projected that the Kahakai Boulevard westbound left-turn movement will continue to increase in delay and degrade in LOS during the Future (2033) Without Project AM peak hour. Currently, the intersection operates under TWSC, with the following restricted movements:

- Northbound Pāhoa Bypass Road left-turn onto Kahakai Boulevard
- Eastbound Kahakai Boulevard left-turn onto Pāhoa Bypass Road
- Eastbound Kahakai Boulevard through-movement
- Westbound Kahakai Boulevard through-movement

Two potential alternative mitigative treatments will be discussed: signaling the intersection or converting it into a single lane roundabout. If signaling the intersection, it is recommended that the intersection be realigned to remove the existing skew along Kahakai Boulevard. It is also recommended to consider providing full-access at the intersection, removing previously restricted movements that were in place due to the skew. It is projected that providing full-access at this intersection may reduce the number of diverted vehicles at the Pāhoa Bypass Road and Kahakai Boulevard roundabout, potentially reducing delay there. The *Federal-Aid Highways 2035*

Transportation Plan for the District of Hawaii (CH2MHill, July 2014), included the intersection of Pāhoa Bypass Road and Kahakai Boulevard in a list of State-owned intersections with nine or more crashes between 2006 – 2008. While specific details of these crashes were not provided, this is likely attributed to factors including the skew of the intersection. Realigning the intersection is not required if providing a single lane roundabout, which could be configured to fit within the existing intersection footprint while still providing full-access.

(i) Signalized Intersection

One potential alternative mitigative treatment to be considered is reconstructing the intersection as a signalized intersection, providing singular through-lanes for all approaches, along with dedicated left- and right-turn lanes. The Kahakai Boulevard westbound right-turn was assumed to remain operating as a free-flow movement, as it does in Existing (2023) Conditions given the existing acceleration lane in the northbound direction of Pāhoa Bypass Road. All other right-turn movements were assumed to have yield slip lanes. Assuming all movements would operate under permitted phasing, cycle lengths and splits were optimized for both peak hours. In this scenario, all movements at the intersection are projected to result in appropriate LOS D or better, as seen in Table 10. Synchro reports for the Future Without Project mitigation can be found in Appendix E.

(ii) Single Lane Roundabout

Another alternative mitigative treatment to be considered is reconstructing the intersection as a single-lane roundabout with full-access at each approach. Although the intersection is skewed, a “dogbone-shaped” (sometimes referred to as “peanut-shaped”) roundabout could largely fit within the existing intersection footprint, and not require realigning to provide full-access. Roundabouts can improve safety compared to traditional signalized or stop-controlled intersection by reducing the number of conflict points while promoting lower speeds, while also providing increased intersection capacity. Additionally, they can reduce noise, fuel consumption, and emissions from cars not waiting at traffic signals. The Kahakai Boulevard westbound right-turn was assumed to remain operating as a free-flow movement, as it does in Existing (2023) Conditions given the existing acceleration lane in the northbound direction of Pāhoa Bypass Road. In this scenario, all movements at the intersection are projected to result in appropriate LOS D or better, as seen in Table 10. Synchro reports for the Future Without Project mitigation can be found in Appendix E. A concept of this roundabout is shown in Figure 21.

Table 10: Future (2033) Without Project Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.3	0.26	B	12.7	0.37	B
Kahakai Boulevard WB Left*	78.0	-	F	27.3	-	D
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road NB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Left	10.4	0.36	B	9.2	0.31	A
Pāhoa Bypass Road SB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Right	Free-Flow Slip		A	Free-Flow Slip		A
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Pāhoa Village Road	14.9	-	B	12.8	-	B
Kahakai Boulevard EB Through	16.1	0.17	B	11.7	0.21	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	20.0	0.31	B	12.7	0.08	B
Kahakai Boulevard WB Through	14.7	0.00	B	10.3	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	11.0	0.52	B	11.0	0.40	B
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	26.2	0.66	C	18.9	0.51	B
Pāhoa Bypass Road SB Through	9.5	0.39	A	10.7	0.37	B
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	10.0	-	A	7.0	-	A
Kahakai Boulevard EB	11.0	0.31	B	10.0	0.39	A
Kahakai Boulevard WB	7.0 - 0.0	0.18 - 0.00	A - A	4.0 - 0.00	0.04 - 0.00	A - A
Pāhoa Bypass Road NB	16.0	0.68	C	9.0	0.41	A
Pāhoa Bypass Road SB	12.0	0.64	B	7.0	0.46	A

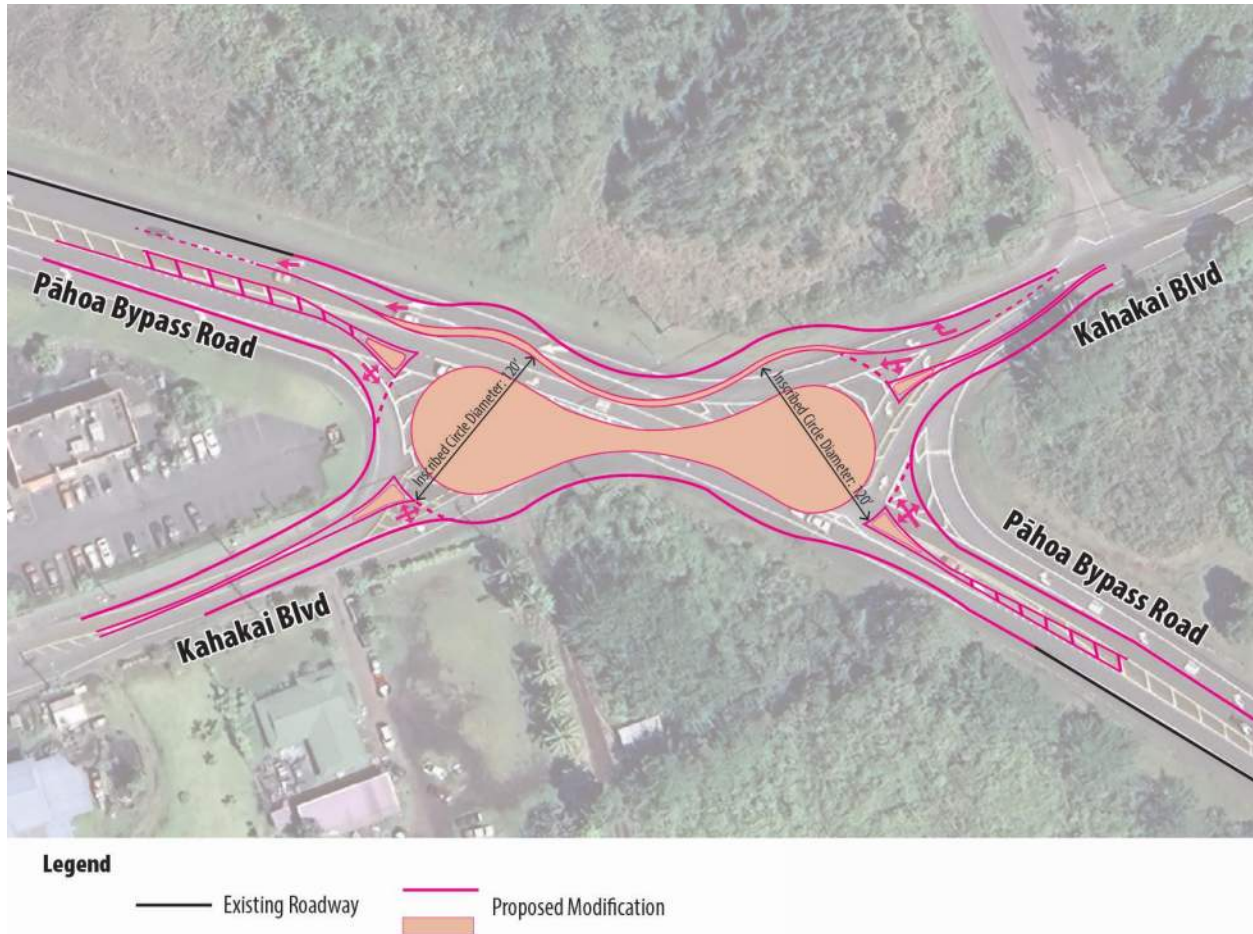


Figure 21: Pāhoa Bypass Road and Kahakai Boulevard Conceptual Roundabout

5. *Future (2043) Without Project Conditions*

Future (2043) Without Project LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 11 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in yellow. Synchro reports for the Future Without Project Conditions can be found in Appendix D.

Table 11: Future (2043) Without Project LOS

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	140.0	-	F	84.0	-	F
Pāhoa Village Road NB	22.0	0.71	C	32.0	0.85	D
Pāhoa Bypass Road SB	160.0	1.30	F	136.0	1.25	F
Pāhoa Bypass Road WB	169.0	1.32	F	28.0	0.83	D
Pāhoa Village Road & Kahakai Boulevard	16.1	-	B	18.4	-	B
Kahakai Boulevard EB Left	28.8	0.34	C	27.9	0.41	C
Kahakai Boulevard EB Through-Right	34.8	0.61	C	31.5	0.48	C
Kahakai Boulevard WB Left	28.9	0.24	C	27.5	0.22	C
Kahakai Boulevard WB Through-Right	35.0	0.53	D	33.0	0.50	C
Pāhoa Village Road NB Left	9.3	0.01	A	11.0	0.03	B
Pāhoa Village Road NB Through-Right	13.0	0.49	B	16.6	0.56	B
Pāhoa Village Road SB Left	7.9	0.17	A	10.3	0.20	B
Pāhoa Village Road SB Through	12.8	0.61	B	15.3	0.61	B
Pāhoa Village Road SB Right	7.5	0.12	A	10.1	0.20	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	
Kahakai Boulevard WB Through	Uncontrolled		A	Uncontrolled		A
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.6	0.00	B	12.6	9.80	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	30.1	0.49	D	45.3	0.62	E
Pāhoa Village Road NB Left-Through	8.9	0.03	A	9.1	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.0	0.28	B	13.4	0.39	B
Kahakai Boulevard WB Left*	347.0	-	F	38.2	-	E
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road NB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Left	11.6	0.44	B	9.9	0.38	A
Pāhoa Bypass Road SB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Right	Free-Flow Slip		A	Free-Flow Slip		A

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

Future (2043) Without Project LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Future (2033) Without Project Conditions. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 160.0 seconds and 169.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 136.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes, as discussed in the Future (2028) and Future (2033) Without Project mitigative section, will be discussed in the following section.

- **Pāhoa Village Road & 'Apa'a Street**

The 'Apa'a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS E with a v/c ratio of 0.62 and a delay of 45.3 seconds/vehicle during the PM peak hour. This increased delay can be attributed to increased volume along Pāhoa Village Road due to projected background growth, making it more difficult for turning-vehicles to find gaps to complete their movement. However, the v/c ratio indicates that this movement is not approaching capacity. The 'Apa'a Street eastbound approach is projected to have up to 101 vehicles during the PM peak hour, equating to just over 1.5 vehicles per minute. *SimTraffic* visual simulations did not indicate substantial queuing or delay along this approach, with maximum queues of up to three vehicles occasionally being observed. Due to the relatively low volume of this approach, and the low v/c ratio, no mitigation is recommended for this intersection at this time.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 347.0 second/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. The increased delay is attributed to the projected increase in volume along Pāhoa Bypass Road due to background growth, reducing the number of gaps westbound left-turning vehicles have to complete their movement. The potential mitigative treatments discussed in the Future (2033) Without Project mitigative section will be analyzed with Future (2043) Without Project volumes.

6. Future (2043) Without Project Conditions Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2043) Without Project volumes. Resulting LOS and delay (in seconds per vehicle) is shown in Table 12. Synchro reports for the Future Without Project mitigation can be found in Appendix E. All movements at the intersection would continue to result in appropriate LOS D or better.

Table 12: Future (2043) Without Project Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	140.0	-	F	84.0	-	F
Pāhoa Village Road NB	22.0	0.71	C	32.0	0.85	D
Pāhoa Bypass Road SB	160.0	1.30	F	136.0	1.25	F
Pāhoa Bypass Road WB	169.0	1.32	F	28.0	0.83	D
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	18.0	-	C	16.0	-	C
Pāhoa Village Road NB	22.0	0.71	C	32.0	0.85	D
Pāhoa Bypass Road SB Left - Through	22.0 - 9.0	0.79 - 0.44	C - A	14.0 - 10.0	0.67 - 0.52	B - A
Pāhoa Bypass Road WB Left - Through	9.0 - 23.0	0.41 - 0.81	A - C	8.0 - 10.0	0.30 - 0.46	A - B

(b) Pāhoa Bypass Road & Kahakai Boulevard

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as discussed in the Future (2033) Without Project mitigative section.

(i) Signalized Intersection

The signalized intersection potential mitigative treatment discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2043) Without Project volumes. Resulting LOS and delay (in seconds per vehicle) is shown in Table 13. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future Without Project mitigation can be found in Appendix E.

(ii) Single Lane Roundabout

The single lane roundabout potential mitigative treatment discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2043) Without Project volumes. Resulting LOS and delay (in seconds per vehicle) is shown in Table 13. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future Without Project mitigation can be found in Appendix E.

Table 13: Future (2043) Without Project Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.0	0.28	B	13.4	0.39	B
Kahakai Boulevard WB Left*	347.0	-	F	38.2	-	E
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road NB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Left	11.6	0.44	B	9.9	0.38	A
Pāhoa Bypass Road SB Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Bypass Road SB Right	Free-Flow Slip		A	Free-Flow Slip		A
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Pāhoa Village Road	16.2	-	B	14.0	-	B
Kahakai Boulevard EB Through	25.5	0.21	C	17.1	0.27	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	32.5	0.41	C	18.7	0.12	B
Kahakai Boulevard WB Through	23.3	0.00	C	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	9.3	0.50	A	9.8	0.42	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	29.4	0.73	C	22.5	0.64	C
Pāhoa Bypass Road SB Through	7.9	0.38	A	9.4	0.38	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	14.0	-	B	8.0	-	A
Kahakai Boulevard EB	13.0	0.35	B	12.0	0.43	B
Kahakai Boulevard WB	7.0 - 0.0	0.20 - 0.00	A - A	4.0 - 0.0	0.05 - 0.00	A - A
Pāhoa Bypass Road NB	25.0	0.82	C	11.0	0.50	B
Pāhoa Bypass Road SB	16.0	0.74	C	9.0	0.55	A

7. Future Without Project Conditions Mitigation Summary

The following is a summary of potential mitigative actions to be considered at each study intersection, as a result of degrading LOS and increased delay due to projected background growth:

- Pāhoa Village Road & Pāhoa Bypass Road

The Pāhoa Bypass Road southbound approach and Pāhoa Bypass Road westbound approaches at existing single lane roundabout at Pāhoa Village Road and Pāhoa Bypass Road are projected to degrade to LOS E by the Future (2028) Without Project Conditions, with delay projected to continue to increase up through the Future (2043) Without Project Conditions. A modified multilane roundabout may be considered, in which the

Pāhoa Bypass Road southbound and westbound approaches are modified to have two lanes: a dedicated left-turn lane, and a through-right lane. This would not require widening Pāhoa Bypass Road, as all exits to the roundabout would only require a minimum of one-lane. The modified multilane roundabout operated at appropriate LOS D or better for all movements up through Future (2043) Without Project Conditions.

- Pāhoa Bypass Road & Kahakai Boulevard

The Kahakai Boulevard westbound left-turn lane is projected to begin operating at LOS F by the Future (2033) Without Project Conditions, with delay projected to continue to increase up through the Future (2043) Without Project Conditions. Two potential mitigative treatments may be considered at the intersection, including a signalized intersection with singular through-lanes for all approaches, along with dedicated left- and right-turn lanes, as well as a single-lane roundabout. In both scenarios, it was assumed that the Kahakai Boulevard westbound right-turn was assumed to remain operating as a free-flow movement, as it does in Existing (2023) Conditions given the existing acceleration lane in the northbound direction of Pāhoa Bypass Road. Similarly, in both scenarios it was assumed that full-access would be provided and that the intersection approaches would be adjusted to remove existing skew. In both potential mitigative treatments, all movements operated at appropriate LOS D or better up through Future (2043) Without Project Conditions.

V. Future With Project Conditions

The proposed development construction is anticipated to begin by 2025, with completion expected by 2027. Therefore, it is assumed that all project-related trips will be in place for all three Future (2028, 2033, and 2043) With Project scenarios.

A. Future With Project Generated Volumes

1. Project Related Volumes

The expected traffic from the proposed project was determined using the following four-step methodology: trip generation, trip distribution, modal choice, and route assignment.

(a) Trip Generation

Trip generation was calculated using rates from *Trip Generation, 11th Edition* (ITE, September 2021) which is standard traffic engineering practice. The following land uses were considered for use with the proposed project:

- **Park and Ride Lot with Bus or Light Rail (ITE Land Use Code 90)**

This land use code is intended for park and ride lots with bus and/or light rail service, typically containing a passenger shelter and parking lot, as well as circulation facilities for buses. Other site amenities such as restrooms and vending machines may be present. In addition to park and ride users, the lot may be used by vehicles dropping off or picking up passengers. As such, this land use code will be used for the development's *Transit Center*.

Preliminary planning efforts done throughout initial coordination meetings for the development have suggested that up to 50 stalls may be required. The intention is that these stalls be provided via an informal gravel parking lot which will be expanded and formalized once the actual demand is known.

- **Day Care Center (ITE Land Use Code 565)**

This land use code is intended for facilities providing care for pre-school age children during daytime hours. As such, this land use code will be used for the development's *Day Care*.

- **Library (ITE Land Use Code 590)**

This land use code is intended for public or private libraries.

The *Cultural Center* is intended to be connected to the Pāhoa Public Library. As such, this land use code will be used for both the *Cultural Center* and *Library*.

Resulting trip generation rates for the proposed development are provided in Table 14.

Table 14: Land Use Development Trip Generation Rates

Land Use Code	Independent Variable	AM Peak Hour			AM Peak Hour		
		Equation	In %	Out %	Equation	In %	Out %
90 - Park and Ride Lot with Bus or Light Rail	Parking Spaces	$T = 0.51 (X) + 22.65$	78%	22%	$T = 0.39 (X) + 47.96$	26%	74%
590 - Library	1000 Sq Ft GFA	$T = 1.75 (X) - 14.59$	71%	29%	$T = 9.33 (X) - 17.13$	48%	52%
	1000 Sq Ft GFA						
Day Care Center	1000 Sq Ft GFA	$T = 11.00 (X)$	53%	47%	$T = 11.12 (X)$	47%	53%

The resulting estimated trips expected from the development were calculated and are shown in Table 15.

Table 15: Project Related Development Trip Generation

Building Description	Land Use Code	Units	Independent Variable	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Transit Center	90 - Park and Ride Lot with Bus or Light Rail	50	Parking Spaces	38	10	48	18	49	67
Library	590 - Library	9	1000 Sq Ft GFA	5	2	7	48	52	100
Cultural Center		3.6	1000 Sq Ft GFA						
Day Care	565 - Day Care Center	3.8	1000 Sq Ft GFA	22	20	42	20	22	42
Total:				65	32	97	86	123	209

While it is likely that some of the vehicle trips to the site will be pass-by trips or diverted-trips, characterized by trips that are already passing along or near the site on an adjacent street or roadway, conservatively no trip reduction factors were applied to these generation rates.

(b) Trip Distribution/Assignment

Project related trips were distributed/assigned based on existing regional traffic patterns, as previously shown in Figure 16.

Trip distribution was done individually for each of the three alternative site locations.

(c) Modal Choice

To assume the worst-case conditions for traffic, all project related external trips accessing the site were assumed to be by private vehicle only, as opposed to considering some trips be taken by foot, bike, or bus.

However, the intention of the development is to increase access and usage of transit multimodal facilities. Additionally, with future development, it is projected that multimodal pedestrian and bicycle infrastructure will improve, similar to the portion fronting the Puna Kai Shopping Center, potentially further reducing the number of users accessing the site by vehicle.

B. Future With Project Volumes

Future With Project volumes were calculated individually for each of the three alternative site locations through the following methods:

- **Alternative 1** - Future (2028) With Project (see Figure 23) is a sum of Future (2028) Without Project (see Figure 17) and the additional site generated trips expected to be produced by the development for **Alternative 1** (see Figure 22).
- **Alternative 1** - Future (2033) With Project (See Figure 24) is a sum of Future (2033) Without Project (see Figure 18) and the additional site generated trips expected to be produced by the development for **Alternative 1** (see Figure 22).
- **Alternative 1** - Future (2043) With Project (See Figure 25) is a sum of Future (2043) Without Project (see Figure 19) and the additional site generated trips expected to be produced by the development for **Alternative 1** (see Figure 22).

- **Alternative 2** - Future (2028) With Project (see Figure 27) is a sum of Future (2028) Without Project (see Figure 17) and the additional site generated trips expected to be produced by the development for **Alternative 2** (see Figure 26).
- **Alternative 2** - Future (2033) With Project (See Figure 28) is a sum of Future (2033) Without Project (see Figure 18) and the additional site generated trips expected to be produced by the development for **Alternative 2** (see Figure 26).
- **Alternative 2** - Future (2043) With Project (See Figure 29) is a sum of Future (2043) Without Project (see Figure 19) and the additional site generated trips expected to be produced by the development for **Alternative 2** (see Figure 26).

- **Alternative 3** - Future (2028) With Project (see Figure 31) is a sum of Future (2028) Without Project (see Figure 17) and the additional site generated trips expected to be produced by the development for **Alternative 3** (see Figure 30).
- **Alternative 3** - Future (2033) With Project (See Figure 32) is a sum of Future (2033) Without Project (see Figure 18) and the additional site generated trips expected to be produced by the development for **Alternative 3** (see Figure 30).
- **Alternative 3** - Future (2043) With Project (See Figure 33) is a sum of Future (2043) Without Project (see Figure 19) and the additional site generated trips expected to be produced by the development for **Alternative 3** (see Figure 30).

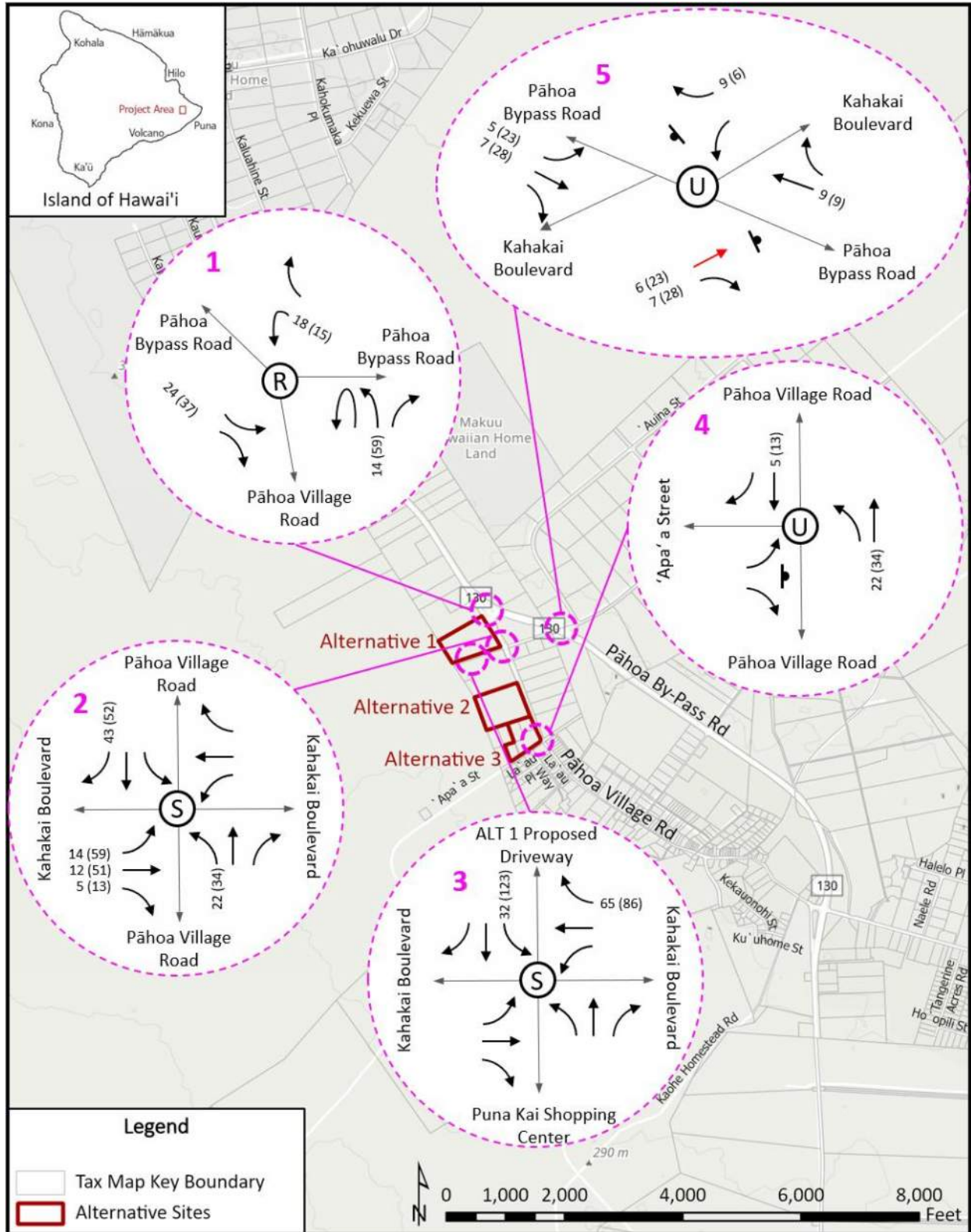
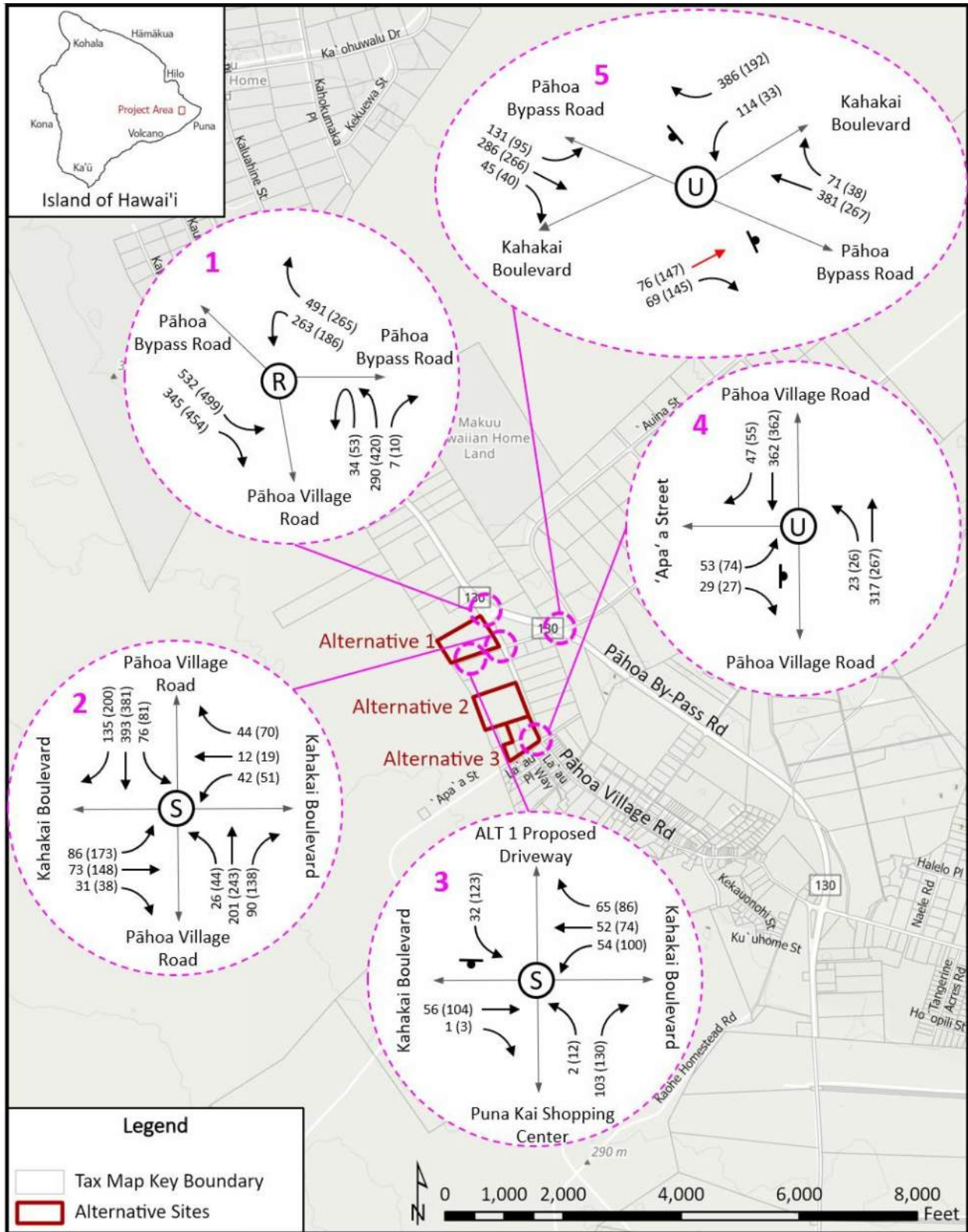
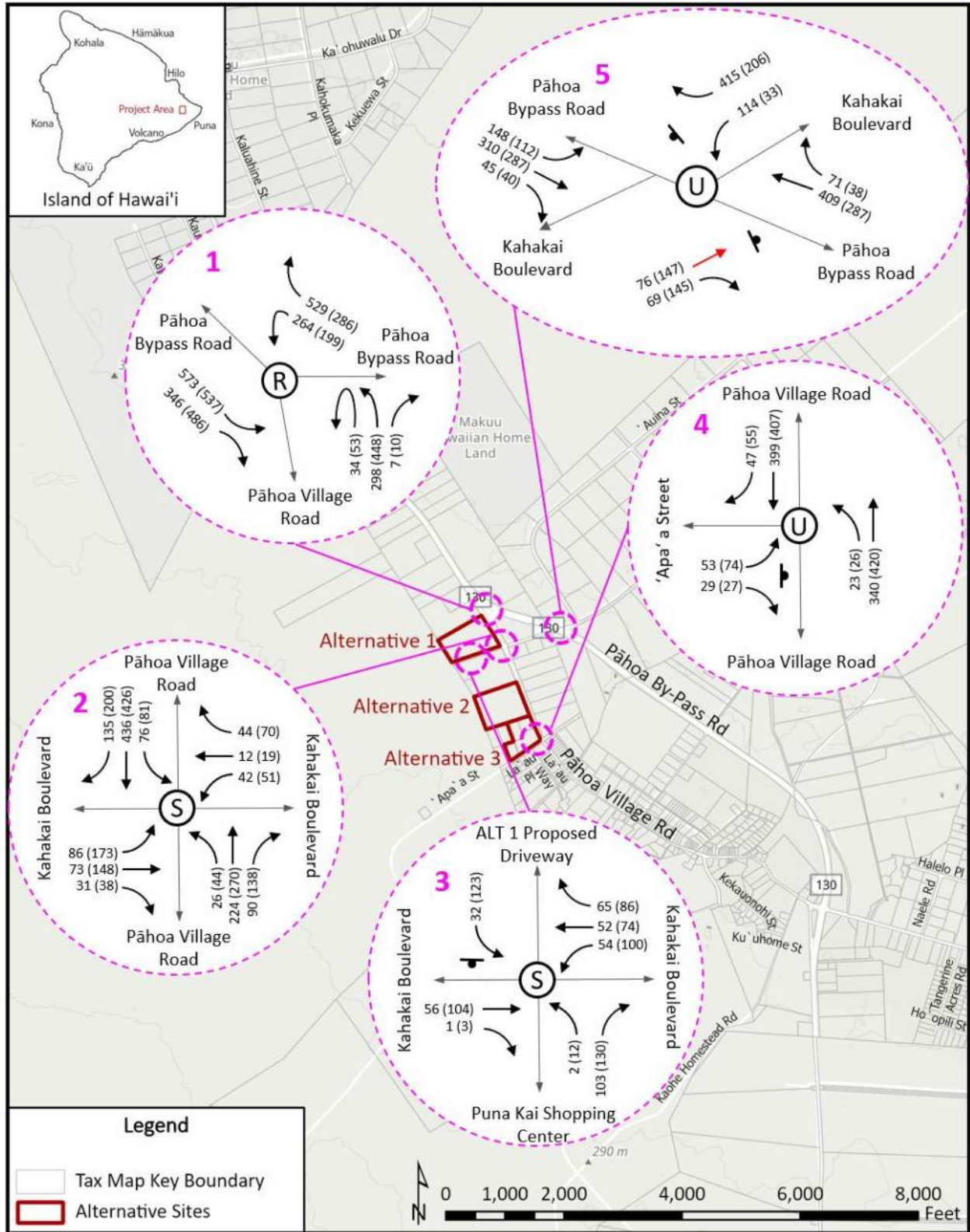


Figure 22: Project Trip Distribution – Alternative 1





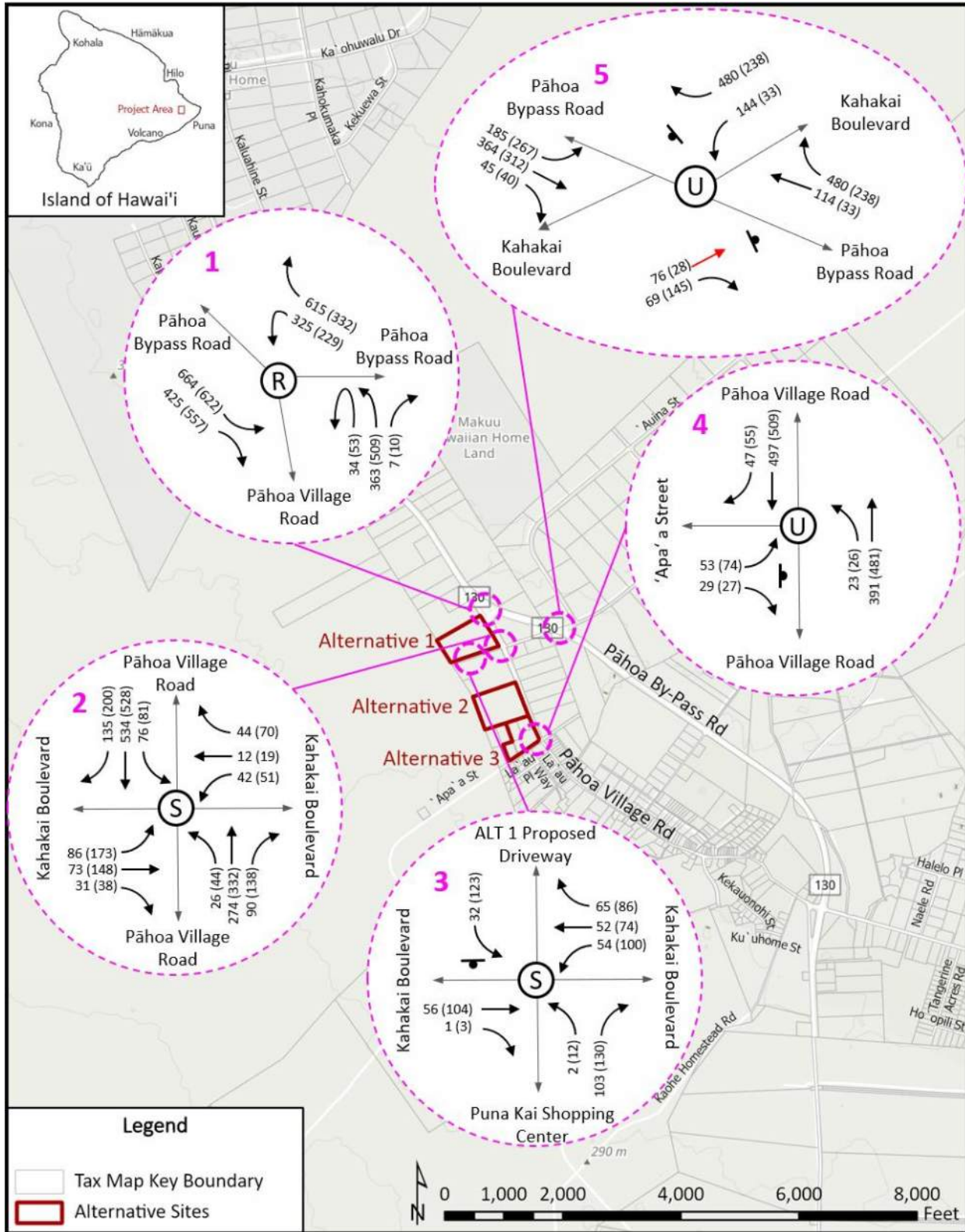


Figure 25: Future (2043) With Project Peak Hour Volumes – Alternative 1

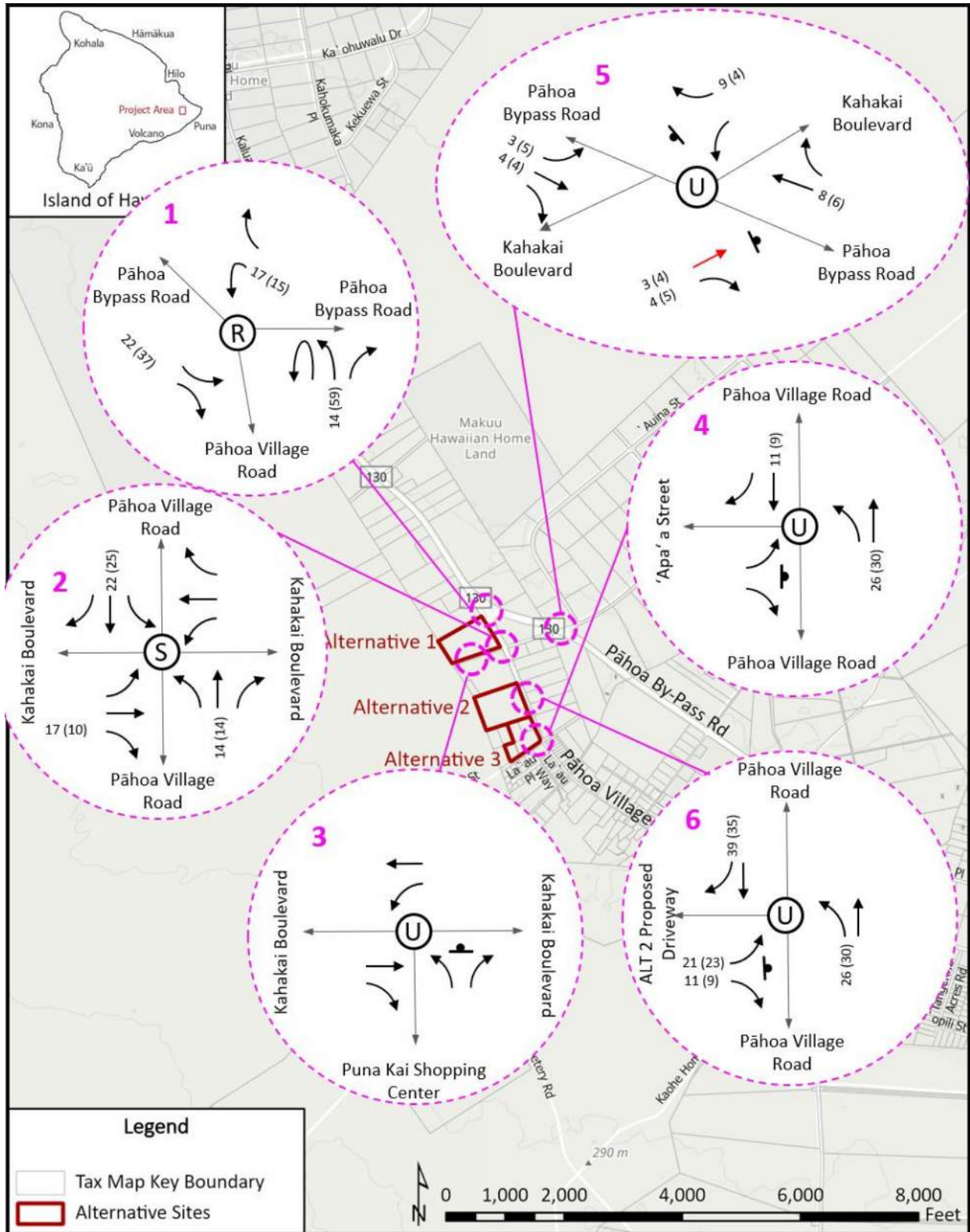
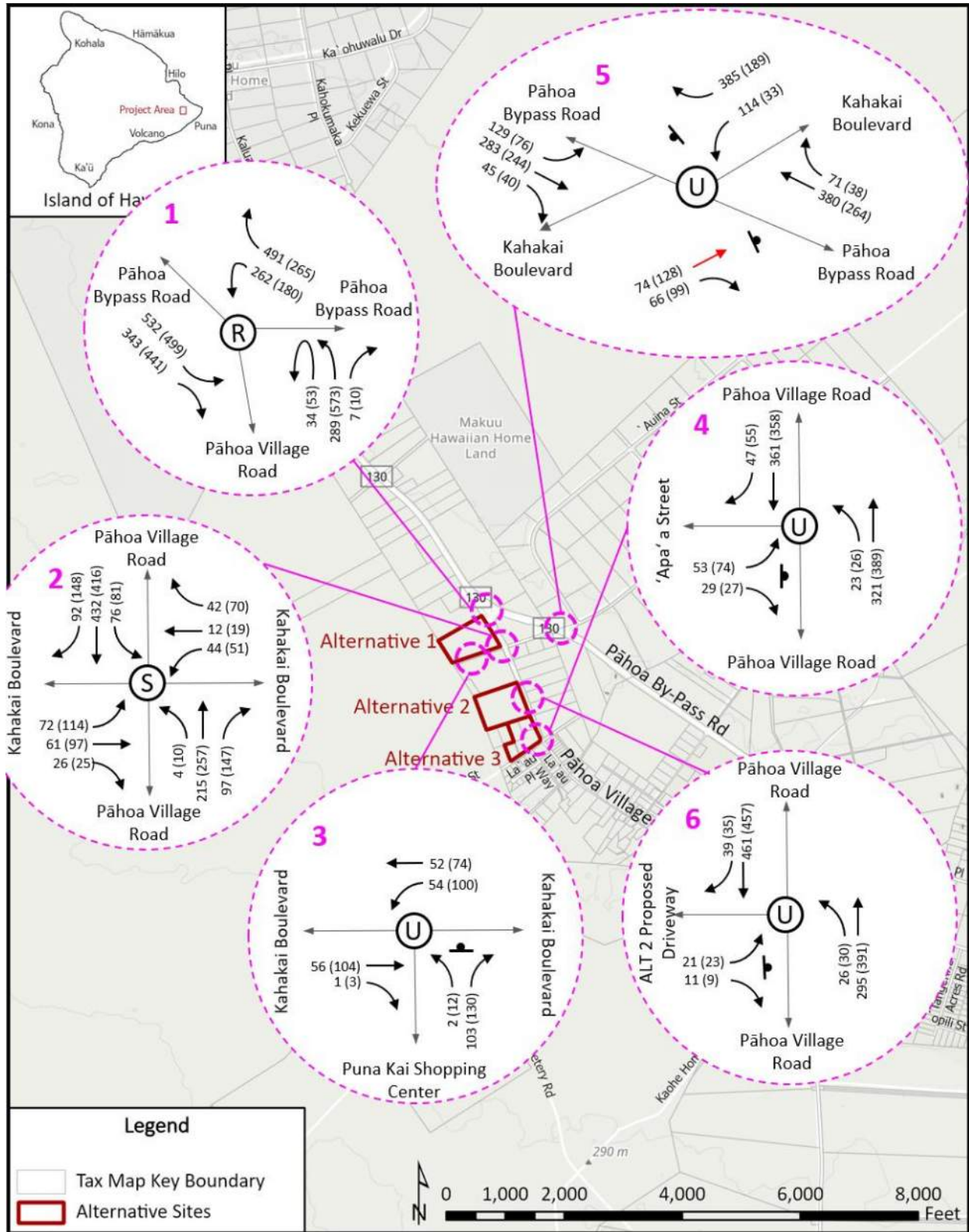
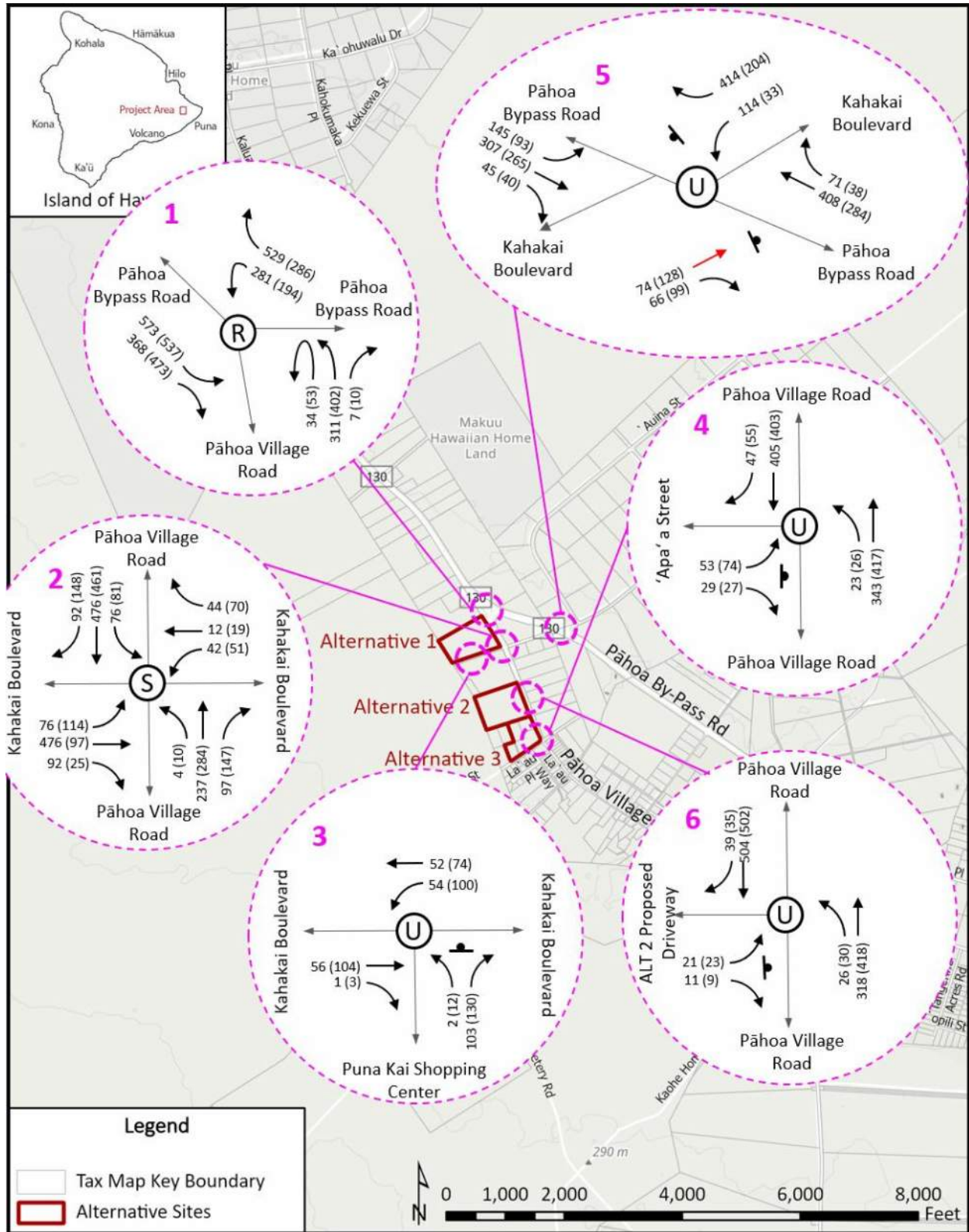
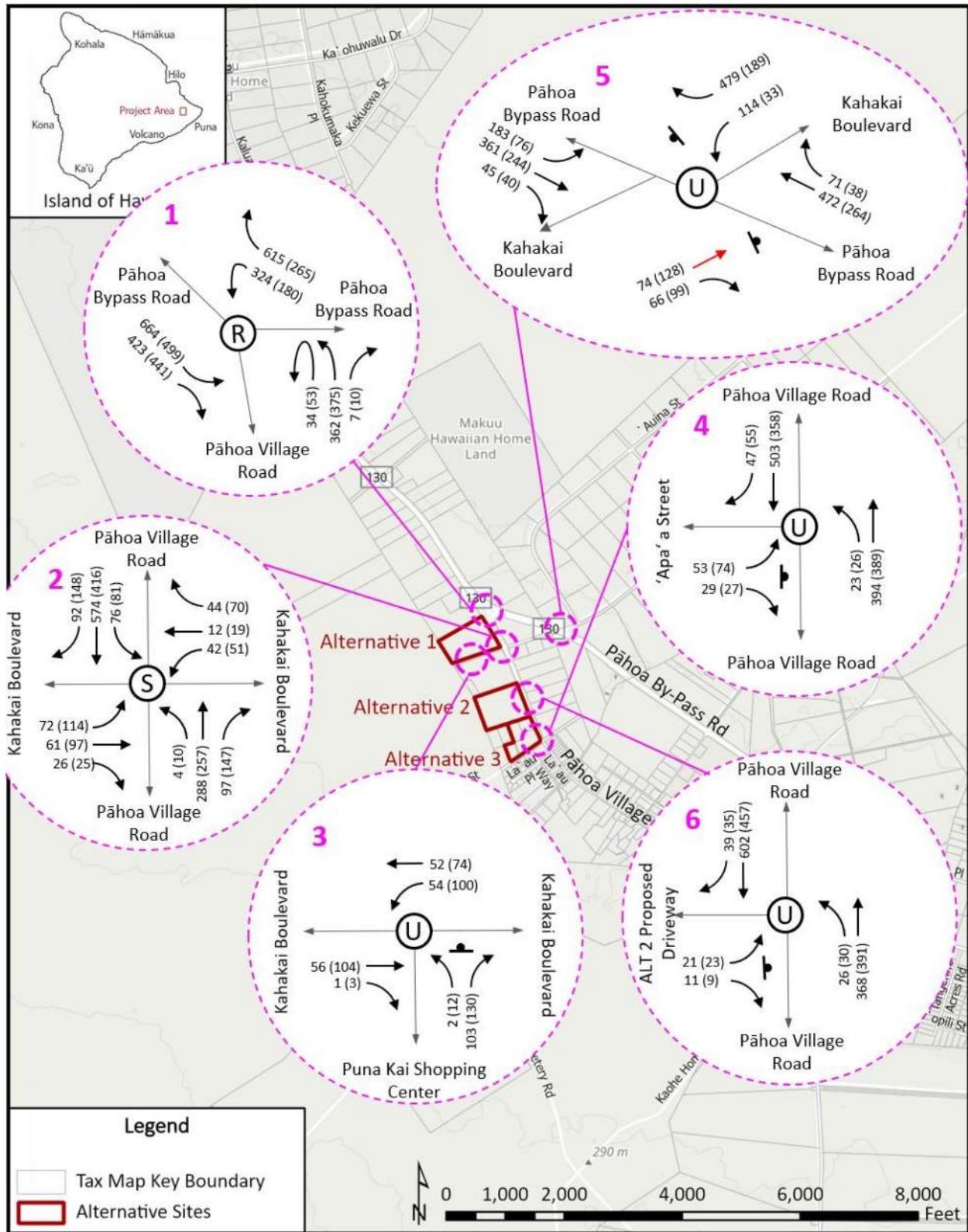
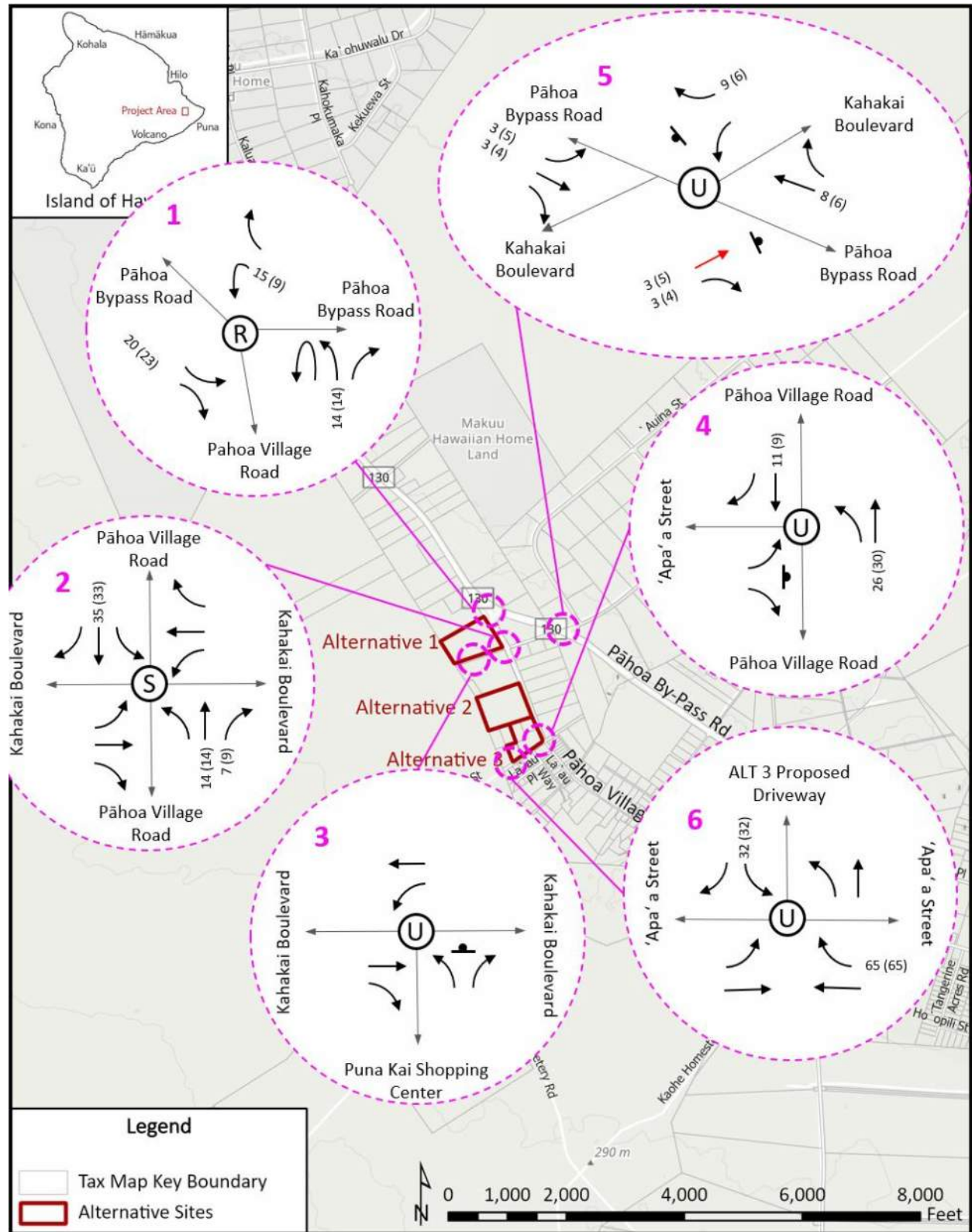


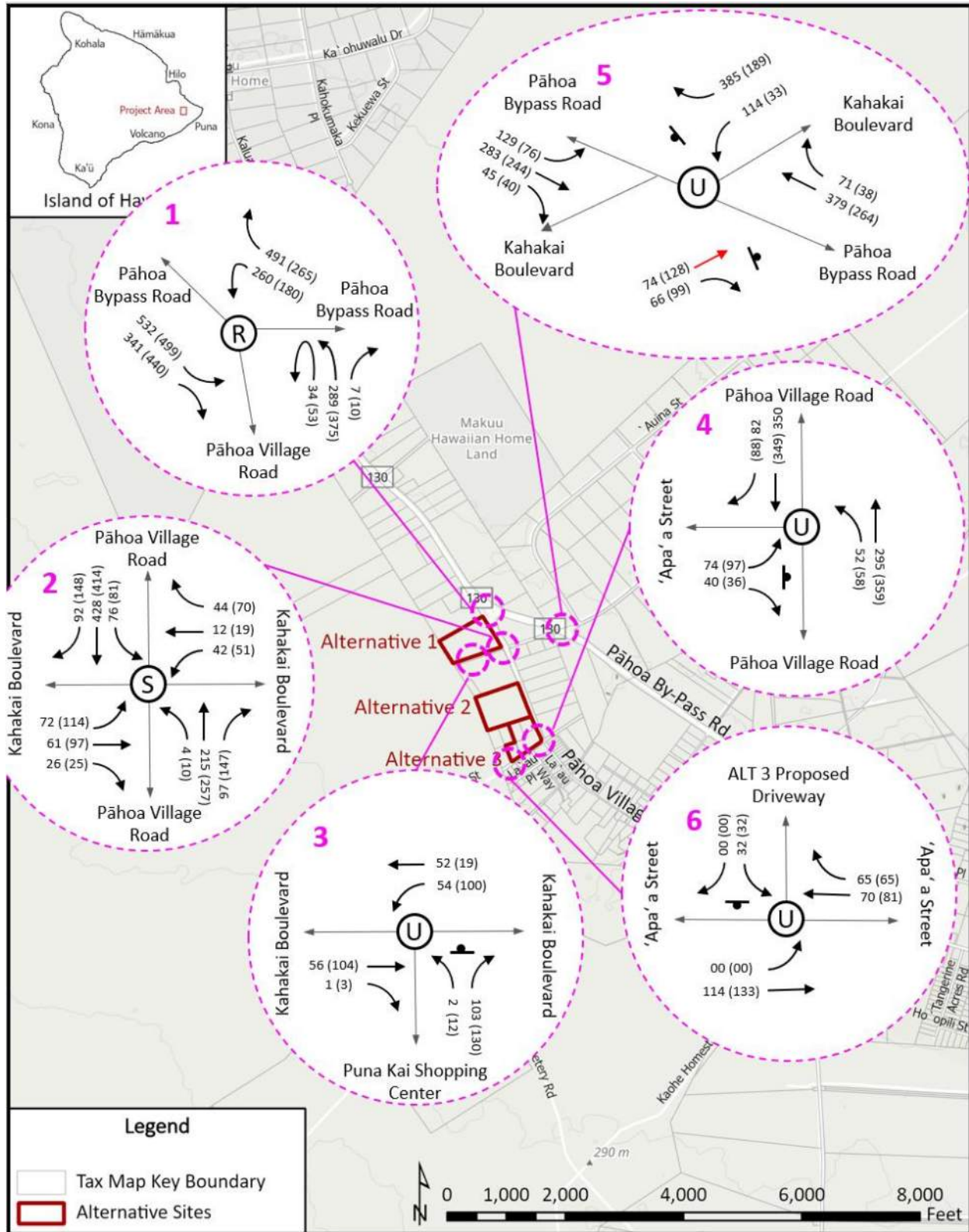
Figure 26: Project Trip Distribution – Alternative 2











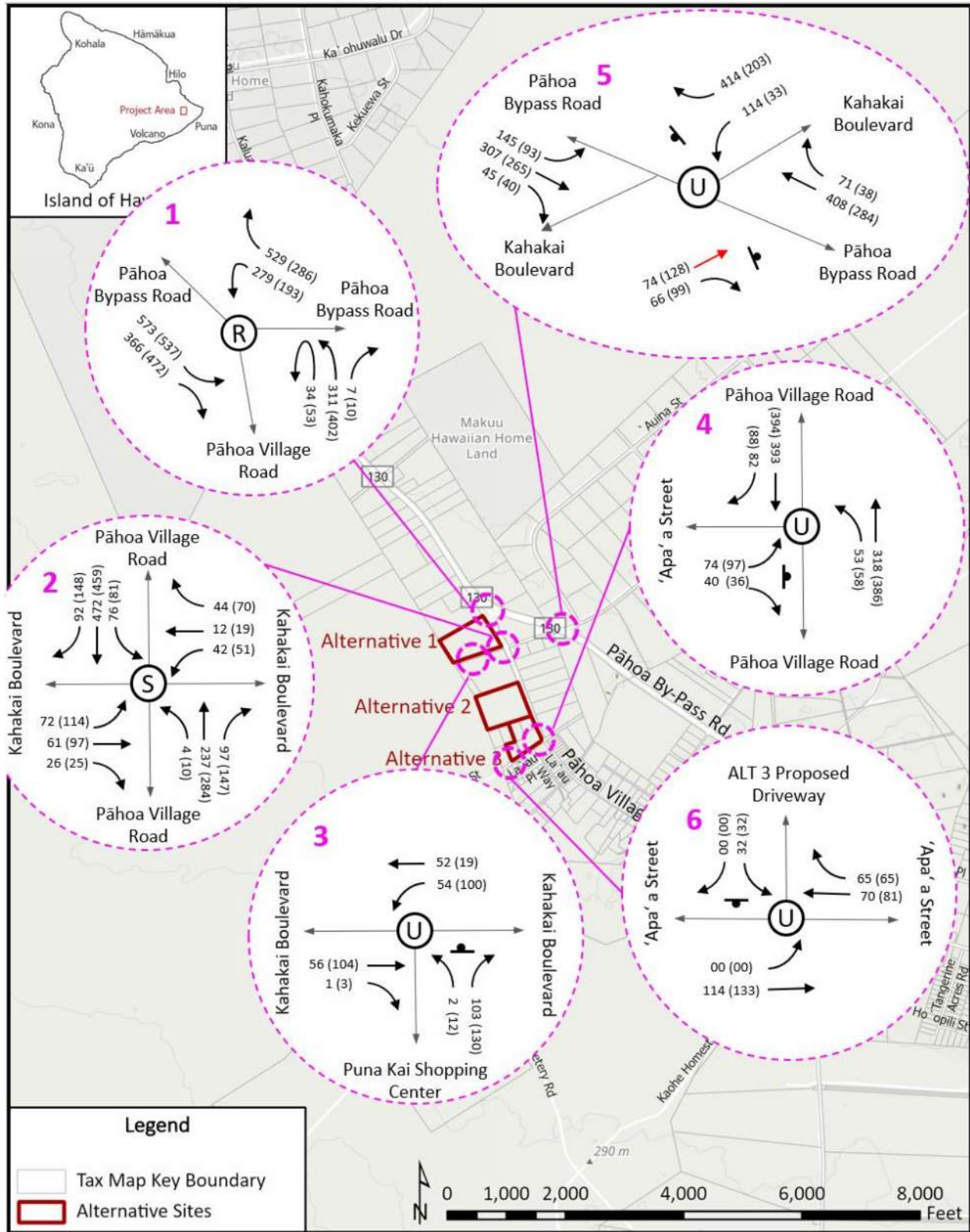


Figure 32: Future (2033) With Project Peak Hour Volumes – Alternative 3

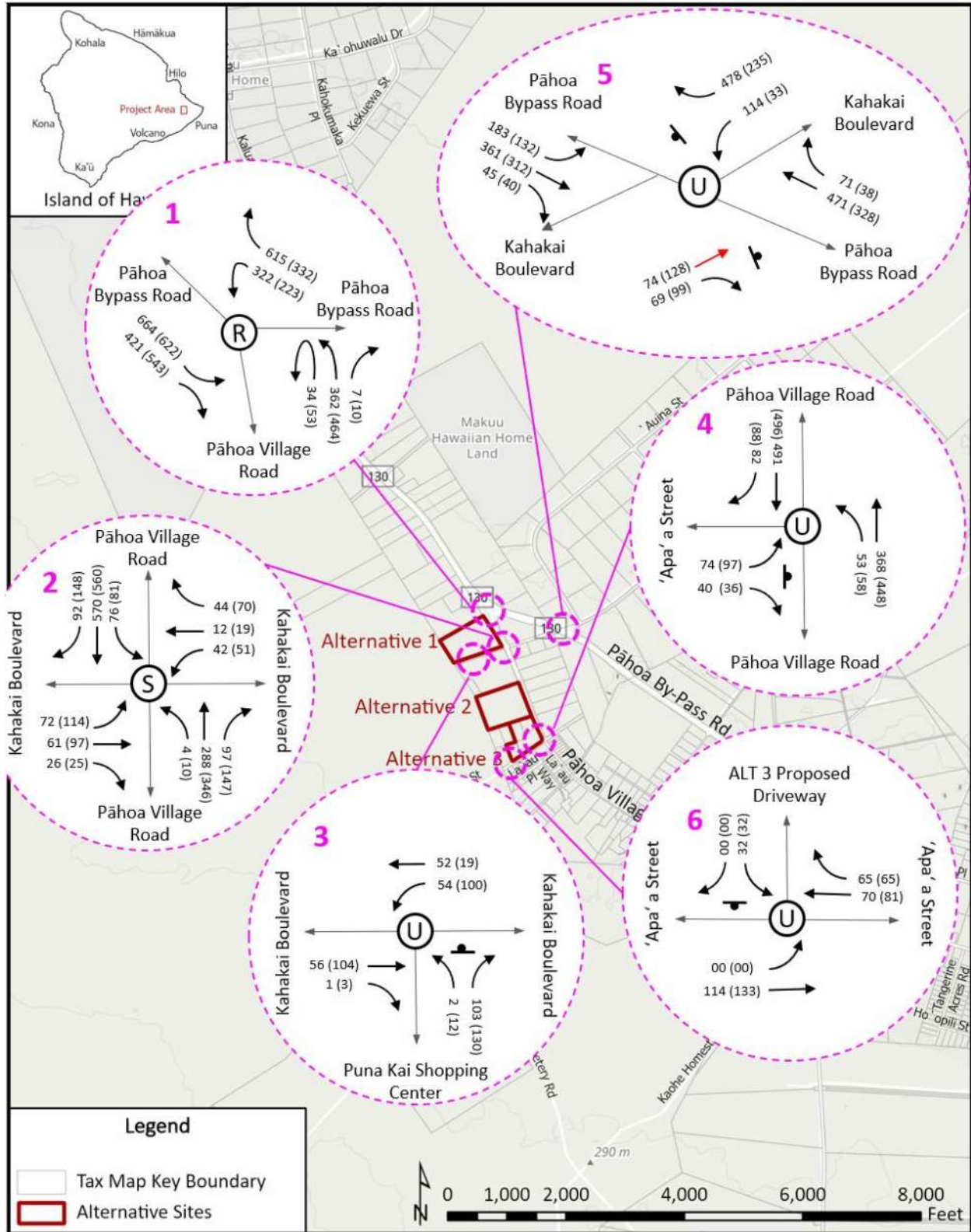


Figure 33: Future (2043) With Project Peak Hour Volumes – Alternative 3

C. Transit Site Access

Each potential alternative site proposes a separated bus loop/bay accessible only to COH Buses via a proposed two-way, two-lane driveway. This proposed driveway is separate from the proposed driveway that will provide access to the library, cultural center, and parking lot, which will be accessible to standard passenger vehicles. The bus loop/bay is being designed to accommodate upwards of six buses at any time, although it should be noted that currently, each of the three adjacent bus routes runs only once per hour. The bus loop will allow buses to circulate internally without conflicting with any passenger vehicles, minimizing conflicts and delay for transit.

This section will analyze operations at each potential alternative site's bus loop/bay driveway. For sake of analysis, operations were analyzed based on the Future (2043) With Project Conditions, representing the worse-case highest volume scenarios. As future COH Bus routing and frequency is not fully known, it was assumed that up to six buses per hour would be entering and exiting the proposed bus loop/bay driveway, doubling the current frequency of each adjacent bus route running only once per hour. Conceptual recommendations for each proposed bus loop/bay driveway will be discussed within each alternative.

1. Alternative 1

Per the conceptual site plans, the bus loop/bay for Alternative 1 is proposed off of Pāhoa Village Road, between the Pāhoa Village frontage road to the north and Kahakai Boulevard to the south, as conceptually shown in Figure 34.



Figure 34: Alternative 1 Conceptual Bus Loop Driveway

Currently, the paved portion of Pāhoa Village Road fronting the proposed bus loop/bay driveway location is approximately 40-feet wide, inclusive of the paved shoulders and striped median. If buses will be accessing the site via traveling northbound on Pāhoa Village Road, there is sufficient room to install a dedicated northbound left-turn lane into the bus loop/bay, which would prevent any buses turning into the bus loop/bay from potentially delaying northbound Pāhoa Village Road passenger vehicles as the bus waits to find a gap in traffic to turn in. No dedicated right-turn lane

in the southbound Pāhoa Village Road direction is required, as this movement will have negligible impact on southbound Pāhoa Village Road passenger vehicles.

As previously discussed, using Future (2043) With Project network volumes, the proposed bus loop/bay was analyzed assuming up to six buses per hour would be entering and exiting the proposed bus loop/bay driveway, doubling the current frequency of each adjacent bus route running only once per hour. Of these, it was assumed that half of the buses would be entering from northbound Pāhoa Village Road, while half would be entering from southbound Pāhoa Village Road, with buses exiting the proposed bus loop/bay driveway following the same distribution. *Synchro 11.0* traffic analysis software was used to determine LOS and delay (in seconds per vehicle) for the AM and PM peak hours, as shown in Table 16.

Table 16: Alternative 1 – Proposed Bus Loop/Bay Driveway Operations

Movement	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
<i>Alternative 1 - Future (2043) With Project Conditions</i>						
Alternative 1 - Bus Loop/Bay Driveway EB Left/Right	19.7	0.03	C	24.6	0.03	C
Pahoa Village Road NB Left	9.4	0.00	A	9.7	0.00	A

As shown in Table 16, it is projected that COH buses traveling northbound along Pāhoa Village Road entering the driveway via a dedicated northbound left-turn lane will experience delay under 10 seconds and operate at LOS A during both the AM and PM peak hours. COH buses exiting the driveway are projected to experience a minor delay of up to 19.7 seconds during the AM peak hour, and up to 24.6 seconds during the PM peak hour, both operating at LOS C.

Alternatively, the conceptual site plan could be adjusted to loop COH Buses to exit onto Kahakai Boulevard and then proceed towards the signalized intersection of Pāhoa Village Road and Kahakai Boulevard. However, the link distance required for COH Buses to travel to make this loop, combined with any delay experienced due to the signalized intersection, will be significantly greater than the aforementioned delay of 19.7 seconds and 24.6 seconds during the AM and PM peak hours, respectively.

2. Alternative 2

Per the conceptual site plans, the bus loop/bay for Alternative 2 is proposed off of Pāhoa Village Road, to the south of the Puna Kai Shopping Center, as conceptually shown in Figure 35.



Figure 35: Alternative 2 Conceptual Bus Loop Driveway

Currently, the paved portion of Pāhoa Village Road fronting the proposed bus loop/bay driveway location is approximately 30-foot wide, inclusive of the paved shoulders. If this alternative site is chosen, it is recommended to slightly widen the roadway at the driveway entrance to provide a dedicated northbound left-turn lane into the bus loop/bay, which would prevent any buses turning into the bus loop/bay from potentially delaying northbound Pāhoa Village Road passenger vehicles as the bus waits to find a gap in traffic to turn in. No dedicated right-turn lane in the southbound Pāhoa Village Road direction is required, as this movement will have negligible impact on southbound Pāhoa Village Road passenger vehicles.

As previously discussed, using Future (2043) With Project network volumes, the proposed bus loop/bay was analyzed assuming up to six buses per hour would be entering and exiting the proposed bus loop/bay driveway, doubling the current frequency of each adjacent bus route running only once per hour. Of these, it was assumed that half of the buses would be entering from northbound Pāhoa Village Road, while half would be entering from southbound Pāhoa Village Road, with buses exiting the proposed bus loop/bay driveway following the same distribution. *Synchro 11.0* traffic analysis software was used to determine LOS and delay (in seconds per vehicle) for the AM and PM peak hours, as shown in Table 17.

Table 17: Alternative 2 – Proposed Bus Loop/Bay Driveway Operations

Movement	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
<i>Alternative 2 - Future (2043) With Project Conditions</i>						
Alternative 2 - Bus Loop/Bay Driveway EB Left/Right	16.9	0.02	C	18.4	0.02	C
Pahoa Village Road NB Left	8.9	0.00	A	8.9	0.00	A

As shown in Table 17 it is projected that COH buses traveling northbound along Pāhoa Village Road entering the driveway via a dedicated northbound left-turn lane will experience delay under 10 seconds and operate at LOS A during both the AM and PM peak hours. COH buses exiting the driveway are projected to experience a minor delay of up to 16.9 seconds during the AM peak hour, and up to 18.4 seconds during the PM peak hour, both operating at LOS C.

3. *Alternative 3*

Per the conceptual site plans, the bus loop/bay for Alternative 3 is proposed off of Pāhoa Village Road, to the north of its intersection with ‘Apa’a Street, as conceptually shown in Figure 36.



Figure 36: Alternative 3 Conceptual Bus Loop Driveway

Currently, the paved portion of Pāhoa Village Road fronting the proposed bus loop/bay driveway location is approximately 30-feet wide, inclusive of the paved shoulders. If this alternative site is chosen, it is recommended to slightly widen the roadway at the driveway entrance to provide a dedicated northbound left-turn lane into the bus loop/bay, which would prevent any buses turning into the bus loop/bay from potentially delaying northbound Pāhoa Village Road passenger vehicles as the bus waits to find a gap in traffic to turn in. No dedicated right-turn lane in the southbound Pāhoa Village Road direction is required, as this movement will have negligible impact on southbound Pāhoa Village Road passenger vehicles.

As previously discussed, using Future (2043) With Project network volumes, the proposed bus loop/bay was analyzed assuming up to six buses per hour would be entering and exiting the proposed bus loop/bay driveway, doubling the current frequency of each adjacent bus route running only once per hour. Of these, it was assumed that half of the buses would be entering from northbound Pāhoa Village Road, while half would be entering from southbound Pāhoa Village Road, with buses exiting the proposed bus loop/bay driveway following the same distribution.

Resulting LOS is projected to be the same as operations for Alternative 2, shown in Table 17.

D. Future With Project LOS

1. Future (2028) With Project Conditions – Alternative 1

Future (2028) With Project – Alternative 1, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 16 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Future (2028) With Project LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions, and Future (2028) Without Project Conditions. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and operate at LOS F in the AM peak hour, resulting in projected delays of 55.0 seconds and 54.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio over 0.85 and operate at LOS F, resulting in a projected delay of 45.0 seconds during the PM peak hour. Likewise, these movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. similar to Existing (2023) Conditions and Future (2028) Without Project Conditions, it is projected that the majority of delay will be felt within short 30-minute segments between 7:45AM – 8:45AM and 3:00PM – 3:30PM. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 68.5 second/vehicle and LOS E using *SimTraffic* software (note no v/c ratio is provided) during the AM peak hour. This projected delay is increased compared to the 46.5 second/vehicle delay experienced during the AM peak hour in Future (2028) Without Project Conditions. As noted previously, videos recorded during traffic data collection did not indicate this significant of a delay, with queuing in the westbound left-turning direction not typically exceeding three vehicles, and most vehicles clearing in under twenty seconds. As such, it is expected that traffic operations for this movement will remain comparable to both Existing (2023) and Future (2028) Without Project Conditions.

Table 18: Future (2028) With Project LOS – Alternative 1

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	47.0	-	E	30.0	-	D
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB	55.0	1.01	F	45.0	0.99	F
Pāhoa Bypass Road WB	54.0	1.01	F	14.0	0.62	B
Pāhoa Village Road & Kahakai Boulevard	16.2	-	B	19.1	-	B
Kahakai Boulevard EB Left	23.7	0.34	C	24.5	0.52	C
Kahakai Boulevard EB Through-Right	29.2	0.62	C	27.5	0.62	C
Kahakai Boulevard WB Left	23.9	0.21	C	22.7	0.21	C
Kahakai Boulevard WB Through-Right	28.9	0.47	C	27.0	0.43	C
Pāhoa Village Road NB Left	9.4	0.08	A	11.3	0.12	B
Pāhoa Village Road NB Through-Right	13.9	0.05	B	17.9	0.54	B
Pāhoa Village Road SB Left	8.7	0.17	A	11.2	0.2	B
Pāhoa Village Road SB Through	13.8	0.53	B	16.8	0.54	B
Pāhoa Village Road SB Right	10.2	0.22	B	14.1	0.33	B
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard NB Left	10.9	0.00	B	13.2	0.03	B
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	20.5	0.364	C	26.60	0.46	D
Pāhoa Village Road NB Left-Through	8.4	0.027	A	8.50	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.2	0.28	B	13.9	0.45	B
Kahakai Boulevard WB Left*	68.5	-	F	20.8	-	C
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.1	0.33	B	9.2	0.32	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

2. Future (2028) With Project Conditions – Alternative 1 Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2028) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 19. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would result in appropriate LOS D or better.

Table 19: Future (2028) With Project Mitigation Alternative 1 – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	47.0	-	F	30.0	-	D
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB	55.0	1.01	F	45.0	0.99	F
Pāhoa Bypass Road WB	54.0	1.01	F	14.0	0.62	B
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	11.0	-	B	10.0	-	A
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB Left - Through	13.0 - 8.0	0.61 - 0.36	B - A	10.0 - 8.0	0.52 - 0.43	A - A
Pāhoa Bypass Road WB Left - Through	7.0 - 13.0	0.33 - 0.61	A - B	6.0 - 8.0	0.23 - 0.34	A - A

3. Future (2033) With Project Conditions – Alternative 1

Future (2033) With Project – Alternative 1, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 20 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Future (2033) With Project – Alternative 1 LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions and Future (2028) Without Project. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 88.0 seconds and 87.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F,

resulting in a projected delay of 71.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes, as discussed in the Future (2028) Without Project mitigative section, will be discussed in the following section.

▪ **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 135.5 second/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. This projected delay is increased compared to the 68.5 second/vehicle delay experienced during the AM peak hour in Future (2028) With Project Conditions for Alternative 1 and 48.5 second/vehicle delay experienced in the Future (2028) Without Project Conditions. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

Table 20: Future (2033) With Project LOS – Alternative 1

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	75.0	-	F	45.0	-	E
Pāhoa Village Road NB	15.0	0.58	B	19.0	0.70	C
Pāhoa Bypass Road SB	88.0	1.12	F	71.0	1.08	F
Pāhoa Bypass Road WB	87.0	1.11	F	18.0	0.69	C
Pāhoa Village Road & Kahakai Boulevard	16.6	-	B	19.6	-	B
Kahakai Boulevard EB Left	23.2	0.34	C	24.5	0.52	C
Kahakai Boulevard EB Through-Right	28.6	0.61	C	27.5	0.62	C
Kahakai Boulevard WB Left	23.4	0.21	C	22.7	0.21	C
Kahakai Boulevard WB Through-Right	28.3	0.47	C	27.0	0.43	C
Pāhoa Village Road NB Left	9.8	0.09	A	11.6	0.13	B
Pāhoa Village Road NB Through-Right	14.6	0.50	B	18.6	0.58	B
Pāhoa Village Road SB Left	9.0	0.18	A	11.4	0.21	B
Pāhoa Village Road SB Through	15.1	0.60	B	18.0	0.60	B
Pāhoa Village Road SB Right	10.3	0.22	B	14.1	0.33	B
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard NB Left	10.9	0.00	B	13.2	0.03	B
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	23.30	0.40	C	32	0.513	D
Pāhoa Village Road NB Left-Through	8.50	0.03	A	8.7	0.031	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.6	0.29	B	14.4	0.47	B
Kahakai Boulevard WB Left*	135.5	-	F	25.3	-	D
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.5	0.37	B	9.5	0.34	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

4. Future (2033) With Project Conditions – Alternative 1 Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 21. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would continue to result in appropriate LOS D or better.

Table 21: Future (2033) With Project Alternative 1 Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	75.0	-	F	45.0	-	F
Pāhoa Village Road NB	15.0	0.58	B	19.0	0.70	C
Pāhoa Bypass Road SB	88.0	1.12	F	71.0	1.08	F
Pāhoa Bypass Road WB	87.0	1.11	F	18.0	0.69	C
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	13.0	-	B	11.0	-	B
Pāhoa Village Road NB	15.0	0.58	B	19.0	0.70	C
Pāhoa Bypass Road SB Left - Through	15.0 - 8.0	0.67 - 0.40	C - A	11.0 - 8.0	0.57 - 0.47	B - A
Pāhoa Bypass Road WB Left - Through	8.0 - 15.0	0.36 - 0.68	A - B	7.0 - 9.0	0.26 - 0.38	A - A

(b) Pāhoa Bypass Road & Kahakai Boulevard

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as first discussed in the Future (2033) Without Project Mitigation section.

(i) Signalized Intersection

The signalized intersection potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 22. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

(ii) Single Lane Roundabout

The single lane roundabout potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 22. All

movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 22: Future (2033) With Project Alternative 1 Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.6	0.29	B	14.4	0.47	B
Kahakai Boulevard WB Left*	135.5	-	F	25.3	-	D
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.5	0.37	B	9.5	0.34	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Pāhoa Village Road	15.4	-	B	15.5	-	B
Kahakai Boulevard EB Through	16.2	0.18	B	17.9	0.33	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	20.2	0.31	C	19.6	0.13	B
Kahakai Boulevard WB Through	14.7	0.00	B	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	11.2	0.53	B	9.9	0.43	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	28.2	0.69	C	26.7	0.72	C
Pāhoa Bypass Road SB Through	9.6	0.4	A	9.7	0.41	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	10.0	-	B	10.0	-	B
Kahakai Boulevard EB	11.0	0.34	B	16.0	0.56	C
Kahakai Boulevard WB	7.0 - 0.0	0.19 - 0.00	A - A	5.0 - 0.00	0.05 - 0.00	A - A
Pāhoa Bypass Road NB	17.0	0.70	C	13.0	0.55	B
Pāhoa Bypass Road SB	12.0	0.65	B	10.0	0.60	A

5. Future (2043) With Project Conditions – Alternative 1

Future (2043) With Project - Alternative 1 LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 23 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in red. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 188.0 seconds and 194.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 154.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes, as first discussed in the Future (2028) Without Project mitigative section, will be discussed in the following section.

- **Pāhoa Village Road & 'Apa'a Street**

The 'Apa'a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS F with a v/c ratio of 0.67 and a delay of 51.8 seconds/vehicle during the PM peak hour. This delay is comparable to the 45.3 seconds/vehicle delay and 0.62 v/c experienced in Future (2043) Without Project Conditions. The v/c ratio continues to indicate that this movement is not approaching capacity. The 'Apa'a Street eastbound approach is projected to have up to 101 vehicles during the PM peak hour, equating to just over 1.5 vehicles per minute. *SimTraffic* visual simulations did not indicate substantial queuing or delay along this approach, with maximum queues of up to three vehicles occasionally being observed. Due to the relatively low volume of this approach, and the low v/c ratio, no mitigation is recommended for this intersection at this time.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 429.1 seconds/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. The potential mitigative treatments first discussed in the Future (2033) Without Project mitigative section will be analyzed with Future (2043) With Project – Alternative 1 volumes.

Table 23: Future (2043) With Project LOS – Alternative 1

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	162.0	-	F	95.0	-	F
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB	188.0	1.36	F	154.0	1.29	F
Pāhoa Bypass Road WB	194.0	1.38	F	31.0	0.86	D
Pāhoa Village Road & Kahakai Boulevard	18.0	-	B	21.3	-	C
Kahakai Boulevard EB Left	23.7	0.34	C	24.5	0.52	C
Kahakai Boulevard EB Through-Right	29.2	0.62	C	27.5	0.62	C
Kahakai Boulevard WB Left	23.9	0.21	C	22.7	0.21	C
Kahakai Boulevard WB Through-Right	28.9	0.47	C	27.0	0.43	C
Pāhoa Village Road NB Left	10.7	0.10	B	12.8	0.16	B
Pāhoa Village Road NB Through-Right	15.7	0.57	B	20.7	0.66	C
Pāhoa Village Road SB Left	9.3	0.20	A	12.0	0.24	B
Pāhoa Village Road SB Through	18.2	0.73	B	22.3	0.75	C
Pāhoa Village Road SB Right	10.2	0.22	B	14.1	0.33	B
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		A	Uncontrolled		A
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard NB Left	10.9	0.00	B	13.2	0.03	B
Puna Kai Shopping Center Driveway/Pāhoa Transit Hub Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	32.2	0.51	D	51.8	0.67	F
Pāhoa Village Road NB Left-Through	8.9	0.03	A	9.1	0.04	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.5	0.31	B	15.5	0.50	C
Kahakai Boulevard WB Left*	429.1	-	F	49.7	-	E
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	11.9	0.45	B	10.2	0.41	B
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-

-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using *SimTraffic Software*

6. Future (2043) With Project Conditions – Alternative 1 Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2043) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 24. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would continue to result in appropriate LOS D or better.

Table 24: Future (2043) With Project Alternative 1 Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	162.0	-	F	95.0	-	F
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB	188.0	1.36	F	154.0	1.29	F
Pāhoa Bypass Road WB	194.0	1.38	F	31.0	0.86	D
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	20.0	-	C	17.0	-	C
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB Left - Through	24.0 - 10.0	0.81 - 0.48	C - A	14.0 - 10.0	0.68 - 0.55	B - B
Pāhoa Bypass Road WB Left - Through	9.0 - 25.0	0.44 - 0.83	A - C	8.0 - 11.0	0.32 - 0.47	A - B

(b) Pāhoa Bypass Road & Kahakai Boulevard

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as first discussed in the Future (2033) Without Project mitigative section.

(i) Signalized Intersection

The signalized intersection potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2043) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 25. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

(ii) Single Lane Roundabout

The single lane roundabout potential mitigative treatment first discussed in the Future (2043) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 1. Resulting LOS and delay (in seconds per vehicle) is shown in Table 25. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 25: Future (2043) With Project Alternative 1 Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.5	0.31	B	15.5	0.50	C
Kahakai Boulevard WB Left*	429.1	-	F	49.7	-	E
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	11.9	0.45	B	10.2	0.41	B
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	18.0	-	B	15.5	-	B
Kahakai Boulevard EB Through	28.3	0.22	C	17.9	0.33	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	36.0	0.42	D	19.6	0.13	B
Kahakai Boulevard WB Through	25.7	0.00	C	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	10.0	0.51	B	9.9	0.43	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	33.8	0.76	C	26.7	0.72	C
Pāhoa Bypass Road SB Through	8.5	0.38	A	9.7	0.41	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Kahakai Boulevard	15.0	-	B	8.0	-	A
Kahakai Boulevard EB	14.0	0.38	B	12.0	0.47	B
Kahakai Boulevard WB	7.0 - 0.0	0.20 - 0.00	A - A	4.0 - 0.0	0.04 - 0.00	A - A
Pāhoa Bypass Road NB	28.0	0.85	D	10.0	0.46	B
Pāhoa Bypass Road SB	16.0	0.76	C	8.0	0.50	A

7. Future (2028) With Project Conditions – Alternative 2

Future (2028) With Project – Alternative 2, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 26 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Table 26: Future (2028) With Project LOS – Alternative 2

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	46.0	-	E	30.0	-	D
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB	54.0	1.01	F	45.0	0.99	E
Pāhoa Bypass Road WB	53.0	1.01	F	14.0	0.62	B
Pāhoa Village Road & Kahakai Boulevard	15.5	-	B	17.7	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	9.5	0.01	A	11.4	0.03	B
Pāhoa Village Road NB Through-Right	13.8	0.48	B	17.8	0.57	B
Pāhoa Village Road SB Left	8.3	0.17	A	10.7	0.21	B
Pāhoa Village Road SB Through	12.4	0.55	B	14.9	0.54	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		-	Uncontrolled		-
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.3	0.00	B	12.1	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	20.80	0.37	C	26.3	0.45	D
Pāhoa Village Road NB Left-Through	8.40	0.03	A	8.5	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.1	0.27	B	12.6	0.37	B
Kahakai Boulevard WB Left*	44.9	-	E	24.8	0.37	C
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.1	0.33	B	9.1	0.29	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Pāhoa Village Road & ALT 2 Proposed Driveway	Unsignalized (TWSC)			Unsignalized (TWSC)		
Pāhoa Village Road NB Left-Through	8.6	0.03	A	8.6	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
ALT 2 Proposed Driveway EB Left-Right	16.2	0.10	C	18.5	0.12	C

Future (2028) With Project LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions, and Future (2028) Without Project Conditions. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and operate at LOS F in the AM peak hour, resulting in projected delays of 54.0 seconds and 53.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio over 0.85 and operate at LOS E, resulting in a projected delay of 45.0 seconds during the PM peak hour. Likewise, these movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Similar to Existing (2023) Conditions and Future (2028) Without Project Conditions, it is projected that the majority of delay will be felt within short 30-minute segments between 7:45AM – 8:45AM and 3:00PM – 3:30PM. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 44.9 second/vehicle and LOS E using *SimTraffic* software (note no v/c ratio is provided) during the AM peak hour. This projected delay is increased comparable to the delay experienced during the AM peak hour in Future (2028) Without Project Conditions. As noted previously, videos recorded during traffic data collection did not indicate this significant of a delay, with queuing in the westbound left-turning direction not typically exceeding three vehicles, and most vehicles clearing in under twenty seconds. As such, it is expected that traffic operations for this movement will remain comparable to both Existing (2023) and Future (2028) Without Project Conditions.

8. *Future (2028) With Project Conditions – Alternative 2 Potential Mitigation*

(a) *Pāhoa Village Road & Pāhoa Bypass Road*

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2028) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 27. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would result in appropriate LOS D or better.

Table 27: Future (2028) With Project Mitigation Alternative 2 – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
<i>Existing Configuration - Single Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	46.0	-	E	30.0	-	D
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB	54.0	1.01	F	45.0	0.99	E
Pāhoa Bypass Road WB	53.0	1.01	F	14.0	0.62	B
<i>Potential Mitigation - Multi Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	11.0	-	B	10.0	-	A
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB Left - Through	13.0 - 8.0	0.61 - 0.36	B - A	10.0 - 8.0	0.52 - 0.43	A - A
Pāhoa Bypass Road WB Left - Through	7.0 - 13.0	0.33 - 0.61	A - B	6.0 - 8.0	0.23 - 0.34	A - A

9. Future (2033) With Project Conditions – Alternative 2

Future (2033) With Project – Alternative 2, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 28 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Future (2033) With Project – Alternative 2 LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions and Future (2028) Without Project. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 87.0 seconds and 86.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 71.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes will be discussed in the following section.

Table 28: Future (2033) With Project LOS – Alternative 2

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	74.0	-	F	45.0	-	E
Pāhoa Village Road NB	15.0	0	B	19.0	0.70	C
Pāhoa Bypass Road SB	87.0	0.58	F	71.0	1.08	F
Pāhoa Bypass Road WB	86.0	1.11	F	18.0	0.69	C
Pāhoa Village Road & Kahakai Boulevard	15.8	-	B	18.2	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	9.8	0.01	A	11.6	0.03	B
Pāhoa Village Road NB Through-Right	14.3	0.52	B	18.5	0.60	B
Pāhoa Village Road SB Left	8.5	0.18	A	11.0	0.22	B
Pāhoa Village Road SB Through	13.4	0.60	B	16.0	0.60	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		-	Uncontrolled		-
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.3	0.00	B	12.1	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	23.60	0.41	C	31.2	0.51	D
Pāhoa Village Road NB Left-Through	8.50	0.03	A	8.7	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.1	0.27	B	12.9	0.38	B
Kahakai Boulevard WB Left*	68.2	1.48	F	9.3	0.32	A
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.5	0.36	B	9.3	0.32	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Pāhoa Village Road & ALT 2 Proposed Driveway	Unsignalized (TWSC)			Unsignalized (TWSC)		
Pāhoa Village Road NB Left-Through	8.8	0.03	A	8.8	0.03	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
ALT 2 Proposed Driveway EB Left-Right	17.4	0.11	C	20.2	0.13	C

▪ **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 68.2 second/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

10. *Future (2033) With Project Conditions – Alternative 2 Potential Mitigation*

(a) *Pāhoa Village Road & Pāhoa Bypass Road*

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 29. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would continue to result in appropriate LOS D or better.

Table 29: Future (2033) With Project Alternative 2 Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	74.0	-	F	45.0	-	E
Pāhoa Village Road NB	15.0	0	B	19.0	0.70	C
Pāhoa Bypass Road SB	87.0	0.58	F	71.0	1.08	F
Pāhoa Bypass Road WB	86.0	1.11	F	18.0	0.69	C
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	13.0	-	B	11.0	-	B
Pāhoa Village Road NB	15.0	0.58	B	19.0	0.70	C
Pāhoa Bypass Road SB Left - Through	15.0 - 8.0	0.67 - 0.40	C - A	11.0 - 5.0	0.57 - 0.47	B - A
Pāhoa Bypass Road WB Left - Through	8.0 - 15.0	0.36 - 0.68	A - B	7.0 - 9.0	0.26 - 0.38	A - A

(b) *Pāhoa Bypass Road & Kahakai Boulevard*

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as first discussed in the Future (2033) Without Project mitigative section.

(i) *Signalized Intersection*

The signalized intersection potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 30. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

(ii) *Single Lane Roundabout*

The single lane roundabout potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 30. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 30: Future (2033) With Project Alternative 2 Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.1	0.27	B	12.9	0.38	B
Kahakai Boulevard WB Left*	68.2	1.48	F	9.3	0.32	A
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.5	0.36	B	9.3	0.32	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	15.0	-	B	12.4	-	B
Kahakai Boulevard EB Through	16.2	0.18	B	17.9	0.33	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	20.2	0.31	C	19.4	0.11	B
Kahakai Boulevard WB Through	14.7	0.00	B	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	11.2	0.53	B	9.2	0.37	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	26.7	0.66	C	16.4	0.46	B
Pāhoa Bypass Road SB Through	9.5	0.40	A	9.1	0.35	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Kahakai Boulevard	10.0	-	A	7.0	-	A
Kahakai Boulevard EB	11.0	0.32	B	10.0	0.42	B
Kahakai Boulevard WB	7.0 - 0.0	0.19 - 0.0	A - A	4.0 - 0.0	0.04 - 0.00	A - A
Pāhoa Bypass Road NB	16.0	0.69	C	9.0	0.43	A
Pāhoa Bypass Road SB	12.0	0.64	B	8.0	0.47	A

11. *Future (2043) With Project Conditions – Alternative 2*

Future (2043) With Project - Alternative 2 LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis

software. Table 31 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in red. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 187.0 seconds and 192.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 154.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes, as first discussed in the Future (2028) Without Project mitigative section, will be discussed in the following section.

- **Pāhoa Village Road & 'Apa'a Street**

The 'Apa'a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS F with a v/c ratio of 0.66 and a delay of 51.3 seconds/vehicle during the PM peak hour. This delay is comparable to the 45.3 seconds/vehicle delay and 0.62 v/c experienced in Future (2043) Without Project Conditions. The v/c ratio continues to indicate that this movement is not approaching capacity. The 'Apa'a Street eastbound approach is projected to have up to 101 vehicles during the PM peak hour, equating to just over 1.5 vehicles per minute. *SimTraffic* visual simulations did not indicate substantial queuing or delay along this approach, with maximum queues of up to three vehicles occasionally being observed. Due to the relatively low volume of this approach, and the low v/c ratio, no mitigation is recommended for this intersection at this time.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 245.0 seconds/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. The potential mitigative treatments first discussed in the Future (2033) Without Project mitigative section will be analyzed with Future (2043) With Project – Alternative 2 volumes.

Table 31: Future (2043) With Project LOS – Alternative 2

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	161.0	-	F	95.0	-	F
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB	187.0	1.36	F	154.0	1.29	F
Pāhoa Bypass Road WB	192.0	1.37	F	31.0	0.86	D
Pāhoa Village Road & Kahakai Boulevard	17.3	-	B	19.9	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	10.7	0.02	B	12.5	0.04	B
Pāhoa Village Road NB Through-Right	15.7	0.59	B	20.6	0.68	C
Pāhoa Village Road SB Left	9.0	0.20	A	11.7	0.24	B
Pāhoa Village Road SB Through	16.6	0.73	B	19.5	0.73	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		-	Uncontrolled		-
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.3	0.00	B	12.1	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	0.9	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	33.0	0.52	D	51.3	0.66	F
Pāhoa Village Road NB Left-Through	8.9	0.03	A	9.1	0.04	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.3	0.30	B	13.7	0.41	B
Kahakai Boulevard WB Left*	245.0	2.20	F	38.5	0.61	E
Kahakai Boulevard WB Right	Free-Flow Slip			Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	11.8	0.45	B	10.0	0.38	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Pāhoa Village Road & ALT 2 Proposed Driveway	Unsignalized (TWSC)			Unsignalized (TWSC)		
Pāhoa Village Road NB Left-Through	9.1	0.31	A	9.1	0.04	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
ALT 2 Proposed Driveway EB Left-Right	20.8	0.132	C	25.1	0.16	D

12. Future (2043) With Project Conditions – Alternative 2 Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2043) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 32. Synchro reports for the Future With Project mitigation can be found in Appendix G. The roundabout is projected to operate at LOS C during both the AM and PM peak hours.

Table 32: Future (2043) With Project Alternative 2 Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	161.0	-	F	95.0	-	F
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB	187.0	1.36	F	154.0	1.29	F
Pāhoa Bypass Road WB	192.0	1.37	F	31.0	0.86	D
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	16.0	-	C	20.0	-	C
Pāhoa Village Road NB	15.0	0.55	C	45.0	0.94	E
Pāhoa Bypass Road SB Left - Through	24.0 - 10.0	0.81 - 0.48	C - A	15.0 - 10.0	0.68 - 0.56	B - B
Pāhoa Bypass Road WB Left - Through	8.0 - 17.0	0.39 - 0.74	A - C	9.0 - 11.0	0.33 - 0.49	A - B

(b) Pāhoa Bypass Road & Kahakai Boulevard

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as first discussed in the Future (2033) Without Project mitigative section.

(i) Signalized Intersection

The signalized intersection potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2043) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 33. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

(ii) Single Lane Roundabout

The single lane roundabout potential mitigative treatment first discussed in the Future (2043) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 2. Resulting LOS and delay (in seconds per vehicle) is shown in Table 33. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 33: Future (2043) With Project Alternative 2 Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.3	0.30	B	13.7	0.41	B
Kahakai Boulevard WB Left*	245.0	2.20	F	38.5	0.61	E
Kahakai Boulevard WB Right	Free-Flow Slip			Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	11.8	0.45	B	10.0	0.38	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	21.4	-	D	14.0	-	B
Kahakai Boulevard EB Through	16.2	0.18	B	17.9	0.33	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	20.2	0.31	C	19.4	0.11	B
Kahakai Boulevard WB Through	14.7	0.00	B	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	12.6	0.61	B	9.9	0.43	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	54.2	0.92	D	22.2	0.62	C
Pāhoa Bypass Road SB Through	10.2	0.46	B	9.6	0.40	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Kahakai Boulevard	14.0	-	B	9.0	-	A
Kahakai Boulevard EB	13.0	0.37	B	12.0	0.47	B
Kahakai Boulevard WB	7.0 - 0.0	0.20 - 0.00	A - A	4.0 - 0.0	0.04 - 0.00	A - A
Pāhoa Bypass Road NB	26.0	0.84	D	12.0	0.52	B
Pāhoa Bypass Road SB	16.0	0.75	C	9.0	0.55	A

13. Future (2028) With Project Conditions – Alternative 3

Future (2028) With Project – Alternative 3, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 34 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or $v/c \geq 1.0$ are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Future (2028) With Project LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions, and Future (2028) Without Project Conditions. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and operate at LOS F in the AM peak hour, resulting in projected delays of 53.0 seconds and 54.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio over 0.85 and operate at LOS E, resulting in a projected delay of 44.0 seconds during the PM peak hour. Likewise, these movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. similar to Existing (2023) Conditions and Future (2028) Without Project Conditions, it is projected that the majority of delay will be felt within short 30-minute segments between 7:45AM – 8:45AM and 3:00PM – 3:30PM. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 65.6.5 second/vehicle and LOS E using *SimTraffic* software (note no v/c ratio is provided) during the AM peak hour. This projected delay is increased compared to the 46.5 second/vehicle delay experienced during the AM peak hour in Future (2028) Without Project Conditions. As noted previously, videos recorded during traffic data collection did not indicate this significant of a delay, with queuing in the westbound left-turning direction not typically exceeding three vehicles, and most vehicles clearing in under twenty seconds. As such, it is expected that traffic operations for this movement will remain comparable to both Existing (2023) and Future (2028) Without Project Conditions.

Table 34: Future (2028) With Project LOS – Alternative 3

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	46.0	-	E	30.0	-	D
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB	53.0	1.01	F	44.0	0.98	E
Pāhoa Bypass Road WB	53.0	1.00	F	14.0	0.62	B
Pāhoa Village Road & Kahakai Boulevard	15.4	-	B	17.7	-	C
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	9.5	0.01	A	11.3	0.03	B
Pāhoa Village Road NB Through-Right	13.8	0.48	B	17.8	0.57	B
Pāhoa Village Road SB Left	8.3	0.17	A	10.7	0.21	B
Pāhoa Village Road SB Through	12.4	0.54	B	14.9	0.54	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		-	Uncontrolled		-
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.3	0.00	B	12.1	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	29.7	0.57	D	40.4	0.66	E
Pāhoa Village Road NB Left-Through	8.6	0.07	A	8.7	0.07	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.1	0.27	B	12.6	0.37	B
Kahakai Boulevard WB Left*	65.6	1.25	F	17	0.37	F
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.1	0.33	B	9.1	0.29	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Pāhoa Village Road & ALT 3 Proposed Driveway	Unsignalized (TWSC)			Unsignalized (TWSC)		
Pāhoa Village Road EB Left-Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Village Road WB Through-Right	Uncontrolled		-	Uncontrolled		-
ALT 3 Proposed Driveway SB Left-Right	10.5	0.051	B	10.8	0.05	B

14. Future (2028) With Project Conditions – Alternative 3 Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2028) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 35. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would result in appropriate LOS D or better.

Table 35: Future (2028) With Project Mitigation Alternative 3 – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
<i>Existing Configuration - Single Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	46.0	-	E	30.0	-	D
Pāhoa Village Road NB	13.0	0.52	B	15.0	0.63	C
Pāhoa Bypass Road SB	53.0	1.01	F	44.0	0.98	E
Pāhoa Bypass Road WB	53.0	1.00	F	14.0	0.62	B
<i>Potential Mitigation - Multi Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	11.0	-	B	11.0	-	B
Pāhoa Village Road NB	13.0	0.52	B	18.0	0.69	C
Pāhoa Bypass Road SB Left - Through	13.0 - 7.0	0.60 - 0.36	B - A	10.0 - 8.0	0.52 - 0.44	A - A
Pāhoa Bypass Road WB Left - Through	7.0 - 13.0	0.32 - 0.61	A - B	7.0 - 8.0	0.24 - 0.35	A - A

15. Future (2033) With Project Conditions – Alternative 3

Future (2033) With Project – Alternative 3, LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 36 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Table 36: Future (2033) With Project LOS – Alternative 3

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	73.0	-	F	45.0	-	E
Pāhoa Village Road NB	15.0	0.58	B	19.0	0.70	C
Pāhoa Bypass Road SB	85.0	1.11	F	70.0	1.08	F
Pāhoa Bypass Road WB	85.0	1.11	F	17.0	0.69	C
Pāhoa Village Road & Kahakai Boulevard	15.8	-	B	18.1	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	9.8	0.01	A	11.6	0.03	B
Pāhoa Village Road NB Through-Right	14.3	0.52	B	18.5	0.60	B
Pāhoa Village Road SB Left	8.5	0.18	A	11.0	0.22	B
Pāhoa Village Road SB Through	13.4	0.60	B	16.0	0.60	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		-	Uncontrolled		-
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.3	0.00	B	12.1	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	36.4	0.63	E	44.2	0.69	E
Pāhoa Village Road NB Left-Through	8.8	0.07	A	8.7	0.07	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.4	0.28	B	12.9	0.38	B
Kahakai Boulevard WB Left*	108.7	1.48	F	23.9	0.43	C
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.5	0.36	B	9.3	0.32	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Pāhoa Village Road & ALT 3 Proposed Driveway	Unsignalized (TWSC)			Unsignalized (TWSC)		
Pāhoa Village Road EB Left-Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Village Road WB Through-Right	Uncontrolled		-	Uncontrolled		-
ALT 3 Proposed Driveway SB Left-Right	10.5	0.051	B	10.8	0.05	B

Future (2033) With Project – Alternative 3 LOS and delay (in seconds per vehicle) is comparable to the LOS and delay experienced in Existing (2023) Conditions and Future (2028) Without Project. Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 85.0 seconds and 85.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 70.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes will be discussed in the following section.

- **Pāhoa Village Road & ‘Apa’a Street**

The ‘Apa’a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS E with a v/c ratio of 0.63 and a delay of 36.4 seconds/vehicle during the AM peak hour, and LOS E with a v/c ratio of 0.69 and delay of 44.2 second/vehicle during the PM peak hour. This delay is comparable to the 45.3 seconds/vehicle delay and 0.62 v/c experienced in Future (2043) Without Project Conditions. The v/c ratio continues to indicate that this movement is not approaching capacity. Due to the relatively low volume of this approach, and the low v/c ratio, no mitigation is recommended for this intersection at this time.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 108.7 second/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. Potential mitigative treatments will be discussed to improve traffic operations at this intersection in the following section.

16. *Future (2033) With Project Conditions – Alternative 3 Potential Mitigation*

(a) *Pāhoa Village Road & Pāhoa Bypass Road*

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 37. Synchro reports for the Future With Project mitigation can be found in Appendix G. All movements at the intersection would continue to result in appropriate LOS D or better.

Table 37: Future (2033) With Project Alternative 3 Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Single Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	73.0	-	F	45.0	-	E
Pāhoa Village Road NB	15.0	0.58	B	19.0	0.70	C
Pāhoa Bypass Road SB	85.0	1.11	F	70.0	1.08	F
Pāhoa Bypass Road WB	85.0	1.11	F	17.0	0.69	C
Potential Mitigation - Multi Lane Roundabout						
Pāhoa Bypass Road & Pāhoa Village Road	13.0	-	B	13.0	-	B
Pāhoa Village Road NB	15.0	0.58	B	22.0	0.76	C
Pāhoa Bypass Road SB Left - Through	15.0 - 8.0	0.66 - 0.39	B - A	11.0 - 9.0	0.57 - 0.47	B - A
Pāhoa Bypass Road WB Left - Through	8.0 - 15.0	0.36 - 0.67	A - B	7.0 - 9.0	0.27 - 0.39	A - A

(b) Pāhoa Bypass Road & Kahakai Boulevard

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as first discussed in the Future (2033) Without Project mitigative section.

(i) Signalized Intersection

The signalized intersection potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 38. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

(ii) Single Lane Roundabout

The single lane roundabout potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 38. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 38: Future (2033) With Project Alternative 3 Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	12.4	0.28	B	12.9	0.38	B
Kahakai Boulevard WB Left*	108.7	1.48	F	23.9	0.43	C
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	10.5	0.36	B	9.3	0.32	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	15.0	-	B	12.4	-	B
Kahakai Boulevard EB Through	16.2	0.18	B	17.9	0.33	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	20.2	0.31	C	19.4	0.11	B
Kahakai Boulevard WB Through	14.7	0.00	B	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	11.2	0.53	B	9.2	0.37	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	26.7	0.66	C	16.4	0.46	B
Pāhoa Bypass Road SB Through	9.5	0.40	A	9.1	0.35	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Kahakai Boulevard	10.0	-	A	7.0	-	A
Kahakai Boulevard EB	11.0	0.32	B	10.0	0.42	B
Kahakai Boulevard WB	7.0 - 0.0	0.19 - 0.0	A - A	4.0 - 0.0	0.04 - 0.00	A - A
Pāhoa Bypass Road NB	16.0	0.69	C	9.0	0.43	A
Pāhoa Bypass Road SB	12.0	0.64	B	8.0	0.47	A

17. Future (2043) With Project Conditions – Alternative 3

Future (2043) With Project - Alternative 3 LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 11.0* and *SimTraffic* traffic analysis software. Table 39 shows the projected vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future With Project Conditions can be found in Appendix F.

Table 39: Future (2043) With Project LOS – Alternative 3

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Pāhoa Bypass Road & Pāhoa Village Road	164.0	-	F	94.0	-	F
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB	191.0	1.37	F	152.0	1.29	F
Pāhoa Bypass Road WB	197.0	1.38	F	31.0	0.86	D
Pāhoa Village Road & Kahakai Boulevard	17.2	-	B	19.8	-	B
Kahakai Boulevard EB Left	23.7	0.30	C	22.7	0.36	C
Kahakai Boulevard EB Through-Right	29.0	0.58	C	25.9	0.44	C
Kahakai Boulevard WB Left	23.8	0.21	C	22.8	0.19	C
Kahakai Boulevard WB Through-Right	29.1	0.50	C	27.8	0.47	C
Pāhoa Village Road NB Left	10.6	0.02	B	12.5	0.04	B
Pāhoa Village Road NB Through-Right	15.7	0.59	B	20.6	0.68	C
Pāhoa Village Road SB Left	9.0	0.20	A	11.7	0.24	B
Pāhoa Village Road SB Through	16.4	0.72	B	19.4	0.73	B
Pāhoa Village Road SB Right	8.2	0.14	A	11.2	0.23	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Left-Through-Right	Uncontrolled		-	Uncontrolled		-
Kahakai Boulevard WB Left	7.5	0.04	A	7.7	0.08	A
Kahakai Boulevard WB Through	Uncontrolled		-	Uncontrolled		-
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Left	10.3	0.00	B	12.1	0.03	B
Puna Kai Shopping Center Driveway & Kahakai Boulevard NB Right	9.2	0.12	A	9.8	0.18	A
Pāhoa Village Road & 'Apa' a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
'Apa' a Road EB Left-Right	63.1	0.80	F	114.0	0.98	F
Pāhoa Village Road NB Left-Through	9.20	0.07	A	9.4	0.08	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.3	0.30	B	13.7	0.41	B
Kahakai Boulevard WB Left*	311.9	2.20	F	38.1	0.61	E
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	11.8	0.45	B	10.0	0.38	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Pāhoa Village Road & ALT 3 Proposed Driveway	Unsignalized (TWSC)			Unsignalized (TWSC)		
Pāhoa Village Road EB Left-Through	Uncontrolled		A	Uncontrolled		A
Pāhoa Village Road WB Through-Right	Uncontrolled		-	Uncontrolled		-
ALT 3 Proposed Driveway SB Left-Right	10.5	0.051	B	10.8	0.05	B

Intersections and movements with noted previous concerns are projected to experience exacerbated operations, including:

- **Pāhoa Bypass Road & Pāhoa Village Road**

The Pāhoa Bypass Road southbound and Pāhoa Bypass Road westbound approaches are projected to exceed a v/c ratio of 1.00 and LOS F in the AM peak hour, resulting in projected delays of 191.0 seconds and 197.0 seconds, respectively. Similarly, the Pāhoa Bypass Road southbound approach is projected to exceed a v/c ratio of 1.00 and LOS F, resulting in a projected delay of 152.0 seconds during the PM peak hour. These movements previously operated at v/c ratios of over 0.85 in Existing (2023) Conditions, indicating they were already approaching capacity. Traffic operations with modified approach lanes, as first discussed in the Future (2028) Without Project mitigative section, will be discussed in the following section.

- **Pāhoa Village Road & ‘Apa’a Street**

The ‘Apa’a Street eastbound approach at Pāhoa Village Road is projected to operate at LOS F with a v/c ratio of 0.80 and a delay of 63.1 seconds/vehicle during the AM peak hour, and LOS F with a v/c ratio of 0.98 and delay of 114.0 seconds/vehicle during the PM peak hour. Potential mitigative treatments will be discussed in the following section.

- **Pāhoa Bypass Road & Kahakai Boulevard**

The Kahakai Boulevard westbound left-turn onto Pāhoa Bypass Road resulted in an average computed delay of 311.9 seconds/vehicle and LOS F using *SimTraffic* software (note that *SimTraffic* does not provide a v/c ratio) during the AM peak hour. The potential mitigative treatments first discussed in the Future (2033) Without Project mitigative section will be analyzed with Future (2043) With Project – Alternative 3 volumes.

18. Future (2043) With Project Conditions – Alternative 3 Potential Mitigation

(a) Pāhoa Village Road & Pāhoa Bypass Road

The multilane roundabout potential mitigative treatment discussed in the Future (2028) Without Project Mitigation section was analyzed using Future (2043) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 40. Synchro reports for the Future With Project mitigation can be found in Appendix G. The roundabout is projected to operate at LOS C during both the AM and PM peak hours.

Table 40: Future (2043) With Project Alternative 3 Mitigation – Pāhoa Bypass Road and Pāhoa Village Road

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
<i>Existing Configuration - Single Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	164.0	-	F	94.0	-	F
Pāhoa Village Road NB	23.0	0.74	C	34.0	0.87	D
Pāhoa Bypass Road SB	191.0	1.37	F	152.0	1.29	F
Pāhoa Bypass Road WB	197.0	1.38	F	31.0	0.86	D
<i>Potential Mitigation - Multi Lane Roundabout</i>						
Pāhoa Bypass Road & Pāhoa Village Road	19.0	-	C	20.0	-	C
Pāhoa Village Road NB	23.0	0.74	C	45.0	0.94	E
Pāhoa Bypass Road SB Left - Through	23.0 - 10.0	0.81 - 0.47	C - A	14.0 - 10.0	0.68 - 0.56	B - B
Pāhoa Bypass Road WB Left - Through	9.0 - 24.0	0.43 - 0.83	A - C	9.0 - 11.0	0.33 - 0.49	A - B

(b) Pāhoa Village Road & ‘Apa’a Street

The EB ‘Apa’a Street approach at Pāhoa Village Road is projected to operate at LOS F during both the AM and PM peak hours in Future (2043) With Project Alternative 3 conditions. Currently, the approach has a shared left-right lane, and is stop-controlled, while Pāhoa Village Road is uncontrolled.

Two mitigative alternatives will be considered, a traffic signal, as well as widening the EB ‘Apa’a Street approach to two-lanes, a dedicated left-turn lane and a dedicated right-turn lane.

(i) Traffic Signal

The MUTCD was used to perform a traffic signal warrant analysis at the intersection.

Traffic Signal Warrant 3 (Peak-Hour Vehicle Volume) was considered based on the projected AM and PM peak hour intersection turning movement volumes. This warrant is typically applied only in unusual cases, such as office complexes, manufacturing plants, industrial complex, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short period of time. It is not projected that the future development will match this description; however, peak-hour warrants are the most typically used warrants to analyze traffic signals for future conditions, as projecting out vehicular volumes related to trip generation outside of the peak hours is not well documented. As a result, this warrant was analyzed as part of potential mitigation for Future (2043) With Project Alternative 3 conditions. To satisfy this warrant and merit the consideration of installing a traffic control signal, volume thresholds must fall above the applicable curve for either of the peak hours throughout the day, as shown in Figure 37. For sake of this analysis, the “1 Lane & 1 Lane” curve was used, representing the through-lane configuration along each movement. The MUTCD notes that communities with population less than 10,000 people are eligible to use a 70% Factor, reducing the applicable thresholds required

to meet a warrant. Pāhoa’s population falls beneath this, meaning that it would qualify for the 70% Factor.

Both the AM and PM projected peak hour volumes fell above this threshold, meaning that a traffic signal at the intersection may be warranted in the future if this alternative location is chosen. Resulting LOS and delay (in seconds per vehicle) is shown in Table 41. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

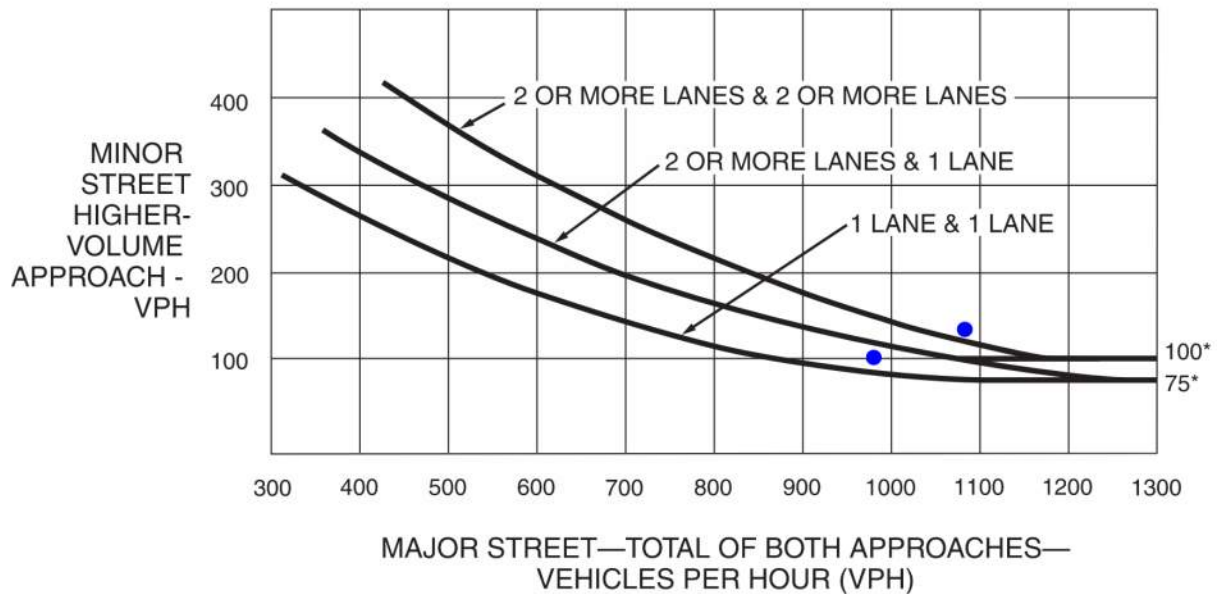


Figure 37: Peak-Hour Signal Warrant – Pāhoa Village Road and ‘Apa’a Street

(ii) *Modified EB ‘Apa’a Street Lane Configuration*

Alternatively, the EB ‘Apa’a Street lane configuration could be modified, keeping the current TWSC-configuration, to provide separated left- and right-turn lanes. In addition, an acceleration lane could be provided for EB ‘Apa’a Street left-turning vehicles onto NB Pāhoa Village Road. Resulting LOS and delay (in seconds per vehicle) is shown in Table 41. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 41: Future (2043) With Project Alternative 3 Mitigation – Pāhoa Village Road and ‘Apa’ a Street

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - Two-Way Stop-Controlled						
Pāhoa Village Road & ‘Apa’ a Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
‘Apa’ a Road EB Left-Right	63.1	0.80	F	114.0	0.98	F
Pāhoa Village Road NB Left-Through	9.20	0.07	A	9.4	0.08	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-
Potential Mitigation - Signalized Intersection						
Pāhoa Village Road & ‘Apa’ a Street	14.8	-	B	18.2	-	B
‘Apa’ a Road EB Left-Right	18.6	0.37	B	18.2	0.35	B
Pāhoa Village Road NB Left-Through	14.4	0.67	B	21.1	0.81	C
Pāhoa Village Road SB Through-Right	14.0	0.67	B	15.6	0.73	B
Potential Mitigation - Modified Eastbound ‘Apa’ a Street Approach with Acceleration Lane						
‘Apa’ a Road EB Left	23.3	0.38	C	27.7	0.46	D
‘Apa’ a Road EB Right	13.3	0.13	B	13.6	0.10	B
Pāhoa Village Road NB Left-Through	9.2	0.07	A	9.4	0.08	A
Pāhoa Village Road SB Through-Right	Uncontrolled		-	Uncontrolled		-

If the intersection were to be signalized, it is projected that all movements would operate at LOS C or better for both peak hours. If the existing TWSC-configuration was kept, with modifications to the EB ‘Apa’ a Street approach to provide dedicated left- and right-turn lanes along with an acceleration lane, all movements would operate at LOS D or better for both peak hours.

(c) Pāhoa Bypass Road & Kahakai Boulevard

The Pāhoa Bypass Road and Kahakai Boulevard intersection was analyzed as a signalized intersection and single-lane roundabout, as first discussed in the Future (2033) Without Project mitigative section.

(i) Signalized Intersection

The signalized intersection potential mitigative treatment first discussed in the Future (2033) Without Project Mitigation section was analyzed using Future (2043) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 42. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

(ii) Single Lane Roundabout

The single lane roundabout potential mitigative treatment first discussed in the Future (2043) Without Project Mitigation section was analyzed using Future (2033) With Project volumes for Alternative 3. Resulting LOS and delay (in seconds per vehicle) is shown in Table 42. All movements at the intersection would continue to result in appropriate LOS D or better. Synchro reports for the Future With Project mitigation can be found in Appendix G.

Table 42: Future (2043) With Project Alternative 3 Mitigation – Pāhoa Bypass Road and Kahakai Boulevard

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Existing Configuration - TWSC Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	Unsignalized (TWSC)			Unsignalized (TWSC)		
Kahakai Boulevard EB Right	13.3	0.30	B	13.7	0.41	B
Kahakai Boulevard WB Left*	245.0	2.20	F	38.5	0.61	E
Kahakai Boulevard WB Right	Free-Flow Slip			Free-Flow Slip		A
Pāhoa Bypass Road NB Right	Yield-Controlled		-	Yield-Controlled		-
Pāhoa Bypass Road NB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Left	11.8	0.45	B	10.0	0.38	A
Pāhoa Bypass Road SB Through	Uncontrolled		-	Uncontrolled		-
Pāhoa Bypass Road SB Right	Free-Flow Slip		-	Free-Flow Slip		-
-Note: Kahakai Boulevard WB Left at Pāhoa Bypass Road analyzed using <i>SimTraffic Software</i>						
Potential Mitigation - Signalized Intersection						
Pāhoa Bypass Road & Kahakai Boulevard	21.4	-	D	14.0	-	B
Kahakai Boulevard EB Through	16.2	0.18	B	17.9	0.33	B
Kahakai Boulevard EB Right	Yield-Controlled		A	Yield-Controlled		A
Kahakai Boulevard WB Left	20.2	0.31	C	19.4	0.11	B
Kahakai Boulevard WB Through	14.7	0.00	B	14.7	0.00	B
Kahakai Boulevard WB Right	Free-Flow Slip		A	Free-Flow Slip		A
Pāhoa Bypass Road NB Through	12.6	0.61	B	9.9	0.43	A
Pāhoa Bypass Road NB Right	Yield-Controlled		A	Yield-Controlled		A
Pāhoa Bypass Road SB Left	54.2	0.92	D	22.2	0.62	C
Pāhoa Bypass Road SB Through	10.2	0.46	B	9.6	0.40	A
Pāhoa Bypass Road SB Right	Yield-Controlled		A	Yield-Controlled		A
Potential Mitigation - Single Lane Roundabout						
Pāhoa Bypass Road & Kahakai Boulevard	14.0	-	B	9.0	-	A
Kahakai Boulevard EB	13.0	0.37	B	12.0	0.47	B
Kahakai Boulevard WB	7.0 - 0.0	0.20 - 0.00	A - A	4.0 - 0.0	0.04 - 0.00	A - A
Pāhoa Bypass Road NB	26.0	0.84	D	12.0	0.52	B
Pāhoa Bypass Road SB	16.0	0.75	C	9.0	0.55	A

19. Future With Project Conditions Mitigation Summary

No additional mitigation to what was triggered by Future Without Project conditions is projected to be triggered by Future With Project conditions for any of the three alternative site locations with one exception.

For Future (2043) With Project Conditions Alternative 3, it is projected that the EB ‘Apa’a Street approach at Pāhoa Village Road will operate at LOS F during both the AM and PM peak hours. The intersection is projected to pass MUTCD peak-hour traffic signal warrants; however, the development is not projected to meet the description of a peak-hour traffic generator. However, peak-hour warrants are the most typically used warrants to analyze traffic signals for future conditions, as projecting out vehicular volumes related to trip generation outside of the peak hours is not well documented. As a result, this warrant was analyzed as part of potential

mitigation for Future (2043) With Project Alternative 3 conditions. In addition, the intersection was analyzed under its existing TWSC-configuration, modifying the EB 'Apa'a Street approach to provide dedicated left- and right-turn lanes, as well as an acceleration lane for EB 'Apa'a Street left-turning vehicles onto NB Pāhoa Village Road. Both potential mitigative treatments are expected to result in appropriate LOS for all movements throughout both peak hours.

VI. Summary and Recommendations

The COH MTA and COH Planning Department plan to construct the Pāhoa Transit Hub and Library on a parcel in the Pāhoa region on the island of Hawai'i, in alignment with the COH's *Transit and Multi-Modal Transportation Master Plan*. Together, the development aims to support the COH's transit-oriented-development initiatives by co-locating key public services as a focal point serving the Pāhoa community. Previously, the MTA and COH Planning Department conducted public outreach and analyzed 13 potential sites within the Pāhoa region for the proposed development, ultimately recommending three preferred sites in a 2022 site suitability analysis. Alternative 1 (Site #2) has been noted to be the preferred site location, although Alternative 2 (Site #8) and Alternative 3 (Site #9) are also under consideration. All three potential sites were analyzed as part of this TIAR. Analysis was completed for Existing (2023) Conditions, as well as for the Future Without Project, and Future With Project Conditions for periods of five (5), ten (10), and twenty (20) years into the future corresponding to 2028, 2033, and 2043, respectively. Construction of the development is estimated to conclude by the end of 2027. This analysis analyzed 5-study intersections, along with driveways to each of the three potential developments (for Future With Project Conditions only). Separately, bus-movements were analyzed turning into and out of proposed bus-only loops within the transit hub.

The transit hub will include passenger shelters, seating, lighting, and trash receptacles for COH Bus passengers. The transit hub will be designed to provide access for multimodal users (pedestrians and bicyclists), as well as off-street parking.

The library is estimated to be 8,000 SF of enclosed, interior space, with an additional 1,000 SF of indoor-outdoor *entry lanai activity area*. The library will provide traditional HSPLS facilities, including multi-purpose rooms, offices, study areas, and lounges. The exterior may include a community garden, courtyard, food truck/concessions, and an outdoor theater/stage area for presentations.

Also being considered for potentially co-locating within the development site are a day care (currently estimated to be 3,800 SF, not inclusive of an outdoor play area) as well as a cultural center (currently estimated to be 3,600 SF, not inclusive of an event lawn space). Various other community amenities including a police sub-station, public restrooms donation drop-offs, ballot drop-boxes, mailboxes, and recycling locations may also be provided.

Pāhoā, as well as the Puna District in general, are among the fastest growing areas of the State. As a result of projected background growth over the next 20-years, various mitigation may be required in Future Without Project Conditions, including:

- **Pāhoā Village Road & Pāhoā Bypass Road**

Modifying the existing single-lane roundabout to provide dedicated left-turn and through-right lanes for the Pāhoā Bypass Road southbound and westbound approaches. This would not require widening Pāhoā Bypass Road, as all exits to the roundabout would only require a minimum of one-lane. This mitigation may be required by 2028, as Future (2028) Without Project Conditions showed these existing approaches degrading to LOS E during projected peak hours.

- **Pāhoā Bypass Road & Kahakai Boulevard**

Modifying the existing skewed TWSC intersection of Pāhoā Bypass Road and Kahakai Boulevard to either a traffic signal with dedicated turn lanes on all approaches, or a single-lane roundabout. It is recommended to realign the intersection if signalizing to remove the existing skew. If installing a single-lane roundabout, realignment would not be required, as a “dogbone-shaped” roundabout could largely fit within the existing roadway limits. In both scenarios it was assumed that full-access would be provided. Roundabouts can improve safety compared to traditional signalized or stop-controlled intersection by reducing the number of conflict points while promoting lower speeds, while also providing increased intersection capacity. Additionally, they can reduce noise, fuel consumption, and emissions from cars not waiting at traffic signals. In both scenarios, it was assumed that the Kahakai Boulevard westbound right-turn was assumed to remain operating as a free-flow movement, as it does in Existing (2023) Conditions given the existing acceleration lane in the northbound direction of Pāhoā Bypass Road. This mitigation may be required by 2033, as Future (2033) Without Project Conditions showed the WB Kahakai Boulevard approach degrading to LOS F during projected peak hours. The *Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii* included the intersection of Pāhoā Bypass Road and Kahakai Boulevard in a list of State-owned intersections with nine or more crashes between 2006 – 2008. While specific details of these crashes were not provided, this is likely attributed to factors including the skew of the intersection.

No additional mitigation to what was triggered by Future Without Project conditions is projected to be triggered by Future With Project conditions for any of the three alternative site locations with one exception for Alternative 3 (Site #9).

For Future (2043) With Project Conditions Alternative 3, it is projected that the EB ‘Apa’a Street approach at Pāhoā Village Road will operate at LOS F during both the AM and PM peak hours. The intersection is projected to pass MUTCD peak-hour warrants, although the development is

not expected to meet the definition of a peak-hour generator. However, peak-hour warrants are the most typically used warrants to analyze traffic signals for future conditions, as projecting out vehicular volumes related to trip generation outside of the peak hours is not well documented. The intersection was also analyzed under existing TWSC conditions, modifying the EB 'Apa'a Street approach to provide dedicated left- and right-turn lanes, along with an acceleration lane for EB 'Apa'a Street left-turning vehicles onto NB Pāhoa Village Road. The intersection is projected to operate at acceptable LOS under either mitigative scenario.

Each potential alternative site proposes a separated bus loop/bay accessible only to COH Buses via a proposed two-way, two-lane driveway. This proposed driveway is separate from the proposed driveway that will provide access to the library, cultural center, and parking lot, which will be accessible to standard passenger vehicles. The bus loop/bay is being designed to accommodate upwards of six buses at any time, although it should be noted that currently, each of the three adjacent bus routes runs only once per hour. The bus loop will allow buses to circulate internally without conflicting with any passenger vehicles, minimizing conflicts and delay for transit. The bus loop was analyzed for each alternative scenario, in which no operational concerns were noted. For each scenario, it is recommended to provide a dedicated left-turn lane along the NB direction of Pāhoa Village Road which would prevent any buses turning into the bus loop/bay from potentially delaying northbound Pāhoa Village Road passenger vehicles as the bus waits to find a gap in traffic to turn in. No dedicated right-turn lane in the southbound Pāhoa Village Road direction is required, as this movement will have negligible impact on southbound Pāhoa Village Road passenger vehicles.

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Appendix F
Phase 1 Environmental Site Assessment

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**PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT
FOR
THREE SITES FOR COUNTY OF HAWAII
MASS TRANSIT AGENCY PAHOA TRANSIT HUB
TMKS (3) 1-5-007:004, 005, 007, 076, 082, AND 083
PAHOA, ISLAND OF HAWAII 96778
MNA PROJECT 3189_3**

SEPTEMBER 26, 2023



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PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT
FOR
THREE SITES FOR COUNTY OF HAWAII
MASS TRANSIT AGENCY PAHOA TRANSIT HUB
TMKS (3) 1-5-007:004, 005, 007, 076, 082, AND 083
PAHOA, ISLAND OF HAWAII 96778

MNA Job No. 3189_3

September 26, 2023

I declare that, to the best of my professional knowledge and belief, I meet the definition of *Environmental professional* as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the *subject property*. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR 312.



Jessica Walsh, Environmental Planner
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APPENDICES

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Appendix B User Questionnaire, Site Reconnaissance Field Forms, and Interview Forms
Appendix C EDR Report
Appendix D Site Reconnaissance Photographs

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LIST OF ABBREVIATIONS

AUL	Activity and Use Limitation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COH	County of Hawaii
CORRACTS	RCRA Facilities that are undergoing “corrective action”
DOH	Department of Health
EC	Engineering Control
EDR	Environmental Data Resources
EHMP	Environmental Hazard Management Plan
EPA	Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FINDS	Facility Index System/Facility Registry System
FUDS	Formerly Used Defense Site
HDOH	State of Hawaii Department of Health
HDOE	State of Hawaii Department of Education
HEER	Hazard Evaluation and Emergency Response
HELCO	Hawaii Electric Light Company
HFD	County of Hawaii Fire Department
IC	Institutional Control
Ma	Mega-annum (One million years)
MEC	Munition and Explosives of Concern
mg/kg	Milligram per kilogram
MNA	Myounghee Noh & Associates, L.L.C., dba MNA Environmental
MTA	Mass Transit Agency
NFA	No Further Action
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
PCB	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SCC	Site Cleanup Complete
SEMS	Superfund Enterprise Management System
SHWB	Solid and Hazardous Waste Branch
SHWS	State Hazardous Waste Site
TMK	Tax Map Key
UIC	Underground Injection Control
USGS	United States Geological Survey
UST	Underground Storage Tank
VRP	Voluntary Response Program
WWB	Wastewater Branch

EXECUTIVE SUMMARY

Myounghee Noh & Associates, L.L.C., dba MNA Environmental (MNA), was retained in April 2023 to conduct a Phase I Environmental Site Assessment (ESA) for approximately 25.213-acre subject properties identified by the Tax Map Keys (TMK) of Island 3, Zone 1, Section 5, Plat 007 and Parcels 004, 005, 007, 076, 082, and 083 [TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083]. At the time of this Phase I ESA, parcel 007 was owned by NHS, Inc., parcel 005 was owned by the Abraham Family, and parcels 004, 076, 082, and 083 were owned by Kikuko Kuwahara and Kuwahara Family Partners. This Phase I ESA is being conducted in support of the conceptual design of County of Hawaii Mass Transit Agency Pahoia Transit Hub. For the conceptual design and analysis, the parcels are split into three separate sites by owner: Site #2 composed of parcel 007, Site #8 composed of parcel 005, and Site #9 composed of parcels 004, 076, 082, and 083.

The purpose of this Phase I ESA is to identify *recognized environmental conditions (REC)* at the subject property, with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act and petroleum products. A Phase I ESA consists of four parts: review of state, federal, and local environmental records; a site reconnaissance; interviews; reporting.

FINDINGS

Limitations/Data Gaps/Deviations

At the time of this writing, a point of contact for Site #8 (parcel 005) was not reachable; therefore, no site reconnaissance was performed at the property, and no key site manager interview was conducted for this parcel. The unavailable information from landowner and site reconnaissance is a deviation from the ASTM standard that is considered a data gap and can lead to a *REC*.

Subject Property

The subject property was not identified on any of the Environmental Data Resources (EDR) searched environmental databases. Review of tax records, aerial photos, and topographic maps did not indicate any *RECs*.

Non-REC

MNA conducted a site reconnaissance at the subject properties on 31 May 2023. During the site reconnaissance, dense vegetation was observed throughout the subject properties. The south portion of parcel 007 was used as a public parking lot; near the parking lot, there were a metal container, a soil and gravel pile, as well as three small plastic pools, potentially containing what appeared to be a mix of soil and water. There were no evident hazardous materials or petroleum products, nor indications of releases, such as stained soils or stressed vegetation; therefore, these observations are not considered a *REC*.

Records received from Hawaii Department of Health Wastewater Branch (WWB) indicated the subject properties at TMK (3) 1-5-007:004 and 076 had two cesspools (one at parcel 004 and one at parcel 076) and one septic tank (at parcel 076). These cesspools

and septic tank have no violations or citations under WWB records that might indicate misuses or issues with these facilities and are therefore not considered a *REC*.

REC

The interview with current owners of Site #9 (parcels 004, 076, 082, and 083), Sharman Oyadomari and Russell Kuwahara, indicated that parcel 004 has been used in the past as a Christmas tree farm and a rental home, and parcels 082 and 083 have been used as an anthurium farm. These agricultural activities are likely to have involved the use of pesticides. It is assumed that any pesticides were applied in accordance with the labels approved for the crops, required by Federal Insecticide, Fungicide, and Rodenticide Act. No evidence of pesticide disposal, storage, spills, or transport was observed at the subject property; however, repeated applications over the years may have impacted the property which could lead to *REC*.

The owners of Site #9 (parcels 004, 076, 082, and 083), also indicated a gasoline pump and storage tank that have been removed from parcel 076. According to HDOH SHWB, there are no records of this UST. This unregistered storage tank could lead to a *REC* as there is no information regarding potential past release or incidents.

Surrounding Area

Non-REC

During the site reconnaissance, 11 pole-mounted transformers and one pad-mounted transformer were observed on the adjoining properties and on the sidewalks adjacent to the subject properties. Information regarding the transformers was received from Hawaii Electric Light Company (HELCO) and was identified as non-polychlorinated biphenyls (PCB) containing. Therefore, the transformers are not considered a *REC*. Additionally, observations during the site reconnaissance include an old pipe piece, an asphalt paved area, as well as some debris including soil in plastic bags (potentially remained from historical agricultural use of the land), on the adjoining property to the north of parcel 083, TMK (3) 1-5-007:084. No evidence of hazardous materials or petroleum products, nor indications of releases, such as stained soils or stressed vegetation were found, therefore, these observations are not considered a *REC*.

Records received from WWB indicated the presence of five cesspools and 19 septic tanks on adjoining properties, as well as an approval for a Waste Water Treatment Plant #599 located at parcel 069. No violations or citations have been found associated with these cesspools and septic tank systems; therefore, these are not considered a *REC*.

Records received from HDOH SHWB indicated the presence of three UST facilities identified within ¼ mile of the subject property. Due to their status and compliance with UST regulations, as well as their location being at a lower hydrologic gradient from the subject properties, the following UST sites were determined not to be a *REC*:

- Malama Gas N Go: Facility ID: 9-603780. Status: Currently in use

- Pahoia Gas & Go: Facility ID: 9-601315. Status: Permanently out of use
- Woodland Center: Facility ID: 9-603792. Status: Currently in use

Longs Drug #7098, 15-1454 Kahakai Boulevard (1,129 ft northeast, lower elevation) store was identified as a very small quantity generator (VSQG) by EDR. Due to compliance and no violations found on public databases, as well as the location being at a lower hydrologic gradient from the subject properties, this site is not considered a *REC*.

Controlled *REC*

A *CREC* is defined as a known past release that has been addressed, but where contamination still remains and is subject to the implementation of required Activity and Use Limitation (AUL), such as institutional or engineering controls. The following SHWS sites are considered a *CREC*:

- Pahoia Elementary School Building Exterior Soils, 15-3030 Pahoia Village Road (4,641 ft southeast, higher elevation)
- Pahoia High and Intermediate School Building Exterior Soils, 15-3038 Pahoia Village Road (5,116 ft southeast, higher elevation)

For both Pahoia Elementary and Pahoia High and Intermediate School, soil analytical results identified elevated levels of lead and chlordane exceeding the HDOH EAL along the perimeter of six buildings. An interim environmental hazard management plan (EHMP) was prepared providing management of contaminated areas for both schools. Since mitigation measures have been established (physical separation by grass cover) but contamination remains, this site is considered a *CREC*.

REC

The HFD indicated 16 fire incidents at the adjoining properties and surrounding areas. These fires include brush fires, structures, appliances, and electrical lines. Contaminated runoff from these incidents has the potential to cause surface and subsurface contamination to the subject properties, and therefore is a *REC*.

RECOGNIZED ENVIRONMENTAL CONDITIONS

MNA performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM E 1527-21 of the 25.213-acre subject properties located at TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083 in Pahoia, Island of Hawaii. Any exceptions to, or deletions from, this practice will be described in Section 7.0 of this report. This assessment indicates no evidence of *recognized environmental conditions*, as defined by ASTM, in connection with the subject property, except for the following:

REC

- Incidents of fires at the *adjoining properties* were confirmed by HFD. These incidents have potential to cause surface and subsurface contaminations and therefore considered a *REC*.
- The owners of Site #9 (parcels 004, 076, 082, and 083) indicated that a gasoline UST had been removed from parcel 076. According to HDOH SHWB, there are no records of this UST. This data gap can lead to a *REC* as there is no available information regarding potential past release or incidents.
- Historical agricultural activities that took place in parcels 004, 082, and 083 are likely to have involved the use of pesticides. It is assumed that any pesticides were applied in accordance with the labels approved for the crops, required by Federal Insecticide, Fungicide, and Rodenticide Act. However, repeated pesticide mixing and applications over the years may have impacted the soil which could lead to *REC*.

CREC

- Pahoia Elementary, Intermediate, and High School Buildings – Soil lead and chlordane contamination at the perimeter of the buildings. A site-specific Interim EHMP provides short-term management of this contamination.

1.0 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) conducted during May-August 2023, for the approximately 25.213-acre subject properties located at Tax Map Key (TMK) (3) 1-5-007:004, 005, 007, 076, 082, and 083 (Figure 1). This Phase I ESA was conducted by Myounghee Noh & Associates, L.L.C. dba MNA Environmental, herein referred to as MNA, for SSFM International, Inc., who is assisting County of Hawaii (COH) to complete the conceptual design for the COH Mass Transit Agency (MTA) Pahoia Transit Hub along with a co-located library facility. These parcels that constitute the subject properties are split by ownership into three separate sites: Site #2 composed of parcel 007, Site #8 composed of parcel 005, and Site #9 composed of parcels 004, 076, 082, and 083. At the time of this Phase I ESA, Parcel 007 was owned by NHS, Inc. Parcel 005 was owned by the Abraham Family, and parcels 004, 076, 082, and 083 were owned by Kikuko Kuwahara and Kuwahara Family Partners. These subject properties have been mainly used for residential purposes. The surrounding adjoining properties are primarily used for commercial, residential, and recreational purposes.

1.1 PURPOSE

The purpose of this Phase I ESA is to identify any *recognized environmental conditions (RECs)* at the subject property, with respect to a range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. This practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability, “all appropriate inquiry into the previous ownership and uses of the site consistent with good commercial or customary practice.” The term *REC* denotes the presence, or likely presence, of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property (ASTM International, 2021).

This report is part of the Phase I ESA conducted for the subject property. The assessment was conducted in accordance with the practices described in Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM International, 2021).

1.2 DETAILED SCOPE OF SERVICES

A Phase I ESA has four components: records review, site reconnaissance, interview, and report. MNA conducted this ESA using information sources with the potential to identify past or current releases of hazardous substances or petroleum products into the subject property. Adjoining properties were also evaluated for their potential to impact the subject property. Per the ASTM International Phase I ESA Standard, adjoining properties include parcels touching the subject property as well as those properties across a roadway (ASTM International, 2021).

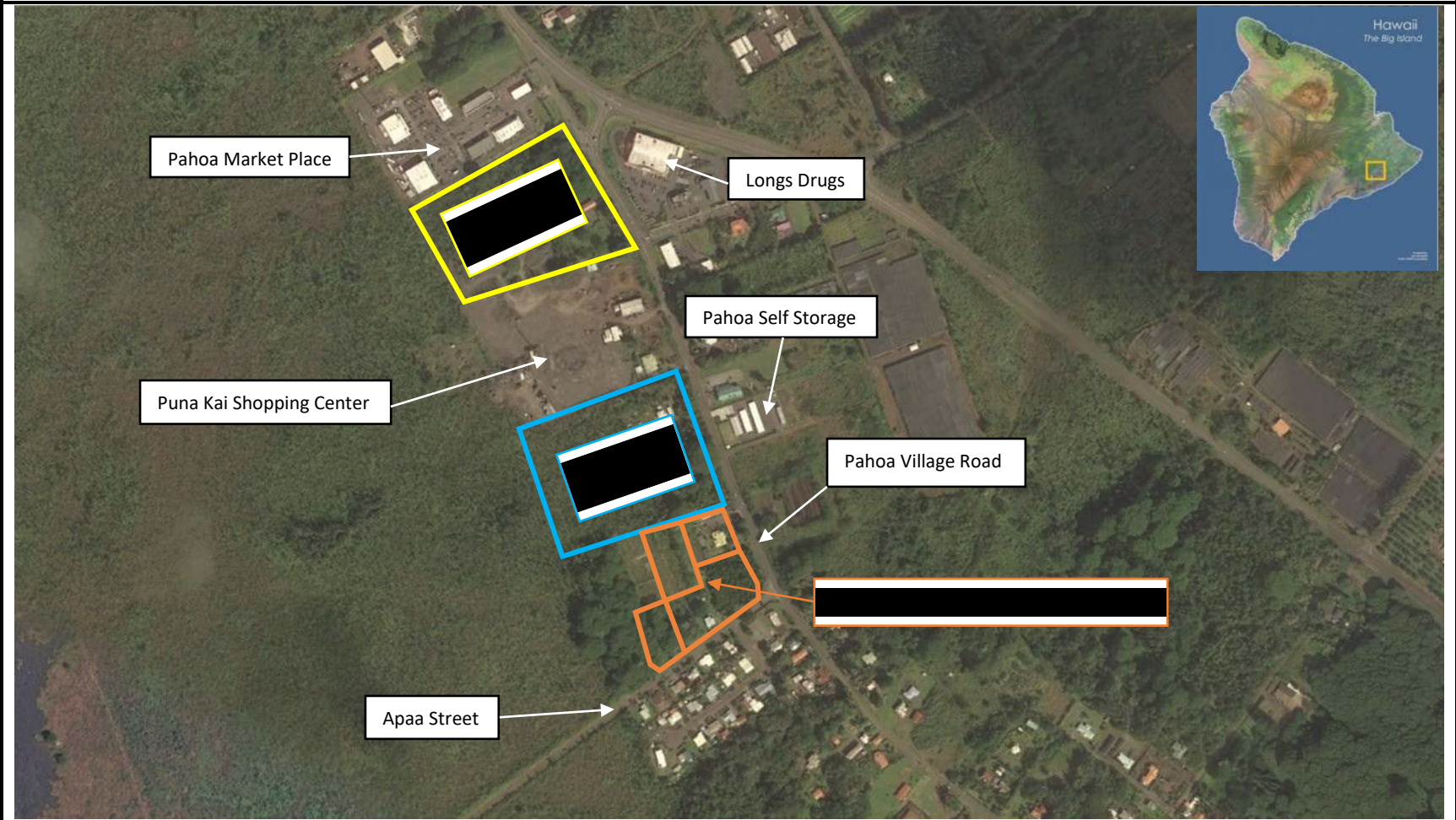


Figure 1. Vicinity Map

**Phase I Environmental Site Assessment
TMK (3) 1-5-007:004, 005, 007, 076, 082,
083 Pahoia, Island of Hawaii**



MNA Environmental

1.2.1 Site History

Where available and as needed, MNA researched historical and current topographic maps, tax records, fire insurance maps, regulatory agency websites, and aerial photographs to identify previous and current uses of the property, adjoining properties, and the surrounding area.

1.2.2 Regulatory Records

MNA examined government records with respect to environmental conditions, citations, complaints, and permits at the subject property, at adjoining properties, and within the surrounding area. MNA utilized a records search provided by EDR, to review records from the following federal and state programs:

- National Priorities List (NPL)
- Delisted NPL
- Resource Conservation and Recovery Act (RCRA) facilities that are undergoing “corrective action” (CORRACTS)
- RCRA - Treatment, Storage, & Disposal (TSD)
- Comprehensive Environmental Response, Compensation & Liability Information System (CERCLIS) List
- Superfund Enterprise Management System (SEMS) List
- SEMS-Archive [formerly CERCLIS No Further Remedial Action Planned (NFRAP) List]
- Federal and Hawaii State Brownfields
- Hawaii Solid Waste & Landfill
- Leaking Underground Storage Tank (Leaking UST)
- Underground Storage Tank (UST)
- Emergency Response Notification System (ERNS)
- RCRA – Generators, including those No Longer Regulated (NLR)
- Hawaii Sites of Interest [State Hazardous Waste Sites (SHWS)]
- Federal and State releases
- Federal and Hawaii State Land Use Controls
- Hawaii Voluntary Cleanup Sites

Additionally, MNA requested environmental case files from the Hawaii Department of Health (HDOH), Hawaiian Electric, and the COH Fire Department (HFD) and Real Property Tax Division.

1.2.3 Site Reconnaissance

MNA performed a site reconnaissance to obtain information indicating the likelihood of contamination, interview available site personnel, and conduct a brief assessment of the adjoining properties. During the site reconnaissance, MNA looked for a variety of indicators of environmental hazards including, but not limited to, stained surface soil, dead or stressed vegetation, hazardous substances, aboveground and underground storage tanks, disposal areas,

groundwater wells, drywells, and sumps. Sampling and testing of soil, surface water, or groundwater, or geophysical/geotechnical investigations were not part of this assessment.

1.2.4 Site Geology and Hydrogeology

MNA reviewed published information for the property and surrounding area on surface and subsurface conditions such as topography, drainage, surface water bodies, subsurface geology, and groundwater. MNA used this information to assess the potential for migration and impact of the subject property by releases of hazardous substances or petroleum products at off-site properties.

1.2.5 Data Evaluation and Reporting

MNA evaluated the information collected and prepared this report as part of the assessment. Section 2 presents the site background information; Section 3 user provided information; Section 4 information collected from records review; Section 5 site reconnaissance; Section 6 interviews; Section 7 data gaps; Section 8 key findings and opinion; and Section 9 conclusion.

1.3 SIGNIFICANT ASSUMPTIONS

The conclusion presented in this report is based upon the assumption that reasonably ascertainable and relevant information pertaining to the environmental condition of the subject property was made available to MNA during the assessment. Information obtained from government agencies and other resources is presumed to be accurate and updated. Additionally, information collected in interviews is collected in “good faith” and believed to be true and accurate to the best knowledge of the interviewee.

1.4 LIMITATIONS AND EXCEPTIONS

The Phase I ESA provides a “snapshot” of the property conditions at the time of the assessment. Findings, opinions, and conclusions apply to property conditions existing at the time of the investigation and those reasonably foreseeable. They do not apply to conditions at, or changes to, the property, of which MNA is not aware, could not reasonably be aware, and has not had the opportunity to evaluate.

This report is based upon visual observations of the subject property and its vicinity, interpretation of the available historical and regulatory information and documents reviewed, and interviews of individuals with knowledge of the subject or surrounding properties. MNA cannot ensure the accuracy of the historical or regulatory information. This report is intended exclusively for the purpose outlined and applies only to the subject property.

This Phase I ESA excludes asbestos, lead paint, clandestine methamphetamine laboratories, and investigation of geotechnical or geophysical concerns. No surface or subsurface sampling or geophysical/geotechnical investigations were involved.

1.5 SPECIAL TERMS AND CONDITIONS

This Phase I ESA was conducted and prepared by MNA for the exclusive use of SSFM International, Inc., and the County of Hawaii. This report shall not be relied upon or transferred to any other parties without a written authorization from SSFM International, Inc., and/or the County of Hawaii.

1.6 USER RELIANCE

This report is an instrument of service of MNA, which summarizes its findings and opinions with respect to *RECs* at the subject property. Findings and opinions are predicated on information that MNA obtained on the dates and from individuals stated herein, from public records reviewed, a site reconnaissance, and ancillary Phase I ESA activities. This assessment relies upon the accuracy and completeness of the information provided. The information obtained for this assessment is used without extraordinary verification. It is possible that other information exists and is discovered, or environmental conditions change subsequent to the site reconnaissance or submittal of this Phase I ESA report, to which MNA shall not be held responsible for exclusion.

2.0 SITE DESCRIPTION

This section contains location and legal description; site and vicinity general characteristics; current subject property uses; structures, roads, and other improvements; past subject property uses; and current and past use of adjoining properties.

2.1 LOCATION AND LEGAL DESCRIPTION

The subject properties are approximately 25.213-acres located at TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083 (Table 1). The subject property at parcel 007 is bound to the north by Pahoia Market Place (TMK 1-5-007:080), to the east by Keaau-Pahoia Road, and to the south by Kahakai Boulevard. Parcel 005 is bound to the north by Puna Kai Shopping Center (TMK 1-5-007:069), to the east by Keaau-Pahoia Road, and to the south by subject property parcels 082 and 076. The remaining subject properties, parcels 004, 076, 082, and 083 are located adjacent to each other and bound by Apaa Street to the south and Keaau-Pahoia Road to the east, with parcel 005 to the north. A TMK map is presented in Figure 2.

Table 1. Summary of Subject Properties

Site	TMK	Address	Size (acres)	Owner
2	1-5-007:007	15-2690 Pahoia Village Road	9.5720	NHS, Inc.
8	1-5-007:005	15-2728 Pahoia Village Road	10	Abraham Family
9	1-5-007:004	15-1506 Apaa Street	2.164	Kuwahara, Kikuko Kuwahara Family Partners
	1-5-007:076	15-2754 Pahoia Village Road	1.1010	
	1-5-007:082	Apaa Road	1.374	
	1-5-007:083	Apaa Road	1.002	

2.2 SITE AND VICINITY GENERAL CHARACTERISTICS

The subject properties are located in Pahoa, adjacent to Keaau-Pahoa Road to the east, and are composed of a few residential structures and vacant land. The subject properties are located in an area with commercial and public facilities, near the Pahoa Market Place, the Puna Kai Shopping Center, the Longs Drugs, as well as the Aloha Malama Market Gas Station. Single family residences are located south of Apana Street. Adjoining properties to the east of Keaau-Pahoa Road are composed of single-family residences and the Solid Rock East Hawaii Church.

Pahoa means knife in the Hawaiian language; the knife pointing down symbolizes strength and peace and can be found in local statues and schools around Pahoa (Kawena & Hoyt, 2003). In 2014, lava flowed from the Kilauea volcano towards the Kaohe Homesteads and Pahoa; additionally in 2018 another eruption from Kilauea volcano took place, resulting in the loss of approximately 700 homes in the District of Puna (Honolulu Star Advertiser, 2018). The U.S. Census counted 924 and 945 residents of Puna District in 2020 and 2010, respectively. Even though it is unknown when indigenous Hawaiians officially established in Pahoa, the numerous archeological sites suggest that Pahoa contains a long history of habitation (Emerson, 1915).

2.3 GEOLOGY

Published geologic and hydrogeological reports and maps were reviewed to obtain information regarding subsurface conditions in the general area of the site. The Emperor Seamount-Hawaiian Chain was formed by a small area of abnormally hot rock in the mantle (asthenosphere), a hotspot beneath the Pacific Oceanic Plate. The Hawaiian hotspot is firmly rooted in the earth's interior (depth of 40-60 miles) and is 50 miles in diameter. The oceanic plate (lithosphere) glides slowly over it moving at a rate of 4 inches per year towards the northwest. Molten rock erupts from the hotspot onto the ocean floor and builds a volcano. Hawaii Island lies mostly over the hotspot. Towards the end of the chain, five volcanoes have erupted in historic time. In the main Hawaiian archipelago, the volcanoes are extinct but have not subsided, forming high standing islands. Beyond the Kure Atoll, the ancient volcano summits of the Emperor Seamounts have subsided beneath the surface of the ocean (Hazlett R. W., 1996).

Hawaii Island, located southeast of the other Hawaiian Islands, is the youngest and most southeasterly of the emerged volcanic edifices of the Hawaiian chain largest of the Hawaiian-Emperor Seamount Chain. The area spans 90 miles from north to south and 80 miles east to west (10, 478 km²). Five large volcanoes (Kohala, Mauna Kea, Hualalai, Mauna Loa, and Kilauea) coalesce to make the visible part of the island. Kohala and Mauna Kea are dormant volcanoes, not having erupted in historic time while Hualalai, Mauna Loa, and Kilauea are active volcanoes (Mink & Lau, 1993). A sixth, Loihi Seamount, 20 miles from the coast lies 3,100 feet beneath the ocean surface. The geology of the island of Hawaii has been extensively studied because of the island's recent geological history, the stages of volcano development has barely advanced beyond the erosional stage as seen in Kohala (the oldest at about 0.7 Ma). Mauna Kea and Hualalai (last active in 1800-1801, its oldest rocks may be greater than 0.12 Ma) have reached the post-caldera stage, while Mauna Loa and Kilauea (divided into two ages: Hilina Basalt and the younger Puna

Basalt) have only advanced to the caldera development and filling stages (George A. L. Yuen and Associates, 1990).

The subject properties are located approximately 670 feet above sea level and slope from the southwest towards the northeast. The subject properties are located on the eastern slope of the Kilauea Volcano. Kilauea Volcano has an elevation of 4,090 feet above sea level, nestled on the southeast slope of Mauna Loa, with a length of 51 miles, a width of 14 miles, and an area of 552 square miles, composing approximately 13.7% of the island (Stearns, 1985). This mountain is believed to lie on the main volcanic rift passing through Kohala and Mauna Kea and be composed of lava from Mauna Loa due to their proximity and significant elevation (Stearns, 1985).

In 1993, Mink and Lau described the geology in the vicinity of the subject properties as follows:

Recent Puna Basalt covers the surface; it is common for ash and cinder to be blown out of vents along the rift. In terms of the environment, farms and orchards can be observed, however, rain forests are predominant throughout most of the region (Mink & Lau, 1993).

The Natural Resource Conservation Service classifies the soil at the subject property to be 100% Keaukaha highly decomposed plant material with 2% – 10% slopes. This is a well-drained soil with a low to moderately low capacity to transmit water (0.00 to 0.06 inches per hour). The parent material is organic material over pahoehoe lava, with 0 to 4 inches highly decomposed plant material, and a depth to bedrock of approximately 4 to 14 inches (United States Department of Agriculture, 2023).

2.4 HYDROLOGY AND HYDROGEOLOGY

The HDOH Safe Drinking Water Branch has established an Underground Injection Control (UIC) line to serve as a boundary between drinking water and non-drinking water portions of aquifers. Areas above (mountain side of) the UIC line are within drinking water portions of the aquifer, while areas below (ocean side of) the UIC are in non-drinking water portions of the underlying aquifer. The subject properties are above the UIC in a drinking water portion of the aquifer (Hawaii Department of Health Safe Drinking Water Branch, 2020).

The hydraulic gradient of the basal groundwater within the basaltic formation is, in general, from mountain areas to the shoreline. According to the Mink and Lau (1993), published by the University of Hawaii, Water Resources Research Center, the subject properties are located within the Pahoia aquifer system and its hydrology and groundwater are described as follows:

The Aquifer lies north of the Kilauea east rift zone, which stretches from Kilauea Crater to Cape Kumukahi. Average annual rainfall ranges from 100 to 180 inches (2,540 to 4,572 mm) at the coast with its lowest rainfall at 60 inches (1,524 mm). High-level and basal waters can be found in large volumes off the rift zone; however, basal freshwater can be found near the coast. Geothermal conditions prevail near the rift zone, with occasionally perched and dike waters (Mink & Lau, 1993).



Hawaii has been divided into nine aquifer sectors and 24 aquifer systems. These nine aquifer sectors are Kohala, East Mauna Kea, West Mauna Kea, Northeast Mauna Loa, Southeast Mauna Loa, Southwest Mauna Loa, Northwest Mauna Loa, Kilauea, and Hualalai; information for the Northeast Mauna Loa aquifer is provided in Table 2 (Mink & Lau, 1993).

Table 2. Northeast Mauna Loa Aquifer Classification System

Aquifer Code	80801111
Island Code	8 – Hawaii
Aquifer Sector	08 – Kilauea
Aquifer System	01 – Pahoia
Aquifer Type, hydrogeology	1 – Basal; Fresh water in contact with seawater
Aquifer Condition	1 – Unconfined; Where water table is upper surface of saturated aquifer
Aquifer Type, geology	1 – Flank; Horizontally extensive lavas
Status Code	11111
Development Stage	1 – Currently Used
Utility	1 – Drinking
Salinity (in mg/L Cl ⁻)	1 – Fresh (<250)
Uniqueness	1 – Irreplaceable
Vulnerability to Contamination	1 – High

mg/L Cl⁻-milligrams per liter of chloride

The Federal Emergency Management Agency flood map for the area (1551661190F, effective 9/29/2017) indicates that the subject properties are in an unshaded Zone X, which describes an area of minimal flood hazard. This area is outside of the 0.2-percent-annual-chance floodplain; hence a flood insurance purchase is not required (Federal Emergency Management Agency, 2023).

2.5 CURRENT USE OF THE SUBJECT PROPERTY

At the time of the Phase I ESA, the subject properties were mostly vacant. Parcel 007 contained a paved area used as a public parking lot, as well as a single-family residence and dense vegetation. Parcel 005 was mostly vegetated with a single-family residence. Parcels 004 and 076 had two single family residences and parcels 082 and 083 were vacant, with dense vegetation.

2.6 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS

Keaau-Pahoia Road, previously known as Pahoia Village Road, is the main access road for all of the subject properties. In 1968, a residential house was built in parcel 004. This house is 500 square feet and is composed of two bedrooms and one bathroom. The roof material is corrugated metal, and the exterior wall is made from pine. In 1995, a residential house was built in parcel 005, containing two bedrooms and two bathrooms in a 1,008 square feet area. The roof material is metal, and the exterior wall is made of plywood. In 1959 and 1955 two buildings were constructed in parcel 007. The first building is 768 square feet and contains one bathroom and three bedrooms. The roof material is corrugated metal, and the exterior wall is made of pine. Similarly, the second building is 1,056 square feet and contains two bathrooms and three bedrooms, with a corrugated metal roof and pine exterior wall. In 1970, a 1,763 square feet building was constructed in parcel 076. This building contains two bathrooms and four bedrooms,

with corrugated metal roof and pine exterior wall. There are no structures and or improvements on parcels 082 and 083 based on public records from County of Hawaii Real Property Tax Office. The structures on the subject properties are summarized in Table 3.

Table 3. Summary of Structures on the Subject Properties

Site No.	Parcel	Structure Type	Year Built	Size (sq. ft.)	Note
2	007	Residential	1959	768	3 bed; 1 bath; exterior pine walls, corrugated iron roof
			1955	1,056	3 bed; 2 bath; exterior pine walls, corrugated iron roof
5	005	Residential	1995	1,008	2 bed; 2 bath; exterior plywood walls, metal roof
9	004	Residential	1968	500	2 bed; 1 bath; exterior pine walls, corrugated iron roof
	076	Residential	1970	1,769	4 bed; 2 bath; exterior pine walls, corrugated iron roof
	082	--	--	--	No Structures/buildings
	083	--	--	--	No Structures/buildings

2.7 PAST USES OF THE SUBJECT PROPERTY

Information regarding the past uses of the subject property was obtained from a review of tax records, historic topographic maps and aerial photographs, user provided information, and interviews. Table 4 summarizes the information available regarding the historical use and users of the subject property. Tax records were available from 1987 to 2023. The subject property has been residential and agricultural since 1987. Tax records indicate that Kuwahara Family Partners, Abraham, NHS Inc., and Kikuko Trust Kuwahara are the owners of these properties.

Table 4. Users and Primary Uses of Subject Property

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
TMK (3) 1-5-007: 004 (15-1506 Akaa Street)			
1996-Present	Kuwahara Family Partners	2.1647	Residential
1995-1996	Kuwahara Family Partners	2.1647	Residential
1994-1995	Kuwahara, Yoso Kuwahara, Kikuko	2.1647	Residential
1987-1994	Kuwahara, Kikuko Trust Kuwahara, Yoso Trust	2.1647	Residential
TMK (3) 1-5-007: 005 (15-2728 Pahoia Village Road)			
1996-Present	Abraham, Kela Abraham Abraham, Philip Abraham, William Kauhi, Henry	10.0	Residential
1987-1996	Abraham, Kela Abraham, Philip Abraham, William Kauhi, Henry	10.0	Residential

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
TMK (3) 1-5-007: 007 (15-2690 Pahoa Village Road)			
1993-Present	NHS, Inc.	9.5720	Residential/ Parking Lot
1991-1993	Tsubota, Sadamu Tsubota, Russel Tsubota, Nancie Nakashima, Clyde Nakashima, Suzan Amano, Roy Amano, Hazelynn	9.5720	Residential
1990-1991	Tsubota, Sadamu	9.5720	Residential
1987-1990	Tsubota, Sadamu	9.5720	Residential
TMK (3) 1-5-007: 076 (15-2754 Pahoa Village Road)			
2018-Present	Kuwahara, Kikuko Trust	1.1018	Agricultural
2008-2018	HQHQ, Inc.	1.1018	Agricultural
2000-2008	Kuwahara, Yoso Trust Kuwahara, Kikuko Trust	1.1018	Agricultural
1994-2000	Kuwahara, Yoso Trust Kuwahara, Kikuko Trust	1.1018	Agricultural
1987-1994	Kuwahara, Yoso Trust Kuwahara, Kikuko Trust	1.1018	Agricultural
TMK (3) 1-5-007: 082 (Apa'a Road)			
1995-Present	Kuwahara Family Partners	1.3740	Agricultural
1994	Acres revised from 1.3748 to 1.3740		
1994-1995	Kuwahara, Yoso Trust Kuwahara, Kikuko Trust	1.3748	Agricultural
TMK (3) 1-5-007: 083 (Apa'a Road)			
1995-Present	Kuwahara Family Partners	1.0020	Agricultural
1994-1995	Kuwahara, Yoso Kuwahara, Kikuko	1.0020	Agricultural

2.8 CURRENT AND PAST USES OF ADJOINING PROPERTIES

Information regarding past uses of the adjoining properties was also obtained from a review of tax records, historic topographic maps and aerial photographs, user provided information, and interviews. Table 5 summarizes the information available regarding the historical use and users of the adjoining properties. Tax records information were available from 1987 to 2023, except as noted.

Table 5. Users and Primary Uses of Adjoining Properties

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
TMK (3) 1-5-007: 020 (15-1450 Kahakai Boulevard) Adjoining property to the Northeast			
2011-Present	HNMP, L.L.C.	4.901	Commercial/ Pharmacy/ Restaurants/ Parking lot
2010-2011	HNMP, L.L.C.	4.901	Commercial/ Pharmacy/ Restaurants/ Parking lot

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 TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083, Pahoa, Hawaii

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
2009-2010	HNMP, L.L.C.	4.901	Commercial/ Pharmacy/ Restaurants/ Parking lot
2008-2009	HNMP, L.L.C.	4.901	Commercial/ Pharmacy/ Restaurants/ Parking lot
2001-2008	HNMP, L.L.C.	4.901	Commercial
1989-2000	Kaneshiro & Sons Enterprise, LTD	4.901	Commercial
1987-2000	Kazumi Shimizu & WF Iyono M.	4.901	Commercial
TMK (3) 1-5-007: 021 (15-2707 Pahoa Village Road) Adjoining property to the Northeast			
2006-Present	Metcalf Family Partners	1.50	Commercial/ Car Repair Shop
2004-2006	Metcalf Family Trust	1.50	Commercial/ Car Repair Shop
2003-2004	Metcalf Family Trust	1.50	Commercial/ Car Repair Shop
2002-2003	Metcalf Family Trust Tsubota, Sadamu Tsubota, May	1.50	Commercial/ Car Repair Shop
1999	Metcalf, Duane Metcalf, Joan Tsubota, Sadamu Tsubota, May	1.50	Commercial
1998-1999	Sadamu Tsubota May Tsubota	1.50	Commercial
1998	Acres revised from 1.7560 to 1.50		
1993-1998	Tsubota, Sadamu Tsubota, May	1.7560	Commercial
1987-1993	Tsubota, Sadamu Tsubota, May	1.7560	Commercial
TMK (3) 1-5-007: 022 (15-2731 Pahoa Village Road) Adjoining property to the East			
2017-Present	Solid Rock East Hawaii Assembly of God	3.3383	Church
1993-2017	Hawaii Assemblies of God, Inc.	3.3383	Church
1987-1993	Hawaii Assemblies of God	3.3383*	Church
TMK (3) 1-5-007: 051 (15-2724 Pahoa Village Road) Adjoining property to the North			
2011-Present	Wilson, Leslie Wilson, Cheri	0.774	Residential
1994	Kawai, Harold Kawai, Amy	0.774	Agricultural
1987-1994	Kawai, Harold Kawai, Amy	0.774	Agricultural
TMK (3) 1-5-007: 054 (15-2721 Pahoa Village Road) Adjoining property to the East			
2021-Present	Miyatake, Kazunocu Mitchell Miyatake, Tokimi	3.184	Residential
1998-2021	Miyatake, Mitsuo Miyatake, Tokimi	3.184	Agricultural/Residential
1987-1998	Miyatake, Mitsuo Miyatake, Tokimi	3.184	Agricultural
TMK (3) 1-5-007:055 (Kahakai Boulevard) Adjoining property			

County of Hawaii Mass Transit Agency Pahoia Transit Hub – Phase I Environmental Site Assessment
 TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083, Pahoia, Hawaii

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1987-Present	State of Hawaii	0.9370	Road
TMK (3) 1-5-007:059 (Puna Road) Adjoining property to the Northeast			
1989-Present	Tsubota, Sidney Horie, Renee Tsubota, Guy	3.213	Agricultural
1987-1989	Tsubota, Sidney Horie, Renee	3.213	Agricultural
TMK (3) 1-5-007: 069 (15-2714 Pahoia Village Road) Adjoining property to the North and South			
2020-Present	Willow Plaza, L.L.C. Kalama Beach Corporation	9.933	Commercial/Malama Market Pahoia/ Gas Station
2019-2020	Willow Plaza, L.L.C. Kalama Beach Corporation	9.933	Commercial/Malama Market Pahoia/ Gas Station
2018-2019	Willow Plaza, L.L.C. Kalama Beach Corporation	9.933	Commercial/Malama Market Pahoia/ Gas Station
2017-2018	B. T. Kuwahara, L.L.C. Kalama Beach Corporation Mennet, L.L.C.	9.933	Commercial/Malama Market Pahoia/ Gas Station
2015-2017	B T Kuwahara L.L.C. Kalama Beach Corporation	9.933	Commercial/Malama Market Pahoia/ Gas Station
2015	Acres revised from 3.3110 to 9.933		
2014-2015	B. T. Kuwahara, L.L.C.	3.110	Commercial/Baseyard
2007-2014	B. T. Kuwahara, L.L.C.	3.110	Agricultural/Baseyard
2000-2007*	B. K. Exotics, Inc.	3.110	Agricultural/Baseyard
TMK (3) 1-5-007:071 (15-2737 Pahoia Village Road Building) Adjoining property to the East			
2020-Present	Leetch, Robert Earl Moore, Paul Frederick	3.3383	Commercial/Self Storage
2019-2020	Leetch, Robert Earl Moore, Paul Frederick	3.3383	Commercial/Self Storage
2010-2019	Leetch, Robert Earl Moore, Paul Frederick	3.3383	Commercial/Self Storage
2006-2010	Leetch, Robert	3.3383	Agricultural
2005-2006	Blue Rock, L.L.C.	3.3383	Agricultural
2003-2005	Bragado, Kate Bragado, Jyme	3.3383	Agricultural
1987-2003	Bragado, Vincente Bragado ,Elroy	3.3383	Agricultural
TMK (3) 1-5-007:072 (15-2745 Pahoia Village Road) Adjoining property to the East			
2002-Present	Juilian, Family Trust Julian, Laureto Susa Julian, William Julian, Catherine	3.3380	Agricultural
1995-2002	Juilian, Family Trust Julian, Laureto Julian, William Julian, Catherine Julian, Elena	3.3380	Agricultural
1992-1995	Julian, Laureto	3.3380	Agricultural

County of Hawaii Mass Transit Agency Pahoa Transit Hub – Phase I Environmental Site Assessment
 TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083, Pahoa, Hawaii

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
	Julian, Elena Julian, Juanito Julian, Eredulin Julian, William Julian, Catherine		
1987-1992	Julian, Laureto Julian, Elena Julian, Juanito Julian, Eredulin Julian, William	3.3380	Agricultural
TMK (3) 1-5-007: 080 (15-2660 Pahoa Village Road) Adjoining property to the North			
2019-Present	Walker Apartments, L.L.C.	8.3970	Commercial/ Gas Station/ Restaurants
2011-2019	Walker Apartments, L.L.C.	8.3970	Commercial/ Gas Station/ Restaurants
2009-2011	Pahoa Marketplce, L.L.C.	8.3970	Commercial/ Gas Station/ Restaurants
2008-2009	Pahoa Marketplce, L.L.C.	8.3970	Commercial/ Gas Station/ Restaurants
2005-2008	Pahoa Marketplce, L.L.C.	8.3970	Commercial/ Gas Station/ Restaurants
2004-2005	Pahoa Marketplce, L.L.C.	8.3970	Commercial/ Gas Station/ Restaurants
1999-2004	Chase, Stephen Chase, Majorie	8.3970	Agricultural
1989-1999*	Tagalicud, Rogelio	8.3970	Agricultural
TMK (3) 1-5-007:084 (Apaa Road) Adjoining property to the West			
2013-Present	Gouveia, Pearla	1.3910	Agricultural
2006-2013	Gouveia, Donny Gouveia, Pearla	1.3910	Agricultural
2003-2006	Kuwahara Family Partners Gouveia, Donny Gouveia, Pearla	1.3910	Agricultural
1995-2003	Kuwahara Family Partners	1.3910	Agricultural
1994-1995	Kuwahara, Yoso Kuwahara, Kikuko	1.3910	Agricultural
TMK (3) 1-5-007: 085 (Apaa Road) Adjoining property to the Southwest			
2005-Present	Kennealy-Rither, Ophelia	1.3910	Agricultural
1995-2005	Kuwahara Family Partners	1.3910	Agricultural
1995	Acres revised from 1.3919 to 1.3910		
1994-1995	Kuwahara, Yoso Kuwahara, Kikuko	1.3919	Agricultural
TMK (3) 1-5-007: 086 (Apaa Road) Adjoining property to the Southwest			
2005-Present	Kennealy-Rither, Ophelia	1.2210	Agricultural
1995-2005	Kuwahara Family Partners	1.2210	Agricultural
1994-1995*	Kuwahara, Yoso Trust Kuwahara, Kikuko Trust	1.2211	Agricultural

County of Hawaii Mass Transit Agency Pahoa Transit Hub – Phase I Environmental Site Assessment
 TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083, Pahoa, Hawaii

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
TMK (3) 1-5-008: 001			
Adjoining property to the West			
2009-Present	State of Hawaii	5,125.5930	Agricultural
2009	Acres revised from 5,127.0930-5,125.5930		
1996-2009	State of Hawaii	5,127.0930	Agricultural
1995	Acres revised from 5,129.3210 to 5,127.0930.		
1995-1996	State of Hawaii	5,129.3210	Agricultural
1992-1995	State of Hawaii	5,129.3210	Agricultural
1987-1992	State of Hawaii	5,129.3210	Agricultural
TMK (3) 1-5-117: 001 (15-1511 Apana Street)			
Adjoining property to the South			
2009-Present	Lum Family Enterprises, L.L.C.	0.3232	Residential
1990-2009	Lum, Lizzy Trust	0.3232	Residential
1987-1990	Lum, Elizabeth	0.3232	Residential
TMK (3) 1-5-117: 002 (15-1515 Apana Street)			
Adjoining property to the South			
2019-Present	Frazer, Edward	0.2296	Residential
2017-2019	Frazer, Edward	0.2296	Residential
2005-2017	Sha, Ying Yang, Zhuohui	0.2296	Residential
1987-2005	Sibucan, Rodolfo Sibucan, Estelita	0.2296	Residential
TMK (3) 1-5-117: 003 (15-1517 Apana Street)			
Adjoining property to the South			
2009-Present	Raras, Wilfredo Raras, Jon-Erik	0.2296	Residential
1999-2009	Raras, Wilfredo Raras, Jose Raras, Paz Raras, Jon-Erik	0.2296	Residential
1987-1999	Raras, Wilfredo Raras, Jose Raras, Paz	0.2296	Residential
TMK (3) 1-5-117: 004 (15-1521 Apana Street)			
Adjoining property to the South			
2018-Present	Magarin, Walter Freddie Magarin, Florylyn	0.2296	Residential
2010-2018	Magarin, Angel L. Trust Magarin, Perlita J. Trust	0.2296	Residential
2007-2010	Magarin, Angel Magarin, Perlita Jose	0.2296	Residential
1987-2007	Magarin, Angel Magarin, Justa	0.2296	Residential
TMK (3) 1-5-117: 024 (15-2773 Apana Street)			
Adjoining property to the South			
2014-Present	State of Hawaii Hilo Baptist Church	0.6887	Residential
2003-2014	State of Hawaii Puna Baptist Church	0.6887	Residential
1991-2003	State of Hawaii Puna Baptist Church	0.6887	Residential

Period (approx.)	Owner/Lessee/Sub-Lessee	Area (acres)	Primary Use
1987-1991	State of Hawaii Kinoole Baptist Church	0.6887	Residential
TMK (3) 1-5-117: 026 (15-2771 Pahoa Village Road) Adjoining property to the Southeast			
1990-Present	Kahookaulana, Samuel Kahookaulana, Marcelina	0.2296	Residential
1989-1990	Kahookaulana, Samuel Kahookaulana, Marcelina	0.2296	Residential
1987-1989	Kahookaulana, Pearl	0.2296	Residential
TMK (3) 1-5-007:023 (15-2765 Pahoa Village Road) Adjoining property to the Southeast			
2000-Present	Good Shepard Foundation	5.600	Agricultural
1987-2000	Lee, Mary Lee, Simeon C. Mukuakane, Daniel	5.600	Vacant

*Data from the years prior to 1989, 1994, and 2000 were not available from the Hawaii Real Property Tax Division at the time of this writing.

TMK - Tax Map Key

3.0 USER PROVIDED INFORMATION

User provided information was obtained from Victor Kandle, Administrator from County of Hawaii Mass Transit Agency, who completed a “User Questionnaire” administered by MNA. The information in the following sections was obtained from the questionnaire. The completed user questionnaire is provided in Appendix B.

3.1 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

Victor Kandle indicated that the agency is not aware of any known environmental cleanup liens for the subject properties. They were unaware of chemicals present at the subject properties, or any spills or other chemical releases, or environmental cleanups that had taken place at the subject properties. Mr. Kandle stated that he is unaware of any activity and land use limitations, such as engineering controls, land use restrictions, or institutional controls that have been previously in place or currently in place on the subject properties.

3.2 SPECIALIZED KNOWLEDGE

Mr. Kandle did not have any specialized knowledge regarding the subject properties and is not involved with any business that are current or former occupants of the property or adjoining properties. Mr. Kandle recommended the property owners who could be potential interviewees: Sharman Oyadomari, trustee of Kikuko Kuwahara Irrevocable Grantor Trust, and Russell Kuwahara, General Partner of Kuwahara Family Partners. Mr. Kandle indicated that they were unable to locate any contacts for Site #8, owners are indicated as deceased on tax records.

3.3 VALUATION REDUCTION

Mr. Kandle stated that the purchase price for the properties has not been discussed to date.

3.4 REASON FOR PERFORMING THE PHASE I ESA

The purpose of this Phase I ESA is to identify any *REC* at the subject properties, within the scope of ASTM Standard 1527-21, for preparing the parcels for potential selection by the County of Hawaii for the new Transit Hub in Pahoia, along with a co-located library facility. SSFM International, Inc., and the COH will rely on this Phase I ESA to take appropriate action and proceed toward the execution of Transit Hub project.

4.0 RECORDS REVIEW

Under ASTM 1527-21, records are to be reviewed by the environmental professional who may help identify *RECs* in connection with the subject property.

4.1 STANDARD ENVIRONMENTAL RECORD SOURCES

MNA used Environmental Data Resources, Inc. (EDR) services to search standard federal and state government databases for hazardous substance or petroleum product releases that could impact the subject property. A copy of the EDR report is provided in Appendix C.

ASTM E 1527-21 specifies a minimum search distance for specific environmental record sources. The following sources are specified for incidents or sites within 1 mile of the subject property:

- Federal NPL site list
- Federal RCRA CORRACTS TSD facilities list
- State-equivalent NPL

The following sources are specified for incidents or sites within ½ mile of the subject property:

- Federal Delisted NPL site list
- Federal CERCLIS list
- Federal SEMS Sites list
- Federal SEMS-Archive site list (formerly CERLIS-NFRAP)
- Federal RCRA non-CORRACTS TSD facilities list
- State-equivalent CERCLIS (SHWS)
- State landfill and/or solid waste disposal site list
- State leaking UST list
- State voluntary cleanup program sites
- State Brownfield Sites

The following sources are for incidents on the subject and adjoining property:

- Federal RCRA generators list
- State registered UST list

Finally, the following are for incidents for the subject property:

- Federal Institutional Controls (IC) and Engineering (EC) Registries
- Federal ERNS list
- State IC and EC Registries

MNA also searches for additional record sources including the following.

- Federal Brownfields Sites within ½ mile of the subject property
- Federal Release Sites for the subject property
- State Releases list (SPILLS) for the subject property
- Integrated Compliance Information System (ICIS) for the subject property

The following subsections summarize the results of the EDR records review for the datasets listed above (EDR, 2023).

4.1.1 Federal National Priorities List

The NPL, maintained by the U.S. Environmental Protection Agency, is a list of highly contaminated sites that have been identified by Superfund Amendments and Reauthorization Act of 1986. No NPL sites were identified within 1 mile of the subject property (EDR, 2023).

4.1.2 Federal RCRA CORRACTS TSD Facilities List

The RCRA CORRACTS TSD facilities list maintained by the Environmental Protection Agency (EPA) contains generators, transporters, treaters, storers, and disposers of hazardous waste that have reported violations and are subject to corrective actions. There were no RCRA CORRACTS TSD within 1 mile of the subject property (EDR, 2023).

4.1.3 Delisted NPL Site List

This list, maintained by the EPA, contains NPL sites that were taken off the list. No delisted NPL sites were identified within ½ mile of the subject property (EDR, 2023)

4.1.4 Federal CERCLIS List

The CERCLIS list, maintained by the EPA, contains sites that are either proposed to be or are on the NPL list, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. No CERCLIS sites were identified within ½ mile of the subject property (EDR, 2023).

4.1.5 Federal SEMS Site List

The Superfund Program deployed SEMS, which integrates multiple legacy systems into a comprehensive tracking and reporting tool. This inventory contains active sites evaluated by the Superfund program that are either proposed to be or are on the NPL, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. No SEMS sites were identified within ½ mile of the subject property (EDR, 2023).

4.1.6 Federal SEMS-Archive Site List

SEMS-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 as SEMS Archive by the EPA in 2015. The SEMS-Archive list, maintained by the EPA, contains

designated CERCLA sites that, to the best of the EPA’s knowledge, assessment has been completed and has determined that no further steps will be taken to list the sites on the NPL. No SEMS-Archive sites were identified within ½ mile of the subject property (EDR, 2023).

4.1.7 Federal RCRA non-CORRACTS TSD Facilities List

The RCRA non-CORRACTS TSD facilities list, maintained by the EPA, contains RCRA permitted facilities that treat, store, or dispose of hazardous waste. No RCRA TSD facilities listed were identified within ½ mile of the subject property (EDR, 2023).

4.1.8 State Hazardous Waste Sites

The SHWS records are the states’ equivalent to CERCLIS. In Hawaii, the CERCLIS-equivalent is the Sites of Interest database, maintained by the HDOH Hazardous Evaluation and Emergency Response (HEER) Office. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds are identified along with sites where cleanup will be paid for by responsible parties. EDR identified two SHWS locations within 1 mile of the subject property (EDR, 2023). Table 6 provides a summary of these sites. Refer to Section 4.2.2 for additional information and Section 8.2 for determination of impact of the SHWS on the subject property.

Table 6. State Hazardous Waste Sites

Site	Relative Location (feet) ¹	Relative Elevation	Address	Status
Pahoa Elementary School Building Exterior Soils	4,641	Higher	15-3030 Pahoa Village Road	Soil contamination was determined. Mitigation measures were recommended on EHMP prepared in 2018 and reviewed by HDOH Refer to Section 4.2.2
Pahoa High and Intermediate School Building Exterior Soils	5,116	Higher	15-3038 Pahoa Village Road	Soil contamination was determined. Mitigation measures were recommended on EHMP prepared in 2018 and reviewed by HDOH Refer to Section 4.2.2

¹Relative locations are based on a geocoded street address for the site and may not reflect the closest distance between the subject property and the site.

4.1.9 State Landfill/Solid Waste Disposal Sites

The HDOH records contain an inventory of permitted landfills in the State of Hawaii. No permitted solid waste landfills, incinerators, or transfer stations were identified within ½ mile of the subject property (EDR, 2023).

4.1.10 State Leaking UST List

This list, maintained by the HDOH Solid and Hazardous Waste Branch (SHWB), is an inventory of sites with Leaking USTs. No leaking UST facilities were located within ½ mile of the subject property (EDR, 2023).

4.1.11 State Voluntary Cleanup Sites

The state voluntary cleanup sites list, maintained by the HDOH Hazard Evaluation and Emergency Response (HEER) Office, contains sites participating in the state’s Voluntary Response Program (VRP). No facilities participating in the state VRP were identified within ½ mile of the subject property (EDR, 2023).

4.1.12 State Brownfield Sites

This database, maintained by the HDOH HEER Office, is an inventory of state designated brownfield sites. Under the Small Business Liability Relief and Brownfields Revitalization Act, a brownfield is defined as “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.” The EPA provides grants and loans to state and local governments for the assessment, cleanup, and redevelopment of these properties. Properties located on the state brownfield list may have received federal funding under this program or be designated a brownfield for state administration or funding purposes. No state brownfield sites were identified within ½ mile of the subject property (EDR, 2023).

4.1.13 Federal RCRA Generators List

The RCRA Generators list, maintained by the EPA, contains small and large quantity generators of hazardous waste. The determination of generator size is used to establish the risk that the facility poses to public health and the environment and consequently, the amount of regulation and reporting required. Large Quantity Generators (LQG) are facilities that generate more than 1,000 kg/month of hazardous waste and/or more than 1 kg/month of acute hazardous waste. Small Quantity Generators (SQG) are facilities that generate less than 1,000 kg/month but more than 100 kg/month of hazardous waste and/or less than 1 kg/month of acute hazardous waste. Very Small Quantity Generators (VSQG) are facilities that generate less than 100 kg/month of hazardous waste and/or less than 1 kg/month of acute hazardous waste. The EPA also maintains the RCRA No Longer Regulated list. This list contains facilities that were once on the RCRA generators list, but are no longer in business, no longer in business at the listed address, or are no longer generating hazardous waste substances in quantities that require reporting. One RCRA-VSQG generator was identified within ½ mile of the subject property (EDR, 2023).

Longs Drug Store #7098, 15-1454 Kahakai Boulevard (1,129 ft. northeast, lower elevation)

Longs Drug store was identified as a VSQG by EDR. Most of the generated waste included components such as, cadmium, chromium, mercury, selenium, silver, and other medication derived waste (EDR, 2023). EDR indicates no violations found regarding this VSQG. No further

information was found. Refer to Section 8.2 for determination of impact of the VSQG on the subject property.

4.1.14 State Registered UST List

The HDOH SHWB maintains a database of known UST. Three UST facilities were identified within a quarter of a mile from the subject properties (EDR, 2023). Table 7 describes the status of the UST facilities.

Table 7. State Registered UST

Site	Relative Location (feet) ¹	Relative Elevation	Address	Status
Malama Gas N Go	258	Lower	15-2660 Keaau-Pahoa	Facility ID: 9-603780 Date installed: 02/01/2005 Two gasohol (Tank IDs: 1-2), Currently in use One diesel (Tank ID: 3), Currently in use
Pahoa Gas & Go	998	Lower	15-2813 Government Road	Facility ID: 9-601315 Four gasoline (Tank IDs: R1-R4), Permanently out of use
Woodland Center	1,146	Lower	15-1450 Kahakai Boulevard	Facility ID: 9-603792 Tank ID: 1, Gasohol, Currently in use Tank ID: 2A, Gasoline, Currently in use Tank ID: 2B, Diesel, Currently in use

¹Relative locations are based on a geocoded street address for the site and may not reflect the closest distance between the subject property and the site.

Refer to Section 4.2.2 for additional information and Section 8.2 for determination of impact of the UST sites on the subject property.

4.1.15 Federal IC and EC Registries

The federal IC and EC registries contain federally listed sites that are required to implement IC or EC. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land use controls can be either ICs or ECs. Institutional controls are limitations on how the property may be used such as prevention of soil disturbance. ECs are physical structures or devices located on the property that contain or limit human or environmental exposure to contamination. Engineering controls need to be maintained or protected to be effective. No federal IC/EC registered sites were identified as within ½ mile of the subject property (EDR, 2023).

4.1.16 Federal ERNS List

The ERNS list, maintained by the EPA, contains CERCLA hazardous substance releases or spills, as maintained at the National Response Center. No incidents were identified on the subject property (EDR, 2023).

4.1.17 State ICs and ECs Registries

The state IC and EC registries contain sites that are state listed sites that have either state-required ICs or ECs in place. Because the sites may continue to be impacted by past use, future use of the property may be restricted in order to protect human health and the environment. Land Use Controls can be either ICs or ECs. ICs are limitations on how the property may be used. ECs are physical structures or devices located on the property that contain or limit exposure to contamination. ECs need to be maintained or protected to be effective. Pahoia Elementary School Buildings Exterior Soils was identified as institutional control site within ½ mile of the subject property (EDR, 2023). Refer to Section 4.2.2 for additional information and Section 8.2 for determination of impact of the UST sites on the subject property.

4.1.18 U.S. Brownfields

U.S. Brownfields are real property, of which the expansion, redevelopment, or reuse may be complicated by the presence of a hazardous substance, pollutant, or contaminant. No U.S. Brownfields sites were identified within 1 mile of the subject property (EDR, 2023).

4.1.19 Facility Index System/Facility Registry System

The Facility Index System/Facility Registry System (FINDS) is a centrally managed EPA database that identifies facilities, sites, or places of environmental interest in the United States. No FINDS sites were identified within the vicinity of the subject property (EDR, 2023).

4.1.20 Hazardous Materials Incident Reporting System

The Hazardous Materials Incident Reporting System, also known as SPILLS or SPILLS90, includes hazardous materials spills that were reported to the State Department of Transportation. No SPILLS incidents were identified in proximity to the subject property (EDR, 2023).

4.1.21 Integrated Compliance Information System

The ICIS is a system that provides information for the Federal Enforcement and Compliance and National Pollutant Discharge Elimination System (NPDES) Programs. The Federal Enforcement and Compliance component supports the EPA's Civil Enforcement and Compliance program activities. The NPDES programs support tracking of permits, limits, discharge monitoring data, and other program reports. No ICIS sites were identified within the vicinity of the subject property (EDR, 2023).

4.2 ADDITIONAL RECORD SOURCES

MNA reviewed additional environmental records as needed and available. Records filed by HELCO, County of Hawaii Fire Department (HFD), and the HDOH SHWB and Wastewater Branch (WWB) were requested. MNA reviewed available information posted on the iHEER System and HEER Office Environmental Health Portal. MNA also reviewed the HDOH HEER

Office Historic Sugarcane Lands Map Viewer and the U.S. Army Corp of Engineers database for Formerly Used Defense Sites (FUDS).

4.2.1 Subject Property

MNA requested information from the WWB, HFD, and HDOH SHWB on 23 May 2023. MNA reviewed available information posted on the iHEER System and HEER Office Environmental Health Portal for the subject property. The HDOH SHWB indicated there were no reports or information on file for the subject property. MNA reviewed the HDOH HEER Office map showing the combined historical sugarcane cultivation land for the Island of Hawaii. The subject property was not identified within an area used for sugarcane production (HDOH HEER Office, 2023). The HFD indicated no fire incidents on the subject properties.

The Army Corp of Engineers FUDS database and the Environmental Health Portal did not identify the subject properties within FUDS (Federal Emergency Management Agency, 2023)(HDOH HEER Office, 2022).

The WWB responded on 23 May 2023, indicating cesspools were present at the subject properties.

Site #9: Parcel 004 Cesspool

A sanitarian's report of cesspools was completed on 10 December 1971 describing the presence of a new cesspool intended for residential sewage on parcel 004. This cesspool is 15 ft from a building, with a 6ft. diameter, and a depth of 16.5 ft. The capacity of this cesspool is 3,172 gallons surrounded by a layered lava rock formation with a concrete cover. The distance from the ground to the cover is 1 ft. This cesspool was approved on 18 January 1973 (HDOH HEER Office, 2023).

Site #9: Parcel 076 Septic Tank and Cesspool

A septic tank system near the nursery building, was approved under permit #10474 to be constructed on 15 February 2002. This septic tank has a capacity of 1,000 gallons. No final inspection report or approval to use was on file. Additionally, a cesspool card has been reviewed, indicating the presence of a cesspool built on 22 September 1970 intended for residential sewage. This cesspool is 12 ft from a building, with a 6ft. diameter, and a depth of 13ft. The capacity of this cesspool is 3,538 gallons surrounded by a layered lava rock formation with a concrete cover. The distance from the ground to the cover is 1 ft. This cesspool was approved on 05 October 1970 (HDOH HEER Office, 2023).

4.2.2 Surrounding Properties

During the site reconnaissance, 11 pole-mounted transformers and one pad-mounted transformer were observed on the sidewalks adjoining to the subject properties as well as on adjoining properties. MNA requested information from HELCO regarding the transformers in the vicinity of the subject properties (Table 8). Information was received from HELCO on 6 June 2023. HELCO indicated that all nine transformers are free of polychlorinated biphenyls (PCB).

Table 8. Transformer Description

Pole/Vault Number	Transformer Number	Type	Address	Date Purchased	PCB Status
150349	49228	Pole-mount	Kahakai Blvd	28 October 2017	Non-PCB
3T1124	69635	Pad-mount		21 May 2018	
111963	49359	Pole-mount	Keaau-Pahoia Road	29 November 2017	
111962	21888			13 June 1990	
132248	34903	Pole-mount Bank	South to Pahoia Fresh Fish (West Keaau-Pahoia Road, Pahoia, HI 96778)	8 October 2002	
	35422			23 May 2003	
	34895			8 October 2002	
132247	36466	Pole-mount Bank	South to First Hawaiian Bank – Pahoia Market Place (West to Keaau-Pahoia Road, Pahoia, HI 96778)	8 November 2014	
	36465				
	36464				
120605	46019	Pole-mount		15 November 2013	
120606	42355			3 June 2010	

PCB - Polychlorinated Biphenyls

The U.S. Army Corp of Engineers FUDS database did not identify adjoining properties to be within FUDS sites (HDOH HEER Office, 2022).

The HFD responded on 01 and 11 August 2023 indicating past incidents on surrounding properties as well as incidents on Apaa Street. Reported incidents are described below:

- TMK (3) 1-5-007:069: On 20 July 2023, a chemical odor (smell of propane) was reported. No chemical leak was found. On 13 March 2023, there was a fuel release from a hole in a vehicle’s fuel tank.
- TMK (3) 1-5-007:080: On 14 April 2023, there was a vehicle fuel release. On 04 April 2023 there was a structure fire.
- TMK (3) 1-5-117:003: On 23 June 2022 the power line went down due to a blown transformer.
- TMK (3) 1-5-117:002: On 15 June 2008 there was a structure fire.
- TMK (3) 1-5-007:020: On 13 January 2014, there was an electrical fire. On 20 May 2021, there was a report of propane leak, however, no leaks were found.
- Records response for incidents found on Apaa Street:
 - 16 July 2007: Compactor Fire
 - 16 March 2016: Compactor Fire at Transfer Station
 - 17 December 2005: Compactor Fire

- 8 June 2019: 15-1860 Akaa Street Vehicle Fire
- 21 October 2020: at Cemetery Road Vehicle Fire
- 21 September 2014: Brush Fire
- 18 February 2015: Brush Fire
- 19 February 2015: Brush Fire
- 4 December 2020: Rubbish Fire
- 28 October 2014: HELCO Pole Fire
- 13 January 2005: Washing Machine on Fire
- 18 August 2013: 15-1901 Akaa Street Structure Fire
- 23 June 2022: 15-1517 Akaa Street Power Lines Down
- 01 April 2019: Rubbish Fire

The smoke and gases from full-scale fires have emissions with a potentially harmful impact on the environment, or chronic toxic effect on humans. These emissions include hydrochloric acid, sulfur dioxide, volatiles (e.g. benzene), polynuclear aromatic hydrocarbons, and dioxins. Runoff water from these areas may contain elevated levels of both organic compounds and heavy metals. Contamination by lead, copper, zinc, and antimony can be significant in water run-off from these types of fires (Lönnermark, 2006). Refer to Section 8.2 for the determination of the impact of these incidents on the subject properties.

MNA reviewed available information posted on the iHEER System and the HEER Office Environmental Health Portal. A summary of those records is provided below. Refer to Section 8.2 for the determination of the impact of the sites on the subject property.

Pahoia Elementary School Building Exterior Soils, 15-3030 Pahoia Village Road (4,641ft. southeast, higher elevation)

On 10 August 2018, an interim environmental hazard management plan (EHMP) was prepared for the Hawaii Department of Education (HDOE), to address the exterior soils around Pahoia Elementary School buildings. On 02 January 2017, soil sampling was conducted. Analytical results identified lead and chlordane exceeding the HDOH environmental action level (EAL) along the perimeter of two buildings. The EHMP recommended further soil sampling if excavation takes place 6 inches below ground surface; additionally, some of the mitigation recommendations included capping the soil with grass cover and landscaping. On 21 November 2018, the HDOH issued a letter to several school locations, including Pahoia Elementary and Pahoia High and Intermediate, indicating the approval of the EHMP. Additionally, HDOH required an annual site inspection with a report provided to HDOH annually. On 14 December 2018, an updated version of the EHMP was released addressing HDOH comments. Additionally, a standard operating procedure was provided for routine maintenance for grass cover or landscaping (HDOH HEER Office, 2023).

Pahoia High and Intermediate School Building Exterior Soils, 15-3038 Pahoia Village Road (5,116 ft. southeast, higher elevation)

Similar to Pahoia Elementary School Building, a revised EHMP was issued on 14 December 2018. On 27 December 2017, soil sampling was conducted at the perimeter of four buildings; lead, arsenic, and chlordane were found exceeding the HDOH EAL. The school specific Interim EHMP provides short-term management of contaminated soils remaining on campus and periodic inspections, reporting, and maintenance or interim actions are required (HDOH HEER Office, 2023).

Woodland Center, 15-2813 Government Road (1,146 ft. east, lower elevation)

On 20 September 2019, HDOH released a follow-up letter regarding a UST inspection performed on 07 August 2019 and noted the violations found during inspection for two 10,000-gallon USTs. These violations included the failure to retain Class A and Class B operators every five years, and failure to properly service release detection equipment in the timeframe required by the Hawaii Administrative Rules. On 24 December 2019, HDOH released a letter confirming the payment submitted towards these previous violations. On 24 September 2021, SHWB received a permit application for renewal of three 10,000-gallon USTs. On 01 October 2021, SHWB approved this permit (P-2006-001-R3) (HDOH HEER Office, 2023).

4.3 HISTORICAL USE INFORMATION ON THE SUBJECT PROPERTY

MNA reviewed historical use information for the subject property, including aerial photographs and United States Geological Survey (USGS) topographic maps. Sanborn fire insurance maps were not available for the subject properties.

4.3.1 Historical Aerial Photographs

Aerial photographs of the subject, adjoining, and surrounding properties were provided by EDR (EDR, 2023). Photographs from the years 1954, 1961, 1974, 1977, and 1985 were reviewed. Table 9 provides the details for those photos. The scale for photos was 1 inch to 500 feet.

Table 9. Aerial Photograph Details

Year	Image Type	Photograph Details
1954	Black and White	The subject properties are vacant land. A main road is observed to the east of the subject property. There are no buildings or structures observed on the subject property. There appears to be residential houses and agricultural land to the southeast of the subject property.
1961	Black and White	Buildings and/or structures are observed to the north of the subject property at parcel 007. No other changes are observed compared to the 1954 photograph.
1974	Color	There are buildings and structures on the subject property. A residential building is observed southwest of parcel 083. Smaller structures are observed on parcels 005 and 007. There is an approximately five-acre agricultural plot on the subject properties at parcels 004, 082, and 083. There are buildings and structures located to the north, south, and east of the subject property. There are roads observed to the east, south, and southwest of the subject properties.

Year	Image Type	Photograph Details
1977	Black and White	The structures located on parcels 007, 005, and 076 are apparent residential developments. The agricultural plot on the subject properties (parcel 004, 082, and 083) remains active. There is an increased number of buildings and structures to the east and south of the subject properties. The land directly south of Apana Street has been cleared.
1985	Color	Residential buildings on the subject properties appear more defined. No other significant changes are observed in the subject properties. The area to the northeast and south of the subject properties is significantly more developed, including the development of Puna Kai Shopping Center at parcel 069. A residential subdivision of approximately 18 residences was developed south of Apana Street.

MNA reviewed historical aerial imagery available from Google Earth. Photographs from the years 2007, 2011, 2013, 2014, 2016, 2017, 2018, and 2023 were reviewed (Table 10).

Table 10. Google Earth Imagery Details

Year	Imagery Details
2007	Subject properties are mostly vacant with four buildings on the properties. The land is mostly undeveloped. Agricultural land use is evident on the subject property at parcel 004, 082 and 083. Keaau-Pahoia Road (east of the subject property) is paved.
2011	The adjacent properties are more developed. Longs Drugs was constructed on the adjoining property east of the subject property at parcel 020. The adjoining property parcel 069, south of Kahakai Boulevard, appears to have additional cleared area and parked vehicles/equipment.
2013	The adjoining property at TMK (3) 1:5:007:069 has been completely cleared and appears to be operated as a baseyard. The operation at parcel 069 has encroached onto the subject property at parcel 007 (southwest quadrant); vegetation clearance and potential deposition of fill from parcel 069 is evident in the image.
2014	The adjoining property at parcel 069 is more developed. Nearly half of the subject property at parcel 007 is impacted by the encroaching operation at adjoining property parcel 069. Parcel 083 has structures and vehicles in the later part of the year, with much of the vegetation cleared.
2016	The parcels 083 and 082 have less vegetation and appear to be under construction. Heavy equipment appears to be in operation at the center of the subject property at parcel 007. Evidence of material stockpiled is visible in the southwest corner of parcel 007. A stockpile can be seen at the subject property in the vicinity of parcels 004, 082, and 083.
2017	Heavy equipment is parked on the subject property at parcel 007. Vegetation has overgrown the material stockpile in the southwest corner of the subject property at parcel 007. Bare ground with containers and stockpiles is evident at the subject property in the vicinity of parcels 004, 082, and 083.
2018	No notable changes on the subject properties from 2017 imagery; the encroaching operation and the overgrown material stockpile at the subject property at parcel 007 remains unchanged. All of the structures at the adjoining property at parcel 069, south of Kahakai Boulevard, were demolished.

Year	Imagery Details
2023	There is more vegetation on parcels 004, 082, and 083, indicative of less use. There is a paved area on the subject property at parcel 007 in the location where the heavy equipment appeared to be operating in 2016. Vegetation is present in the area of the previously seen overgrown material stockpile in the southwest corner of the subject property at parcel 007. Two pieces of heavy equipment appear to be parked directly to the north. The surrounding area is significantly more developed, with full build out of parcel 069 including approximately nine large buildings. Kahakai Boulevard is a paved road adjacent to parcel 007.

4.3.2 Historical Topographic Maps

USGS topographic maps that cover the subject property and vicinity were reviewed. Maps were available for the years 1922, 1924, 1965-1966, 1980-1981, 1994-1995, 1997, 2013 and 2017 (EDR, 2023). Table 11 provides details for the maps reviewed.

Table 11. Topographic Map Details

Year	Topographic Map Details
1922	The subject properties are located in Pahoia at approximately 667 ft above sea level. Keaau-Pahoia Road is depicted on the east side of the subject properties. Pahoia National Guard Reservation is observed to the northwest. The subject property is within the Keonepoko Homesteads. Nanawale Homestead is identified to the southeast of the subject properties.
1924	There are more structures located to the southeast of the subject properties. No other significant changes compared to 1922 map.
1965-1966	Two structures are depicted in the northeast quadrant of the subject property at parcel 007. There is a stream depicted crossing the northeast corner of parcel 007 and running west to east. A cinder pit and a cemetery are observed approximately 0.75 miles to the southeast of parcel 004. There are more roads built to the south within Pahoia. A well is observed a mile to the southeast of parcel 004. Pahoia airstrip is located approximately a mile to the north of parcel 007.
1980-1981	Four structures are depicted along the eastern boundary of the subject properties at parcel 007, 005, and 076. Keaau-Pahoia Road is a secondary highway and has been extended. There are more buildings observed and residential development to the southeast, within Pahoia town. An increased density of roads is visible throughout Nanawale Homesteads.
1994-1995	Eight structures are depicted along the eastern boundary of the subject properties, at parcel 007, 005, and 076 and a ninth structure is visible along the southern boundary on parcel 004. Pahoia Bypass Road is a secondary highway and Keaau-Pahoia Road is now depicted as a light duty road. No other significant changes are observed from the 1980-1981 map.
1997	No significant changes are observed from the 1994-1995 map. The bottom half of the map, including a southern portion of the subject property, is unmapped.
2013	The map style has been simplified; residential structures are no longer depicted. There are four schools observed to the southeast of the subject property, parcel 004, within Pahoia town.

Year	Topographic Map Details
	The National Guard Reservation is no longer depicted on the map. The road along the southern boundary of the subject property is identified as Old Cemetery Road.
2017	There are two schools observed to the southeast and one school observed to the east. The road along the southern boundary of the subject property is identified as Rubbish Dump Road (today named Apaa Street), which after turning south, is renamed Cemetery Road.

4.3.3 Sanborn Fire Insurance Maps

Fire insurance map coverage was not available for the subject property (EDR, 2023).

5.0 SITE RECONNAISSANCE

The site reconnaissance was conducted by Vanessa Gabriel and Gabrielle Richardson of MNA on 31 May 2023. The site reconnaissance focused on identifying *RECs* with the potential to impact the subject property. A site map of the subject property and path walked are presented in Figure 3. Refer to Section 8.0 for findings related to the observations made during the site reconnaissance. The site reconnaissance was conducted by visually inspecting the subject property and adjoining properties by foot. MNA assessed the site for a variety of environmental hazard indicators including, but are not limited to, stained surface soil, dead or stressed vegetation, hazardous substances, above ground and underground storage tanks, disposal areas, groundwater wells, drywells, and sumps. Field forms from the site reconnaissance are provided in Appendix B. Photographs from the site reconnaissance are presented in Appendix D.

5.1 METHODOLOGY AND LIMITING CONDITIONS

MNA obtained permission to access subject properties 007, 082, and 083. For subject properties 004, 005, and 076, MNA conducted observations from the adjoining properties or where a view was accessible. Additionally, the path taken for site reconnaissance was limited due to dense vegetation and tall grass on most of the subject properties.

5.2 GENERAL SITE SETTING

The subject properties are in a residential and commercial area of Pahoia. Parcel 007 was accessed via Kahakau Boulevard, at the south boundary of the subject property. Parcels 083 and 082 were accessed via Apaa Street, at the south boundary of parcels 083 and 004. Keaau-Pahoia Road is the east boundary of all parcels, except for parcels 082 and 083. The adjoining properties to the north and south of parcel 007 are used for commercial purposes, including gas stations, a coffee shop, a grocery store, and restaurants. Mainly residential homes are located to the east and south of parcels 083, 004 and 076.

5.3 EXTERIOR OBSERVATIONS

The following paragraphs describe observations made for each of the parcels.

5.3.1 Site #2: Parcel 007

The main access point for the subject property was located at the south boundary of the subject property through Kahakai Boulevard. The south portion of the property was used as a gravel public parking lot (Photographs 1-2). A metal container, a soil and gravel pile, as well as three small plastic pools, potentially containing what appears to be a mix of soil and water, was observed on an empty portion of the parking lot (Photographs 3-5). A gas station, located in the adjoining property TMK (3) 1-5-007:069, was observed south of the subject property, opposite Kahakai Boulevard (Photograph 6). A pole-mounted transformer, a pad-mounted transformer, as well as cable manholes were present on this adjoining property, parcel 069 (Photographs 7-9). A concrete structure with drainage grate as well as a surface level drainage grate were observed near the intersection between Keaau-Pahoia Road and Kahakai Boulevard (Photographs 10-11).

On Keaau-Pahoia Road, to the east side of the subject property, a Hawaii Electric Light Company (HELCO) streetlight and traffic sign meter cabinets were observed (Photographs 12-13). A pole-mounted transformer was present on the sidewalk bordering the subject property (Photograph 14). A single residential structure was present on the east side of the subject property as well as a fire hydrant outside near the driveway (Photographs 15-16). The east boundary of the subject property was densely vegetated (Photograph 17) and a second pole-mounted transformer was present (Photograph 18). The north boundary of the subject property is of the property line with the adjoining property TMK (3) 1-5-007:080 (Photograph 19), where a propane tank as well as two pole-mounted transformer banks containing three transformers each were observed (Photographs 20-22).

5.3.2 Site #9: Parcels 004, 076, 082, and 083

Apaa Street is the south boundary of parcels 083 and 004 (Photograph 23). Parcel 083 was accessed through a grassy path with tire marks near Apaa Street; there is no fence separating the cluster of parcels comprised of the subject property and adjoining property parcels, only dense vegetation (Photographs 24-25). Dense vegetation, an old pipe fragment, an asphalt paved area, as well as some debris including soil in plastic bags (potentially remained from historical agricultural use of the land), was observed on the adjoining property to the north of parcel 083, TMK (3) 1-5-007:084 (Photographs 26-28).

A metal gate was present between parcel 083 and 004. A tractor was observed on parcel 083 (Photographs 30-31). A residential structure was observed on the southwest portion of parcel 004 (Photograph 32). Parcel 082 was mostly vegetated with dense tall grass (Photograph 33); southwest of parcel 082, a metal closet surrounded by dense vegetation was observed (Photograph 34). Parcel 076 was observed from Keaau-Pahoia Road, and contained two residential structures, as well as a pole-mounted transformer located across the street and a pole-mounted Hawaiian Telecom repeater device located on the sidewalk (Photographs 35-37).

5.3.3 Site #8: Parcel 005

The main access point for parcel 005 was through Keaau-Pahoia Road and most of the property was surrounded by dense vegetation (Photograph 38). A pole mounted transformer was observed across the road to the east (Photograph 38). A residential driveway was present on the subject

property leading from Keaau-Pahoia Road (Photograph 40). Puna Kai Shopping center is located on the north adjoining property, parcel 006 (Photograph 41).

5.4 INTERIOR OBSERVATIONS

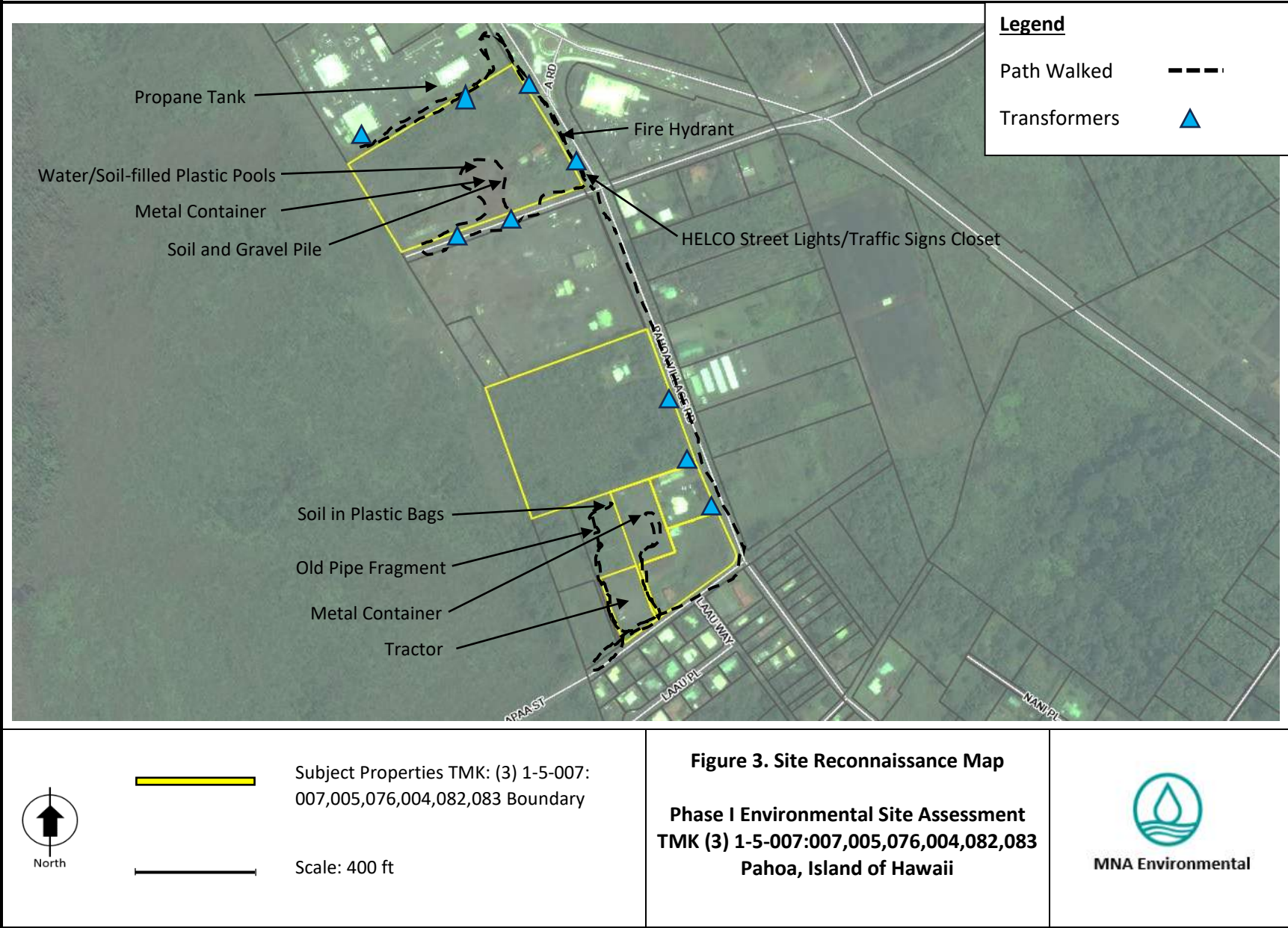
MNA was not granted permission to access the interiors of the residential structures located on the subject properties; therefore, no interior observations were made.

5.5 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS

Twelve transformers were observed on the sidewalk adjoining the subject properties and on adjoining properties (Photographs 7, 8, 14, 18, 20, 22, 37, 39). No transformers were observed on the subject property. No other suspected hazardous substances or petroleum products were observed during the site reconnaissance.

5.6 ABOVEGROUND AND UNDERGROUND STORAGE TANKS

MNA observed no above ground or underground storage tanks. No vent pipes or access panels/ports were located on the subject properties.



6.0 INTERVIEWS

MNA administered the interview forms to subject property owners, coordinated by SSFM. Completed interview forms were obtained via email through SSFM during 01-14 June 2023. Current co-manager of NHS, Inc. (owner of Site #2: parcel 007), Hazelynn Amano; and Sharman Oyadomari, trustee of Kikuko Kuwahara Irrevocable Grantor Trust, and Russell Kuwahara, General Partner of Kuwahara Family Partners (owners of Site #9: parcels 004, 076, 082, and 083) completed the interview forms (provided in Appendix B).

6.1 HAZELYNN AMANO, CO-MANAGER OF NHS, INC. (Site #2: parcel 007)

Hazelynn Amano indicated the subject property as well as adjoining properties have been vacant. Ms. Amano was not aware of any chemicals that are present or were present on the subject property. They were unaware of any spills, environmental cleanups, activity use limitations (AUL), environmental assessments, or any issues regarding the subject property. Ms. Amano indicated the presence of a cesspool in the subject property; however, records requested from WWB indicated no records of a cesspool at parcel 007.

During a follow up phone call on 08 August 2023, Ms. Amano indicated that the southern gravel area portion of parcel 007 is used for overflow parking for Puna Kai Shopping Center customers. Additionally, she indicated no knowledge of the contents of the white container located north of the gravel area. Additionally, Ms. Amano stated that the County of Hawaii issued two stockpiling permits in 2013 (permit number: ST5887_ENG) and 2016 (permit number: ST5971_ENG). Further research indicates that both stockpiling permits expired in 2014 and 2017, respectively. These permits are assumed to have been used during the Puna Kai Shopping Center construction to stockpile extra construction materials between 2013 and 2017.

6.2 SHARMAN OYADOMARI, TRUSTEE OF KIKUKO KUWAHARA IRREVOCABLE GRANTOR TRUST and RUSSELL KUWAHARA, GENERAL PARTNER OF KUWAHARA FAMILY PARTNERS (Site #9: parcel 004, 076, 082, and 083).

Sharman Oyadomari indicated that parcel 076 has been used as residence and warehouse, parcel 004 has been used in the past as a Christmas tree farm and a rental home, and parcels 082 and 083 have been used for anthurium farming. The adjoining properties at parcels 084, 085, and 086 have also been used as anthurium farms in the past. He was not aware of any chemicals that are present or were present on the subject property. He was unaware of any spills, environmental cleanups, AUL, environmental assessments, or any issues regarding the subject property. He indicated the past presence of a gasoline pump storage tank at parcel 076 that had previously been removed. Additionally, they indicated the presence of a cesspool at parcel 076 and 004. Regarding legal proceedings, parcel 076 has an appeal foreclosure. Refer to section 4.2.1 for additional information regarding the tank and cesspools.

7.0 DATA GAPS AND DEVIATIONS

Data gaps were encountered during research on the current and past uses of the subject property. No tax records were available for the subject or adjoining properties prior to 1989 (parcel 080), 1994 (parcel 086), and 2000 (parcel 069), at the County of Hawaii Real Property Tax Office. This is considered a minor data gap, as historical aerial images and topographic maps were also reviewed to assess the site use.

Dense vegetation on most of the subject properties posed a limitation during site reconnaissance due to limited available area to walk through. This deviation is not considered to be a REC as many additional data sources were reviewed, including historical aerials and topographic maps, other county agency information, and standard federal and state government databases.

At the time of this writing, a point of contact for Site #8 (parcel 005) was not reachable; therefore, no site reconnaissance was performed at the property, and no key site manager interview was conducted for this parcel. The unavailable information from landowner and site reconnaissance is a deviation from the ASTM standard that is considered a data gap and can lead to a *REC*.

The interview with Sharman Oyadomari, trustee of Kikuko Kuwahara Irrevocable Grantor Trust, and Russell Kuwahara, General Partner of Kuwahara Family Partners (owners of Site #9: parcels 004, 076, 082, and 083) indicated a gasoline pump storage tank that has been previously removed at parcel 076. According to HDOH SHWB, there are no records of this UST. This is considered a data gap that could lead to a *REC* since there is no information regarding potential past release from the tank or previously tank management, including inspections, service, and maintenance.

No other limitations, data gaps, or deviations were encountered during this Phase I ESA.

8.0 KEY FINDINGS AND OPINION

This section evaluates the key findings of this assessment and makes a determination as to the presence of *RECs*, if any.

8.1 SUBJECT PROPERTY

The EDR report did not identify the subject property on any environmental databases. Review of tax records, aerial photos, and topographic maps did not indicate any *RECs*.

MNA requested information about releases of hazardous materials or petroleum products as well as other environmental hazards on the subject property from the HDOH SHWB, WWB, and HFD. MNA reviewed the HEER Office online resources. The HDOH SHWB Office did not have records on file associated with the subject property.

8.1.1 Non-REC

During the site reconnaissance, dense vegetation was observed throughout the subject properties. The south portion of parcel 007 has been used as a public parking lot; near it there was a metal container, a soil and gravel pile, as well as three small plastic pools, potentially containing what

seems like a mix of soil and water. There were no evident hazardous materials or petroleum products, nor indications of releases, such as stained soils or stressed vegetation. Based on the types of solid waste observed on the property, the user questionnaire, interviews completed, current and past uses recorded in the County of Hawaii tax records from 2000 to 2023, as well as historical aerial photographs and topographic maps, parcel 007 has been mostly vacant property with a single residential home and public parking lot. Parcel 005 has been highly vegetated with a single residential home, parcel 076 has been used as residence and warehouse, parcel 004 has been used in the past as a Christmas tree farm and a rental home, and parcels 082 and 083 have been used as anthurium farm. These observations made during the site reconnaissance are not considered a *REC*.

Site #9: Parcels 004 and 076 Cesspool and Septic Tank

The WWB responded on 23 May 2023, indicating cesspool information for the subject property parcels 004 and 076. The cesspools were approved on 18 January 1973 and on 05 October 1970, respectively. There were no violations or citations in WWB records that might indicate misuse or issues with these cesspools, therefore, these cesspools are not considered a *REC*. Additionally, WWB indicated the presence of a septic tank on parcel 076 constructed on 15 February 2002. Though no final inspection report was submitted or final approval for its use provided, this septic tank is not considered a *REC*, as there were also no violations on file.

8.1.3 REC

Site #9: Parcels 004, 082, and 083 Agricultural Use and Undocumented Historical UST

The interview form filled out by Sharman Oyadomari, trustee of Kikuko Kuwahara Irrevocable Grantor Trust, and Russell Kuwahara, General Partner of Kuwahara Family Partners (owners of Site #9: parcels 004, 076, 082, and 083) indicate that parcel 004 has been used in the past as a Christmas tree farm and a rental home, and parcels 082 and 083 have been used as an anthurium farm. These agricultural activities might have involved the use of pesticides that could be remaining in the soil. It is assumed that any pesticides were applied in accordance with the labels approved for the crops, required by Federal Insecticide, Fungicide, and Rodenticide Act. No evidence of pesticide disposal, storage, spills, or transport was observed at the subject property; however, repeated applications over the years may have impacted the property which could lead to a *REC*.

Owners of Site #9: parcels 004, 076, 082, and 083, indicated a gasoline pump storage tank that has been removed from parcel 076. According to HDOH SHWB, there are no records of this UST. This data gap could lead to a *REC* since there is no information regarding potentially past leakage of the tank, incidents, or violations.

8.2 SURROUNDING AREA

No records of NPL, Delisted NPL, federal CERCLIS, RCRA CORRACT, RCRA TSD facilities, federal IC/EC, ERNS, state or federal Brownfields, state landfills, state voluntary cleanup, or FINDS sites were identified in the area surrounding the subject property in the EDR report.

8.2.1 Non-REC

During the 31 May 2023 site reconnaissance, no evidence of *recognized environmental conditions* was observed in the surrounding area. An old pipe piece, an asphalt paved area, as well as some debris including soil in plastic bags (potentially from historical agricultural use of the land), was observed on the adjoining property, parcel 084, to the north of parcel 083. There were no evident hazardous materials or petroleum products, nor indications of releases, such as stained soils or stressed vegetation; therefore, these observations made during the site reconnaissance are not considered a *REC*.

Additionally, during the site reconnaissance, 11 pole-mounted transformers and one pad-mounted transformer were observed on the adjoining properties and on the sidewalks adjacent to the subject properties (Table 7). HELCO identified all 12 transformers as free of PCB, and there were no evidence of dielectric fluid leaks or stains in the soil. Therefore, the transformers are not considered a *REC*.

Records received from WWB indicated the presence of cesspools and septic tanks at the following adjoining properties:

Cesspools

- TMK (3) 1-5-117:004 at 15-1521 Apaa Street (Magarin, Walter & Florylyn)
- TMK (3) 1-5-117:003 at 15-1517 Apaa Street (Rara, Wilfredo & Jon-Erik)
- TMK (3) 1-5-117:002 at 15-1515 Apaa Street (Frazer, Edward)
- TMK (3) 1-5-117: 001 at 15-1511 Apaa Street (Lum Family Enterprises LLC)
- TMK (3) 1-5-007:021 at 15-2707 Pahoia Village Road (Metcalf Family Partners)

Septic Tank Systems

- TMK (3) 1-5-007:080 at 15-2660 Pahoia Village Road (Walker Apartments LLC):
 - Retail Bldg, Permit# 10732, Approval to Use issued 30 August 2004.
 - Pahoia Hardware, Permit# 10773, Approval to Use issued 26 May 2004.
 - Malama Market, Permit# 11067, Approval to Use issued 23 August 2004.
 - Lex Brodies, Permit# 11105, Approval to Use issued 23 November 2004.
 - Gas Station, Permit# 11230, Approval to Use issued 4 February 2005.
 - Retail Bldg #2, Permit# 11715, Approval to Use issued 3 August 2005.
 - Office Bldg, Permit# 13034, Approval to Use issued 17 April 2007.
 - Fast Lube Lex Brodies, Permit# 58154, Approved to Construct 2 August 2017. No Final Inspection Report submitted, No Approval to Use issued.
- TMK (3) 1-5-117:024 at 15-2773 Laau Way (State of Hawaii, Hilo Baptist Church): Permit# 12254, Approval to Use issued 18 November 2005.
- TMK (3) 1-5-007:071 at 15-2737 Pahoia Village Road (Leetch, Robert & Moore, Paul): Permit# 38973, Approval to Use issued 23 July 2008.
- TMK (3) 1-5-007:021 at 15-2707 Pahoia Village Road (Metcalf Family Partners): Permit# 54472, Approval to Use issued 3 February 2017.

- TMK (3) 1-5-007:020 at 15-1450 Kahakai Blvd (HNMP LLC):
 - Gas Station, Permit# 11167, Approval to Use issued 28 November 2006.
 - KFC #1, Permit# 40853, Approval to Use issued 8 September 2009.
 - BK #1, Permit# 40854, Approval to Use issued 8 September 2009.
 - Longs Drugs, Permit# 40855, Approval to Use issued 8 September 2009.
 - KFC #2, Permit# 40991, Approval to Use issued 8 September 2009.
 - KFC #3, Permit# 40992, Approval to Use issued 8 September 2009.
 - BK #2, Permit# 40993, Approval to Use issued 8 September 2009.
 - BK #3, Permit# 40994, Approval to Use issued 8 September 2009.

Additionally, WWB indicated that Waste Water Treatment Plant #599, with an approval to use issued on 23 November 2020, was located at TMK (3) 1-5-007:069. No violations or citations have been found in these cesspools and septic tank systems, therefore, these are not considered a *REC*.

Records received from HDOH SHWB indicated the presence of three UST facilities identified within ¼ mile of the subject property. Due to their status and compliance with UST regulations, as well as their location being at a lower hydrologic gradient from the subject property, the following UST sites were determined not to be a *REC*:

- Malama Gas N Go: Facility ID: 9-603780. Status: Currently in use
- Pahoa Gas & Go: Facility ID: 9-601315. Status: Permanently out of use
- Woodland Center: Facility ID: 9-603792. Status: Currently in use

Longs Drug store was identified as a VSQG by EDR. Most of the generated waste included substances, such as cadmium, chromium, mercury, selenium, silver, and other medication derived waste (EDR, 2023). No violations were found regarding this VSQG. No further information was found in other databases. Due to compliance and no violations found on this site, this VSQG is not considered a *REC*.

8.2.2 Controlled REC (CREC)

A *CREC* is defined as a known past release that has been addressed, but where contamination still remains and is subject to the implementation of required AULs such as institutional or engineering controls. Two SHWS sites were identified by the EDR to be situated within 1 mile from the subject property at a higher hydrologic gradient from the subject property. These SHWS sites were determined to be a *CREC* and are described in further detail, as follows:

Pahoa Elementary School Building Exterior Soils, 15-3030 Pahoa Village Road (4,641ft. southeast, higher elevation)

On 02 January 2017, Integral Consulting Inc. performed soil sampling. Soil analysis results identified lead and chlordane above HDOH EAL along the perimeter of two buildings. An EHMP was prepared and mentioned that further soil sampling is recommended if excavation takes place more than 6 inches below surface level; additionally, some of the mitigation recommendations included to cap the soil with grass cover and landscaping. On 21 November 2018, the HDOH

released a letter to several school locations, including Pahoia Elementary and Pahoia High and Intermediate, indicating the review and approval of the EHMP. This school specific Interim EHMP provides short-term management of contaminated soils remaining on campus and periodic inspections, reporting, and maintenance or interim actions are required. Since mitigation measures have been established but contamination still remains, this site is considered a *CREC*.

Pahoia High and Intermediate School Building Exterior Soils, 15-3038 Pahoia Village Road (5,116 ft. southeast, higher elevation)

Similar to Pahoia Elementary School Building, on 27 December 2017, Integral Consulting Inc. performed soil sampling on the perimeter of four buildings; lead, arsenic, and chlordane were found above HDOH EALs. A revised EHMP was approved on 14 December 2018. Since mitigation measures have been established but contamination remains, this site is considered a *CREC*.

8.2.3 REC

The HFD indicated 16 fire incidents at the adjoining properties and surrounding areas. These fires include brush fires, structures, appliances, and electrical lines. Contaminated runoff from these incidents has the potential to cause surface and subsurface contamination to the subject properties, and therefore this is a *REC*.

9.0 CONCLUSION

MNA performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM E 1527-21 of the approximately 25.213-acre subject properties located at TMK (3) 1-5-007:004, 005, 007, 076, 082, and 083. Any exceptions to, or deletions from, this practice are described in Section 7.0 of this *report*. This assessment has revealed no evidence of *REC*, with the exception of the following:

REC

- Incidents of fires at the *adjoining properties* were confirmed by HFD. These incidents have potential to cause surface and subsurface contaminations and therefore considered a *REC*.
- Owners of Site #9: parcels 004, 076, 082, and 083, indicated a gasoline pump storage tank that has been removed from parcel 076. According to HDOH SHWB, there are no records of this UST. This data gap could lead to a *REC* since there is no information regarding potentially past leakage of the tank, incidents, or violations.
- Historical agricultural activities that took place in parcels 004, 082, and 083 are likely to have involved the use of pesticides. It is assumed that any pesticides were applied in accordance with the labels approved for the crops, required by Federal Insecticide, Fungicide, and Rodenticide Act. However, repeated applications over the years may have impacted the property which could lead to *REC*.

CREC

- Pahoia Elementary, Intermediate, and High School Buildings – Soil lead and chlordane contamination at the perimeter of the buildings. A site-specific Interim EHMP provides short-term management of this contamination.

REFERENCES

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APPENDIX A Resume of Environmental Professional



JESSICA WALSH
ENVIRONMENTAL PLANNER/PROJECT MANAGER



EDUCATION

Bachelor of Science, Natural Resources Management, Grand Valley State University (2001)

ASTM International ESA Standards for Commercial Real Estate

38-Hour Wetland Delineation Training

Wetland Permitting Training

CREDENTIALS

Hazardous Waste Operations & Emergency Response (HAZWOPER- OSHA 29 CFR 1910.120)

American Planning Association (APA) member
Association of State Wetlands Managers (ASWM)

National Association of Environmental Professionals

PROFESSIONAL PROFILE

Ms. Walsh has more than 19 years of experience in the environmental field. She offers her knowledge of federal environmental laws and NEPA processes and provides environmental consulting services to a wide variety of clients including federal, state, county, and commercial. Her recent projects include: environmental studies; NEPA planning and interagency coordination; Phase I ESAs; technical support for site investigations; USACE permits; asbestos and lead based paint survey reports; preparation of analytical studies, reports, and management plans; and development of legally-sufficient environmental documents. Her most recent employment includes:

- Myounghee Noh & Associates, L.L.C., 2010-present
- Arizona Department of Transportation, Environmental Planning Group, 2004-2009



RELEVANT PROJECT EXPERIENCE

FY17 Special Project TACMOR, Babeldaob and Angaur Island, Republic of Palau, NAVFAC Pacific. Provided environmental consulting and Republic of Palau regulatory and permit requirement assessment for design and construction phases. Participated in a planning charrette and planning and logistics for field visits. Reviewed U.S. Air Force (USAF) prepared field investigation documentation to prepare the environmental portion of the Design Bid-Build construction package, including basis of design, specifications, and cost estimate. She collaborated with the design team and project stakeholders to develop and document environmental requirements and mitigation measures to meet the substantive environmental requirements at two remote off-base locations. Ms. Walsh presented the developing environmental course of action from pre-design to 100% Final design at many large group stakeholder, coordination, and over-the-shoulder review meetings. Environmental concerns requiring design and mitigation included threatened and endangered species, cultural and archaeological resources, munitions and explosives of concern (MEC), high-value trees, site contamination, near shore areas, Waters of Palau, biosecurity, and green and brown waste management.

Environmental Assessment for University of Guam Cultural Repository Facility, Lot 5372-3A, Maga, Municipality of Mangilao, Guam. Served as National Environmental Policy Act (NEPA) planner and PM for the U.S. DOD Office of Economic Adjustment NEPA compliant environmental assessment, for the construction of a cultural repository on Guam. Supported OEA and the University of Guam to develop purpose and need for the proposed action and alternatives. Completed preconsultation with project stakeholders as required under NEPA. Led agency consultation with the Guam State Historic Preservation Office (SHPO) for National Historic Preservation Act (NHPA) Section 106 compliance, and the U.S. Fish and Wildlife Service for Endangered Species Act (ESA) Section 7 compliance. Prepared the Draft Environmental Assessment (EA) for public and agency review. The Final EA will be developed once the comment period is complete and a Finding of No Significant Impact (FONSI) is anticipated.



Air Force Research Laboratory (AFRL) – Air Force Maui Optical Station (AMOS) Facility FAA Site Infrastructure Haleakala, Maui, Hawaii. Ms. Walsh functioned as project manager and environmental designer on record. MNA attended a site investigation/validation meeting to investigate and document potential environmental concerns at the project site. Based on the investigation and meeting, Ms. Walsh prepared environmental revisions to the project scope of work and requirements documentation. The revised scope of work and requirements documents will be used in the subsequent design phase of the project. Prior to the initiation of design, Ms. Walsh collaborated with biological and archaeological subconsultants to provide consultation letters for Endangered Species Act (ESA) Section 7 and National Historic Preservation Act (NHPA) Section 106 consultations. The technical subconsultants conducted the background research and fieldwork. Ms. Walsh utilized the technical reports provided to develop consultation letters for government use.

FY20 MCON Project P-310 Infantry Battalion Company Headquarters, Camp Blaz, Finegayan, Guam. The objective of the project was to design an infantry battalion company headquarters facility within Camp Blaz. As environmental subconsultant, Ms. Walsh participated in the charrette and design development from 35%-100% Final Design. Conducted research for environmental due diligence related to National Environmental Policy Act (NEPA) compliance, natural resources, cultural resources, potential site contamination, regulatory requirements for the prevention of water and air pollution, radon mitigation requirements, and solid and green waste management. Provided environmental support for the Design-Bid-Build package including basis of design, cost estimate, and specifications package.

Enchanted Lake Development, Akumu Street, Kailua, Hawaii. The purpose of the project was a smaller scale residential development at the edge of Enchanted Lake, in Kailua, Oahu. Ms. Walsh functioned as project manager and coordinated with a wetlands specialist for wetland delineation. Using the wetlands specialist prepared wetlands delineation report, she coordinated with the regulator, the U.S. Army Corps of Engineers. Ms. Walsh prepared the application for Jurisdictional Delineation for USACE concurrence. USACE response is pending.

War Memorial Football Stadium Rehabilitation Assessment. The objective of the project was to assess the existing condition of the stadium in order for the owner agency, County of Maui Department of Parks and Recreation, Planning and Development Division, to prioritize future improvement design scope. Ms. Walsh developed an assessment approach that included review of record and regulatory records, hazardous material survey, and assessment for petroleum products, waste, or other chemicals or environmental conditions with the potential to impact site users, or future construction personnel. MNA conducted a site visit to assess the existing conditions, and Ms. Walsh utilized the field reports to develop an Assessment of Existing Conditions Report, which included recommendations for future actions. Additionally, Ms. Walsh prepared a preliminary cost estimate to document the anticipated cost of recommended future improvements.

FY23-24 MILCON PNEK063092 Secure Integration Support Lab Maui Research and Technology Center (Tech Park), Maui, Hawaii. The purpose of the project was to develop a vacant lot (Lot 3-D-2) within the Maui Tech Park into a support lab to include administrative and laboratory services, in addition to data centers and warehouse functionality. The project required a geotechnical investigation, planned to be conducted during design. Prior to the geotechnical investigation, Ms. Walsh collaborated with biological and archaeological subconsultants to provide consultation letters for Endangered Species Act (ESA) Section 7 and National Historic Preservation Act (NHPA) Section 106 consultations. The technical subconsultants conducted the background research and fieldwork. Ms. Walsh utilized the technical reports provided to develop consultation letters for government use.

FY23 MCON Project P-187 BTS Exclusion Barrier South, U.S. Naval Support Activity, MCB Guam. The project will support the design and construction of an exclusion barrier to create a forest enhancement site, as required under the 2017 Biological Opinion for the DON relation of the US Marine Corps from Okinawa to Guam. The barrier will be design to exclude rats, cats, snakes, and ungulates. Ms. Walsh participated in a charrette and presented environmental understanding of issues and concerns related to the project. Primary issues for consideration included the previously identified CERCLA sites within/adjacent to the fence project, and the potential for archaeological and biological resources. She prepared the environmental portions of the charrette report, coordinated to ensure design quality control review, and updated per comments received from government stakeholders. Ms. Walsh prepared the MILCON checklist and developed the cost estimate. The preliminary design was over budget, and Ms. Walsh participated in a Value Engineering study to reduce design cost.

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APPENDIX B User Questionnaire, Site Reconnaissance Field Forms, and Interview Forms



Phase I ESA User Questionnaire

This Phase I Environmental Site Assessment (ESA) User Questionnaire (UQ) is provided by Myounghee Noh & Associates (MNA) to the Phase I ESA user (name, address, phone number), _____, with regards to the Phase I ESA being performed by MNA for the subject property located at _____ and identified by Tax Map Key (TMK)_____.

This questionnaire contains two parts. The first part is information that the user of Phase I ESA is required to obtain in order to qualify for Superfund liability Protection. The second part of the questionnaire is more specific questions which will assist us in collecting information regarding the subject property and identifying *recognized environmental conditions* (REC) with regards to the subject property.

Please complete the questionnaire at your earliest convenience by providing information, where available and to the best of your ability. When complete, please return the Questionnaire to MNA by mailing, faxing, or emailing it to your MNA Project Manager. While you are not required to provide any of this information, failure to do so may affect your liability protection, result in data gaps that will be noted in the report and may affect the conclusions of the assessment.

If you have any questions regarding this UQ please contact your MNA Project Manager.

This Phase I ESA User Questionnaire was completed by:

Name: _____ Date: _____

Title: _____ Organization: _____

Part A

In order to qualify for one of the *Landowner Liability Protections (LLPs)* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "*Brownfields Amendments*"), the user must provide the following information (if available) to the *environmental professional*. Failure to provide this information could result in a determination that "*all appropriate inquiry*" is not complete.

(1.) Environmental cleanup liens that are filed or recorded against the site (40 CFR 312.25).

Are you aware of any environmental cleanup liens against the *property* that are filed or recorded under federal, tribal, state or local law?

(2.) Activity and land use limitations that are in place on the site or that have been filed or recorded in a registry (40 CFR 312.26).

Are you aware of any AULs, such as *engineering controls*, land use restrictions or *institutional controls* that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

(3.) Specialized knowledge or experience of the person seeking to qualify for the LLP (40 CFR 312.28).

As the *user* of this *ESA* do you have any specialized knowledge or experience related to the *property* or nearby properties? For example, are you involved in the same line of business as the current or former *occupants* of the *property* or an adjoining *property* so that you would have specialized knowledge of the chemicals and processes used by this type of business?

(4.) Relationship of the purchase price to the fair market value of the *property* if it were not contaminated (40 CFR 312.29).

Does the purchase price being paid for this *property* reasonably reflect the fair market value of the *property*? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property*?

(5.) Commonly known or *reasonably ascertainable* information about the *property* (40 CFR 312.30).

Are you aware of commonly known or *reasonably ascertainable* information about the *property* that would help the *environmental professional* to identify conditions indicative of releases or threatened releases?

For example, as *user*,

Do you know the past uses of the *property*?

Do you know of specific chemicals that are present or once were present at the *property*?

Do you know of spills or other chemical releases that have taken place at the *property*?

Do you know of any environmental cleanups that have taken place at the *property*?

(6.) The degree of obviousness of the presence of likely presence of contamination at the *property*, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).
As the *user* of this *ESA*, based on your knowledge and experience related to the *property* are there any *obvious* indicators that point to the presence or likely presence of contamination at the *property*?

Part B

Describe the reason this Phase I ESA is being conducted?

Describe the type of property and type of property transaction (sale, purchase, exchange, lease, lease termination) that triggered this Phase I ESA?

Identify all parties who will rely on the Phase I ESA report?

Identify one or more contacts (and the method for contacting them), such as a *key site manager*, who have daily operational knowledge of current (recent) use of the property.

Identify any knowledge you have regarding the environmental condition of the property (prior environmental site assessment reports, documents, correspondence, communications, etc).

Indicate if you have knowledge of the following issues with regards to the subject property. Please provide details below for any positive indications.

<u>Issue</u>	<u>Yes</u>	<u>No</u>
1. Sinkholes or tunnels		
2. Addition of fill material to the property		
3. Underground storage tanks		
4. Aboveground storage tanks.....		
5. On-site fuel source for HVAC or heating		
6. Electrical or hydraulic equipment that may contain PCBs.....		
7. On-site solid waste disposal		
8. On-site wastewater system (drywell, wet well, septic tank, cesspool, leach field, etc.)		
9. On-site waste treatment equipment (oil/water separator, neutralization tank, settling tank, etc).....		
10. Floor drains.....		
11. Pits, ponds or lagoons		
12. Wells		
13. Release of hazardous materials		
14. Release of petroleum products.....		
15. Environmental permits.....		
16. Environmental compliance audit reports		
17. Environmental complaints, fines, infractions		
18. Legal proceedings		

Provide details to items marked "Yes" or use this space for additional detail from any part of the questionnaire.



Phase I ESA Site Visit Field Form

MNA is conducting a Phase I ESA for the subject property. The site visit is an integral part of the process. Use this form to verify that you have collected all the information necessary to successfully complete the site visit in accordance with ASTM E 1527-05. Document information collected as part of the site visit only. Refer to information collected from other sources.

MNA Staff Conducting the Site Visit: Vanissa Gabriel, Gabrielle Richardson

Location of Site Visit: Pahoehoe Village Ct. HI 96778

Date: 5/31/23

Project Number: 3189-3

Project Name: Phase I Pahoehoe Transit Hub

General Site Setting:

9.4.1.1 Identify the Current use of the property.

Is the current use likely to involve the treatment, storage, disposal or generation of HS or PP?

Are there occupant spaces that are unoccupied?

- 007 is parking lot with one property being occupied and highly vegetated
- 005 one ~~open~~ house and highly vegetated
- 083 & 083 unoccupied & vegetated
- 064 & 076 occupied are house each.

9.4.1.2 Identify, if possible, indications of past use of the property.

Are there indications that the past use likely involved the treatment, storage, disposal or generation of HS or PP?

NO

9.4.1.3 Identify current use of adjoining properties.

Are adjoining properties likely to contain RECs?

NO

Adjoining properties are residential and commercial. (Malama Market)

9.4.1.4 Identify past uses of adjoining properties.

Are past uses of adjoining properties likely to have caused RECs?

No

9.4.1.5 Identify the current or past use of the surrounding area.

Is it likely to contribute to a REC?

Residential / Commercial.

9.4.1.6 Observe and describe the geologic, hydrogeologic, hydrologic, and topographic setting of the subject property.

Highly vegetated, tall grass, tall trees, gravel in some areas, soil in some areas. Some water puddles by 083 & 082

9.4.1.7 General Description of Structures.

Number of buildings, number of stories, approximate age of buildings, construction material, roof type and material, ancillary structures.

Approx. 5 houses / structures among all properties. Residential and one floor

9.4.1.8 Identify public road adjoining the property and roads and parking on the property.

- Paloa Village rd;

- Kahakoi Blvd.

Apaa St.

9.4.19 Identify potable water supply

N/A

9.4.1.10 Identify Sewage Disposal System

N/A

Make observations for the following items. Provide details for any "Yes" observations.

No	Item	O	Y	N
<u>Interior and Exterior Observations</u>				
1	9.4.2.3 HS and PP in Connection with Identified Uses			X
2	9.4.2.4 Storage Tanks			X
3	9.4.2.5 Odors			X
4	9.4.2.6 Pools of Liquid		X	N/A
5	9.4.2.7 Drums			X
6	9.4.2.8 HS or PP Containers not associated with an identified use		X	
7	9.4.2.9 Unidentified Substance Container			X
8	9.4.2.10 PCB (electrical or hydraulic equipment)	X	N/A	X
<u>Interior Observations</u>				
9	9.4.3.1 Heating/Cooling System (and fuel source)			X
10	9.4.3.2 Stains or Corrosion			X
11	9.4.3.3 Drains and Sumps			X
<u>Exterior Observations</u>				
12	9.4.4.1 Pits, Ponds, Lagoons			X
13	9.4.4.2 Stained Soil or Pavement			X
14	Stressed Vegetation			X
15	9.4.4.4 Solid Waste(debris, depressions, mounds, fill of unknown origin)			X
16	9.4.4.5 Waste Water (disposal systems)			X
17	9.4.4.6 Wells			X
18	9.4.4.7 Septic Systems			X

Transferring

O-Observations Made Y-Yes, indications seen N-No indications

Provide details to items marked "Yes"

Pools of liquid in 007 by the parking space near the metal container.

Describe any limitations encountered in conducting the site visit.

Did not have access to subject properties 005, 076, 004.
Highly vegetated, could not walk through vegetation due to density in 082, 083, 007 in some areas.
Tracks observed in 007 inside vegetation.



Phase I ESA Interview Form

MNA is conducting a Phase I ESA for the subject properties, **TMKs (3) 1-5-007:004, 005, 007, 076, 082, and 083**. Interviews with individuals knowledgeable about the property are an integral part of the process. MNA is using this form to verify that we have collected all pertinent information, in accordance with ASTM E 1527. Interviewees are asked to provide as specific and complete answers as possible. Interviewees are informed that they are asked to answer in good faith and to the extent of their knowledge. Interviewees have no obligation to answer questions.

MNA Staff Conducting the Interview: Vanessa Gabriel
Subject of Interview: TMKs (3) 1-5-007:004, 005, 007, 076, 082, and 083
Date: _____
Project No. & Name: 3189_3 Phase I - County of Hawaii Mass Transit Agency Pahoia Transit Hub
Interviewee Name: _____
Contact Information: _____
Interviewee relationship to subject property: _____

Describe your knowledge of past uses of the *property*?

Describe your knowledge of the past use of adjoining properties?

Do you know of specific chemicals that are present or once were present at the *property*?

Do you know of spills or other chemical releases that have taken place at the *property*?

Do you know of any environmental cleanups that have taken place at the *property*?

Are you aware of any environmental cleanup liens against the *property*?

Are you aware of any AULs, such as *engineering controls*, land use restrictions or *institutional controls* that are in place at the site?

Identify any knowledge you have regarding the environmental condition of the property (prior environmental site assessment reports, documents, correspondence, communications, etc.).

Indicate if you have knowledge of the following issues with regards to the subject property. Please provide details below for any positive indications.

Issue	Yes	No	Note
1. Sinkholes or tunnels			
2. Addition of fill material to the property			
3. Underground storage tanks			
4. Aboveground storage tanks			
5. On-site fuel source for HVAC or heating			
6. Electrical or hydraulic equipment that may contain PCBs			
7. On-site solid waste disposal			
8. On-site wastewater system (drywell, wet well, septic tank, cesspool, leach field, etc.)			
9. On-site waste treatment equipment (oil/water separator, neutralization tank, settling tank, etc.)			
10. Floor drains			
11. Pits, ponds or lagoons			
12. Wells			
13. Release of hazardous materials			
14. Release of petroleum products			
15. Environmental permits			
16. Environmental compliance audit reports			
17. Environmental complaints, fines, infractions			
18. Legal proceedings			

Provide details to items marked "Yes" or use this space for additional detail from any part of the questionnaire.



Phase I ESA Interview Form

MNA is conducting a Phase I ESA for the subject properties, TMKs (3) 1-5-007:004, 005, 007, 076, 082, and 083. Interviews with individuals knowledgeable about the property are an integral part of the process. MNA is using this form to verify that we have collected all pertinent information, in accordance with ASTM E 1527. Interviewees are asked to provide as specific and complete answers as possible. Interviewees are informed that they are asked to answer in good faith and to the extent of their knowledge. Interviewees have no obligation to answer questions.

MNA Staff Conducting the Interview: Vanessa Gabriel

Subject of Interview: TMKs (3) 1-5-007:004, 005, 007, 076, 082, and 083

Date: _____

Project No. & Name: 3189_3 Phase I - County of Hawaii Mass Transit Agency Pahoia Transit Hub

Interviewee Name: Russell Kuwahara

Contact Information: (808) 933-1379 (H)

Interviewee relationship to subject property: 1-5-007-076 son of Yosoi/Kikuko Kuwahara
1-5-007-004/082/083 General Partner of Kuwahara Family Partners

Describe your knowledge of past uses of the property?

Residence 15 007 076
 Rental unit 15 007 004
 Anthurium farm 15 007 082 - 15 007 083

Describe your knowledge of the past use of adjoining properties?

anthurium farm 15 007 084
 Anthurium 15 007 085
 15 007 096

Do you know of specific chemicals that are present or once were present at the property?

no

Do you know of spills or other chemical releases that have taken place at the property?

no

Do you know of any environmental cleanups that have taken place at the property?

no

Are you aware of any environmental cleanup liens against the property?

no

Are you aware of any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the site?

no

Identify any knowledge you have regarding the environmental condition of the property (prior environmental site assessment reports, documents, correspondence, communications, etc.).

None

Indicate if you have knowledge of the following issues with regards to the subject property. Please provide details below for any positive indications.

Issue	Yes	No	Note
1. Sinkholes or tunnels	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Addition of fill material to the property	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Underground storage tanks 1-S-007-076	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1000 gallon asbestos storage tank but removed
4. Aboveground storage tanks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5. On-site fuel source for HVAC or heating	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6. Electrical or hydraulic equipment that may contain PCBs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. On-site solid waste disposal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8. On-site wastewater system (drywell, wet well, septic tank, cesspool, leach field, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	cesspool 15 007 076 15 007 064
9. On-site waste treatment equipment (oil/water separator, neutralization tank, settling tank, etc.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10. Floor drains	<input type="checkbox"/>	<input type="checkbox"/>	
11. Pits, ponds or lagoons	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
12. Wells	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13. Release of hazardous materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
14. Release of petroleum products	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
15. Environmental permits	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
16. Environmental compliance audit reports	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
17. Environmental complaints, fines, infractions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
18. Legal proceedings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15 007 076

Provide details to items marked "Yes" or use this space for additional detail from any part of the questionnaire.



Phase I ESA Interview Form

MNA is conducting a Phase I ESA for the subject properties, TMKs (3) 1-5-007:004, 005, 007, 076, 082, and 083. Interviews with individuals knowledgeable about the property are an integral part of the process. MNA is using this form to verify that we have collected all pertinent information, in accordance with ASTM E 1527. Interviewees are asked to provide as specific and complete answers as possible. Interviewees are informed that they are asked to answer in good faith and to the extent of their knowledge. Interviewees have no obligation to answer questions.

MNA Staff Conducting the Interview: Vanessa Gabriel

Subject of Interview: TMKs (3) 1-5-007:004, 005, 007, 076, 082, and 083

Date: 7/6/23

Project No. & Name: 3189_3 Phase I - County of Hawaii Mass Transit Agency Pahoia Transit Hub

Interviewee Name: Sharman Oyadomari

Contact Information: (808) 938-5960 (cell)

Interviewee relationship to subject property: (3) 1-5-007-076 Trustee of Kikuko Kuwahara Irrevocable Grantor Trust
(3) 1-5-007-004 / -082 / -083 General Partner of Kuwahara Family Partners

Describe your knowledge of past uses of the property?

076 - Residence & warehouse
 004 - Christmas Tree Farm / rental home
 082 - Anthurium Farm
 083 - Anthurium Farm

Describe your knowledge of the past use of adjoining properties?

084 - Anthurium Farm
 085 - " "
 086 - " "

Do you know of specific chemicals that are present or once were present at the property?
 No

Do you know of spills or other chemical releases that have taken place at the property?
 No

Do you know of any environmental cleanups that have taken place at the property?
 No

Are you aware of any environmental cleanup liens against the property?

No

Are you aware of any AULs, such as *engineering controls*, land use restrictions or *institutional controls* that are in place at the site?

No

Identify any knowledge you have regarding the environmental condition of the property (prior environmental site assessment reports, documents, correspondence, communications, etc.).

No

Indicate if you have knowledge of the following issues with regards to the subject property. Please provide details below for any positive indications.

Issue	Yes	No	Note
1. Sinkholes or tunnels	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Addition of fill material to the property	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Underground storage tanks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-076 Gasoline Pump Storage tank (Removed)
4. Aboveground storage tanks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5. On-site fuel source for HVAC or heating	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6. Electrical or hydraulic equipment that may contain PCBs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. On-site solid waste disposal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8. On-site wastewater system (drywell, wet well, septic tank, cesspool, leach field, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	cesspool 1-5-007-076 -004
9. On-site waste treatment equipment (oil/water separator, neutralization tank, settling tank, etc.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10. Floor drains	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
11. Pits, ponds or lagoons	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
12. Wells	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13. Release of hazardous materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
14. Release of petroleum products	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
15. Environmental permits	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
16. Environmental compliance audit reports	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
17. Environmental complaints, fines, infractions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
18. Legal proceedings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-076 Appeal Foreclosure

Provide details to items marked "Yes" or use this space for additional detail from any part of the questionnaire.

APPENDIX C EDR Report

NHS Inc

15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

Inquiry Number: 7337968.2s
May 16, 2023

FirstSearch Report



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Search Summary Report

**TARGET SITE 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778**

Category	Sel	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
<i>NPL</i>	Y	0	0	0	0	0	0	0
<i>NPL Delisted</i>	Y	0	0	0	0	0	0	0
<i>CERCLIS</i>	Y	0	0	0	0	-	0	0
<i>NFRAP</i>	Y	0	0	0	0	-	0	0
<i>RCRA COR ACT</i>	Y	0	0	0	0	0	0	0
<i>RCRA TSD</i>	Y	0	0	0	0	-	0	0
<i>RCRA GEN</i>	Y	0	0	1	-	-	0	1
<i>Federal IC / EC</i>	Y	0	0	0	0	-	0	0
<i>ERNS</i>	Y	0	0	-	-	-	0	0
<i>State/Tribal CERCLIS</i>	Y	0	0	0	0	2	0	2
<i>State/Tribal SWL</i>	Y	0	0	0	0	-	0	0
<i>State/Tribal LTANKS</i>	Y	0	0	0	0	-	0	0
<i>State/Tribal Tanks</i>	Y	0	1	2	-	-	0	3
<i>State/Tribal IC / EC</i>	Y	0	0	0	0	-	0	0
<i>State/Tribal VCP</i>	Y	0	0	0	0	-	0	0
<i>ST/Tribal Brownfields</i>	Y	0	0	0	0	-	0	0
<i>US Brownfields</i>	Y	0	0	0	0	-	0	0
<i>Other SWF</i>	Y	0	0	0	0	-	0	0
<i>Other Haz Sites</i>	Y	0	0	-	-	-	0	0
<i>Spills</i>	Y	0	0	-	-	-	0	0
<i>Other</i>	Y	0	0	0	-	-	0	0
- Totals --		0	1	3	0	2	0	6

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Search Summary Report

**TARGET SITE: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778**

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	NPL	01/25/2023	1.000	0	0	0	0	0	0	0
	Proposed NPL	01/25/2023	1.000	0	0	0	0	0	0	0
NPL Delisted	Delisted NPL	01/25/2023	1.000	0	0	0	0	0	0	0
CERCLIS	SEMS	01/25/2023	0.500	0	0	0	0	-	0	0
NFRAP	SEMS-ARCHIVE	01/25/2023	0.500	0	0	0	0	-	0	0
RCRA COR ACT	CORRACTS	03/06/2023	1.000	0	0	0	0	0	0	0
RCRA TSD	RCRA-TSDF	03/06/2023	0.500	0	0	0	0	-	0	0
RCRA GEN	RCRA-LQG	03/06/2023	0.250	0	0	0	-	-	0	0
	RCRA-SQG	03/06/2023	0.250	0	0	0	-	-	0	0
	RCRA-VSQG	03/06/2023	0.250	0	0	1	-	-	0	1
Federal IC / EC	US ENG CONTROLS	02/20/2023	0.500	0	0	0	0	-	0	0
	US INST CONTROLS	02/20/2023	0.500	0	0	0	0	-	0	0
ERNS	ERNS	12/12/2022	0.001	0	0	-	-	-	0	0
State/Tribal CERCLIS	SHWS	10/20/2022	1.000	0	0	0	0	2	0	2
State/Tribal SWL	SWF/LF	09/14/2022	0.500	0	0	0	0	-	0	0
State/Tribal LTANKS	LUST	11/21/2022	0.500	0	0	0	0	-	0	0
	INDIAN LUST	10/19/2022	0.500	0	0	0	0	-	0	0
State/Tribal Tanks	UST	11/21/2022	0.250	0	1	2	-	-	0	3
	INDIAN UST	10/19/2022	0.250	0	0	0	-	-	0	0
State/Tribal IC / EC	ENG CONTROLS	04/17/2019	0.500	0	0	0	0	-	0	0
	INST CONTROL	04/17/2019	0.500	0	0	0	0	-	0	0
State/Tribal VCP	VCP	10/20/2022	0.500	0	0	0	0	-	0	0
ST/Tribal Brownfields	BROWNFIELDS	10/20/2022	0.500	0	0	0	0	-	0	0
US Brownfields	US BROWNFIELDS	04/06/2023	0.500	0	0	0	0	-	0	0

Search Summary Report

**TARGET SITE: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778**

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
Other SWF	SWRCY	09/14/2022	0.500	0	0	0	0	-	0	0
	IHS OPEN DUMPS	04/01/2014	0.500	0	0	0	0	-	0	0
Other Haz Sites	US CDL	01/06/2023	0.001	0	0	-	-	-	0	0
Spills	HMIRS	12/13/2022	0.001	0	0	-	-	-	0	0
	SPILLS	11/16/2022	0.001	0	0	-	-	-	0	0
	SPILLS 90	03/10/2012	0.001	0	0	-	-	-	0	0
Other	RCRA NonGen / NLR	03/06/2023	0.250	0	0	0	-	-	0	0
	TSCA	12/31/2020	0.001	0	0	-	-	-	0	0
	TRIS	12/31/2021	0.001	0	0	-	-	-	0	0
	SSTS	01/17/2023	0.001	0	0	-	-	-	0	0
	RAATS	04/17/1995	0.001	0	0	-	-	-	0	0
	PRP	10/27/2022	0.001	0	0	-	-	-	0	0
	PADS	11/03/2022	0.001	0	0	-	-	-	0	0
	ICIS	11/18/2016	0.001	0	0	-	-	-	0	0
	FTTS	04/09/2009	0.001	0	0	-	-	-	0	0
	MLTS	10/26/2022	0.001	0	0	-	-	-	0	0
	RADINFO	07/01/2019	0.001	0	0	-	-	-	0	0
	INDIAN RESERV	12/31/2014	1.000	0	0	0	0	0	0	0
	US AIRS	10/12/2016	0.001	0	0	-	-	-	0	0
	ABANDONED MINES	12/20/2022	0.001	0	0	-	-	-	0	0
	FINDS	02/02/2023	0.001	0	0	-	-	-	0	0
	UXO	11/09/2021	1.000	0	0	0	0	0	0	0
	DOCKET HWC	05/06/2021	0.001	0	0	-	-	-	0	0
	PFAS NPL	02/23/2022	0.250	0	0	0	-	-	0	0
	PFAS FEDERAL SITES	03/30/2023	0.250	0	0	0	-	-	0	0
	PFAS TSCA	01/03/2022	0.250	0	0	0	-	-	0	0
	PFAS RCRA MANIFEST	03/30/2023	0.250	0	0	0	-	-	0	0
	PFAS ATSDR	06/24/2020	0.250	0	0	0	-	-	0	0
	PFAS WQP	03/30/2023	0.250	0	0	0	-	-	0	0
	PFAS NPDES	03/30/2023	0.250	0	0	0	-	-	0	0
	PFAS ECHO	03/30/2023	0.250	0	0	0	-	-	0	0
	PFAS ECHO FIRE TRAINING	03/30/2023	0.250	0	0	0	-	-	0	0
	PFAS PART 139 AIRPORT	03/30/2023	0.250	0	0	0	-	-	0	0
	AQUEOUS FOAM NRC	04/27/2023	0.250	0	0	0	-	-	0	0
	PFAS	02/25/2022	0.250	0	0	0	-	-	0	0
	LEAD	12/06/2022	TP	0	-	-	-	-	0	0
MINES MRDS	08/23/2022	TP	0	-	-	-	-	0	0	
PFAS TRIS	03/07/2023	0.250	0	0	0	-	-	0	0	
- Totals --				0	1	3	0	2	0	6

Site Information Report

Request Date: MAY 16, 2023
Request Name: GABRIELLE RICHARDSON

Search Type: COORD
Job Number: NA

Target Site: 15-2728 PAHOA VILLAGE RD
 PAHOA, HI 96778

Site Location

	<u>Degrees (Decimal)</u>	<u>Degrees (Min/Sec)</u>	<u>UTMs</u>
Longitude:	154.955653	154.9556530 - 154° 57' 20.35"	Easting: 294757.2
Latitude:	19.500929	19.5009290 - 19° 30' 3.34"	Northing: 2157296.5
Elevation:	649 ft. above sea level		Zone: Zone 5

Demographics

Sites: 6	Non-Geocoded: 0	Population: N/A		
RADON				
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: 96778				
Number of sites tested: 4				
<u>Area</u>	<u>Average Activity</u>	<u>% <4 pCi/L</u>	<u>% 4-20 pCi/L</u>	<u>% >20 pCi/L</u>
Living Area - 1st Floor	0.200 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	-0.400 pCi/L	100%	0%	0%

Federal Area Radon Information for HAWAII COUNTY, HI				
Number of sites tested: 97				
<u>Area</u>	<u>Average Activity</u>	<u>% <4 pCi/L</u>	<u>% 4-20 pCi/L</u>	<u>% >20 pCi/L</u>
Living Area - 1st Floor	0.054 pCi/L	99%	1%	0%
Living Area - 2nd Floor	1.100 pCi/L	100%	0%	0%
Basement	-0.247 pCi/L	100%	0%	0%

Target Site Summary Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

TOTAL: 6

GEOCODED: 6

NON GEOCODED: 0

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
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No sites found for target address

Sites Summary Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

TOTAL: 6 GEOCODED: 6 NON GEOCODED: 0

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
1	UST --Currently In Use --9-603780	MALAMA GAS N GO	15-2660 KEAAU-PAHOA PAHOA, HI 96778	0.05 NNW	- 36	1
2	UST --Permanently Out of Use --12/09/1997 --12/07/1997 --9-601315	PAHOA GAS & GO	15-2813 GOVERNMENT RD PAHOA, HI 96778	0.19 SE	- 22	5
A3	RCRA-VSQG --HIR000140582	LONGS DRUG STORE #7098	15-1454 KAHAKAI BLVD PAHOA, HI 96778	0.21 NE	- 31	7
A4	UST --Currently In Use --9-603792	WOODLAND CENTER	15-1450 KAHAKAI BLVD PAHOA, HI 96778	0.22 NE	- 31	18
5	SHWS	PAHOA ELEMENTARY SCHOOL BUILDI	15-3030 PAHOA VILLAGE RD PAHOA, HI 96778	0.88 SE	+ 28	19
6	SHWS	PAHOA HIGH AND INTERMEDIATE SC	15-3038 PAHOA VILLAGE RD PAHOA, HI 96778	0.97 SE	+ 32	20

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U003967144 **DIST/DIR:** 0.049 NNW **ELEVATION:** 613 **MAP ID:** 1

NAME: MALAMA GAS N GO **Rev:** 11/21/2022
ADDRESS: 15-2660 KEAAU-PAHOA ID/Status: Currently In Use
PAHOA, HI 96778 ID/Status: 9-603780

SOURCE: HI Department of Health

UST:
Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778
Facility ID: 9-603780
Owner: ALOHA PETROLEUM, LTD.
Owner Address: 1001 Bishop Street, ASB Tower, Suite 1300
Owner City,St,Zip: Paho, 96778 96778
Latitude: 19.505500
Longitude: -154.957370
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: 1
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 1
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 1
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U003967144 **DIST/DIR:** 0.049 NNW **ELEVATION:** 613 **MAP ID:** 1

NAME: MALAMA GAS N GO
ADDRESS: 15-2660 KEAAU-PAHOA
PAHOA, HI 96778

Rev: 11/21/2022
ID/Status: Currently In Use
ID/Status: 9-603780

SOURCE: HI Department of Health

City,State,Zip: PAHOA, HI 96778

Tank ID: 1
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 2
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 2
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 2
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U003967144 **DIST/DIR:** 0.049 NNW **ELEVATION:** 613 **MAP ID:** 1

NAME: MALAMA GAS N GO
ADDRESS: 15-2660 KEAAU-PAHOA
PAHOA, HI 96778

Rev: 11/21/2022
ID/Status: Currently In Use
ID/Status: 9-603780

SOURCE: HI Department of Health

Tank ID: 2
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Gasohol

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 3
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Diesel

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 3
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Diesel

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 3
Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Diesel

Name: MALAMA GAS N GO
Address: 15-2660 KEAAU-PAHOA
City,State,Zip: PAHOA, HI 96778

Tank ID: 3

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U003967144 **DIST/DIR:** 0.049 NNW **ELEVATION:** 613 **MAP ID:** 1

NAME: MALAMA GAS N GO
ADDRESS: 15-2660 KEAAU-PAHOA
PAHOA, HI 96778

Rev: 11/21/2022
ID/Status: Currently In Use
ID/Status: 9-603780

SOURCE: HI Department of Health

Date Installed: 02/01/2005
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 12000
Substance: Diesel

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U001237036 **DIST/DIR:** 0.189 SE **ELEVATION:** 627 **MAP ID:** 2

NAME: PAHOA GAS & GO

Rev: 11/21/2022

ADDRESS: 15-2813 GOVERNMENT RD
PAHOA, HI 96778

ID/Status: Permanently Out of Use
ID/Status: 12/09/1997
ID/Status: 12/07/1997
ID/Status: 9-601315

SOURCE: HI Department of Health

UST:

Name: PAHOA GAS & GO
Address: 15-2813 GOVERNMENT RD
City,State,Zip: PAHOA, HI 96778
Facility ID: 9-601315
Owner: YAMAGUCHI BROS. SERVICE STATION
Owner Address: P. O. BOX 398 / PAHOA HWY
Owner City,St,Zip: Pahoia, 96778 96778
Latitude: 19.497302
Longitude: -154.951952
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: R-1
Date Installed: 01/21/1942
Tank Status: Permanently Out of Use
Date Closed: 12/09/1997
Tank Capacity: 1000
Substance: Gasoline

Name: PAHOA GAS & GO
Address: 15-2813 GOVERNMENT RD
City,State,Zip: PAHOA, HI 96778

Tank ID: R-1
Date Installed: 01/21/1942
Tank Status: Permanently Out of Use
Date Closed: 12/09/1997
Tank Capacity: 1000
Substance: Gasoline

Name: PAHOA GAS & GO
Address: 15-2813 GOVERNMENT RD
City,State,Zip: PAHOA, HI 96778

Tank ID: R-2
Date Installed: 01/21/1942
Tank Status: Permanently Out of Use
Date Closed: 12/09/1997
Tank Capacity: 1000
Substance: Gasoline

Name: PAHOA GAS & GO
Address: 15-2813 GOVERNMENT RD

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U001237036 **DIST/DIR:** 0.189 SE **ELEVATION:** 627 **MAP ID:** 2

NAME: PAHOA GAS & GO

Rev: 11/21/2022

ADDRESS: 15-2813 GOVERNMENT RD
PAHOA, HI 96778

ID/Status: Permanently Out of Use

ID/Status: 12/09/1997

ID/Status: 12/07/1997

ID/Status: 9-601315

SOURCE: HI Department of Health

City,State,Zip: PAHOA, HI 96778

Tank ID: R-3

Date Installed: 01/21/1942

Tank Status: Permanently Out of Use

Date Closed: 12/09/1997

Tank Capacity: 550

Substance: Gasoline

Name: PAHOA GAS & GO

Address: 15-2813 GOVERNMENT RD

City,State,Zip: PAHOA, HI 96778

Tank ID: R-4

Date Installed: 01/21/1957

Tank Status: Permanently Out of Use

Date Closed: 12/07/1997

Tank Capacity: 5000

Substance: Gasoline

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQG

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098 **Rev:** 03/06/2023
ADDRESS: 15-1454 KAHAKAI BLVD **ID/Status:** HIR000140582
PAHOA, HI 96778
HONOLULU
SOURCE: US Environmental Protection Agency

RCRA Listings:

Date Form Received by Agency: 20210718
Handler Name: Longs Drug Store #7098
Handler Address: 15-1454 KAHAKAI BLVD
Handler City,State,Zip: PAHOA, HI 96778
EPA ID: HIR000140582
Contact Name: NICOLE WILKINSON
Contact Address: CVS DR MC2340
Contact City,State,Zip: WOONSOCKET, RI 02895
Contact Telephone: 401-770-7132
Contact Fax: Not reported
Contact Email: NICOLE.WILKINSON@CVSHEALTH.COM
Contact Title: DIRECTOR, CORPORATE ENVIRONMENTAL
EPA Region: 09
Land Type: Private
Federal Waste Generator Description: Conditionally Exempt Small Quantity Generator
Non-Notifier: Not reported
Biennial Report Cycle: Not reported
Accessibility: Not reported
Active Site Indicator: Handler Activities
State District Owner: Not reported
State District: Not reported
Mailing Address: CVS DR MC2340
Mailing City,State,Zip: WOONSOCKET, RI 02895
Owner Name: Hnmp
Owner Type: Private
Operator Name: Longs Drug Stores California, L.L.C
Operator Type: Private
Short-Term Generator Activity: No
Importer Activity: No
Mixed Waste Generator: No
Transporter Activity: No
Transfer Facility Activity: No
Recycler Activity with Storage: No
Small Quantity On-Site Burner Exemption: No
Smelting Melting and Refining Furnace Exemption: No
Underground Injection Control: No
Off-Site Waste Receipt: No
Universal Waste Indicator: No
Universal Waste Destination Facility: No
Federal Universal Waste: No
Active Site State-Reg Handler: ---
Federal Facility Indicator: Not reported
Hazardous Secondary Material Indicator: N

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQG

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Sub-Part K Indicator: Not reported
2018 GPRA Permit Baseline: Not on the Baseline
2018 GPRA Renewals Baseline: Not on the Baseline
202 GPRA Corrective Action Baseline: No
Subject to Corrective Action Universe: No
Non-TSDFs Where RCRA CA has Been Imposed Universe: No
Corrective Action Priority Ranking: No NCAPS ranking
Environmental Control Indicator: No
Institutional Control Indicator: No
Human Exposure Controls Indicator: N/A
Groundwater Controls Indicator: N/A
Significant Non-Complier Universe: No
Unaddressed Significant Non-Complier Universe: No
Addressed Significant Non-Complier Universe: No
Significant Non-Complier With a Compliance Schedule Universe: No
Financial Assurance Required: Not reported
Handler Date of Last Change: 20210721
Recognized Trader-Importer: No
Recognized Trader-Exporter: No
Importer of Spent Lead Acid Batteries: No
Exporter of Spent Lead Acid Batteries: No
Recycler Activity Without Storage: No
Manifest Broker: No
Sub-Part P Indicator: H

Biennial: List of Years
Year: 2019

[Click Here for Biennial Reporting System Data:](#)

Year: 2017

[Click Here for Biennial Reporting System Data:](#)

Hazardous Waste Summary:

Waste Code: D001
Waste Description: IGNITABLE WASTE

Waste Code: D002
Waste Description: CORROSIVE WASTE

Waste Code: D006
Waste Description: CADMIUM

Waste Code: D007

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQQ

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Waste Description: CHROMIUM

Waste Code: D009

Waste Description: MERCURY

Waste Code: D010

Waste Description: SELENIUM

Waste Code: D011

Waste Description: SILVER

Waste Code: D024

Waste Description: M-CRESOL

Waste Code: P001

Waste Description: 2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS,
WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3% (OR) WARFARIN, &
SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3%

Waste Code: P042

Waste Description: 1,2-BENZENEDIOL, 4-[1-HYDROXY-2-(METHYLAMINO)ETHYL]-, (R)- (OR)
EPINEPHRINE

Waste Code: P075

Waste Description: NICOTINE, & SALTS (OR) PYRIDINE, 3-(1-METHYL-2-PYRROLIDINYL)-,(S)-, &
SALTS

Waste Code: P081

Waste Description: 1,2,3-PROPANETRIOL, TRINITRATE (R) (OR) NITROGLYCERINE (R)

Waste Code: U002

Waste Description: 2-PROPANONE (I) (OR) ACETONE (I)

Waste Code: U034

Waste Description: ACETALDEHYDE, TRICHLORO- (OR) CHLORAL

Waste Code: U129

Waste Description: CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, (1ALPHA, 2ALPHA, 3BETA, 4ALPHA,
5ALPHA, 6BETA)- (OR) LINDANE

Waste Code: U165

Waste Description: NAPHTHALENE

Waste Code: U188

Waste Description: PHENOL

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQQ

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098 **Rev:** 03/06/2023
ADDRESS: 15-1454 KAHAKAI BLVD **ID/Status:** HIR000140582
PAHOA, HI 96778
HONOLULU
SOURCE: US Environmental Protection Agency

Waste Code: U205
Waste Description: SELENIUM SULFIDE (OR) SELENIUM SULFIDE SES2 (R,T)

Handler - Owner Operator:
Owner/Operator Indicator: Operator
Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: ONE CVS DRIVE
Owner/Operator City,State,Zip: WOONSOCKET, RI 02895
Owner/Operator Telephone: Not reported
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator
Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: Not reported
Owner/Operator City,State,Zip: Not reported
Owner/Operator Telephone: Not reported
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator
Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: Not reported
Owner/Operator City,State,Zip: Not reported
Owner/Operator Telephone: Not reported
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101101

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQG

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778
Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778
Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778
Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator
Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: ONE CVS DRIVE
Owner/Operator City,State,Zip: WOONSOCKET, RI 02895
Owner/Operator Telephone: Not reported
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQG

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C

Legal Status: Private

Date Became Current: 20101101

Date Ended Current: Not reported

Owner/Operator Address: ONE CVS DRIVE

Owner/Operator City,State,Zip: WOONSOCKET, RI 02895

Owner/Operator Telephone: Not reported

Owner/Operator Telephone Ext: Not reported

Owner/Operator Fax: Not reported

Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner

Owner/Operator Name: HNMP

Legal Status: Private

Date Became Current: 20101101

Date Ended Current: Not reported

Owner/Operator Address: PO BOX 384

Owner/Operator City,State,Zip: PAHOA, HI 96778

Owner/Operator Telephone: 808-217-1085

Owner/Operator Telephone Ext: Not reported

Owner/Operator Fax: Not reported

Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator

Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C

Legal Status: Private

Date Became Current: 20101101

Date Ended Current: Not reported

Owner/Operator Address: ONE CVS DRIVE

Owner/Operator City,State,Zip: WOONSOCKET, RI 02895

Owner/Operator Telephone: Not reported

Owner/Operator Telephone Ext: Not reported

Owner/Operator Fax: Not reported

Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator

Owner/Operator Name: LONGS DRUG STORES CA, LLC

Legal Status: Private

Date Became Current: 20101110

Date Ended Current: Not reported

Owner/Operator Address: Not reported

Owner/Operator City,State,Zip: Not reported

Owner/Operator Telephone: Not reported

Owner/Operator Telephone Ext: Not reported

Owner/Operator Fax: Not reported

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQQ

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778
Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778
Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778
Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Owner
Owner/Operator Name: HNMP
Legal Status: Private
Date Became Current: 20101110
Date Ended Current: Not reported
Owner/Operator Address: PO BOX 384
Owner/Operator City,State,Zip: PAHOA, HI 96778

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Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQG

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098 **Rev:** 03/06/2023
ADDRESS: 15-1454 KAHAKAI BLVD **ID/Status:** HIR000140582
PAHOA, HI 96778
HONOLULU
SOURCE: US Environmental Protection Agency

Owner/Operator Telephone: 808-217-1085
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Owner/Operator Indicator: Operator
Owner/Operator Name: LONGS DRUG STORES CALIFORNIA, L.L.C
Legal Status: Private
Date Became Current: 20101101
Date Ended Current: Not reported
Owner/Operator Address: Not reported
Owner/Operator City,State,Zip: Not reported
Owner/Operator Telephone: Not reported
Owner/Operator Telephone Ext: Not reported
Owner/Operator Fax: Not reported
Owner/Operator Email: Not reported

Historic Generators:
Receive Date: 20180227
Handler Name: LONGS DRUG STORE #7098
Federal Waste Generator Description: Large Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: No
Electronic Manifest Broker: No

Receive Date: 20200228
Handler Name: LONGS DRUG STORE #7098
Federal Waste Generator Description: Large Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: No
Electronic Manifest Broker: No

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQQ

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098 **Rev:** 03/06/2023
ADDRESS: 15-1454 KAHAKAI BLVD **ID/Status:** HIR000140582
PAHOA, HI 96778
HONOLULU
SOURCE: US Environmental Protection Agency

Receive Date: 20110922
Handler Name: LONGS DRUG STORES NO 7098
Federal Waste Generator Description: Conditionally Exempt Small Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: Not reported
Electronic Manifest Broker: Not reported

Receive Date: 20121005
Handler Name: LONGS DRUG STORES NO 7098
Federal Waste Generator Description: Conditionally Exempt Small Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: Not reported
Electronic Manifest Broker: Not reported

Receive Date: 20160627
Handler Name: LONGS DRUG STORE #7098
Federal Waste Generator Description: Large Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: Not reported
Electronic Manifest Broker: Not reported

Receive Date: 20160630
Handler Name: LONGS DRUG STORE #7098
Federal Waste Generator Description: Large Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQQ

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: Not reported
Electronic Manifest Broker: Not reported

Receive Date: 20210117
Handler Name: LONGS DRUG STORE #7098
Federal Waste Generator Description: Conditionally Exempt Small Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: No
Non Storage Recycler Activity: No
Electronic Manifest Broker: No

Receive Date: 20210718
Handler Name: LONGS DRUG STORE #7098
Federal Waste Generator Description: Conditionally Exempt Small Quantity Generator
State District Owner: Not reported
Large Quantity Handler of Universal Waste: No
Recognized Trader Importer: No
Recognized Trader Exporter: No
Spent Lead Acid Battery Importer: No
Spent Lead Acid Battery Exporter: No
Current Record: Yes
Non Storage Recycler Activity: No
Electronic Manifest Broker: No

List of NAICS Codes and Descriptions:
NAICS Code: 44611
NAICS Description: PHARMACIES AND DRUG STORES

NAICS Code: 446110
NAICS Description: PHARMACIES AND DRUG STORES

NAICS Code: 812922
NAICS Description: ONE-HOUR PHOTOFINISHING

- Continued on next page -

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

RCRA-VSQQ

EDR ID: 1014916464 **DIST/DIR:** 0.214 NE **ELEVATION:** 618 **MAP ID:** A3

NAME: LONGS DRUG STORE #7098

Rev: 03/06/2023

ADDRESS: 15-1454 KAHAKAI BLVD
PAHOA, HI 96778
HONOLULU

ID/Status: HIR000140582

SOURCE: US Environmental Protection Agency

Facility Has Received Notices of Violations:
Violations: No Violations Found

Evaluation Action Summary:
Evaluations: No Evaluations Found

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

UST

EDR ID: U003998224 **DIST/DIR:** 0.217 NE **ELEVATION:** 618 **MAP ID:** A4

NAME: WOODLAND CENTER
ADDRESS: 15-1450 KAHAKAI BLVD
PAHOA, HI 96778

Rev: 11/21/2022
ID/Status: Currently In Use
ID/Status: 9-603792

SOURCE: HI Department of Health

UST:

Name: WOODLAND CENTER
Address: 15-1450 KAHAKAI BLVD
City,State,Zip: PAHOA, HI 96778
Facility ID: 9-603792
Owner: PAUL'S AUTO REPAIR
Owner Address: P.O. BOX 384
Owner City,St,Zip: Pahoia, 96778 96778
Latitude: 19.504220
Longitude: -154.954740
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: 1
Date Installed: 04/25/2006
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Name: WOODLAND CENTER
Address: 15-1450 KAHAKAI BLVD
City,State,Zip: PAHOA, HI 96778

Tank ID: 2A
Date Installed: 04/25/2006
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 6000
Substance: Gasoline

Name: WOODLAND CENTER
Address: 15-1450 KAHAKAI BLVD
City,State,Zip: PAHOA, HI 96778

Tank ID: 2B
Date Installed: 04/25/2006
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Diesel

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

SHWS

EDR ID: S123640215 **DIST/DIR:** 0.879 SE **ELEVATION:** 677 **MAP ID:** 5

NAME: PAHOA ELEMENTARY SCHOOL BUILDING EXTERIOR SOILS **Rev:** 10/20/2022

ADDRESS: 15-3030 PAHOA VILLAGE RD
PAHOA, HI 96778

SOURCE: HI Department of Health

SHWS:

Name: PAHOA ELEMENTARY SCHOOL BUILDING EXTERIOR SOILS
Address: 15-3030 PAHOA VILLAGE RD
City,State,Zip: PAHOA, HI 96778
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Pahoia Elementary School Building Exterior Soils
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER Office
Program: State
Project Manager: Eric Sadoyama
Hazard Priority: Low
Potential Hazards And Controls: Hazard Managed With Controls
Island: Hawaii
SDAR Environmental Interest Name: Pahoia Elementary School Building Exterior Soils
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: Response Ongoing
Nature of Contamination: Found: Limited surface soil testing was carried out at Pahoia Elementary in 2016 and 2017, which identified lead and chlordane above HDOH EALs along the perimeter of two older (1940 and 1960) buildings.
Nature of Residual Contamination: Not reported
Use Restrictions: Controls Required to Manage Contamination
Engineering Control: Not reported
Description of Restrictions: Not reported
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: Eric Sadoyama
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782
Facility ID: 834
Location Description: 15-3030 Pahoia Village Rd, Pahoia, HI 96778
Is Public: True
Update On: 44047.391423611109
Latitude: 19.491925
Longitude: -154.942909

Site Detail Report

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

SHWS

EDR ID: S126283063 **DIST/DIR:** 0.970 SE **ELEVATION:** 681 **MAP ID:** 6

NAME: PAHOA HIGH AND INTERMEDIATE SCHOOL BUILDING EXTERIOR SOILS 10/20/2022
ADDRESS: 15-3038 PAHOA VILLAGE RD
PAHOA, HI 96778
HAWAII
SOURCE: HI Department of Health

SHWS:

Name: PAHOA HIGH AND INTERMEDIATE SCHOOL BUILDING EXTERIOR SOILS
Address: 15-3038 PAHOA VILLAGE RD
City,State,Zip: PAHOA, HI 96778
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: 835
Location Description: 15-3038 Pahoa Village Rd, Pahoa, HI 96778
Is Public: True
Update On: 44047.480740740742
Latitude: 19.490959
Longitude: -154.941932

Database Descriptions

NPL: NPL 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. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites.

NPL Delisted: Delisted NPL 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. Delisted NPL - National Priority List Deletions

CERCLIS: SEMS 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. SEMS - Superfund Enterprise Management System

NFRAP: SEMS-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. SEMS-ARCHIVE - Superfund Enterprise Management System Archive

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF 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. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG 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. 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 IC / EC: US ENG CONTROLS 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. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROLS - Institutional Controls Sites List.

Database Descriptions

ERNS: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System

State/Tribal CERCLIS: SHWS 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). SHWS - Sites List

State/Tribal SWL: SWF/LF 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. SWF/LF - Permitted Landfills in the State of Hawaii

State/Tribal LTANKS: LUST 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. LUST - Leaking Underground Storage Tank Database INDIAN LUST R4 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R5 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R9 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R8 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R7 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R6 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R1 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R10 - Leaking Underground Storage Tanks on Indian Land.

State/Tribal Tanks: UST 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. UST - Underground Storage Tank Database INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R1 - Underground Storage Tanks on Indian Land.

State/Tribal IC / EC: ENG CONTROLS A listing of sites with engineering controls in place. ENG CONTROLS - Engineering Control Sites INST CONTROL - Sites with Institutional Controls.

State/Tribal VCP: VCP 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. VCP - Voluntary Response Program Sites

ST/Tribal Brownfields: BROWNFIELDS 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. BROWNFIELDS - Brownfields Sites

US Brownfields: US BROWNFIELDS 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. US BROWNFIELDS - A Listing of Brownfields Sites

Other SWF: SWRCY A listing of recycling and drop-off facilities located in Hawaii. SWRCY - SWRCY IHS OPEN DUMPS - Open Dumps on Indian Land.

Database Descriptions

Other Haz Sites: US CDL 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. US CDL - Clandestine Drug Labs

Spills: HMIRS Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT. HMIRS - Hazardous Materials Information Reporting System SPILLS - Release Notifications. SPILLS 90 - SPILLS90 data from FirstSearch.

Other: RCRA NonGen / NLR 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. RCRA NonGen / NLR - RCRA - Non Generators / No Longer Regulated FEDLAND - Federal and Indian Lands. TSCA - Toxic Substances Control Act. TRIS - Toxic Chemical Release Inventory System. SSTS - Section 7 Tracking Systems. 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). FTTS INSP - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). MLTS - Material Licensing Tracking System. RADINFO - Radiation Information Database. BRS - Biennial Reporting System. INDIAN RESERV - Indian Reservations. US AIRS (AFS) - Aerometric Information Retrieval System Facility Subsystem (AFS). US AIRS MINOR - Air Facility System Data. ABANDONED MINES - Abandoned Mines. FINDS - Facility Index System/Facility Registry System. DOCKET HWC - Hazardous Waste Compliance Docket Listing. UXO - Unexploded Ordnance Sites. 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. LEAD - Lead Inspection Listing. PCS - Permit Compliance System. MINES MRDS - Mineral Resources Data System. PCS ENF - Enforcement data. PFAS TRIS - List of PFAS Added to the TRI.

Database Sources

NPL: EPA

Updated Quarterly

NPL Delisted: EPA

Updated Quarterly

CERCLIS: EPA

Updated Quarterly

NFRAP: EPA

Updated Quarterly

RCRA COR ACT: EPA

Updated Quarterly

RCRA TSD: Environmental Protection Agency

Updated Quarterly

RCRA GEN: Environmental Protection Agency

Updated Quarterly

Federal IC / EC: Environmental Protection Agency

Varies

ERNS: National Response Center, United States Coast Guard

Updated Quarterly

State/Tribal CERCLIS: Department of Health

Updated Semi-Annually

State/Tribal SWL: Department of Health

Varies

State/Tribal LTANKS: Department of Health

Updated Semi-Annually

State/Tribal Tanks: Department of Health

Updated Semi-Annually

Database Sources

State/Tribal IC / EC: Department of Health

Varies

State/Tribal VCP: Department of Health

Varies

ST/Tribal Brownfields: Department of Health

Varies

US Brownfields: Environmental Protection Agency

Updated Semi-Annually

Other SWF: Department of Health

Varies

Other Haz Sites: Drug Enforcement Administration

Updated Quarterly

Spills: U.S. Department of Transportation

Updated Quarterly

Other: Environmental Protection Agency

Updated Quarterly

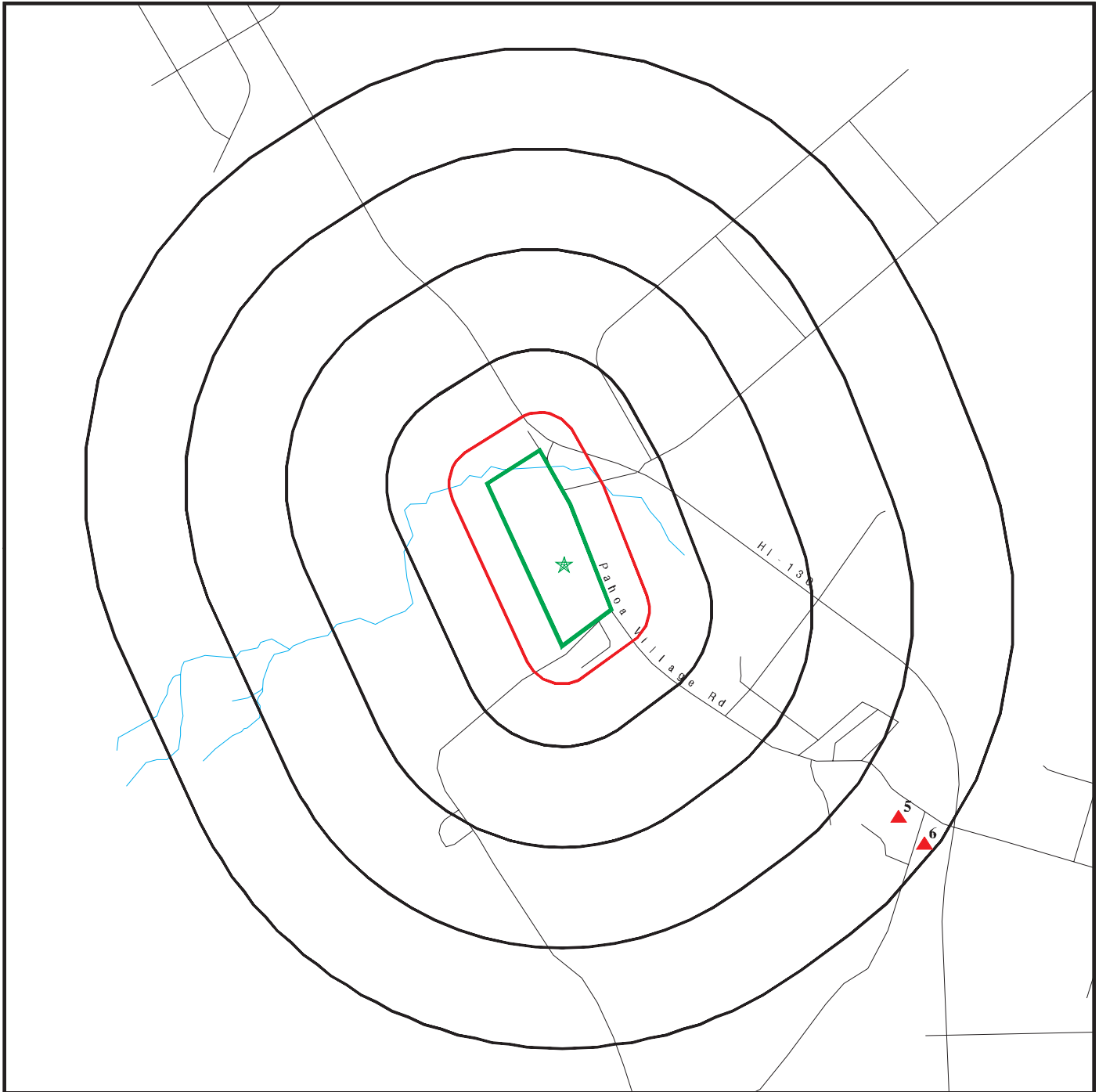
Street Name Report for Streets near the Target Property

Target Property: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

JOB: NA

Street Name	Dist/Dir	Street Name	Dist/Dir
Kahakai Blvd	0.19 North		
Laaui Pl	0.23 SSE		
Laaui Way	0.16 SSE		
Old Cemetery Rd	0.16 SE		
Pahoa Village Rd	0.07 ENE		

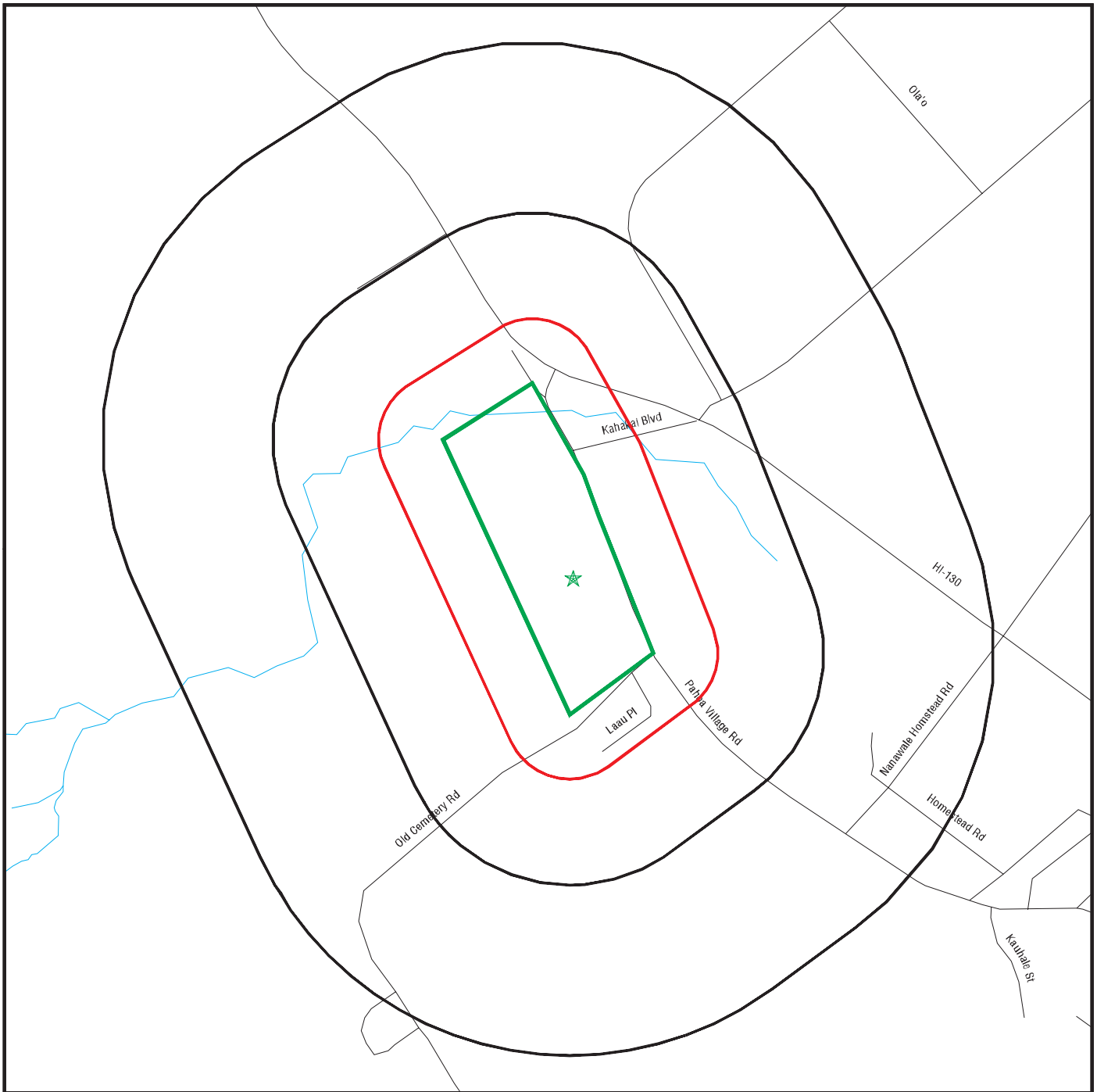
15-2728 PAHOA VILLAGE RD PAHOA, HI 96778



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

- ★ Target Property (Latitude: 19.500929 Longitude: 154.955653)
- ▲ Identified Sites
- ▨ Indian Reservations BIA
- ▨ National Priority List Sites

15-2728 PAHOA VILLAGE RD PAHOA, HI 96778



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

- ★ Target Property (Latitude: 19.500929 Longitude: 154.955653)
- ▲ Identified Sites
- ▭ Indian Reservations BIA
- ▭ National Priority List Sites

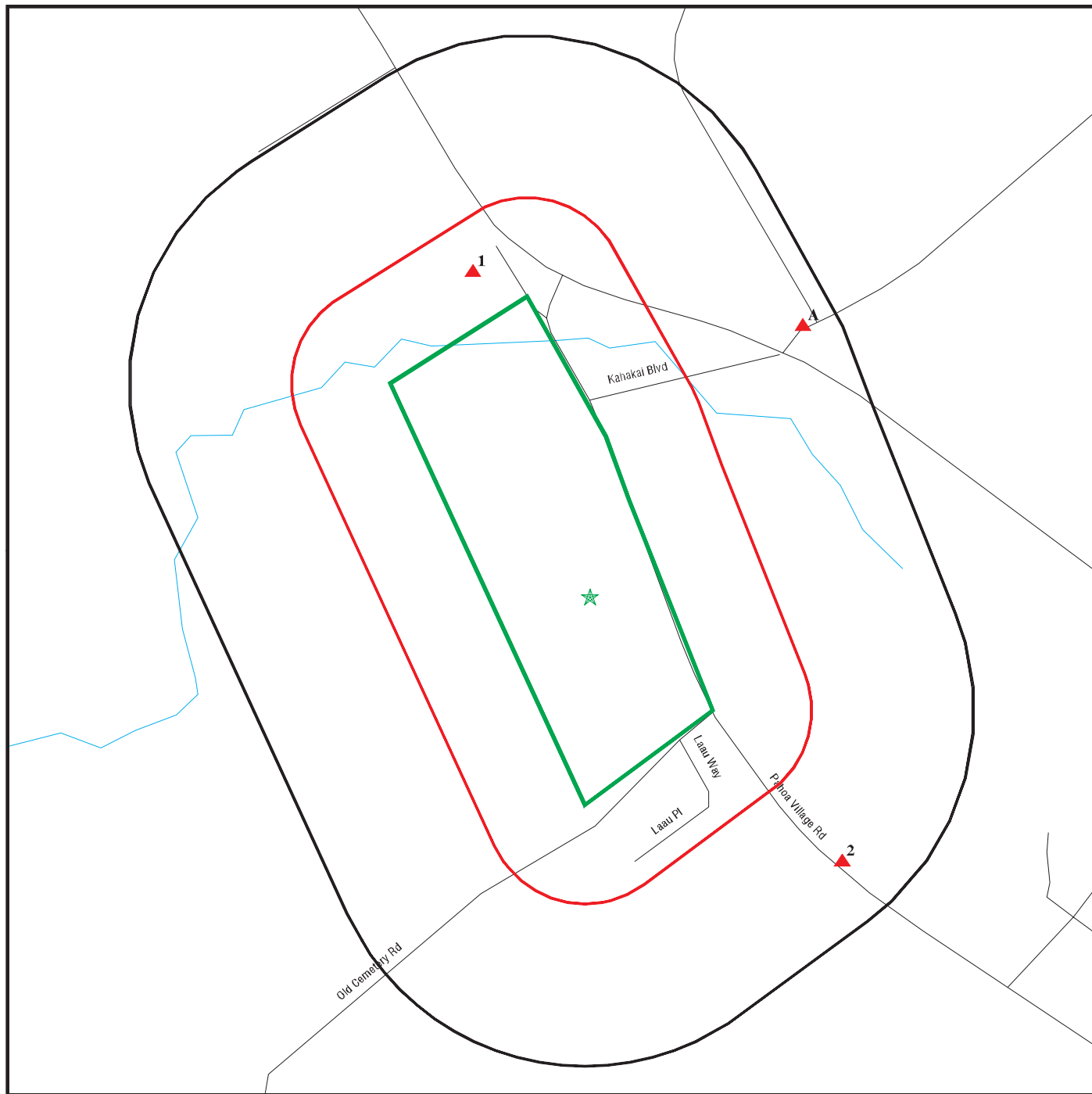
Environmental FirstSearch

0.25 Mile Radius

ASTM MAP: RCRAGEN, ERNS, UST, FED IC/EC, METH LABS



15-2728 PAHOA VILLAGE RD PAHOA, HI 96778



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

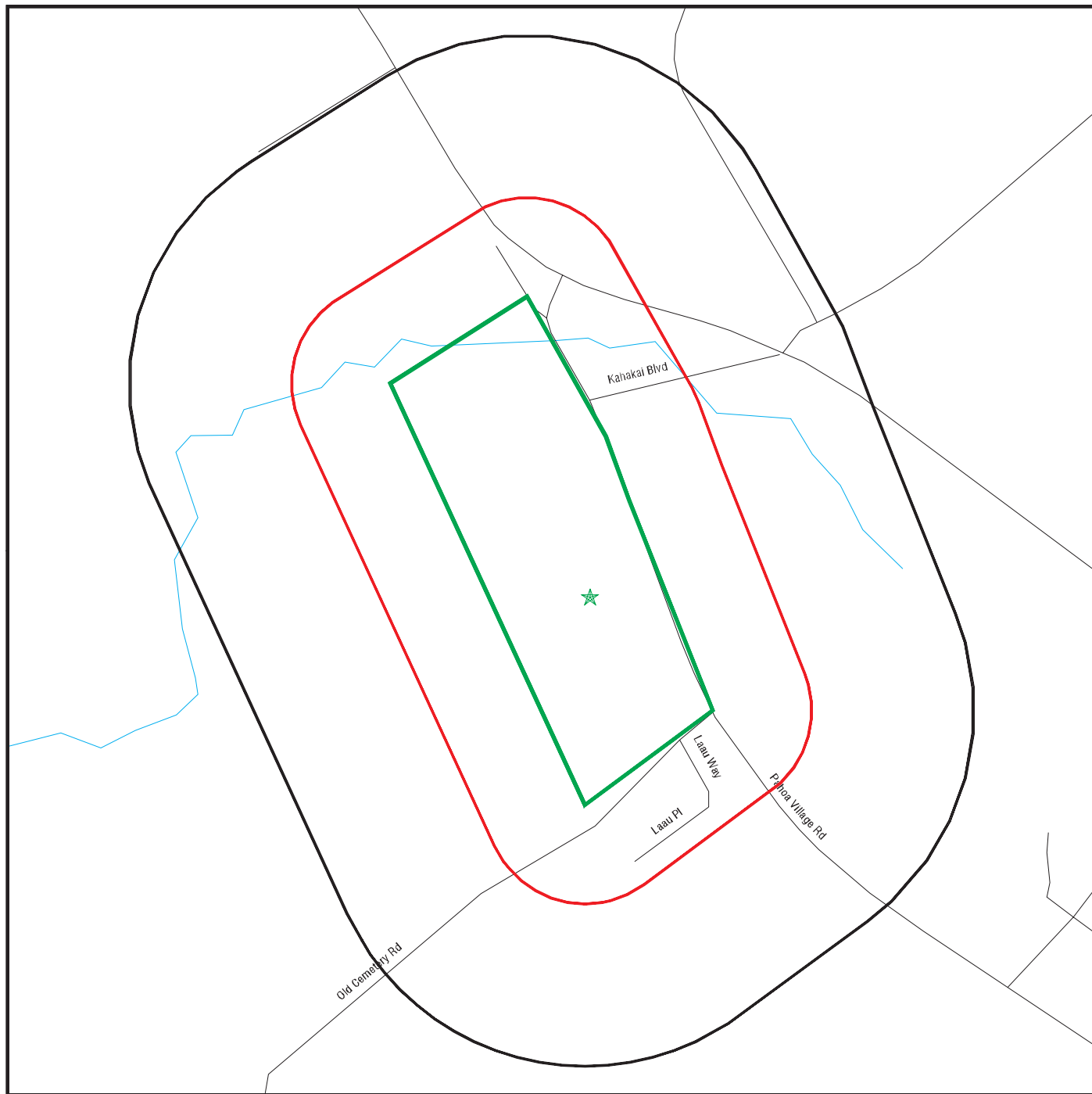
- ★ Target Property (Latitude: 19.500929 Longitude: 154.955653)
- ▲ Identified Sites
- ▭ Indian Reservations BIA
- ▭ National Priority List Sites

Environmental FirstSearch

0.25 Mile Radius
Non ASTM Map, Spills, FINDS



15-2728 PAHOA VILLAGE RD PAHOA, HI 96778



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

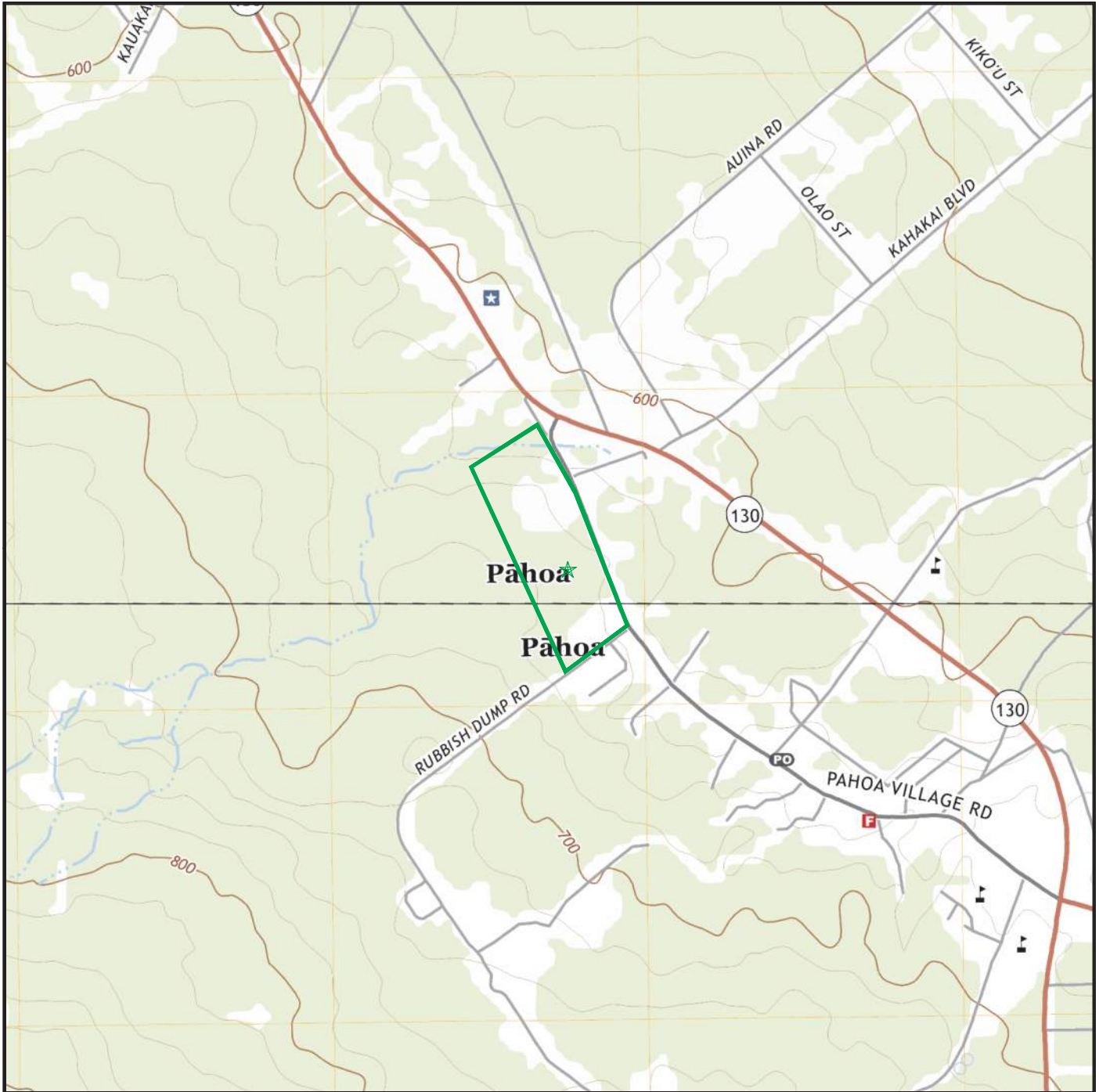
- ★ Target Property (Latitude: 19.500929 Longitude: 154.955653)
- ▲ Identified Sites
- 🏠 Sensitive Receptors
- 🚧 National Priority List Sites
- 🏠 Indian Reservations BIA

Site location Map

Topo: 0.75 Mile Radius



15-2728 PAHOA VILLAGE RD PAHOA, HI 96778



Map Image Position: TP
Map Reference Code & Name: 9646914 Paho North
Map State(s): HI
Version Date: 2017
Map Image Position: S
Map Reference Code & Name: 9646916 Paho South
Map State(s): HI
Version Date: 2017



NHS Inc

15-2728 PAHOA VILLAGE RD

PAHOA, HI 96778

Inquiry Number: 7337968.8

May 16, 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

05/16/23

Site Name:

NHS Inc
15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
EDR Inquiry # 7337968.8

Client Name:

Myounghee Noh and Associates
99-1046 Iwaena Street
Aiea, HI 96701
Contact: Gabrielle Richardson



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:

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
1985	1"=500'	Flight Date: April 29, 1985	USGS
1977	1"=500'	Flight Date: February 19, 1977	USGS
1974	1"=500'	Flight Date: October 19, 1974	USGS
1961	1"=500'	Flight Date: February 04, 1961	USGS
1954	1"=500'	Flight Date: April 10, 1954	USGS

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INQUIRY #: 7337968.8

YEAR: 1985

— = 500'





INQUIRY #: 7337968.8

YEAR: 1977

— = 500'



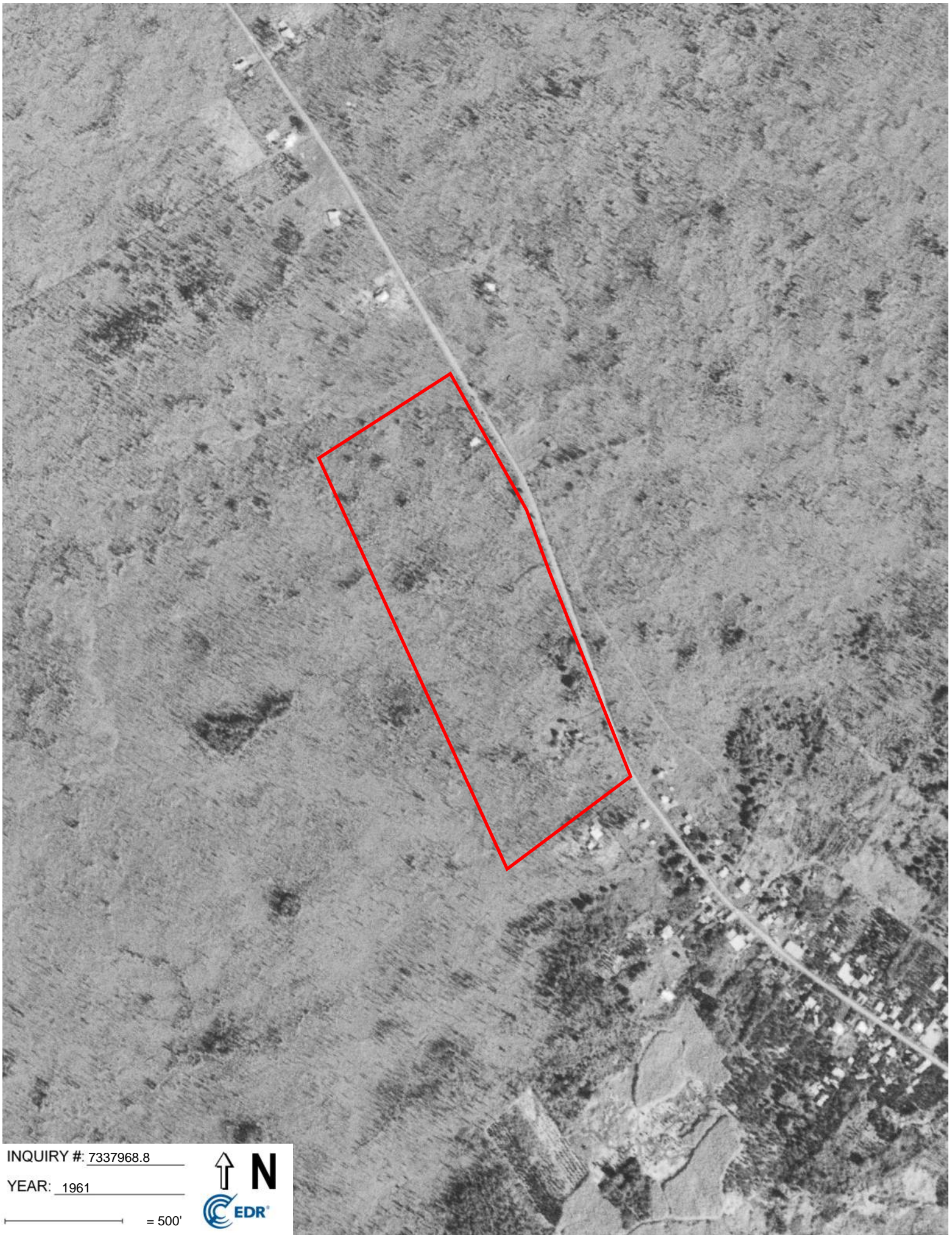


INQUIRY #: 7337968.8

YEAR: 1974

— = 500'



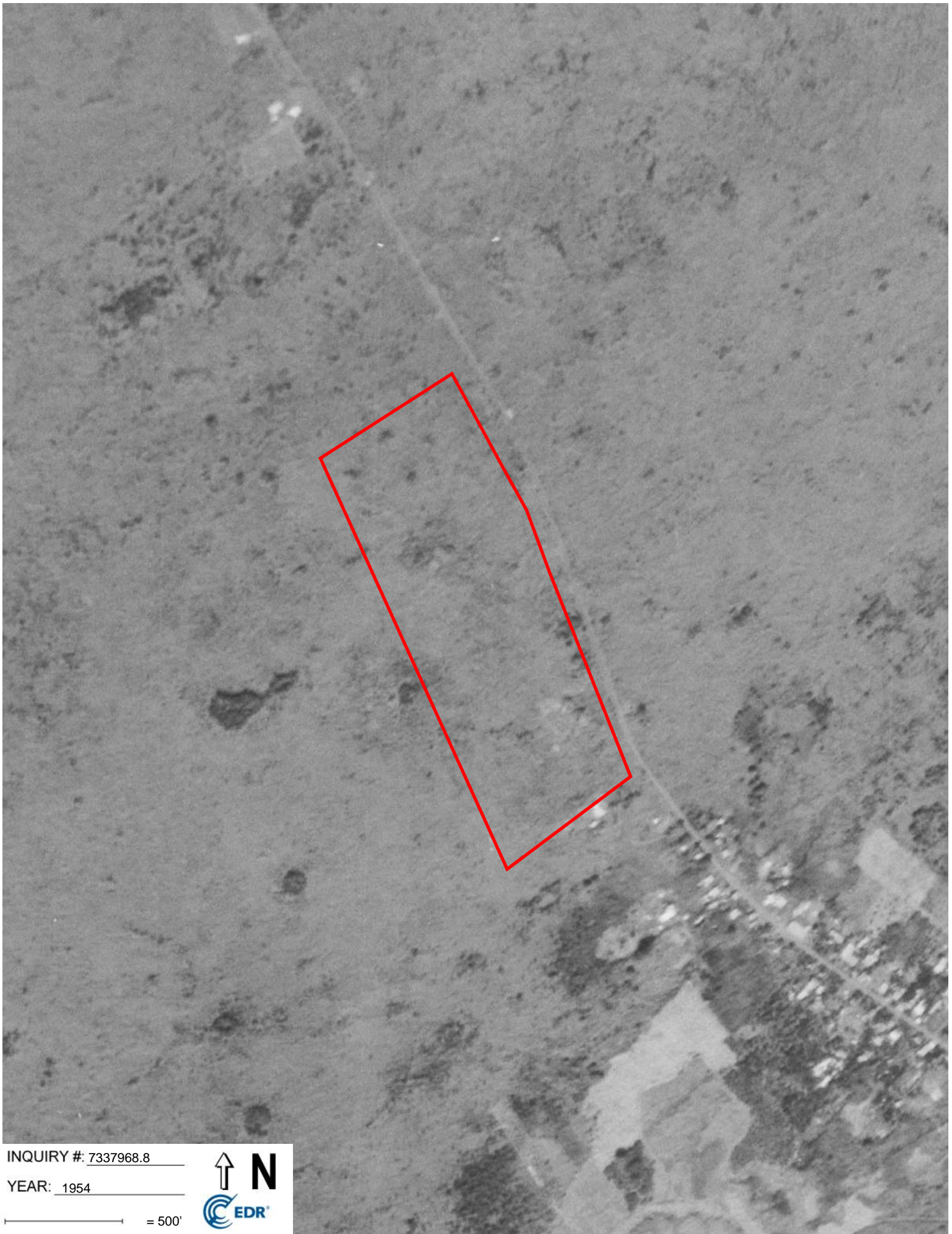


INQUIRY #: 7337968.8

YEAR: 1961

— = 500'





INQUIRY #: 7337968.8

YEAR: 1954

— = 500'



NHS Inc
15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

Inquiry Number: 7337968.4

May 16, 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

05/16/23

Site Name:

NHS Inc
15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
EDR Inquiry # 7337968.4

Client Name:

Myounghee Noh and Associates
99-1046 Iwaena Street
Aiea, HI 96701
Contact: Gabrielle Richardson



EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Myounghee Noh and Associates 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. EDR's 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:**Coordinates:**

P.O.#	NA	Latitude:	19.500929 19° 30' 3" North
Project:	COH Pahoia Hub Phase I	Longitude:	-154.955653 -154° 57' 20" West
		UTM Zone:	Zone 5 North
		UTM X Meters:	294760.31
		UTM Y Meters:	2157425.24
		Elevation:	647.25' above sea level

Maps Provided:

2017
2013
1997
1994, 1995
1980, 1981
1965, 1966
1924
1922

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2017 Source Sheets



Pahoa North
2017
7.5-minute, 24000



Pahoa South
2017
7.5-minute, 24000

2013 Source Sheets



Pahoa North
2013
7.5-minute, 24000



Pahoa South
2013
7.5-minute, 24000

1997 Source Sheets



PAHOANORTH
1997
7.5-minute, 24000

1994, 1995 Source Sheets



Pahoa South
1994
7.5-minute, 24000



Pahoa North
1995
7.5-minute, 24000
Aerial Photo Revised 1995

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1980, 1981 Source Sheets



Pahoa South
1980
7.5-minute, 24000
Aerial Photo Revised 1977



Pahoa North
1981
7.5-minute, 24000
Aerial Photo Revised 1977

1965, 1966 Source Sheets



Pahoa North
1965
7.5-minute, 24000
Aerial Photo Revised 1961



Pahoa South
1966
7.5-minute, 24000
Aerial Photo Revised 1961

1924 Source Sheets



Kalapana
1924
15-minute, 62500



Makuu
1924
15-minute, 62500

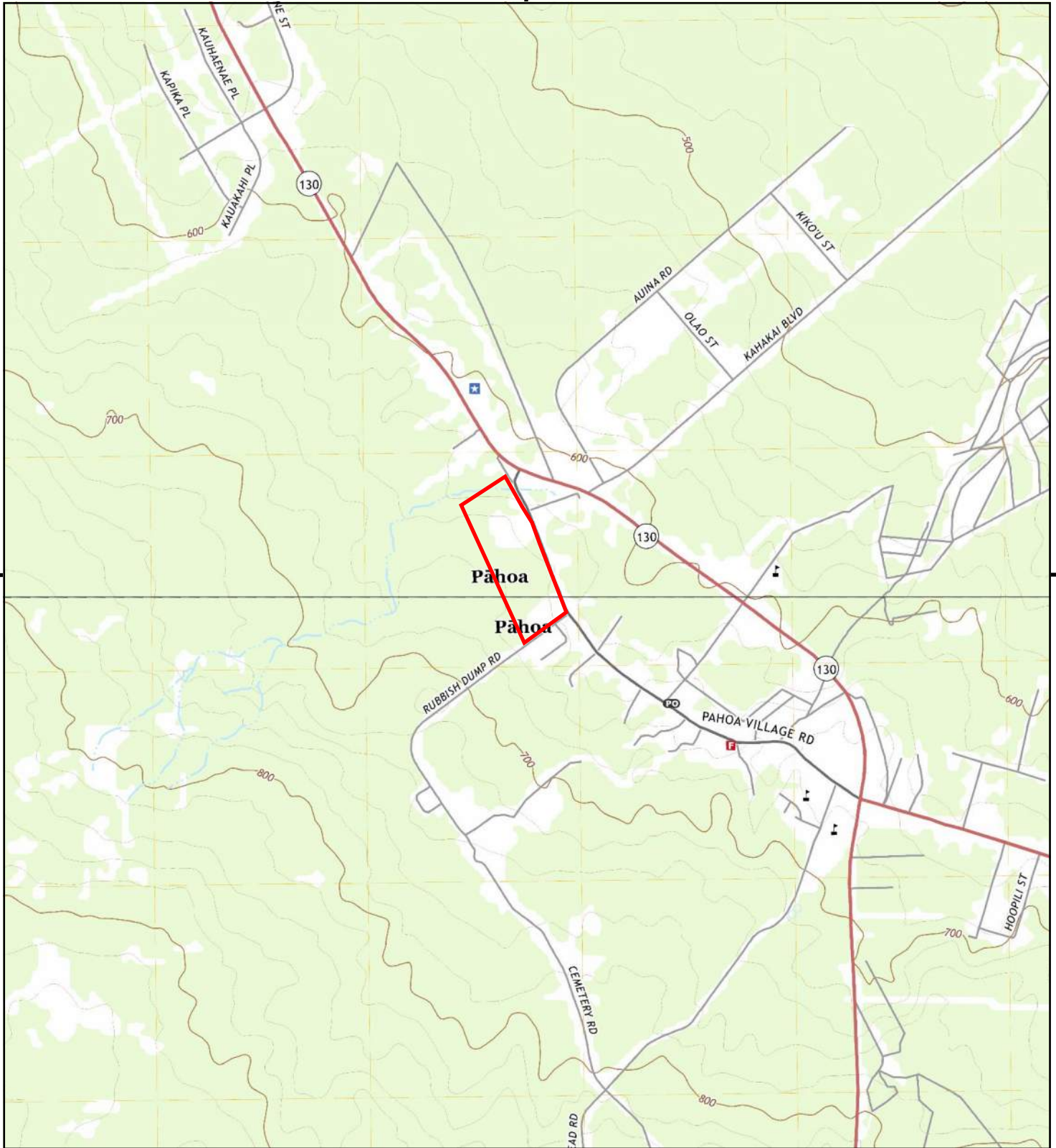
1922 Source Sheets



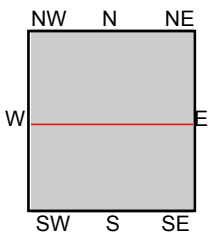
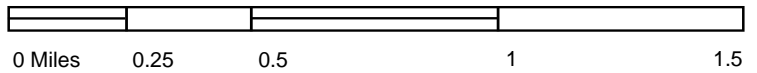
PAHOAJUNCTION
1922
7.5-minute, 31680



PAHOA
1922
7.5-minute, 31680



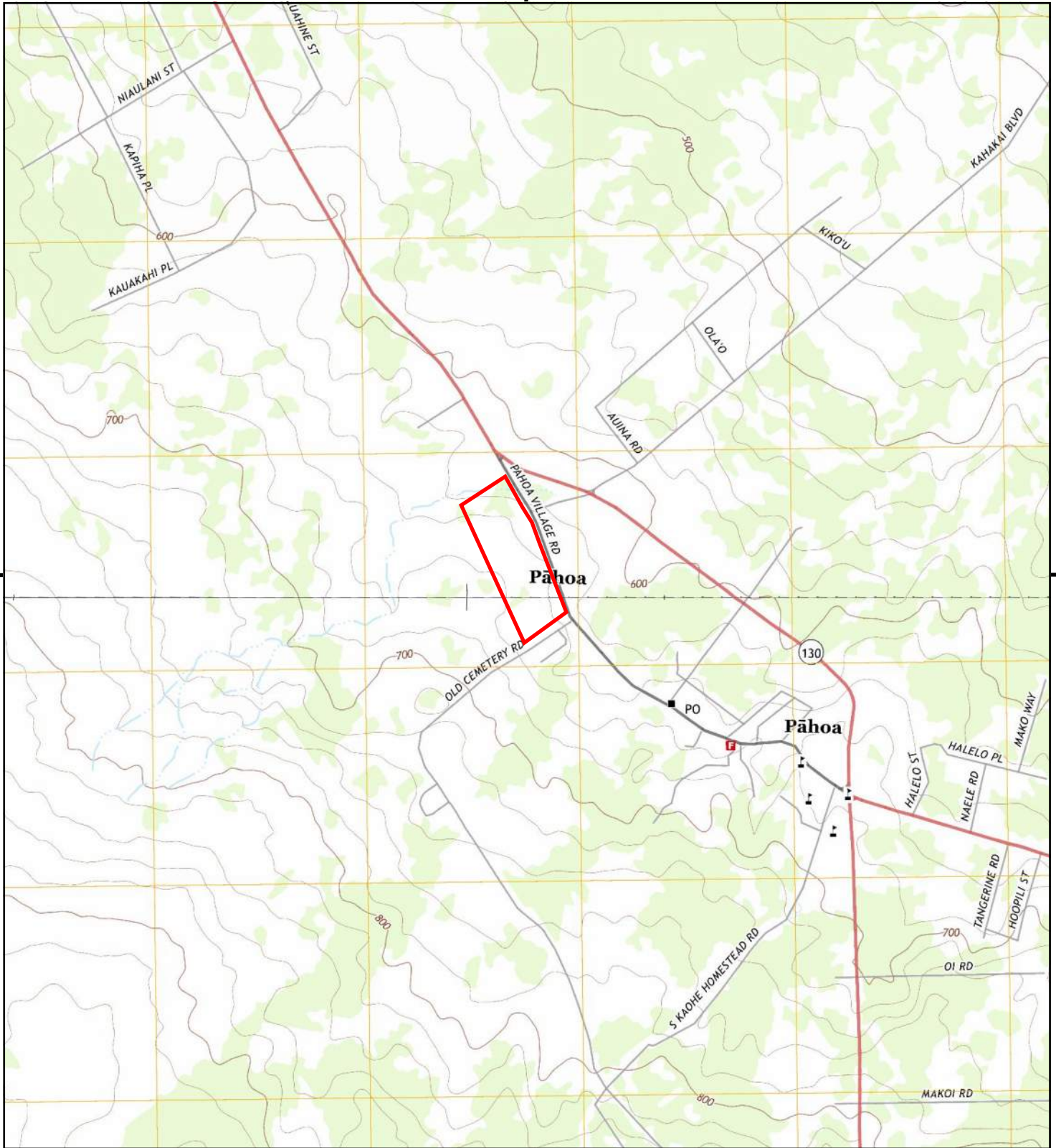
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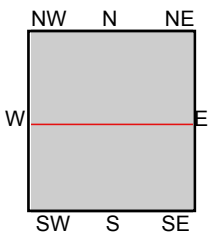
TP, Pāhoā North, 2017, 7.5-minute
S, Pāhoā South, 2017, 7.5-minute

SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
CLIENT: Myounghee Noh and Associates





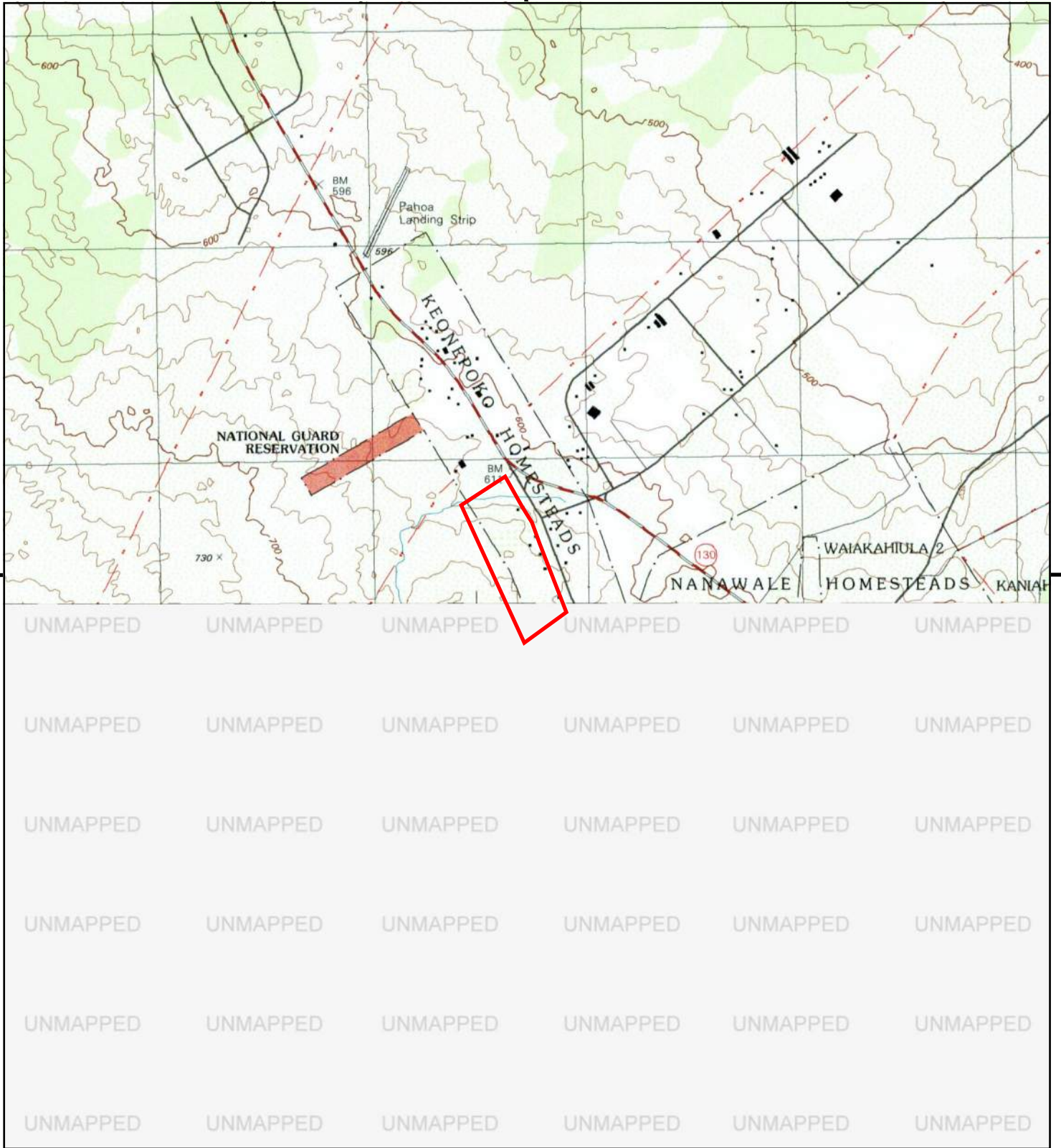
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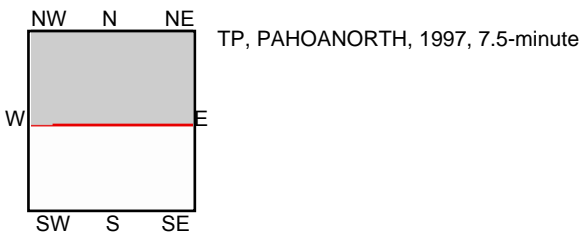
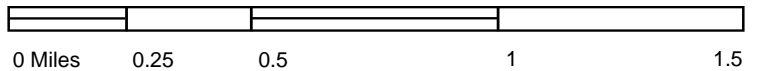
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SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
CLIENT: Myounghee Noh and Associates



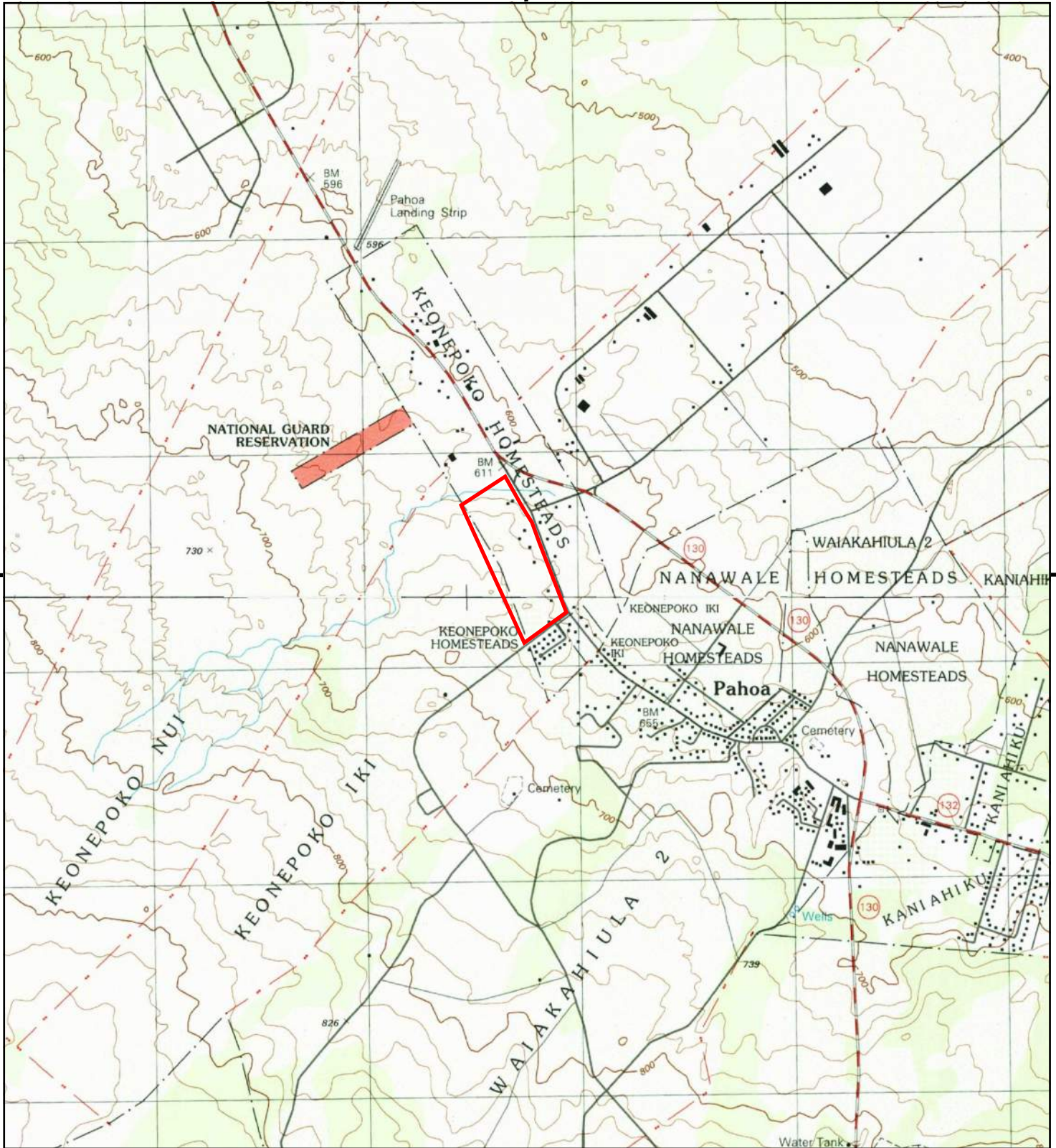


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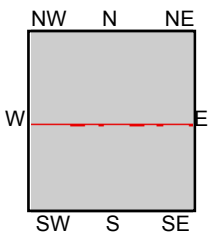


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ADDRESS: 15-2728 PAHOA VILLAGE RD
 PAHOA, HI 96778
CLIENT: Myounghee Noh and Associates





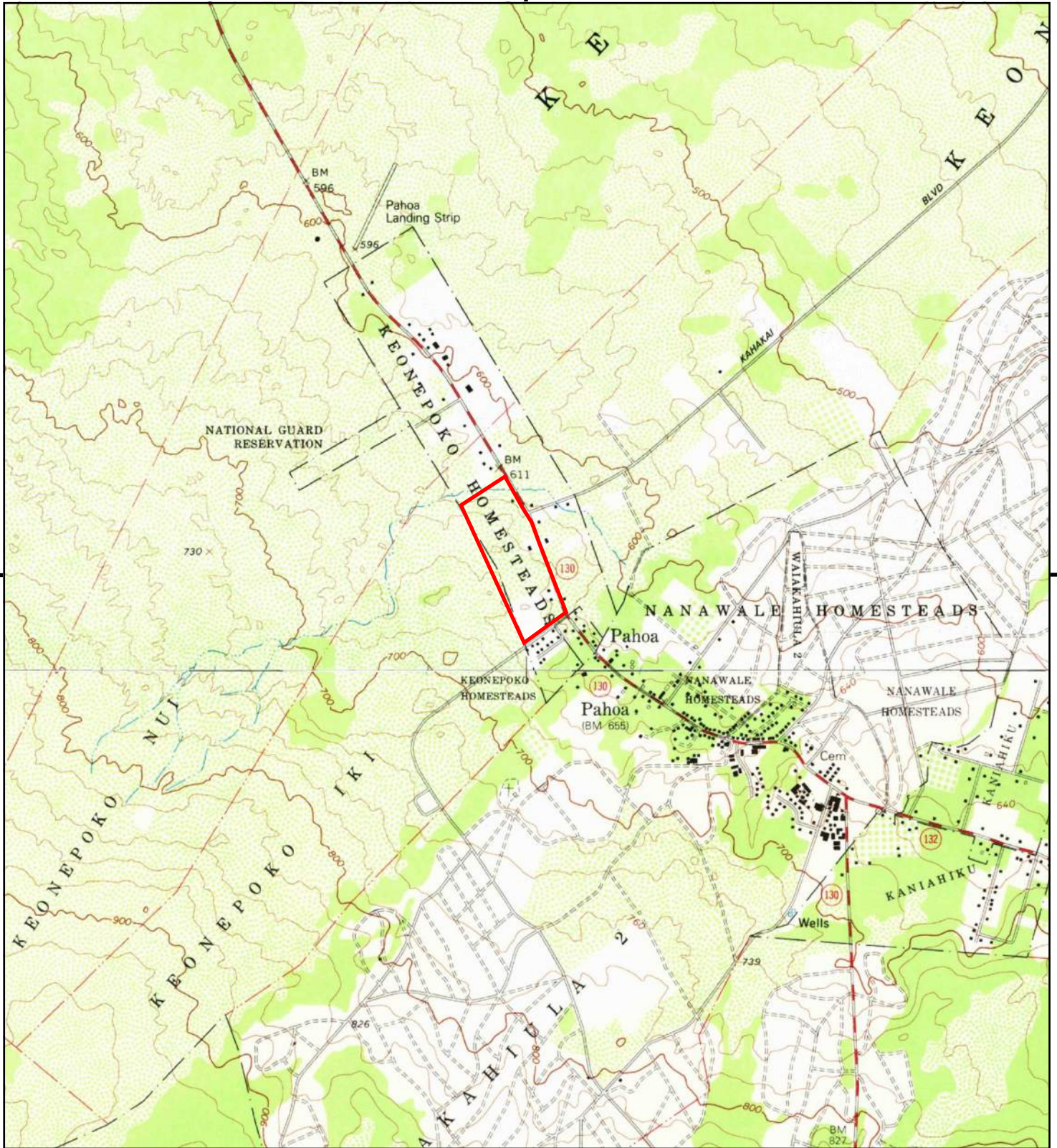
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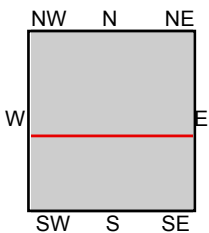
TP, Pahoia North, 1995, 7.5-minute
S, Pahoia South, 1994, 7.5-minute

SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOIA VILLAGE RD
PAHOIA, HI 96778
CLIENT: Myounghee Noh and Associates





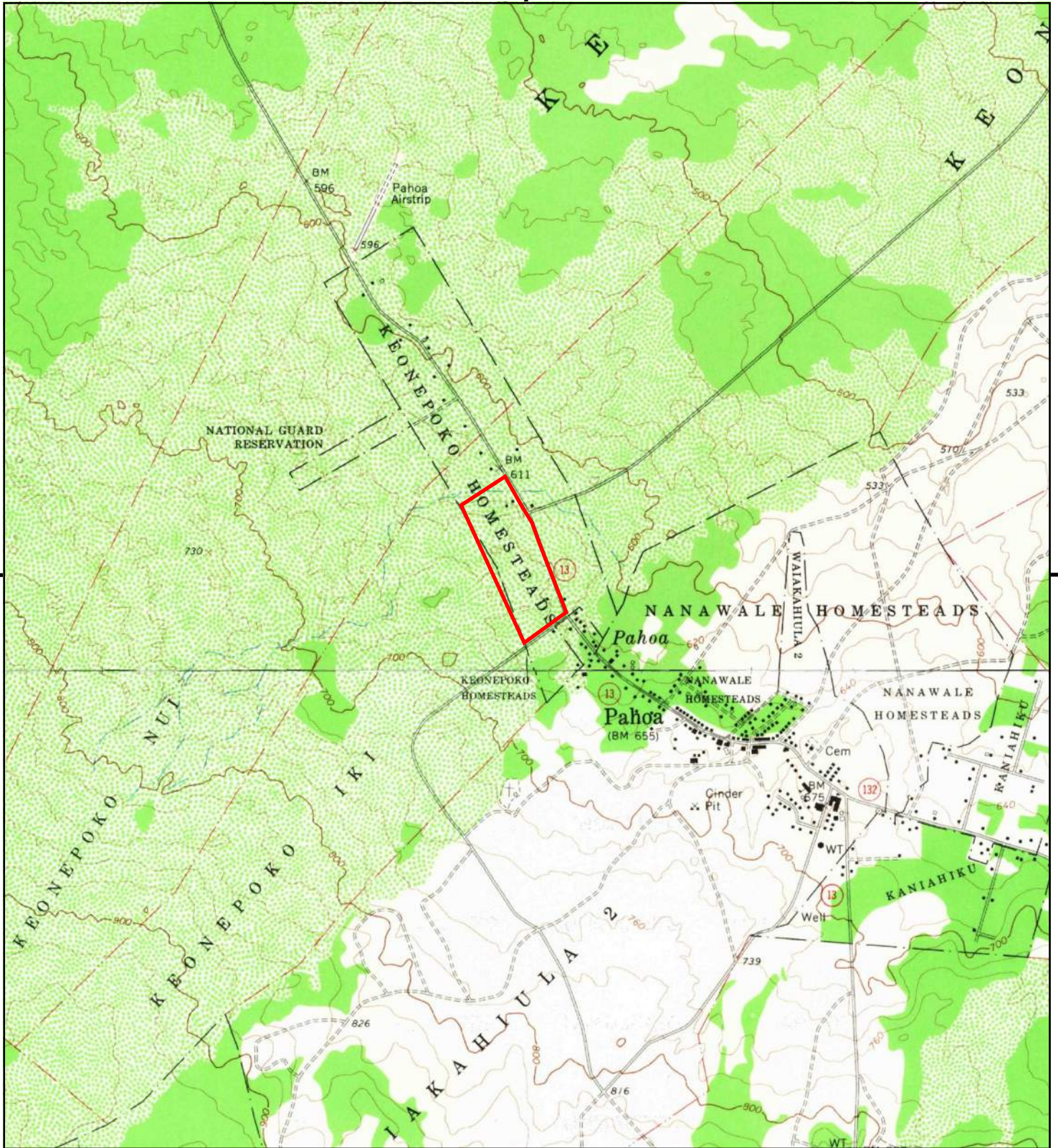
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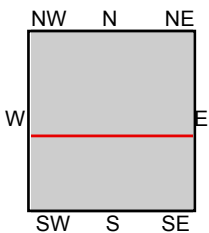
TP, Pahoehoe North, 1981, 7.5-minute
S, Pahoehoe South, 1980, 7.5-minute

SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOEHOE VILLAGE RD
PAHOEHOE, HI 96778
CLIENT: Myounghee Noh and Associates





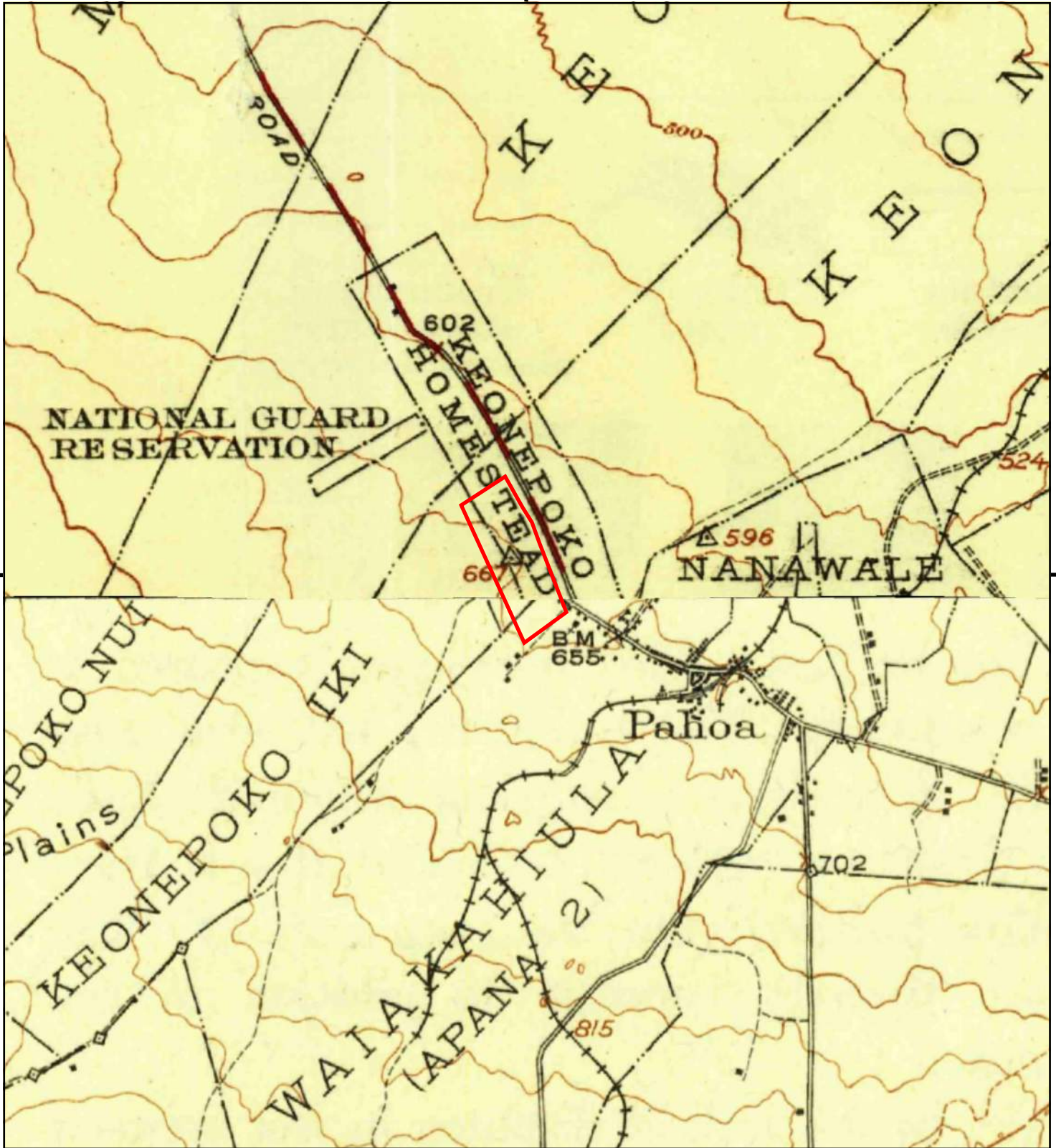
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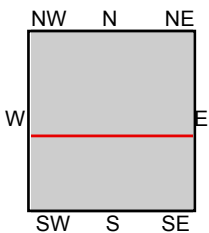
TP, Pahoia North, 1965, 7.5-minute
S, Pahoia South, 1966, 7.5-minute

SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOIA VILLAGE RD
 PAHOIA, HI 96778
CLIENT: Myounghee Noh and Associates





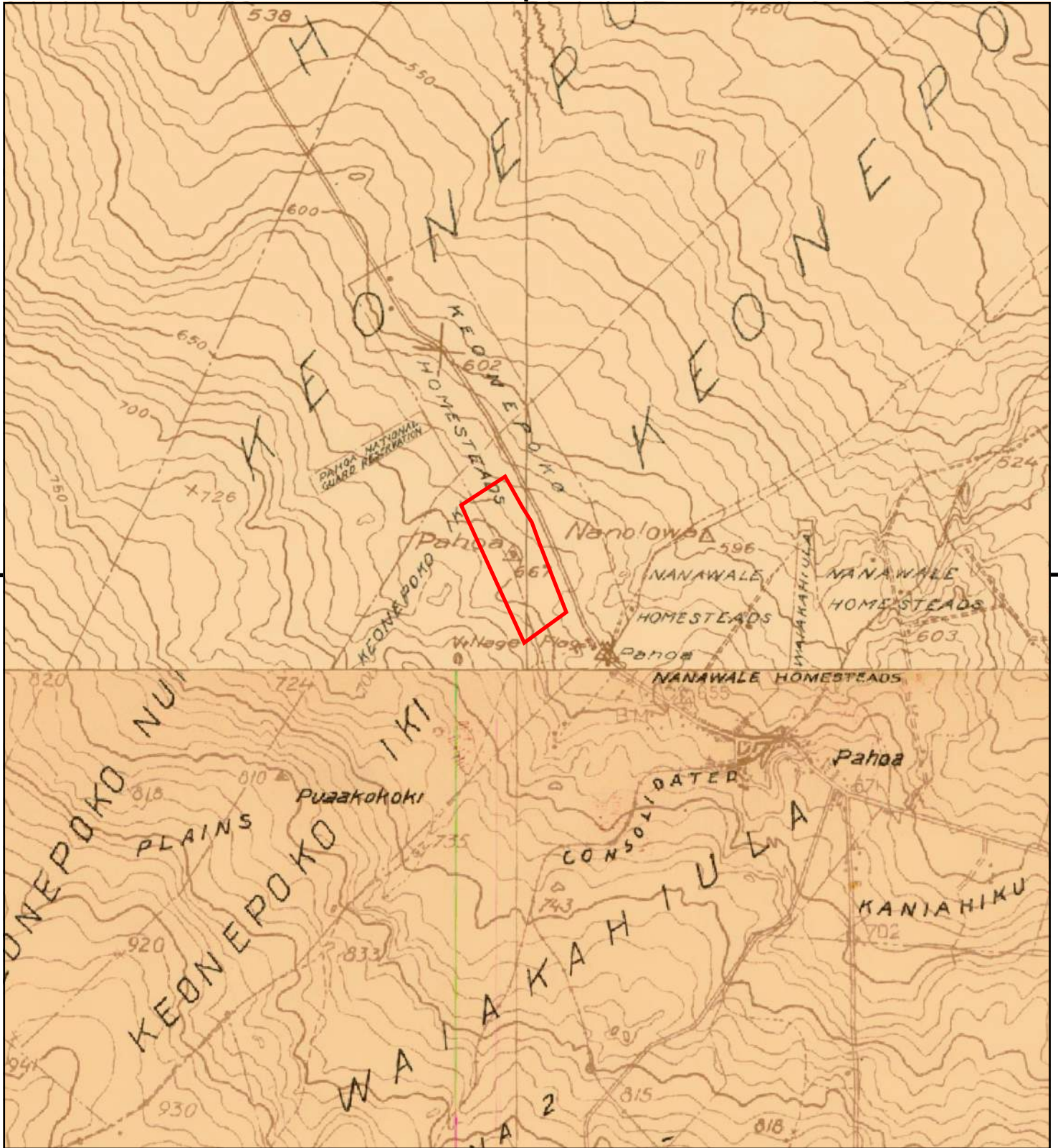
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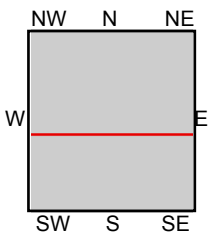
TP, Makuu, 1924, 15-minute
SE, Kalapana, 1924, 15-minute

SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
CLIENT: Myounghee Noh and Associates






This report includes information from the following map sheet(s).



TP, PAHOAJUNCTION, 1922, 7.5-minute
S, PAHOA, 1922, 7.5-minute

SITE NAME: NHS Inc
ADDRESS: 15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
CLIENT: Myounghee Noh and Associates





NHS Inc
15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778

Inquiry Number: 7337968.3

May 16, 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

05/16/23

Site Name:

NHS Inc
15-2728 PAHOA VILLAGE RD
PAHOA, HI 96778
EDR Inquiry # 7337968.3

Client Name:

Myounghee Noh and Associates
99-1046 Iwaena Street
Aiea, HI 96701
Contact: Gabrielle Richardson



The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Myounghee Noh and Associates 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 # FDE6-4151-B2EB
PO # NA
Project COH Pahoia Hub Phase I

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 #: FDE6-4151-B2EB

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™

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Disclaimer - Copyright and Trademark Notice

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APPENDIX D Site Reconnaissance Photographs

Site #2: Subject Property TMK (3) 1-5-007:007



Photograph 1. A view of the south boundary (Kahakai Blvd.) of parcel 007. The south portion of parcel 007 is used as a parking lot (31 May 2023).



Photograph 2. A view of dense vegetation west of parking lot at parcel 007 (31 May 2023).



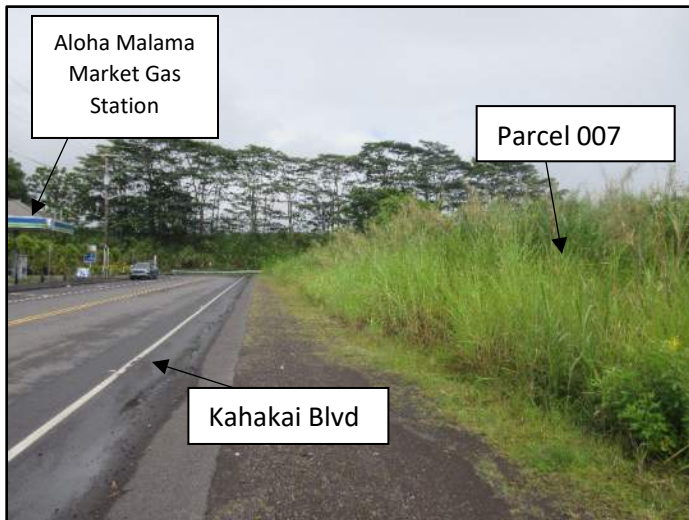
Photograph 3. A view of the metal container located in the parking lot at parcel 007 (31 May 2023).



Photograph 4. A soil and gravel pile located east of the metal container in the parking lot at parcel 007 (31 May 2023).



Photograph 5. Three potentially water/soil-filled plastic pools located west of the metal container in parking lot at parcel 007 (31 May 2023).



Photograph 6. A view of the south and west boundaries of parcel 007 (31 May 2023).



Photograph 7. A view of a pole-mounted transformer on an adjoining property (parcel 069) to the south of parcel 007 (31 May 2023).



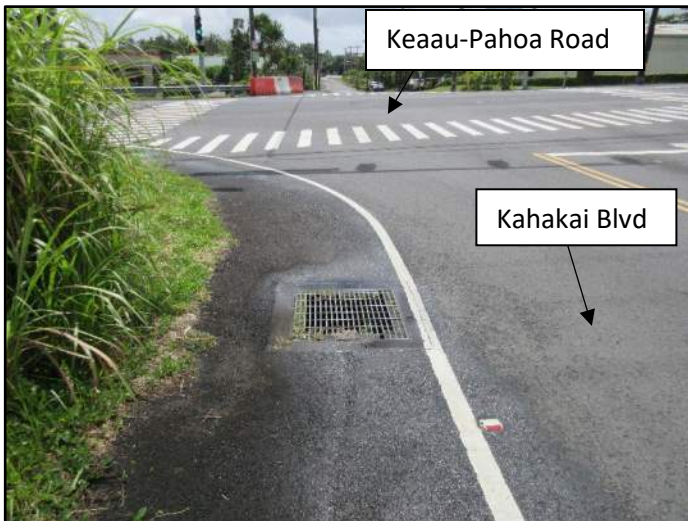
Photograph 8. A view of the pad-mounted transformer on the adjoining property (parcel 069) to the south of parcel 007. Stain on the concrete pad appears to be mildew (31 May 2023).



Photograph 9. A view of the cable manholes west of the pad-mounted transformer on the adjoining property, parcel 069. The concrete cap is stained due to rain/water and potential mildew (31 May 2023).



Photograph 10. A view of the concrete structure with drainage grate, located in the southern area of parcel 007 (31 May 2023).



Photograph 11. A view of the stormwater drainage at the southeast corner of parcel 007 with Keaau-Pahoia Road in the background (31 May 2023).



Photograph 12. A view of the Hawaii Electric Light Company (HELCO) street light and traffic signs closets east to parcel 007. The concrete pad is stained due to potential mildew (31 May 2023).



Photograph 13. A view of the back side of a concrete wall with street light and traffic sign meters as well as the HELCO gutter box and communication cabinet east of the subject property at parcel 007 (31 May 2023).



Photograph 14. A view of the pole-mounted transformer east of the subject property at parcel 007 (31 May 2023).



Photograph 15. A view of the occupied residential structure located on the subject property at parcel 007, bordering Keaau-Pahoia Road (31 May 2023).



Photograph 16. A view of the fire hydrant located to the east of parcel 007 bordering Keaau-Pahoia Road (31 May 2023).



Photograph 17. A view of dense vegetation to the east of parcel 007 (31 May 2023).



Photograph 18. A view of the pole-mounted transformer east of parcel 007 (31 May 2023).



Photograph 19. View of the north boundary of the subject property at parcel 007. The adjoining property to the north (parcel 080) is primarily for commercial use, Pahoia Market Place (31 May 2023).



Photograph 20. A view of the three pole-mounted transformers on the adjoining property to the north (parcel 080) (31 May 2023).

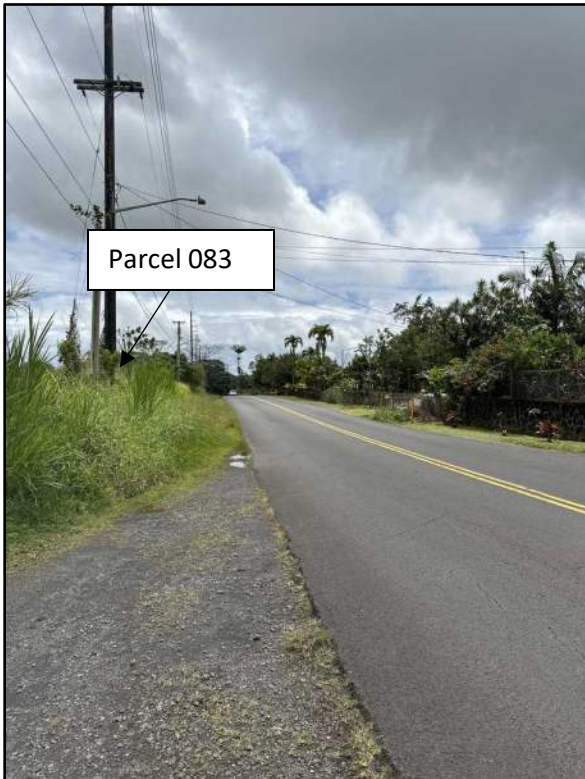


Photograph 21. A view of the propane tank on the adjoining property to the north (parcel 080) (31 May 2023).



Photograph 22. A view of three pole-mounted transformers on the adjoining property to the north (parcel 080) (31 May 2023).

Site #9: Subject Properties TMK (3) 1-5-007:004, 076, 082, and 083



Photograph 23. A view of Aapa Street, the south boundary of parcels 083 and 004 (31 May 2023).



Photograph 24. A view of tire marks on dense vegetation bordering parcel 083 to the west (31 May 2023).



Photograph 25. A view of the adjoining property to the west, parcel 086 (31 May 2023).



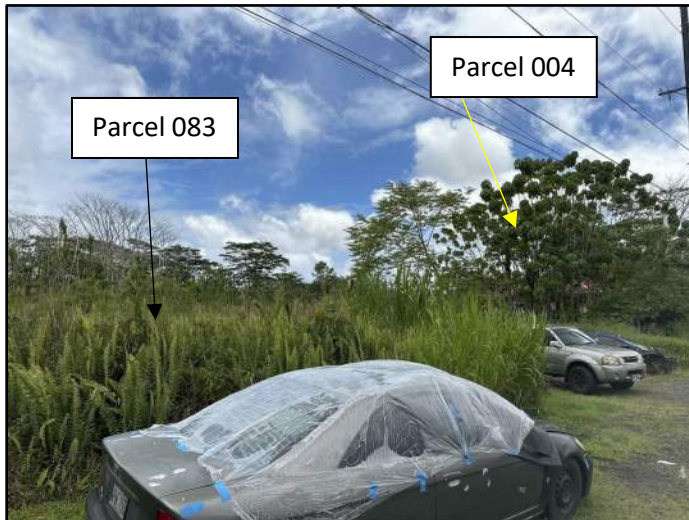
Photograph 26. A view of an old pipe piece (black) observed on the adjoining property to the north of parcel 083 (31 May 2023).



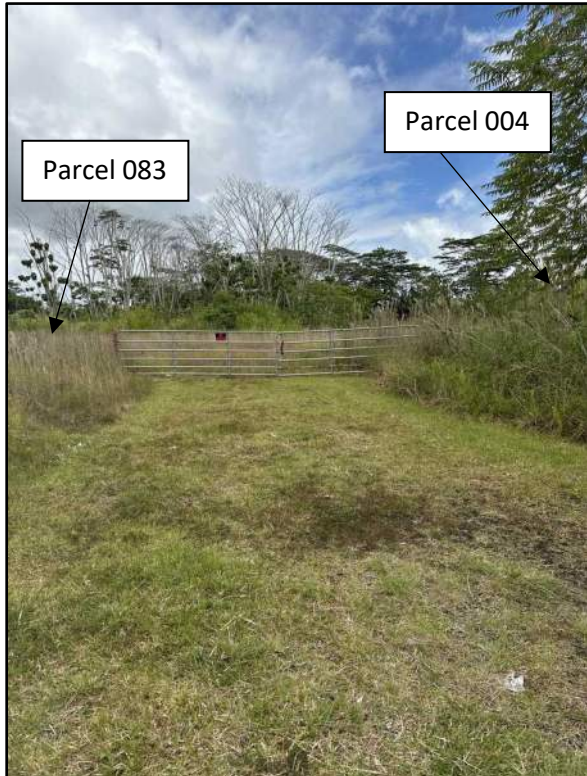
Photograph 27. A view of asphalt area on the adjoining property to the north (parcel 084) (31 May 2023).



Photograph 28. A view of soil in plastic bags on the adjoining property to the north (parcel 084) bordering the subject property, parcel 082, to the west (31 May 2023).



Photograph 29. A view of the boundary at subject properties 083 and 004. Parcel 083 was mainly composed of dense and tall vegetation (31 May 2023)



Photograph 30. A view of the metal gate separating subject properties, parcel 083 to the west and parcel 004 to the east (31 May 2023).



Photograph 31. A view of the tractor observed at the subject property, parcel 083 (31 May 2023).



Photograph 32. A view of parcel 004 with a residential structure (31 May 2023).



Photograph 33. A view of parcel 082 from the southern boundary. Mostly dense tall vegetation was observed within the subject property (31 May 2023).



Photograph 34. A view of a metal container located southwest of parcel 082. Access to it was restricted due to surrounding dense vegetation (31 May 2023).



Photograph 35. A view of two residential structures located within the subject property, parcel 076, from Keaau-Pahoia Road (31 May 2023).



Photograph 36. A view of the pole-mounted transformer east of parcel 076 (31 May 2023).



Photograph 37. A view of the pole-mounted Hawaiian Telecom repeater device (31 May 2023).

Site #8: Subject Property TMK (3) 1-5-007:005



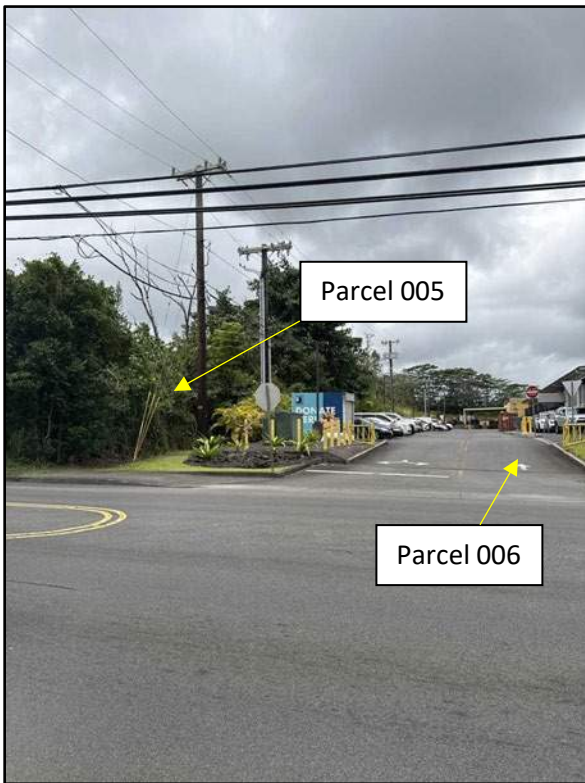
Photograph 38. A view of the east boundary of parcel 005, bordering Keaau-Pahoia Road (31 May 2023).



Photograph 39. A view of the pole-mounted transformer east of parcel 005 (31 May 2023).



Photograph 40. A view of the residential driveway at parcel 005, perpendicular to Keaau-Pahoia Road (31 May 2023).



Photograph 41. A view of the north boundary of parcel 005. The adjoining property to the north (parcel 006) is primarily for commercial use, including Puna Kai Shopping Center (31 May 2023).

Appendix G
Pre-Assessment Consultation
Comments and Responses

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Mitchell D. Roth
Mayor



Benjamin T. Moszkowicz
Police Chief

County of Hawai`i

POLICE DEPARTMENT

349 Kapi`olani Street • Hilo, Hawai`i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

April 18, 2023

Jennifer M. Scheffel
Sr. Environmental Planner
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720
jscheffel@ssfm.com

Dear Ms. Scheffel:

SUBJECT: PAHOA TRANSIT HUB AND LIBRARY; COUNTY OF HAWAII MASS TRANSIT AGENCY AND HAWAII STATE PUBLIC LIBRARY SYSTEM; TAX MAP KEYS (TMKS): (3) 1-5-007:007, 005, 004, 076, 082, 083; PRE-ASSESSMENT CONSULTATION FOR DRAFT ENVIRONMENTAL ASSESSMENT

This is in response to a letter dated April 5, 2023, requesting input on a pre-assessment consultation for draft environmental assessment for a Pahoia Transit Hub and a new Hawaii State Public Library in Pahoia, Puna District, Island of Hawaii.

Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Scott Amaral of Puna Patrol at 965-2716 or via email at scott.amaral@hawaiiicounty.gov.

Sincerely,


KENNETH A. K. QUIJOCHO
ASSISTANT POLICE CHIEF

SA:III/23HQ0465



March 20, 2024

SSFM 2021_134.000

Kenneth A.K. Quioco
Assistant Police Chief
County of Hawai'i Police Department
349 Kapiolani St
Hilo, HI 96720

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai'i Mass Transit Agency and Hawai'i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment**

Aloha,

Thank you for your letter dated April 18, 2023, regarding the subject project. The Mass Transit Agency has noted that the Police Department does not anticipate any significant impact to traffic and/or public safety concerns.

Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads 'Jennifer M. Scheffel'.

Jennifer M. Scheffel
Sr. Environmental Planner

JOSH GREEN, M.D.
GOVERNOR



KEITH T. HAYASHI
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
KA 'OIHANA HO'ONA'AUAO
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF FACILITIES AND OPERATIONS

May 1, 2023

Jennifer Scheffel
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

Re: Pahoehoe Transit Hub and Library
County of Hawaii Mass Transit Agency and Hawaii State Public Library System
Tax Map Keys (TMKs): (3)1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment

Dear Ms. Scheffel:

Thank you for your letter dated April 5, 2023. Based on the information provided, the proposed project will not impact Hawaii State Department of Education Facilities.

Should you have any questions, please contact Cori China with the Facilities Development Branch, Planning Section, at (808) 784-5095 or via email at cori.china@k12.hi.us.

We appreciate the opportunity to comment.

Sincerely,

A handwritten signature in black ink, appearing to read "Roy Ikeda".

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:ctc

c: Facilities Development Branch



March 20, 2024

SSFM 2021_134.000

Roy Ikeda
Interim public Works Manager
Department of Education
Planning Section
P. O. box 2360
Honolulu, HI 96804

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai‘i Mass Transit Agency and Hawai‘i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment**

Aloha,

Thank you for your letter dated May 1, 2023, regarding the subject project. The Mass Transit Agency has noted that the Department of Education does not anticipate any significant impact on nearby educational institutions or services.

Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads 'Jennifer M. Scheffel'.

Jennifer M. Scheffel
Sr. Environmental Planner



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAII 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

May 5, 2023

Ms. Jennifer Scheffel, Senior Environmental Planner
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, HI 96720

SSFM International, Inc.
RECEIVED
5.31.2023

Dear Ms. Scheffel:

**Subject: Pre-Assessment Consultation for Draft Environmental Assessment for
Pāhoa Transit Hub and Library
County of Hawai'i Mass Transit Agency and Hawai'i State Public Library System
Tax Map Keys (3) 1-5-007:007, 005, 004, 076, 082, and 083**

This is in response to your Pre-Environmental Assessment Consultation letter of April 5, 2023.

In order to ascertain the total water demand of the project, the Department requests that the applicant submit estimated maximum daily water usage calculations for the proposed project, prepared by a professional engineer licensed in the State of Hawai'i, for review and approval. The water usage calculations shall include the total estimated daily water usage in gallons, per day, and the estimated peak flow in gallons, per minute.

Upon acceptance of the water usage calculations, the Department will determine if water is available, the water commitment deposit amount, facilities charge due, and necessary water system improvements to support the subject development.

The current water availability conditions in the area can provide a maximum of 14 units of water, or average daily water usage of 5,600 gallons (400 gallons per day, per unit of water) for each pre-existing lot of record.

Water availability for each of the proposed alternatives, as noted in your letter, is described below:

Alternative 1 - TMK 1-5-007:007

Please be informed there are existing 6-inch and 12-inch waterlines within Pāhoa Village Road fronting this parcel. There are two (2) existing services, each service allows a daily average usage of 400 gallons. Furthermore, there are 12 units of water available, subject to water demand calculations.

... Water, Our Most Precious Resource ... Ka Wai A Kāne ...

The Department of Water Supply is an Equal Opportunity provider and employer.

Ms. Jennifer Scheffel
Page 2
May 5, 2023

Alternative 2 - TMK 1-5-007:005

Please be informed there are existing 6-inch and two (2) 12-inch (high and low pressure) waterlines within Pāhoa Village Road fronting this parcel. There are 14 units of water is available, subject to water demand calculations.

Alternative 3 - TMK 1-5-007:004, 076, 082, 083

Please be informed there are existing 6-inch and two (2) 12-inch (high and low pressure) waterlines within Pāhoa Village Road and there are existing 6-inch, 8-inch and 12-inch waterlines within 'Apa'a Street. There is an existing service for each parcel and each service allows a daily average usage of 400 gallons. An additional service or one (1) unit of water is available for each parcel.

Lastly, The Department's Water System Standards require that a minimum of 2,000 gallons per minute be available at the site for fire protection for the proposed type of land use. Please be informed that the existing water system front the subject parcels is inadequate to provide the required fire flow. The applicant should contact the Fire Department to determine any other fire protection requirements.

Should there be any questions, please contact Mr. Ryan Quitarano of our Water Resources and Planning Branch at (808) 961-8070, extension 256.

Sincerely yours,



A

Keith K. Okamoto, P.E.
Manager-Chief Engineer

RQ:dfg



March 20, 2024

SSFM 2021_134.000

Keith K. Okamoto, P.E.
Manager-Chief Engineer
County of Hawai'i
Department of Water Supply
345 Kekuanao'a Street, Suite 20
Hilo, HI 96720

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai'i Mass Transit Agency and Hawai'i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment**

Aloha,

Thank you for your letter dated May 5, 2023, regarding the subject project. The Mass Transit Agency has noted the current water availability for the alternative project sites and will submit estimated maximum daily water usage calculations, as requested.

Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads "Jennifer M. Scheffel".

Jennifer M. Scheffel
Sr. Environmental Planner

JOSH GREEN, M.D.
GOVERNOR
KE KIA'AINA



KEITH A. REGAN
COMPTROLLER
KA LUNA HO'OMALU HANA LAULĀ

MEOH-LENG SILLIMAN
DEPUTY COMPTROLLER
KA HOPE LUNA HO'OMALU HANA LAULĀ

STATE OF HAWAII | KA MOKU'ĀINA O HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES | KA 'OIHANA LOIHELU A LAWELAWE LAULĀ
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)23.060

APR 24 2023

Jennifer Scheffel
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

SSFM International, Inc.
RECEIVED
4.28.2023

Dear Ms. Scheffel:

Subject: Pre-Assessment Consultation for Draft Environmental Assessment
Pahoa Transit Hub and Library
County of Hawaii Mass Transit Agency and Hawaii State Public Library System
TMKs: (3) 1-5-007:007, 005, 004, 076, 082, 083

Thank you for the opportunity to provide comments on the subject project. The Department of Accounting and General Services is assisting the Hawaii State Public Library System with planning efforts for the Pahoa Library. We are supportive of the subject project and have no additional comments to offer at this time.

If you have any questions, your staff may call David DePonte of the Planning Branch at (808) 586-0492, or email at david.c.deponte@hawaii.gov..

Sincerely,

A handwritten signature in blue ink, appearing to read "Christine L. Kinimaka".
CHRISTINE L. KINIMAKA
Public Works Administrator

DD:



March 20, 2024

SSFM 2021_134.000

Christine L. Kinimaka
Public Works Administrator
Department of Accounting and General
Services
P.O. Box 119
Honolulu, HI 96810-0119

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai‘i Mass Transit Agency and Hawai‘i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment**

Aloha,

Thank you for your letter dated April 24, 2023, regarding the subject project. The Mass Transit Agency (MTA) has noted that the Department of Accounting and General Services has no comments regarding the proposed project. MTA appreciates your support for the proposed project.

Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads "Jennifer M. Scheffel".

Jennifer M. Scheffel
Sr. Environmental Planner

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

May 4, 2023

SSFM International, Inc.
Attn: Ms. Jennifer M. Scheffel
Sr. Environmental Planner
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

via email: jscheffel@ssfm.com

Dear Ms. Scheffel:

SUBJECT: Pre-Assessment consultation for DEA for the Proposed **Pahoa Transit Hub and Library** located at Pahoa, Puna, Island of Hawaii; TMKs: (3) 1-5-007: 007, 005, 004, 076, 082, and 083 on behalf of County of Hawaii Mass Transit Agency and Hawaii State Public Library System

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 (a) Engineering Division and (b) 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'AINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'AINA



DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAI'I) KA MOKU'AINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'AINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 11, 2023

MEMORANDUM

FROM: 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)

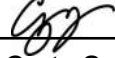
TO: FROM: Russell Y. Tsuji, Land Administrator W
 SUBJECT: Pre-Assessment consultation for DEA for the Proposed Pahoia Transit Hub and Library
 LOCATION: Pahoia, Puna, Island of Hawaii; TMKs: (3) 1-5-007: 007, 005, 004, 076, 082, and 083
 APPLICANT: SSFM International on behalf of County of Hawaii Mass Transit Agency and Hawaii State Public Library System

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by May 4, 2023.

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: 
 Print Name: Carty S. Chang, Chief Engineer
 Division: Engineering Division
 Date: May 4, 2023

Attachments

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

LD/Russell Y. Tsuji

Ref: Pre-Assessment consultation for DEA for the Proposed Pahoia Transit Hub and Library

Location: Pahoia, Puna, Island of Hawaii

TMK: (3) 1-5-007: 007, 005, 004, 076, 082, and 083

Applicant: SSFM International on behalf of County of Hawaii Mass Transit Agency and Hawaii State Public Library System

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (<http://gis.hawaiiinfip.org/FHAT>) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4849.

Signed: 
CARTY S. CHANG, CHIEF ENGINEER

Date: May 4, 2023

4/27/23

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 HAWAII | KA MOKU'ĀINA 'O HAWAII'
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 11, 2023

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: Pre-Assessment consultation for DEA for the Proposed **Pahoa Transit Hub and Library**
 LOCATION: Pahoa, Puna, Island of Hawaii; TMKs: (3) 1-5-007: 007, 005, 004, 076, 082, and 083
 APPLICANT: SSFM International on behalf of County of Hawaii Mass Transit Agency and Hawaii State Public Library System

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 4, 2023**.

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: _____
 Print Name: GORDON C. HEIT
 Division: Land Division
 Date: 4/25/23

Attachments



March 20, 2024

SSFM 2021_134.000

Russell Y. Tsuji
Land Administrator
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, HI 96809

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai‘i Mass Transit Agency and Hawai‘i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment**

Aloha,

Thank you for distributing the pre-assessment consultation letter for the Draft Environmental Assessment (EA) to the divisions within the Department of Land and Natural Resources. We offer the following responses to the Land Division-Hawaii District and Engineering Division:

Land Division-Hawaii District

The Mass Transit Agency has noted that the Department of Land and Natural Resources, Hawai‘i District Land Division does not anticipate any significant impact to surrounding natural and cultural resources.

Engineering Division

The Mass Transit Agency has noted the Department of Land and Natural Resources, Engineering Division advice to research the Flood Hazard Zone designations for the proposed alternative sites and to check for relevant County Flood Ordinances. The Mass Transit Agency will do its due diligence to ensure safety and proper compliance.

Your letters, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads "Jennifer M. Scheffel".

Jennifer M. Scheffel
Sr. Environmental Planner

JOSH GREEN, M.D.
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO
JAMES KUNANE TOKIOKA

IN REPLY REFER TO:

HWY-2998
HWY-PL 2.1220

April 28, 2023

Ms. Jennifer M. Scheffel
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, Hawaii 96720

Dear Ms. Scheffel:

Subject: Pre-Assessment Consultation for Draft Environmental Assessment (DEA)
County Pahoa Transit Hub and State Library
Pahoa Village Road - Pahoa, Hawaii
Tax Map Key No: (3) 1-5-007: 004, 005, 007, 076, 082, 083

Thank you for your letter dated April 5, 2023, requesting our comments on the subject projects. The County of Hawaii and Mass Transit Agency are preparing for an upcoming DEA required by Chapter 343, Hawaii Revised Statutes, due to the use of state lands and state funds.

The project proposes to establish a co-location for both transit hub and state library, which is being considered with three alternative sites on Pahoa Village Road. All three sites will range from 5.6 to 10.5 acres in size and will be accessible from Pahoa Bypass Road (State Route 130) via the Pahoa Village Road; a county roadway.

The Hawaii Department of Transportation has the following comments:

1. It is recommended that a Traffic Impact Analysis Report (TIAR), should be prepared by a state-licensed professional engineer and should contain the following:
 - a. An evaluation should be provided in the TIAR to identify whether the proposed daily operations will have any direct or regional impact on the state-owned Pahoa Bypass Road (Route 130). The TIAR should also provide any recommended mitigations to be implemented at no cost to the state.

Ms. Jennifer M. Scheffel
April 28, 2023
Page 2

HWY-PL 2.1220

- b. The TIAR should include an evaluation of intersections potentially affected by any of the proposed alternative sites (including Pahoa Village Road and Pahoa Bypass Road).
2. The DEA and/or the TIAR should provide detailed plans for multimodal (bicycle/pedestrian) paths within the proposed site and connectivity to the rest of the area.

If you have any questions, please contact Jeyan Thirugnanam, Systems Planning Engineer, Highways Planning Branch at (808) 587-6336 or by email at jeyan.thirugnanam@hawaii.gov. Please reference file review number PL 2023-032.

Sincerely,



SERGIO GEORGE G. ABCEDE
Highways Administrator



March 20, 2024

SSFM 2021_134.000

Sergio George G. Abcede
Highways Administrator
Department of Transportation
869 Punchbowl Street, Room 513
Honolulu, HI 96813

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai‘i Mass Transit Agency and Hawai‘i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment
File Review # PL 2023-032**

Aloha,

Thank you for your letter dated April 28, 2023, regarding the subject project. We offer the following responses to your comments.

- **Traffic Impact Analysis Report (TIAR):** A TIAR shall be prepared by a state-licensed professional engineer as a part of the Environmental Assessment process. The Mass Transit Agency will ensure this TIAR identifies any direct or regional impacts on the state-owned Pāhoa Bypass Road (Route 130) and intersections thereof. The study will take particular consideration of the roundabout between Pāhoa Village Road and Pāhoa Bypass Road. Where impacts are identified, mitigating measures shall be proposed that will not subject the State to additional cost liability.
- **Multi-Modal Paths and Connectivity:** The subject project is being planned in consideration of the Hawai‘i County Transit and Multi-Modal Master Plan and the complementary County roadway maintenance program. Coordinating the Transit Hub multi-modal design features in concert with the Department of Public Work’s roadway plans will be crucial for the success of the project. As the TIAR progresses and more information becomes available, the design of the Transit Hub will reflect and accommodate the future growth of a multi-modal network in Pāhoa Town.

Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads 'Jennifer M. Scheffel'.

Jennifer M. Scheffel
Sr. Environmental Planner



STATE OF HAWAII OFFICE OF PLANNING & SUSTAINABLE DEVELOPMENT

JOSH GREEN, M.D.
GOVERNOR

MARY ALICE EVANS
ACTING DIRECTOR

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: <https://planning.hawaii.gov/>

DTS 202304131304RE

Coastal Zone
Management
Program

May 8, 2023

Environmental Review
Program

Jennifer M. Scheffel
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, Hawai'i 96720

Land Use Commission

Land Use Division

Special Plans Branch

Dear Ms. Scheffel:

State Transit-Oriented
Development

Subject: Pre-Assessment Consultation for Draft Environmental Assessment for the
Pahoa Transit Hub and Library Project
Pahoa, Island of Hawai'i
Tax Map Key Nos: (3) 1-5-007: 004, 005, 007, 076, 082, and 083

Statewide Geographic
Information System

Statewide
Sustainability Branch

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 project proposes to develop a County of Hawai'i Mass Transit Agency (MTA) transit hub on one of three potential sites in Pahoa Town to improve transit services for the Pahoa region. The project is also exploring the co-location of a new public library for the Hawai'i State Public Library System (HSPLS) with the planned transit hub.

OPSD notes that the County Pahoa Transit Hub is a priority County Project in the *State Strategic Plan for Transit-Oriented Development* issued by the Hawai'i Interagency Council for Transit-Oriented Development (TOD) in 2017, as updated.

OPSD offers the following comments related to the preparation of the DEA and final project design and implementation.

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,

aesthetic, 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 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 (PEIS) for wastewater system improvements in the Puna District. OPSD recommends that the County Department of Environmental Management be consulted as to proposed wastewater infrastructure or package plants envisioned or planned for the Pahoa Town area. The DEA should discuss the County's plans and identify the facility design and development measures that could be taken to enable the transit hub and library to connect to any planned wastewater collection and treatment system in the Pahoa area in the future; and
- b. Stormwater and drainage. The DEA should discuss whether a stormwater drainage system is planned for Pahoa Town and whether onsite low impact development practices will be proposed to manage onsite retention and treatment of stormwater runoff quantity and quality.

2 Advancement of 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 and best practices and other mitigation measures 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 three potential sites identified for the new transit hub and library facility support infill development and town revitalization. The DEA should discuss facility needs and impacts as they would affect pedestrian access and safety, connectivity to other town destinations, and provision of alternative and active transportation options for users of both the transit hub/system and the library, as

Ms. Jennifer Scheffel
May 8, 2023
Page 3

well as specific measures to promote transit use, enhance transit and library customer access and use of the facilities, mitigate traffic flows, and promote placemaking at each site. It should also reference how the site design, building placement, and architecture could help establish a new pattern for development of other properties in this area to make it a more walkable, village-scaled center around the new facilities. The DEA should also discuss the potential environmental benefits of co-location of the two facilities on one site.

4 Library Infrastructure

The DEA should also discuss the availability of broadband infrastructure and services in the area and any measures that might be needed to ensure the library facility would have robust broadband service to meet their program needs.

Thank you for the opportunity to comment on issues to consider in the preparation of the DEA. We look forward to reviewing and commenting on the DEA when it is published.

If you have any questions, please contact Ruby Edwards, ruby.m.edwards@hawaii.gov, (808) 587-2817.

Mahalo,

Katia Balassiano

Katia Balassiano
Planning Program Administrator
Land Use Division



March 20, 2024

SSFM 2021_134.000

Katia Balassiano
Planning Program Administrator
Office of Planning and Sustainable Development
Land Use Division
P.O. Box 2359
Honolulu, HI 96804

SUBJECT: Pāhoa Transit Hub and Library
County of Hawai‘i Mass Transit Agency and Hawai‘i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment

Aloha,

Thank you for your letter dated May 8, 2023, regarding the subject project. We offer the following responses to your comments.

- **Coastal Management Zone (CZM):** The Mass Transit Agency recognizes the importance of incorporating environmental considerations related to CZM in the design of the subject project. The Draft Programmatic Environmental Impact Statement for Wastewater Systems in the Puna District shall be referenced in the current planning stage as well as the subsequent design stage of the subject project. Coordinating with the County Department of Environmental Management will be advantageous to the project’s alignment with future planning efforts for Pāhoa Town. This collaboration should encompass any potential stormwater drainage systems that may be required to support the town's future growth.
- **2050 Sustainability Plan:** The subject project aims to be an example of an action to implement the State 2050 Sustainability Plan. The Mass Transit Agency appreciates your insight in identifying relevant sections of the plan related to reducing greenhouse gas emissions, sustainable transportation, and equity. These recommended actions will be referenced and reflected in the Draft Environmental Assessment and serve as a valuable source of inspiration for the project.
- **Transit Oriented Development (TOD)-Related Issues:** The Mass Transit Agency will thoroughly assess the potential influence of the subject project’s design and operation on the emerging TOD area surrounding the alternative sites. Prioritizing pedestrian and cyclist safety, as well as establishing seamless connectivity to nearby amenities and services is integral to supporting a vibrant town commercial center. Ensuring that town revitalization initiatives perpetuate Pāhoa Town's distinctive rural character is of the utmost importance. The Mass Transit Agency notes the various factors suggested by the Office of Planning and Sustainable Development and remains committed to their ongoing consideration for the project moving forward.

March 15, 2024

- **Broadband Infrastructure:** The Mass Transit Agency will incorporate existing broadband infrastructure in the Pāhoa area as well as projected future needs for the subject project. These measures will be reflected in the project design, recognizing the benefits such services bring to address community needs, especially with respect to library services and functions.

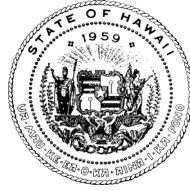
Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.



Jennifer M. Scheffel
Sr. Environmental Planner

JOSH GREEN, M.D.
GOVERNOR OF HAWAII
KE KIA'ĀINA O KA MOKU'ĀINA 'O HAWAII'



KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HO'ŌKELE

STATE OF HAWAII
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

6487 – 3 1 5 007 007 etc.
PreAsmnt Pahoia Transit Hub

May 8, 2023

Ms. Jennifer M. Scheffel
Senior Environmental Planner
SSFM International
99 Aupuni Street Suite 202
Hilo, Hawaii 96720
Email: jscheffel@ssfm.com

Dear Ms. Scheffel:

Subject: Pre-Assessment Consultation for Draft Environmental Assessment
Pahoia Transit Hub and Library
County of Hawaii Mass Transit Agency and Hawaii State Public Library System
15-2690 Pahoia Village Road, Keonepoko Homesteads, Pahoia, Hawaii 96778
TMK (3) 1-5-007: 007, 005, 004, 076, 082, 083

Thank you for allowing us the opportunity to provide comments for the subject project.

Wastewater systems proposed for the project shall conform to applicable provisions of the Hawaii Administrative Rules, Chapter 11-62, "Wastewater Systems." Please be informed that the design plans should address any effects associated with the construction of and/or discharges from the wastewater systems to any public trust, Native Hawaiian resources or the exercise of traditional cultural practices.

Should you have any questions, please call Mr. Mark Tomomitsu of my staff at (808) 586-4294.

Sincerely,

SINA PRUDER, P.E., CHIEF
Wastewater Branch

LM/MST:ct



March 20, 2024

SSFM 2021_134.000

Sina Pruder, P.E., Chief
Department of Health
Wastewater Branch
P. O. box 3378
Honolulu, HI 96801-3378

**SUBJECT: Pāhoa Transit Hub and Library
County of Hawai‘i Mass Transit Agency and Hawai‘i State Public Library
System
Tax Map Keys (TMKs): (3) 1-5-007:007, 005, 004, 076, 082, 083
Pre-Assessment Consultation for Draft Environmental Assessment**

Aloha,

Thank you for your letter dated May 8, 2023, regarding the subject project. The Mass Transit Agency will address and mitigate any effects of wastewater construction and/or discharge on public trust land or Native Hawaiian resources in the design and proposed operation of the subject project. Such measures shall effort to be in full compliance of Hawai‘i Administrative Rules, Chapter 11-62.

Your letter, along with this response letter, will be included in the forthcoming Draft Environmental Assessment. We appreciate your participation in the pre-assessment consultation process. Should you have additional comments or questions regarding this project, please contact me at (808) 375-6038 or via email at jscheffel@ssfm.com.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink that reads 'Jennifer M. Scheffel'.

Jennifer M. Scheffel
Sr. Environmental Planner

Appendix H

Community Outreach Summary Reports

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PĀHOA TRANSIT HUB COMMUNITY MEETING #1 SUMMARY

March 1, 2023, 6:00 PM – 8:00 PM
Pāhoa Neighborhood Facility

Event Description

The purpose of the community meeting was to present information and findings about the Pāhoa Transit Hub and Library project. Among shared topics included project and outreach efforts to date, site suitability analyses and layout features. Another purpose of the community meeting was to gather community mana’o on the preferred sites and potential design features of the Transit Hub and Library. The meeting was hosted at the Pāhoa Neighborhood Facility and intended for neighboring residents and community stakeholders.

Attendees received copies of the agenda, presentation print outs, a project fact sheet, and instructions for Mentimeter. The project team shared a presentation, received questions and mana’o from the attendees and answered inquiries. The handouts and presentation slides are included in the appendices of this summary.

Community Meeting Agenda

- Welcome and Team Introductions
- Presentation
 - Project Overview and Schedule
 - Site Selection
 - Polling and Discussion
 - Design Features
 - Polling and Discussion
- Q&A Discussion Session
- Wrap up and Next Steps





Project Team Attendees

- Hele-On: John Andoh
- Hawai'i State Public Library System: Mallory Fujitani, Kathryn Tipton
- SSFM: Austen Drake, Melissa May, Jennifer Scheffel, Genevieve Runningwind, Melanie Cussac

Community Meeting Attendees

Attendees of the meeting were asked to sign in. The attendees are listed below.

1. Kathy Tilton
2. Gaila Vidunas
3. Jon Olson
4. Bill Tilton
5. Terence Scanlan
6. M. Baj
7. Kapohokealoha Miller
8. Steve Sparks
9. Kevin Kushez
10. Ben Ruco
11. Bob Veetch
12. Quinn Wellone
13. Amedeo Markoff
14. Eddie Cardines
15. Andrea Rosanoff
16. Anne Kamau
17. Cindy Horwitz
18. Nakia
19. Michael Brestovsky
20. Hannah Hedrick
21. Jill Raznov
22. David Chan
23. Michael McGuire
24. Bo Breda
25. Michelle Farrar
26. Sam Carlos
27. Pete Wilson



Presentation

A copy of the presentation given at the meeting is appended to this summary. Attendees were given the opportunity to ask questions of the Project Team about the project and provide their input through discussion and written comment cards. The project team also gathered input using Mentimeter polling. The polling results are included in the appendices of this summary.

During the discussion, comments were recorded on chart paper in the front of the room. Handwritten comment cards and chart comments were submitted by meeting attendees and the following notes were transcribed below.

Comment Cards

- Definitely bullet trains. I understand this is a volcano but things can be figured out if not trains more lane roads. Also conservation of energy tapping into free energy.
- I feel like it is working backwards to continue to fund a bus system. It would be better if big Island has a train system. Hawaii needs to be updated.
- It seems like site #2 is great. I think a way up from lower/downtown Puna would also be great as others have said. More tables/sitting areas for adults in the library especially w/ outdoor wifi/charges would be nice so we can do business calls/meetings. Or private meeting rooms in the library.
- Any roundabout should be a much larger diameter and a minimum of 2 lanes.

Discussion Comments

Key: Questions (Q), Answers from Project Team (A), Comments (C).

- **Q:** Were any sites considered outside Pāhoa?
 - **A:** Looked at sites as far north as the police station; as far south as the elementary school. The bus routes already go to Pāhoa so didn't want to put it too far outside town and adjust the routes.
 - **A:** Library looked at sites near Ainaloa, now partnering with transit will make it easier to get to the library.
- **C:** Preference for site 13
- **Q:** If choose the site near Puna Kai, can sidewalks be extended to at least to the post office?
 - **A:** The project can improve the sidewalks along the street frontage of the site, but not necessarily beyond that. The roads through Pāhoa town are narrow in some places, making expansion of sidewalks and other features challenging.
- **C:** Important to be able to walk/bike from old Pāhoa to newer area
- **C:** Site 8 is Lava Zone 3. Opportunity for federal funding.





Pāhoa Transit Hub and Library

- **C:** Opportunity to connect to Ainaloa
- **C:** Need to connect w/upper Puna and Need inter-subdivision connectivity
 - **A:** In summer 2023 van service will be provided through Hele-On to service the subdivisions
- **C:** Interested in library being accessible and safe for kids & adults
- **C:** Library should be 100% solar & have fully functional wifi system
- **C:** Site 2 is only site that keeps big buses out of town
- **C:** Site 2 connects Puna Kai to Ace shopping center
- **C:** Need roundabout @ Kahakai/Bypass Rd.
- **C:** Site 2 only one w/infrastructure
- **C:** Land behind sites is state land. Provides opportunity for future connectivity/development.
- **C:** Congestion is a concern for the area
 - **A:** Traffic impacts will be looked at in the EA.
- **C:** Prefer to site it at the corner of Kahakai/Bypass Rd. Currently being leased
- **Q:** Who prefers Site 2? (show of hands) - Majority of attendees raised hands
- **Q:** Any consideration for shuttle from hub to downtown?
 - **A:** Yes, the idea is that the transit hub will have “spokes” with service provided to Downtown and other areas
- **C:** Lava hazard zone impacts ability to get federal funds
- **C:** Pahoia needs community auditorium
 - **A:** There are plans for one in Pāhoa as part of another project
- **C:** Security is necessary so that homeless don't take over the hub and scare people off - recommend police substation
- **C:** Day care would be OK as long as there is appropriate security
- **C:** Make it look like Pahoia, not Puna Kai
 - **C:** Pahoia has Design Review Guidelines, Puna Kai actually followed them, they are just newer buildings
- **C:** Top 3 Design features: Bike storage, garden, playground
- **C:** Puna needs gathering places, places for events, to see art, come together
- **C:** Library should have a kids program space
- **C:** What is sq.ft of proposed library?
 - **A:** To be determined depending on the site selected. Conceptual planning phase will have more details.
- **C:** Outdoor grassy concert space w/stage like Waikiki Shell for live events is planned in Phase II of Park expansion
- **C:** Library reading area should have comfy chairs/couches





Pāhoa Transit Hub and Library

- C: All the listed design features should be included
- C: Like the atrium at Hilo Library. It's open and light and inviting
- C: Location is important to prevent criminal element - Site 2 ideal
- C: Balance between connectivity & surveillance
- C: If able to park and ride would take bus to Hilo
- C: Need more frequent bus service





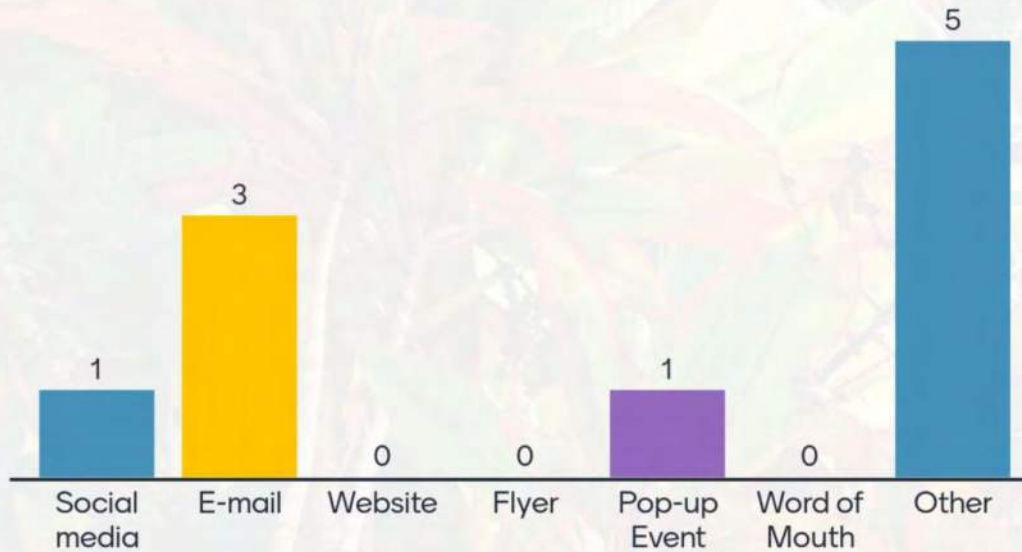
Mentimeter Results

During the meeting, attendees were invited to provide their input via Mentimeter, an online polling app. The results are shown below:





How did you hear about today's meeting?





Do you have other suggestions for getting the word out to the Puna community?

Call me and let me know	Mass text	Fliers
Mass text or tweet	Fliers and commercials	Commercials and fliers
Big Island Thieves Facebook page	Community outreach meetings	1. Communicate with Puna bus users by putting information on buses and at bus stops and communicating through Hele-On info line. Have the events during Puna bus times (Mtn View stops around 5 pm)

Do you have other suggestions for getting the word out to the Puna community?

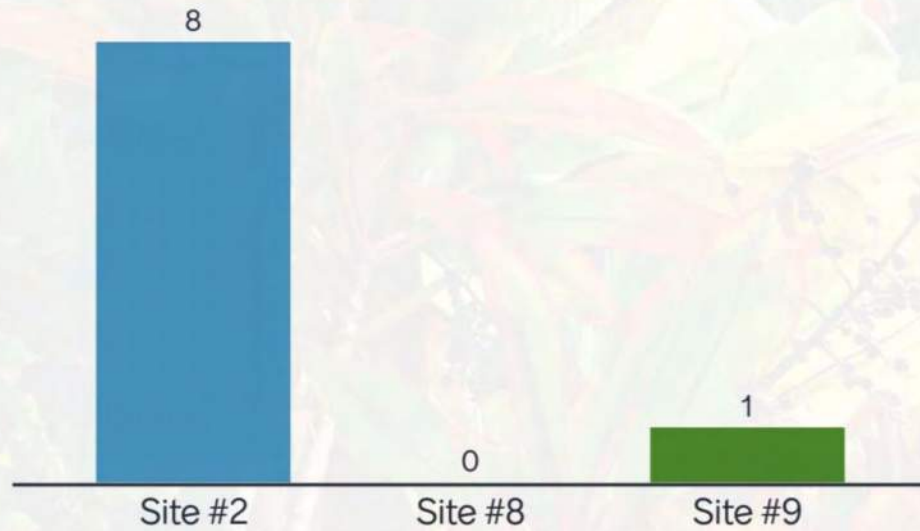
Hi Tribune Herald newspaper	2. Puna Strong Newsletter	3. Fliers at community boards at Puna laundromats, Island Naturals, Keolu Naturals etc and various churches, as well as Neighborhood Community Centers. There are approx 30 community boards. Directly contact some on Soc Media.
Call aunties	Newspaper	
Fliers at businesses		Newspaper

- Call me and let me know
- Mass text
- Fliers
- Mas text or tweet
- Flyers and commercials
- Commercials and flyers
- Big Island Thieves Facebook page
- Community outreach meetings
- Communicate with Puna bus users by putting information on buses and at bus stops and communicating through Hele-On info line. Have the events during Puna bus times (Mtn View stops around 5pm
- Tribune Herald newspaper
- Puna Strong newsletter
- Flyers at community boards at Puna laundromats, Island Naturals, etc. various churches as well as Neighborhood Community Centers. There are approx. 30 community boards. Directly contact some on social media.
- Call aunties
- Newspaper
- Newspaper
- Flyers at business



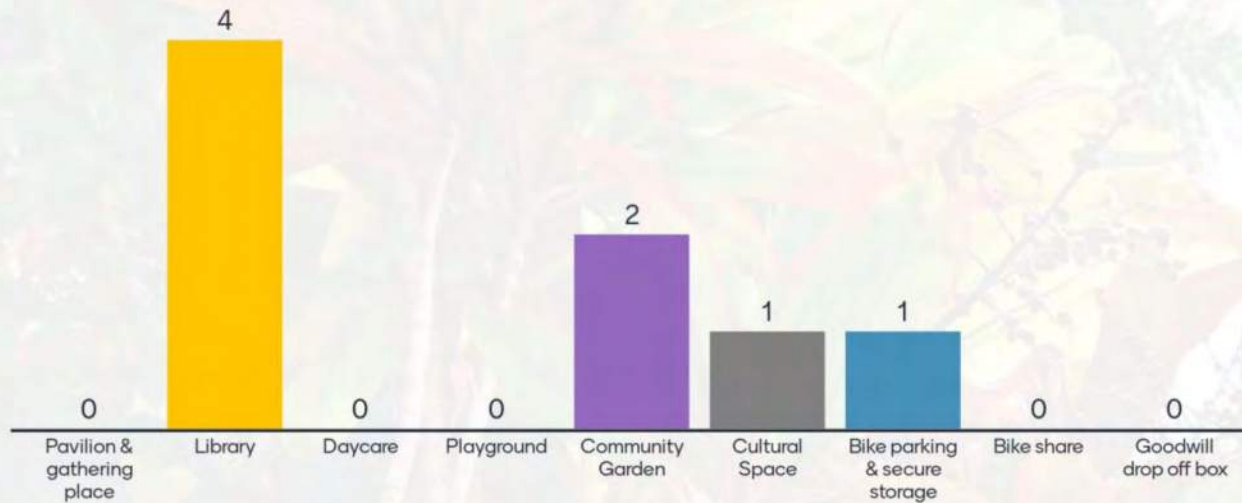


Of the top three sites, which do you prefer?





Which of the following features or services would motivate you to use the transit hub? Select your top 3.





What other features would you like to see in the future transit hub?

Train

I would like to see a train on the Big Island. Having a train would cut time and traffic in half. Its the update Hawai'i needs.

1. Security during all scheduled times; 2. Security cameras; 3. Substantial dry areas with roofing and sidewalks ample enough for Social Distancing; 4. Phone charging including wireless; 5. Rain poncho, umbrella and cord vending machine

Restrooms, Wi-Fi, sidewalk, outlets/charge ports, art

4. Schedules posted; 5. Direct phone to emergency services (Kea'au PD's is broken for example); 6. water fountain

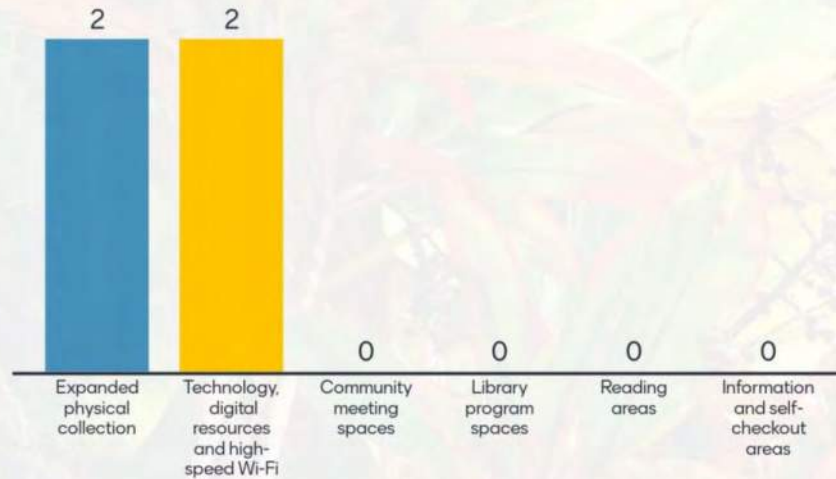
Grocery shopping; Drug store; Medical offices; Post office; Community auditorium

- Train
- I would like to see a train on the Big Island. Having a train would cut time and traffic in half. It's the update Hawai'i needs.
- Security during all schedules times;
- Security cameras;
- Substantial dry areas with roofing and sidewalks ample enough for Social Distancing;
- Phone charging including wireless;
- Rain poncho, umbrella and cord vending machine
- Restrooms, wi-fi, sidewalk, outlets/charge ports, art
- Schedules posted; direct phone to emergency services (Kea'au PD's is broken); water fountain
- Grocery shopping; drug store; Medical offices; Post office; Community auditorium





Which of the following features or services would motivate you to use the library? Select your top 3.





What other features would you like to see in the future library?

1. Phone, laptop and ebike charging — the angels in Mountain View Library and Hilo library allows phone and laptop charging, it's often safer to use your own equipment. 2. Academic e-books. 3. Nap pods (dreaming).

4. Dry place outside to sit and snack, for when you're doing long work online. 5. Train librarians to help patrons to access the state tax site and other government programs. 6. Privacy nooks for the "well-behaved". 7. Therapy dogs.

Your previous screen asked for top 3 but only one was possible with the software.

- Phone, laptop and ebike charging — the angels in Mountain View Library and Hilo library allows phone and laptop charging, it's often safer to use your own equipment
- Academic e-books
- Nap pods (dreaming)
- Dry place outside to sit and snack, for when you're doing long work online
- Train librarians to help patrons to access the state tax site and other government programs.
- Privacy nooks for the "well-behaved" :)
- Therapy dogs





Pāhoā Transit Hub and Library

Project Overview

The County of Hawai'i Transit and Multi-Modal Transportation Master Plan (Master Plan) was completed in August 2018. One of the goals of the Master Plan was to "Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places." To implement this goal, the County of Hawai'i Planning Department and Mass Transit Agency (the Department and MTA) are initiating the planning phase of a Transit Hub in the Pāhoā region.

In addition, the County entered into discussions with the Hawai'i State Public Library System (HSPLS) regarding co-location of the transit hub with a new State library. HSPLS intends to construct a new library in the Pāhoā region and desires to support the County's Transit-Oriented-Development (TOD) initiatives and explore the possibility of co-locating the library with the future transit center. Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoā community and advance TOD principles.

Read the County's Transit and Multi-Modal Transportation Master Plan here



<http://heleonmasterplan.com/final-transit-and-multi-modal-transportation-master-plan/>

How to Get Involved



For more information and to sign up for the project mailing list, please scan the QR code below and visit the project website:



<http://pahoatransithub.info>



Drop by an upcoming pop-up event!

February 26, 2023
7:00 AM-12:00 PM

Maku'u Farmers Market

15-2131
Kea'au-Pāhoā Rd.
Pāhoā, Hawai'i 96778



Participate in in-person community meetings

Community Meeting 1
March 1, 2023
6:00 PM-8:00 PM

Pāhoā Neighborhood Facility

15-0322 Kauhale Street,
Pāhoā, HI 96778

Community Meeting 2

Location: TBD

Summer 2023
Details to be announced



A display with information about the project and ways to provide comments will also be available at Pāhoā Public Library.

Previous Efforts on Transit Hub Site Selection

- MTA initiated public outreach in 2019 along with initial identification of locations for consideration of a transit hub.
- A community meeting was held in March 2019, where **four possible locations** were proposed, along with parcel ownership, address tax map key (TMK), size (in acres), and zoning.
- A second community meeting was held in July 2019, where **two additional sites** were added by the Department.
- A **seventh location** was added after research results were presented, and site advantages/disadvantages were discussed by attendees.
- After the public outreach, the Department and MTA added additional locations and ranked 13 potential sites based on the criteria previously identified. Of the 13, three were removed from consideration.
- Site suitability analysis of the remaining ten sites was conducted, resulting in three preferred sites.
- \$100,000 in State Transit-oriented Development Capital Improvement Projects (CIP) Planning funds were awarded to support the planning study.

Community input is currently being sought on three sites.

Previous Efforts on Pāhoā Public Library Site Selection

- The Department of Accounting and General Services (DAGS)' consultant, G70, completed an Environmental Assessment for the Pāhoā Public Library Site Selection in September 2021, with a Finding of No Significant Impact.
- The document identified **six State-owned and County-owned sites** in Pāhoā.
- The **identified sites were not satisfactory for HSPLS** to proceed with the design phase.
- HSPLS has begun coordinating with State/County TOD efforts to explore the possible co-location of the library with the transit hub.
- HSPLS/DAGS contributed \$350,000 in HSPLS CIP funds to support the planning study for the co-located library.

Project Schedule



John Andoh, Administrator and General Manager
 County of Hawai'i Mass Transit Agency
 Phone: (808) 961- 8555
 Email: john.andoh@hawaiicounty.gov



Stacey Aldrich, State Librarian
 Hawaii State Public Library System
 Email: stlib@librarieshawaii.org



Melissa May, Outreach Lead
 SSFM International
 Phone: (808) 628-5861
 Email: mmay@ssfm.com



If you need an auxiliary aid/service or other accommodation to attend a meeting due to a disability, contact Melissa May at (808) 628-5861 as soon as possible. Requests made as early as possible will allow adequate time to fulfill your request.

Pāhoā Transit Hub & Library

Community Meeting #1:
Pāhoā Neighborhood Facility

March 1, 2023
6:00-8:00 PM



Team Introductions



- John Andoh, Mass Transit Agency Administrator and General Manager



- April Surprenant, Long Range Planning Manager
- Natasha Soriano, Transportation Planner



- Stacey Aldrich, State Librarian
- Kathryn Tipton, Branch Manager, Pāhoā Public School and Library
- Mallory Fujitani, Special Assistant, Office of the State Librarian



- Austen Drake, Project Manager
- Melissa May, Outreach Lead
- Jennifer Scheffel, Environmental Lead



- This project is funded in part through the State Office of Planning and Sustainable Development (OPSD)



Meeting Objectives

- 1) Introduce and share information about the Pāhoia Transit Hub and Library project.
- 2) Present findings of the site suitability analysis and gather input on the preferred sites.
- 3) Present and gather input on the potential layout and design features of the Transit hub and Library



Today's Agenda

- I. Welcome and Introductions
- II. Project Overview and Schedule
- III. Site Selection
 - Polling and Discussion
- IV. Basic Minimum Footprint and Design Features
 - Polling and Discussion
- V. Wrap-up and Next Steps

Ground Rules



- 1. Be Open: open your mind, ears and heart. Take home new ideas and information.**
- 2. Be Comfortable: move around and use facilities as needed.**
- 3. Be Respectful: please do not interrupt the person that is talking, show aloha, treat others how you would like to be treated.**
- 4. Be Creative: work towards future solutions/aspirations.**
- 5. Agree to Disagree: accept that others may have different perspectives and opinions.**
- 6. Cellphones on Silent: please take calls/texts outside but be ready to use your smartphone for Mentimeter.**

Mentimeter

1 Copy code from presentation

2 Enter code here

1. Visit [menti.com](https://www.menti.com) on your smartphone or web browser.

Enter this code: **2119 1189**

1. Respond to questions that appear on your screen.
2. You will be asked first for your name and e-mail, which will be confidential and serve as a “virtual sign-in sheet”

TEST POLL: What neighborhood are you from?

The image shows two screenshots from a Mentimeter presentation. The left screenshot is a bar chart titled "How did you find out about Mentimeter?" with the instruction "Go to www.menti.com and use the code 65 79 30". The chart shows the following data:

Source	Count
It's a secret	4211
I've always known	1268
Social media	1489
Google	3024
Friend or colleague	16765
I was voting	3257

The right screenshot shows the mobile app interface with the Mentimeter logo, the text "Please enter the code", a text input field containing "12 34 56", a blue "Submit" button, and the text "The code is found on the screen in front of you". At the bottom, it says "Powered by Mentimeter Terms".

OR





Project Overview & Anticipated Schedule

Puna Community Development Plan (CDP)

- The 2008 Puna CDP includes goals to improve transit service and ridership while complementing the development of village and town centers.
- Objectives included converting Hele-On routes and services to a “hub and spoke” system.
- Actions included preparation of a County-wide Transit Master Plan to guide improvements for the system and each district.
- Transit hubs were called for in the Puna district in Kea’au, Pāhoa, Volcano, and Mountain View or South Kulani.

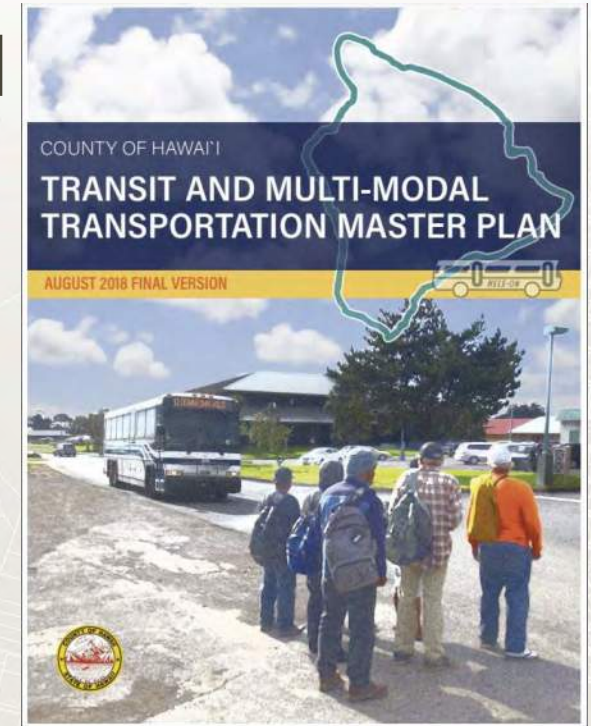
PUNA COMMUNITY DEVELOPMENT PLAN



SEPTEMBER 2008
(As Amended)

Transit Hub Project Background

- The County completed its Transit and Multi-Modal Transportation Master Plan (Master Plan) in **August 2018**. It identified five goals, including: “Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places.”
- It recommended a hub and spoke system for each district, which led to the proposal for a transit hub in Pāhoā for the Puna District.
- The project is now in the planning phase and is exploring possible civic and community uses, including a public library, day care, and other transit-oriented development (TOD) uses.



Scan here to read the County's
Transit and Multi-Modal
Transportation Master Plan



<http://heleonmasterplan.com/final-transit-and-multi-modal-transportation-master-plan/>

Hub and Spoke Transit: What is It?



- This is a way of routing transportation through a central location, or hub.
- Spokes are the routes going in and out of the hub.
- By meeting up at the hub, passengers on the shorter routes (using smaller vehicles can get off and transfer onto the longer routes (which use longer vehicles).
- This makes service more efficient than if the long routes had to stop everywhere.
- The concept has been in use among airlines since 2001.
- In the past ten to fifteen years, transit systems have been converting to hub and spoke.

Major Lines for Puna

Hele-On Bus Route - #40, #401, #402

Legend

-  **40** Hilo - Pāhoa
-  **401** HI Beaches-
Nanawale-
Seaview
-  **401** Selected Trip
-  **402** Paradise -
Ainaloa -
Orchidland



Previous Efforts on Transit Hub Site Selection

2019



MTA initiated public outreach to identify locations for consideration.

March
2019

- A community meeting was held where **four possible locations** were proposed.

July
2019

- **Two additional sites** were added during second community meeting.
- **A seventh location was added** after research results were presented.



In total 13 sites were ranked after the public outreach, two were removed from consideration.

present



Site suitability analysis of the remaining eleven sites was conducted, resulting in three preferred sites.



Library and Transit Hub Co-Location



- MTA entered into discussions with the Hawai‘i State Public Library System (HSPLS) regarding co-location of the transit hub with a new State library.
- HSPLS intends to construct a new library in the Pāhoa region and desires to support the County’s Transit-Oriented Development (TOD) initiatives.
- Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoa community and advance TOD principles.
- This project received \$100,000 from State TOD Capital Improvement Projects (CIP) Planning funds and \$350,000 from HSPLS CIP funds to support the planning study for the transit hub and co-located library.

Previous Efforts on Public Library Site Selection

2021



Environmental Assessment for the Pāhoa Public Library Site Selection with a Finding of No Significant Impact.

- The document identified **six State-owned and County-owned sites** in Pāhoa.
- The **identified sites were not satisfactory** for HSPLS to proceed with the design phase.

present



HSPLS has begun coordinating with State/County TOD efforts to explore the possible co-location of the library with the transit hub.





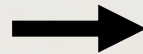
Overall Project Goals

- Support comfort and safety for transit riders in the Puna district
- Promote other multi-modal uses such as walking and biking
- Provide amenities and gathering spaces for the greater Pāhoā community, including a new public library

Project Tasks

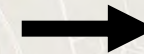
Site Selection

Evaluate eleven potential sites for feasibility, suitability, and desirability and identify top three preferred sites



Conceptual Design

Develop conceptual design alternatives, infrastructure requirements, and preliminary cost estimates for the three preferred sites



Environmental Assessment

Assess environmental, biological, cultural, historic, traffic, and other impacts of three alternatives in accordance with HRS Chapter 343 and other applicable requirements

Community Engagement Program

Seek input from the Puna community, transit riders, elected officials, government agencies, and other stakeholders throughout the project

Outreach Conducted to Date

- Elected Officials Outreach
- Community Associations Outreach
- Puna CDP Action Committee Presentation
 - 2/27 Meeting
- Pop-up Events:
 - Maku'u Farmers Market – 2/26
 - Pāhoa Public Library – ongoing
- Promotions:
 - Website
 - Social media
 - Radio
 - Flyers – buses, businesses, library



Poll:

- 1) How did you hear about today's meeting?
- 2) Do you have other suggestions for getting the word out to the Puna community?

Pāhoa Transit Hub and Library

The County of Hawai'i Planning Department, Mass Transit Agency, and Hawai'i State Public Library System are initiating the planning phase of a transit hub and co-located library in the Pāhoa region.

We invite you to join the discussion and provide feedback on the preferred sites and potential transit hub and library features

SCAN HERE TO VISIT THE PROJECT WEBSITE

<http://pahoatransithub.info>

COME TO OUR UPCOMING EVENTS & MEETINGS!

POP-UP EVENT	MEETING #1
February 26, 2023 7:00 AM-12:00 PM	March 1, 2023 6:00 PM-8:00 PM
Maku'u Farmers Market, 15-2131 Kea'au-Pāhoa Rd. Pāhoa, Hawai'i 96778	Pāhoa Neighborhood Facility, 15-0322 Kauhale Street, Pāhoa, HI 96778

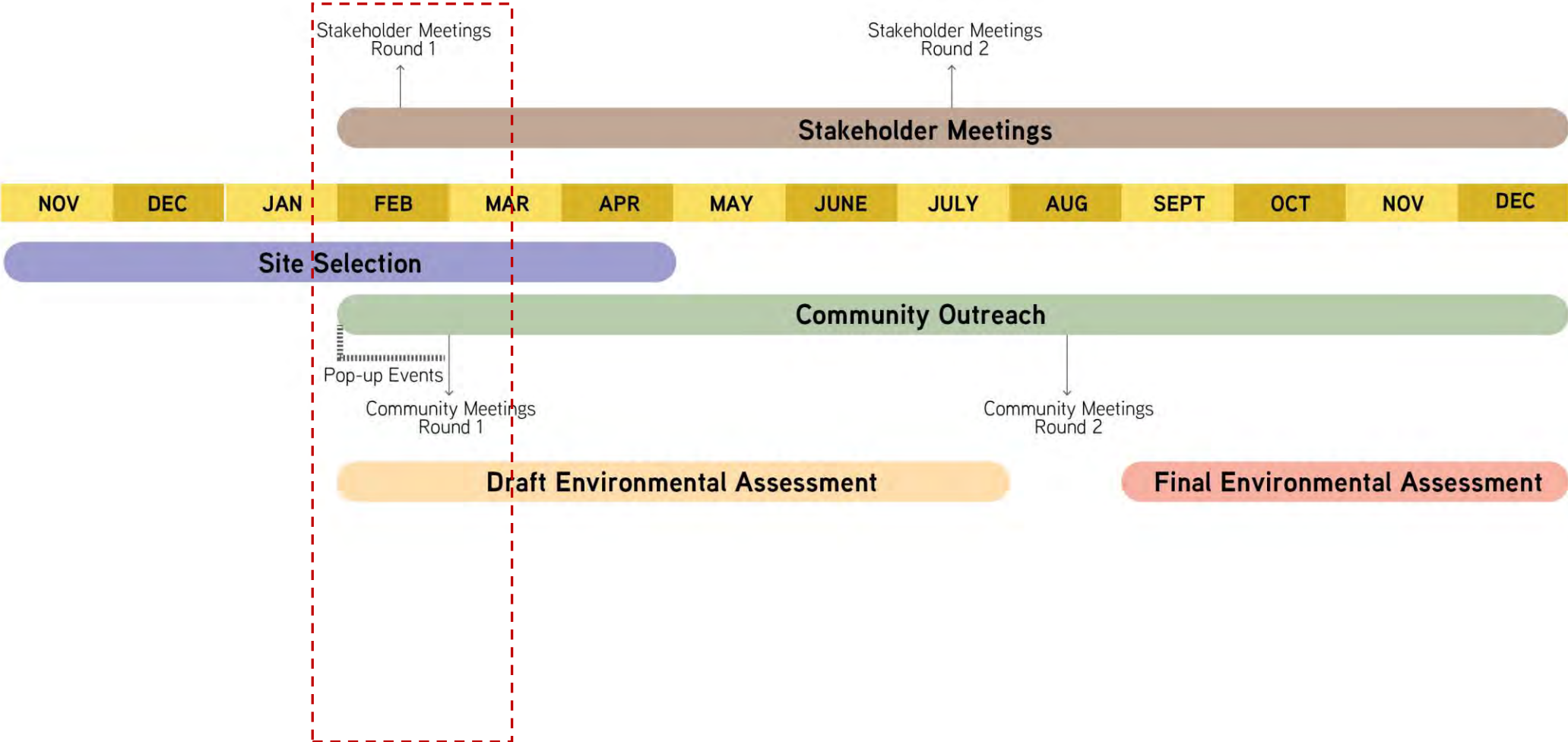
Visit [menti.com](https://www.menti.com) on your smartphone or web browser.

Enter this code: **2119 1189**

Or Scan QR Code



Anticipated Project Schedule



We are Here



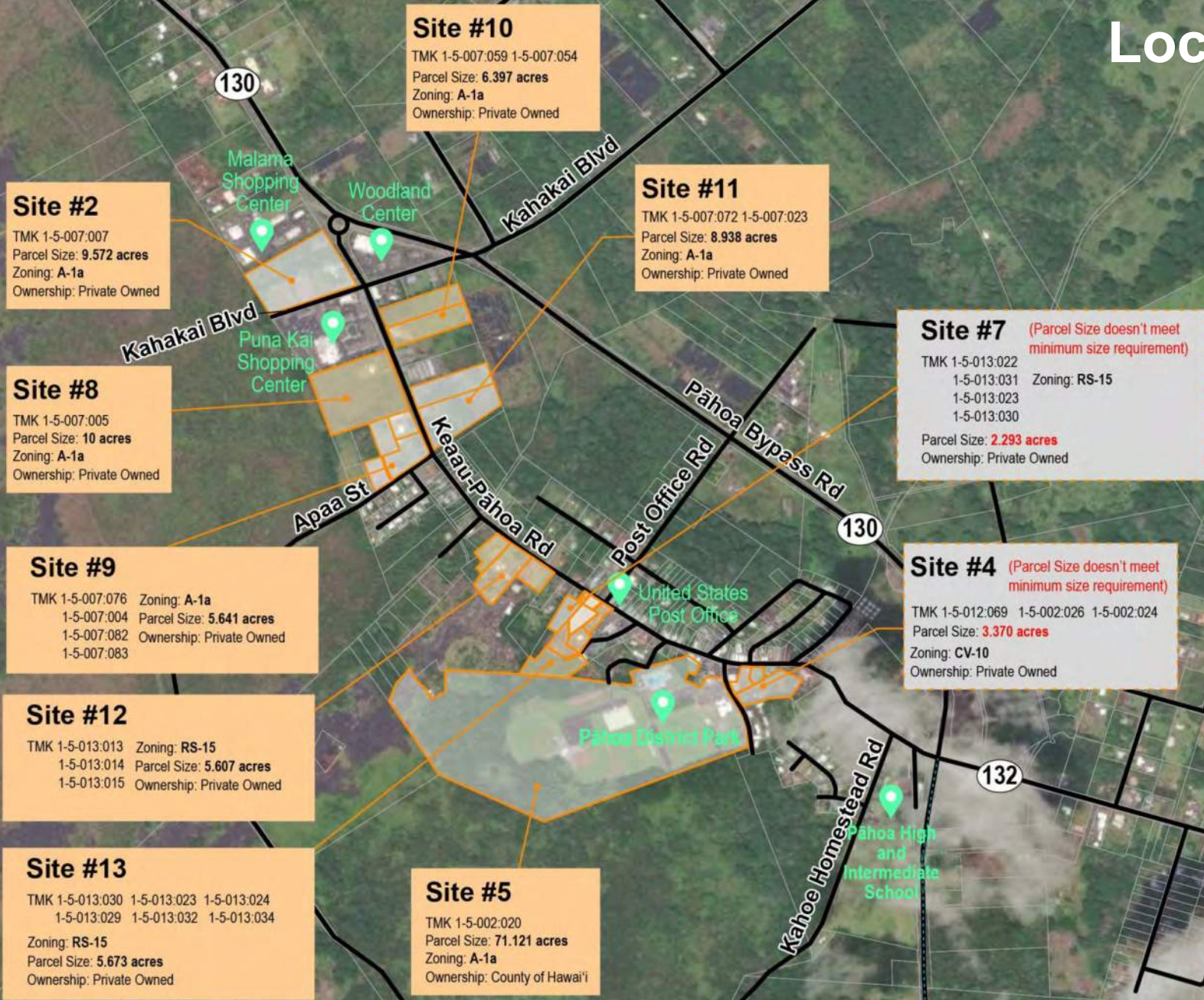
Site Selection



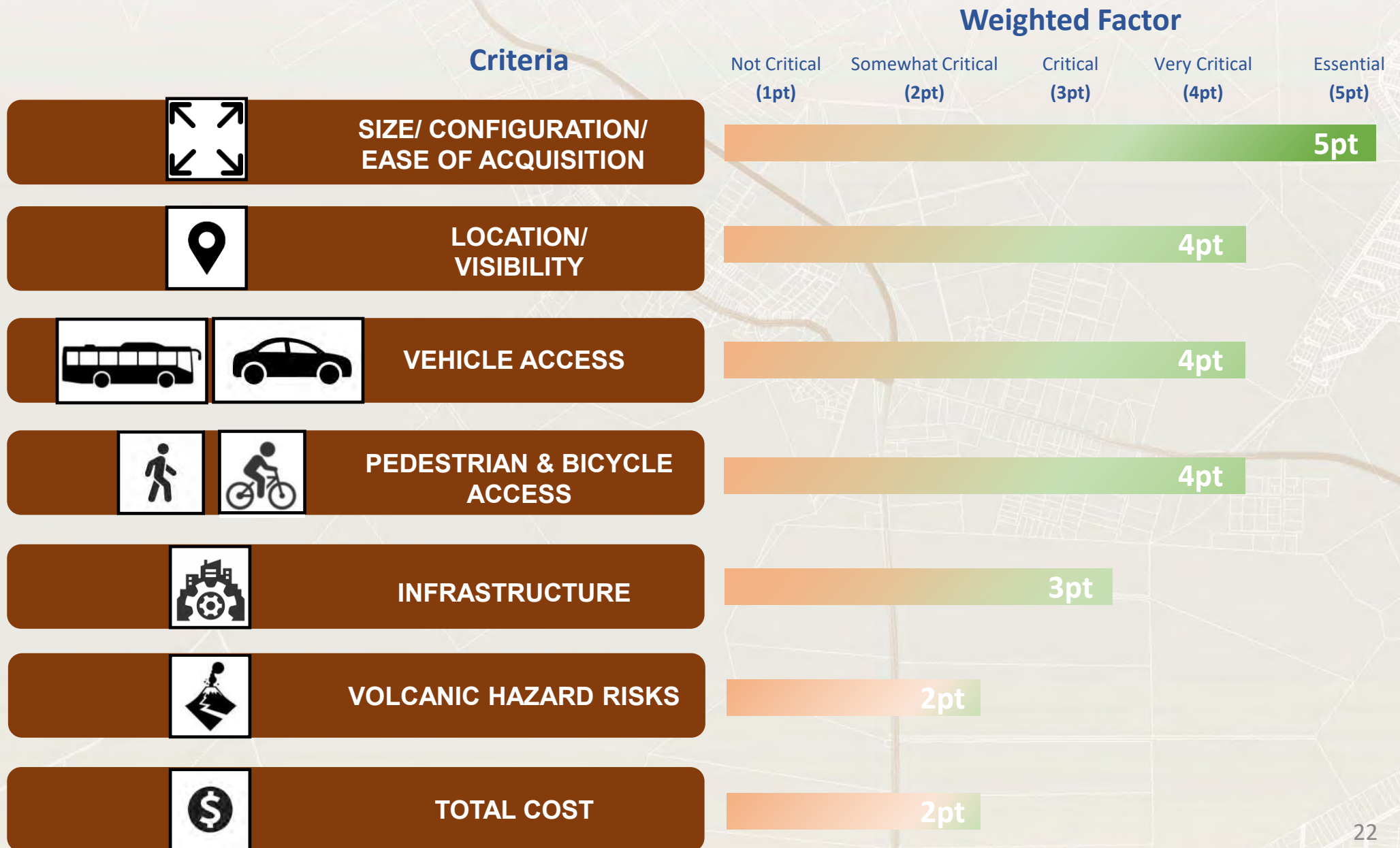
What We Heard: Site Selection

- The hub should help enhance Pāhoa Town. It is not critical that the location be IN town, so long as all the spokes/routes go through town.
- The town lacks parking, and there are no lands available, which is an economic impediment. So if the hub goes further west, then all circulator routes go through town to help drum up business and connect the old and new retail areas which are a mile apart.
- There could be some compatibility if there is a shuttle between the hub/Puna Kai and Pāhoa town.











Alternative Site Locations Evaluated



Site Suitability Criteria



Scoring System

Criteria		Score				
		Poor (1pt)	Fair (2pt)	Good (3pt)	Great (4pt)	Excellent (5pt)
1. Size/Configuration/ Ease of Acquisition		Total area less than basic minimum footprint (4 acres)	Total area meets basic minimum footprint (4 acres)	Total area meets basic minimum footprint and expansion (5 acres)	Total area exceeds basic minimum footprint and expansion (5 acres)	Size and shape is good, and it is a single parcel for ease of acquisition (5 acres)
2. Location/visibility		Limited street frontage and visibility; not close to points of interest	Some street frontage/visibility or reasonable proximity to points of interest	Either street frontage/visibility or proximity is good	Both street frontage/visibility and proximity to points of interest is good	
3. Vehicle Access	 	No frontage access or buses will have challenges with maneuvering	Existing Access (would share access with other users of site); buses may have challenges	Space for single driveway (short frontage); Buses can be accommodated	Significant potential for driveways (good frontage) and bus accommodation	Significant potential for driveways (good frontage) and bus accommodation; existing roads allow space for turning movements and limited vehicle conflicts
4. Pedestrian & Bicycle Access	  	No existing access; no shoulder; need to create pedestrian path fronting potential site	Minimal existing access; pedestrian access would need to be improved for safety	Existing access available; pedestrian access would need to be improved for safety and connectivity	Existing access available	
5. Infrastructure			Infrastructure available on property; adequate supply not available to potential site (significant extension of utilities needed)	Infrastructure and adequate supply available up to site		
6. Volcanic Hazard Risk		Sites in close proximity to previous eruption and/or line of steepest decent	All sites are the same; Lava Zone 2			
7. Total Cost		Significant costs to develop, and/or property value higher than other sites	No apparent high cost factors that stand out as compared to the other sites			

Final Scores

Criteria	Weighted Factor	Site #2 Total Area (9.572 acres)		Site #8 Total Area (10 acres)		Site #9 Total Area (5.641 acres)		Site #11 Total Area (8.938 acres)		Site #4 Total Area (3.370 acres)		Site #10 Total Area (6.397 acres)		Site #5 Total Area (71.121 acres)		Site #12 Total Area (5.607 acres)		Site #13 Total Area (5.673 acres)		Site #7 Total Area (2.293 acres)	
		Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor	Score	Score * Weighted Factor
Size/Configuration/ Ease of Acquisition	5	5	25	4	20	3	15	4	20	1	5	3	15	4	20	2	10	2	10	1	5
Location/visibility	4	4	16	4	16	3	12	2	8	3	12	4	16	1	4	2	8	2	8	2	8
Vehicle Access	4	4	16	5	20	5	20	4	16	3	12	3	12	2	8	4	16	2	8	2	8
Pedestrian & Bicycle Access	4	3	12	2	8	2	8	1	4	4	16	1	4	2	8	1	4	1	4	1	4
Infrastructure	3	3	9	3	9	3	9	3	9	3	9	3	9	2	6	3	9	3	9	3	9
Volcanic Hazard Risk	2	2	4	2	4	2	4	2	4	2	4	2	4	2	4	1	2	2	4	2	4
Total Cost	2	2	4	2	4	1	2	2	4	2	4	1	2	1	2	1	2	1	2	2	4
Total Score			86		81		70		65		62		62		52		51		45		42

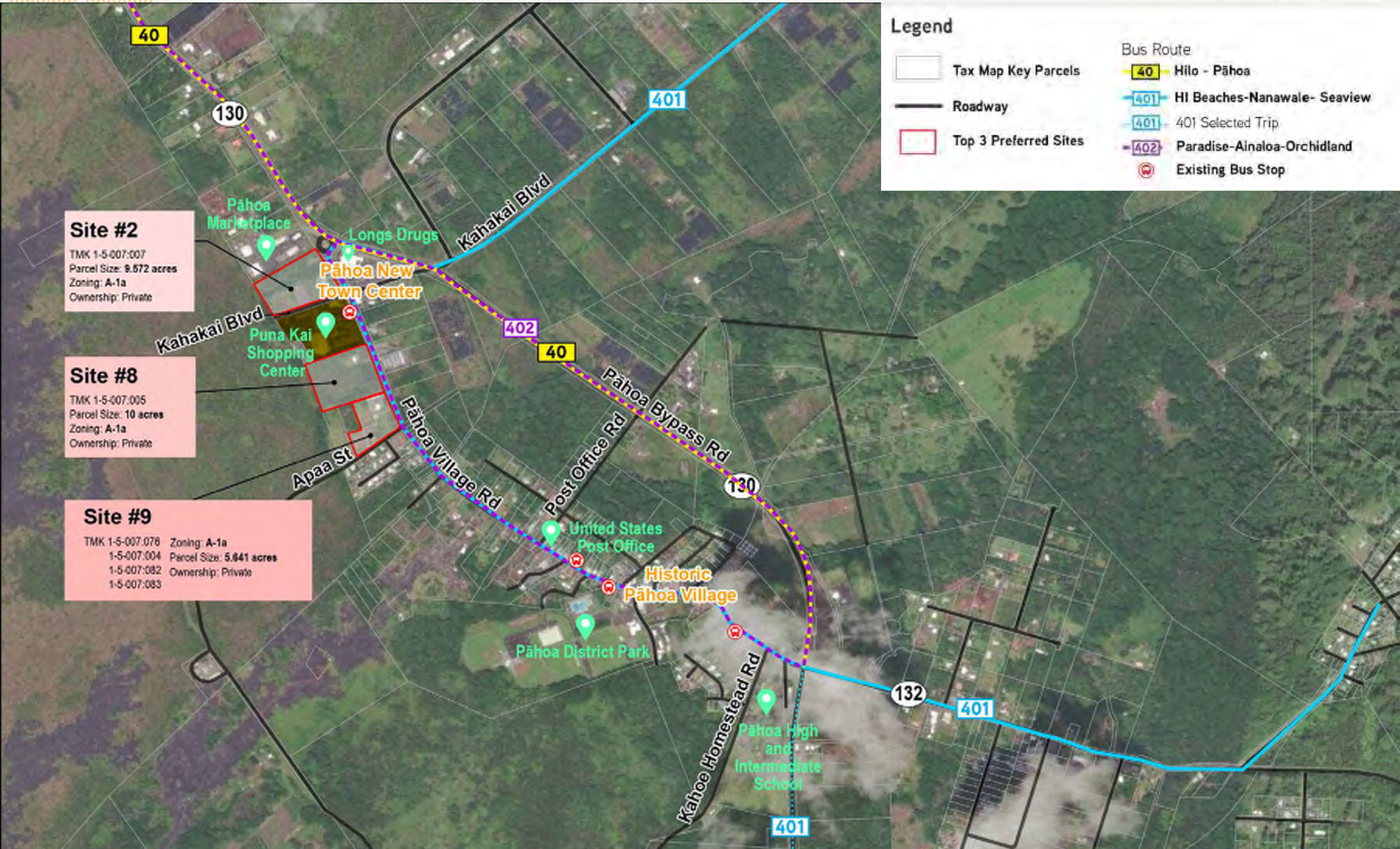
Community input is currently being sought on top three sites.

Ranking Matrix

SITE NUMBER	SITE NAME	CRITERIA																SCORE	RANK						
		SIZE/ CONFIGURATION/EAS E OF ACQUISITION (Weighted Factor = 5)	Score	Weighted Factor	LOCATION/VISIBILITY (Weighted Factor = 4)	Score	Weighted Factor	INFRASTRUCTURE (Weighted Factor = 3)	Score	Weighted Factor	VEHICLE ACCESS (Weighted Factor = 4)	Score	Weighted Factor	PEDESTRIAN & BICYCLE ACCESS (Weighted Factor = 4)	Score	Weighted Factor	VOLCANIC HAZARD RISKS (Weighted Factor = 2)			Score	Weighted Factor	TOTAL COST (Weighted Factor = 2)	Score	Weighted Factor	
2	Between Malama Market & PKSC	<ul style="list-style-type: none"> Large parcel Good shape Single parcel with cooperative owner 	5	25	<ul style="list-style-type: none"> Close proximity to commercial points of interest Very Good street frontage 	4	16	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Corner site Access on Pahoa Village Road and Kahakai Boulevard 	4	16	<ul style="list-style-type: none"> Wide asphalt shoulder but no raised sidewalk 	3	12	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site partially cleared 	2	4	86	1	
8	Abraham	<ul style="list-style-type: none"> Large parcel Good shape Single parcel 	5	25	<ul style="list-style-type: none"> Close proximity to commercial points of interest Good street frontage 	4	16	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Large street frontage for multiple vehicle access 	4	16	<ul style="list-style-type: none"> Poor pedestrian connectivity; narrow asphalt shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site will need to be cleared 	2	4	78	2	
9	Apaa Road	<ul style="list-style-type: none"> Good parcel size No room for expansion since parcel size just meets basic minimum footprint Requires acquisition of multiple parcels 	3	15	<ul style="list-style-type: none"> Somewhat close proximity to commercial points of interest Good street frontage 	3	12	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Corner site Access on Pahoa Village Road and Apaa Street 	4	16	<ul style="list-style-type: none"> Wide asphalt shoulder but no raised sidewalk 	3	12	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Potential increase in acquisition costs due to existing structures on-site Site mostly cleared 	1	2	70	3	
11	Julian & Good Shepherd Foundation	<ul style="list-style-type: none"> Large combined parcel size Good shape Requires acquisition of multiple parcels 	4	20	<ul style="list-style-type: none"> Somewhat close proximity to commercial points of interest Somewhat good street frontage 	3	12	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Large street frontage for multiple vehicle access 	4	16	<ul style="list-style-type: none"> Poor pedestrian connectivity; narrow asphalt shoulder 	1	4	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Low land costs Site will need to be cleared 	2	4	69	4	
*	4	Akebono Theatre	<ul style="list-style-type: none"> Total area less than basic minimum footprint Parcels have odd configuration; might offer less than ideal flow/circulation Requires acquisition of multiple parcels 	1	5	<ul style="list-style-type: none"> Close proximity to Pahoa Town points of interest Good street frontage 	3	12	<ul style="list-style-type: none"> No existing adequate infrastructure on property Good infrastructure potential due to proximity to main road 	3	9	<ul style="list-style-type: none"> Corner site Access on Pahoa Village Road and Kahale Street 	4	16	<ul style="list-style-type: none"> Good pedestrian connectivity; existing sidewalks 	4	16	<ul style="list-style-type: none"> USGS Volcano Lava Flow Hazard Zone 2 	2	4	<ul style="list-style-type: none"> Significant land costs due to previous development Existing infrastructure might be adequate Site already cleared 	2	4	66	5

(*Parcel Size doesn't meet minimum size requirements)

Top Three Preferred Sites



Site #2
 TMK 1-5-007:007
 Parcel Size: 9.672 acres
 Zoning: A-1a
 Ownership: Private

Site #8
 TMK 1-5-007:005
 Parcel Size: 10 acres
 Zoning: A-1a
 Ownership: Private

Site #9
 TMK 1-5-007:078 Zoning: A-1a
 1-5-007:004 Parcel Size: 5.841 acres
 1-5-007:082 Ownership: Private
 1-5-007:083

Legend

-  Tax Map Key Parcels
-  Roadway
-  Top 3 Preferred Sites
-  Bus Route 40 Hilo - Pāhoā
-  Bus Route 401 HI Beaches-Nanawale- Seaview
-  Bus Route 401 Selected Trip
-  Bus Route 402 Paradise-Ainaloa-Orchidland
-  Existing Bus Stop

Site #2

Rank: 1

Parcel Size: 9.572 acres

Ownership: Private



Street View from Keeau-Pāhoia Rd looking towards Pāhoia Bypass Rd

Site #2

Potential Layout

This is a conceptual graphic showing what the site layout could be with the transit hub and library

Legend

- Tax Map Key Parcels
- Site #2
- Bus Route
 - 40 Hilo - Pāhoa
 - 401 HI Beaches-Nanawale- Seaview
 - 402 Paradise-Ainaloa-Orchidland
- Existing Bus Stop
- Existing Raised Sidewalk
- Possible Raised Sidewalk with Development
- Possible Crosswalk with Development



Site #2

Between Malama Market & Puna Kai Shopping Center

TMK 1-5-007:007
Parcel Size: 9.572 acres
Zoning: A-1a
Ownership: Private

SITE #8

Pros:

- 1) Large parcel with good shape;
- 2) Location provides a gateway opportunity for Pāhoa;
- 3) Bus access can be placed away from high pedestrian traffic areas;
- 4) Adjacent to the more pedestrian-oriented side of Puna Kai Shopping Center;
- 5) Opportunities to enhance walkability, connectivity and pedestrian safety along Kahakai Blvd and Pāhoa Village Rd frontages;
- 6) Opportunities to create pedestrian friendly environment from Puna Kai Shopping Center to the site.

Cons:

- 1) No existing raised sidewalks;
- 2) Existing traffic signal could be point of congestion for bus access

Site #8

Rank: 2

Parcel Size: 10 acres

Ownership: Private



Street View from Keeau-Pāhoa Rd
looking towards Kahakai Blvd

Site #8

Potential Layout

Pros:

- 1) Large parcel with good shape;
- 2) Slightly separated from congested Puna Kai Shopping Center area, which might be easier for bus access;
- 3) Good street frontage;
- 4) A single parcel with relatively low land cost.

Cons:

- 1) No existing raised sidewalk and limited asphalt shoulder space outside of property frontage;
- 2) Site will need to be cleared;
- 3) Adjacent to fewer pedestrian-oriented uses.

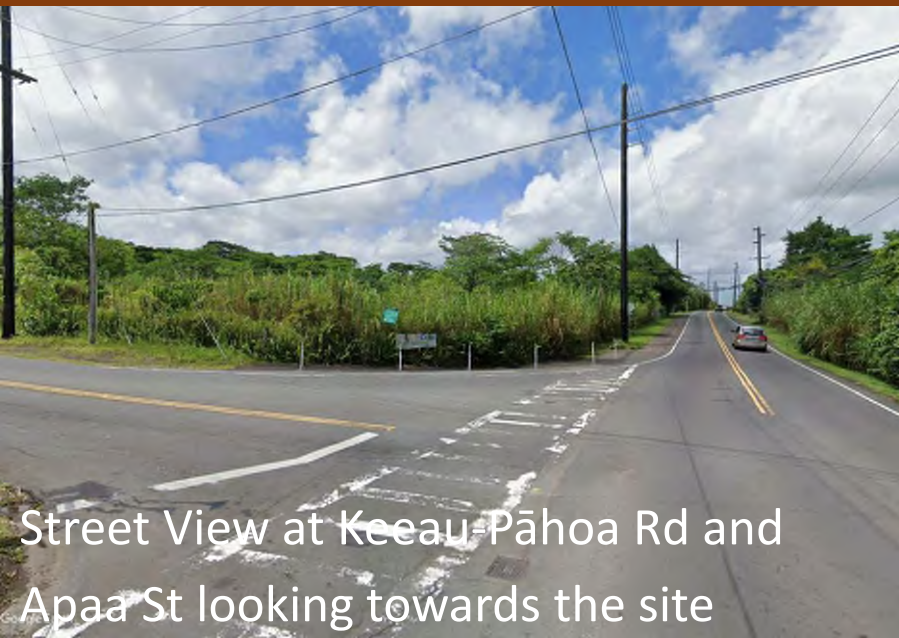


Site #9

Rank: 3

Parcel Size: 5.641 acres

Ownership: Private



Street View at Keanu-Pāhoā Rd and Apana St looking towards the site



Site #9

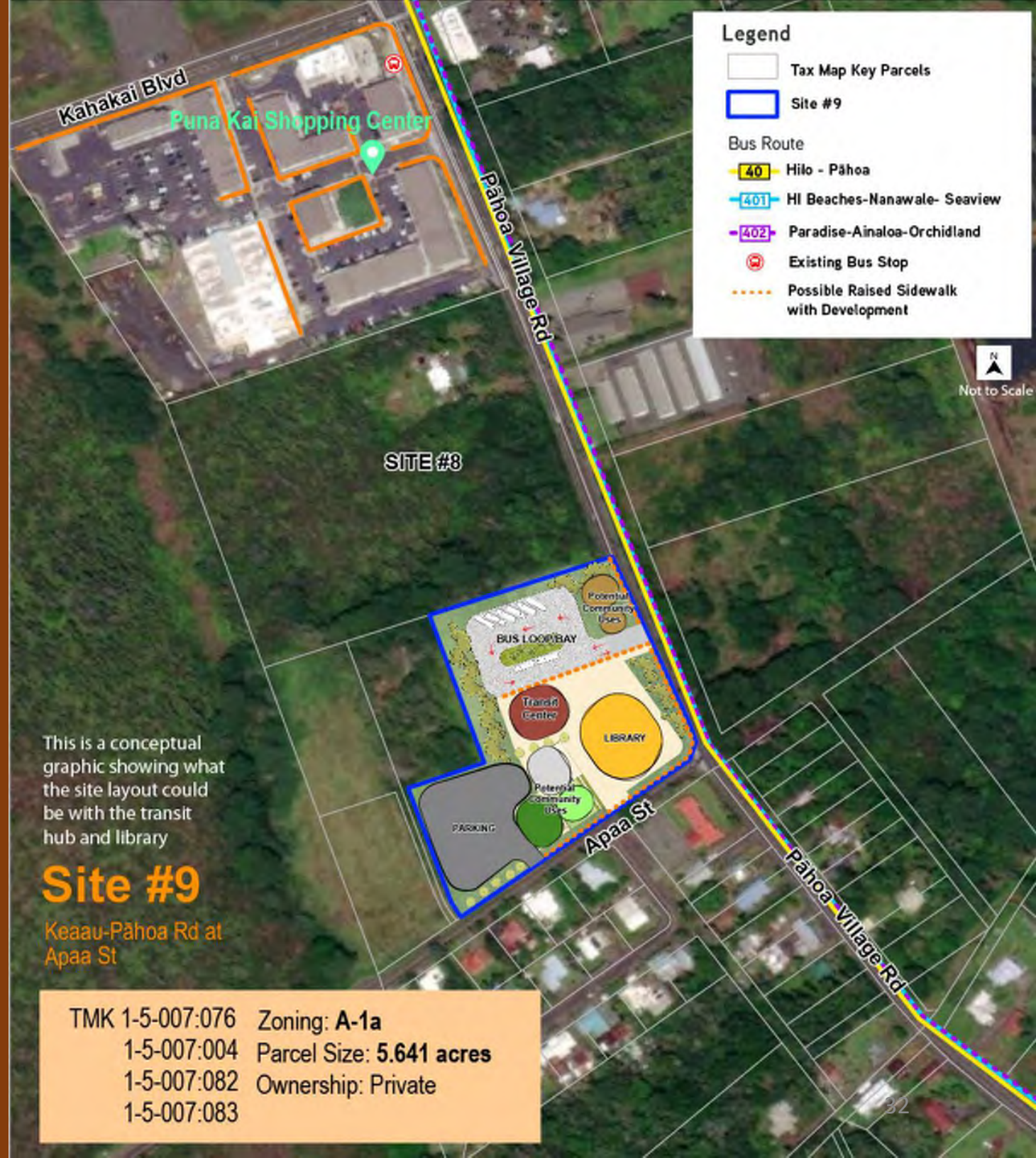
Potential Layout

Pros:

- 1) Adequate parcel size;
- 2) Located at corner of Kea'au-Pāhoa Rd and Apaa St, close to commercial areas and separate from the congested Puna Kai Shopping Center area;
- 3) Good street frontage.

Cons:

- 1) Parcel size just meets basic minimum footprint with no room for potential expansion;
- 2) No existing raised sidewalk;
- 3) Adjacent to single-family development which is less pedestrian-oriented;
- 4) Potential increase in acquisition costs due to existing structures.



Discussion & Poll

- Poll: Of the top three sites, which do you prefer?
 - Site #2
 - Site #8
 - Site #9
- Discussion: What are your thoughts on the top three sites identified?



Visit menti.com on your smartphone or web browser.

Enter this code: **2119 1189**

Or Scan QR Code



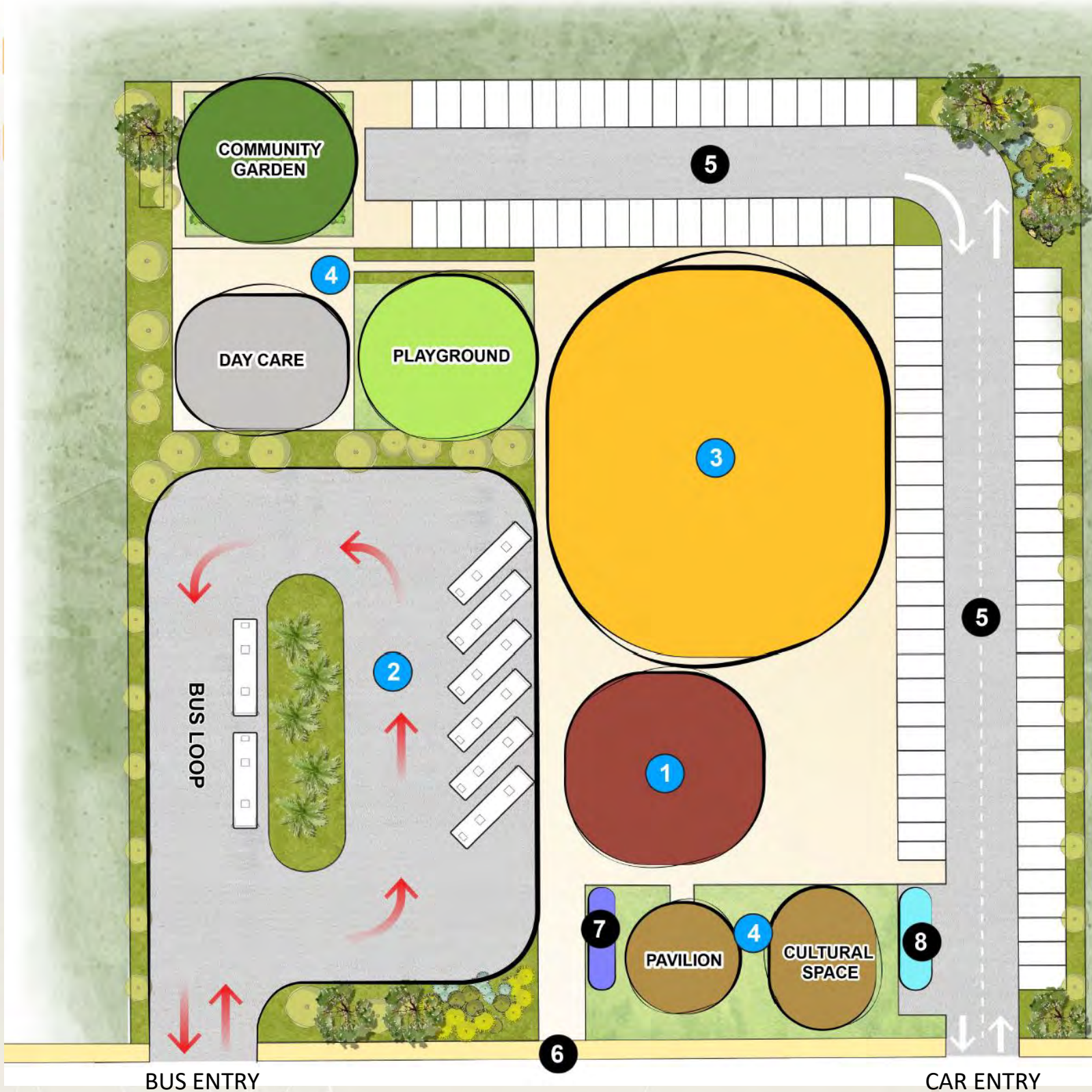


Basic Minimum Footprint & Design Features



What We Heard: Transit Hub Design Features

- The size and appearance of the hub should reflect Pāhoa.
- Make sure the hub and associated parking area is ADA compliant, giving priority to the safety of pedestrians and children who may be in the parking lot. Consider the goals of Vision Zero and the needs of the disabled.
- Lighting and security are important. Have a locked gate after hours.
- Soften the area with landscaping, using native plants.
- Incorporate energy efficiency and renewable energy (solar, etc.)
- Use durable building materials for disaster preparedness and the wet climate.
- Consider environmental conditions (rain, wind) in choosing the orientation of the shelters.
- Like the “stool” design for seating, avoids people sleeping on the benches.



Legend

1. Transit Center
 2. Bus Loop/Bay
 3. Pāhoā Library
 4. Potential Community Uses
 - Pavilion
 - Cultural Space
 - Day Care
 - Playground
 - Community Garden
 - Goodwill Dropbox
- Vehicle/Pedestrian/
Bicycle Access:
5. Parking/Park & Ride
 6. Sidewalk
 7. Bicycle Parking
 8. Bike Share Station

Possible Transit Hub Amenities

Pavilion and Community Gathering Place



Goodwill Dropoff Box



Bike Parking and Storage



Bike Share



Poll & Discussion: Transit Hub Features

Poll: Which of the following features or services would motivate you to use the transit hub? Select your top 3.

- Pavilion & gathering place
- Library
- Daycare
- Playground
- Community Garden
- Cultural Space
- Bike parking & secure storage
- Bike share
- Goodwill dropoff box

Poll & Discussion: What other features would you like to see in the future transit hub?



Visit menti.com on your smartphone or web browser.

Enter this code: **2119 1189**

Or Scan QR Code



Possible Library Features

Expanded Physical Collection



Program Spaces



Technology & Digital Learning



Reading Areas



Meeting Rooms



Poll & Discussion: Library Features

Poll: Which of the following features or services would motivate you to use the public library? Select all that apply.

- Expanded physical collection
- Technology, digital resources and high-speed Wi-Fi
- Community meeting spaces
- Library program spaces
- Reading areas
- Information and self-checkout areas

Poll & Discussion: What other features would you like to see in the future library?



Visit menti.com on your smartphone or web browser.

Enter this code: **2119 1189**

Or Scan QR Code



Discussion

- What other questions or mana'ō do you have for the project team?

An aerial photograph of a residential development. In the center, there is a large, light-colored paved area with a prominent roundabout. Surrounding this central area are several buildings, some with flat roofs and others with gabled roofs. The area is interspersed with lush green trees and landscaping. In the background, a body of water is visible, suggesting a coastal or island location. The overall scene depicts a planned community with modern infrastructure and natural elements.

Next Steps

Ways to Stay Involved and Provide Input



- Visit the project website to learn more, participate in the virtual open house, and sign up for e-mail updates
- Visit the pop-up display at the Pāhoā Public Library
- Attend a future pop-up event or community meeting (to be announced on the project website in summer 2023)

SCAN HERE WITH YOUR SMARTPHONE CAMERA



<http://pahoatransithub.info>

MAHALO!

Project Contacts:

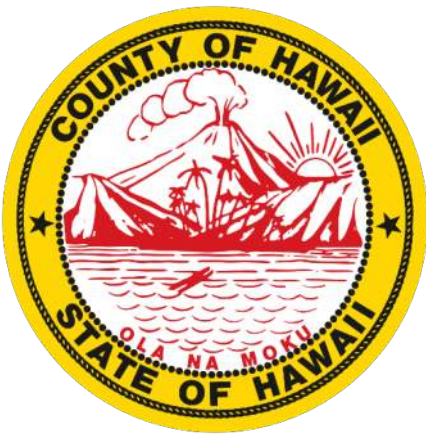
- **John Andoh**, Administrator & General Manager
County of Hawai'i Mass Transit Agency
Phone: (808) 961-8555
Email: john.andoh@hawaiicounty.gov
- **Stacey Aldrich**, State Librarian
Hawai'i State Public Library System
E-mail: stlib@librarieshawaii.org
- **Melissa May**, Outreach Lead
SSFM International, Inc.
Phone: (808) 628-5861
Email: mmay@ssfm.com

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Pāhoā Transit Hub and Library
Community Meeting #2 Summary Report
April 17, 2024

Pāhoā Transit Hub and Library

Prepared for
County of Hawai'i
Mass Transit Agency



Prepared by
SSFM International, Inc.
May 2024

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APPENDIX A Poster Boards

APPENDIX B Comment Forms and Feedback Forms

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Introduction

On March 23, 2024, the County of Hawai'i Mass Transit Agency (MTA), County of Hawai'i Planning Department (PD), and the State of Hawai'i Public Library System (HSPLS) published the Draft Environmental Assessment (EA) for the Pāhoa Transit Hub and Library Project. As part of the environmental review process, agencies and the public were invited to provide comments on the DEA that would be incorporated into the Final Environmental Assessment for the project. The public review period ended on May 1, 2024.

At this meeting, the project team presented the findings of the Draft EA, explained the environmental review process, and invited questions and discussion on the potential impacts of the project. Attendees received copies of the agenda, a project fact sheet, and instructions on how to access the Draft EA online and provide comments to the project team. The front table at the meeting also hosted two copies of the EA for reference along with comment forms to enable the community to share their feedback on both the project and the meeting itself. The project team shared a presentation, received questions and mana'o from the attendees, and answered inquiries.

This community meeting commenced with an open house session in the beginning that included background information on the project. This allowed the community to read through the information and ask questions of the project team in a conversational manner. This was followed by a presentation that began with a welcoming and project team introductions by Victor Kandle, the MTA Administrator. The presentation was followed by a second open house session. The meeting agenda was as follows:

Open house session

Presentation start:

- 1) Project Overview**
 - a) Transit hub background
 - b) Pāhoa library background and co-location
 - c) Project goals and scope
- 2) Outreach, Design, and Site Selection Process**
 - a) What we heard (previous community outreach)
 - b) Site selection process
 - c) Three Alternative Sites and Preferred Alternative
 - d) Possible Transit Hub and Library design and amenities
- 3) Environmental Assessment Process and Schedule**
 - a) Environmental review process
 - b) Outline of the Pāhoa Transit Hub and Library Environmental Assessment
 - c) Impacts identified
- 4) Discussion**
 - a) Questions and comments for the project team
- 5) Next Steps**
 - a) Ways to provide input
 - b) Project contacts

Open house and talk story session

Project Team Attendees

- MTA: Victor Kandle
- HSPLS: Stacie Kaneshige, Stacy Aldrich, Kathryn Tipton
- SSFM: Austen Drake, Jennifer Scheffel, Michael Packard, Cheryl Soon, Jo-Anna Herkes, Heather Bartlett
- Ferraro Choi: Tina Zeng

Community Attendees

Attendees of the meeting were asked to sign in. The attendees are listed below.

1. Rosemary Brown
2. Lee Maniscalco
3. Milo Clark
4. Cheryl Carrol
5. Teki Vizkeys
6. Shel Remngton
7. Karin Tihopu
8. D. Korchijuski
9. Wendy Swoboda
10. Kimberley N Jordon
11. David M Santo
12. Kato Myers
13. Vicki Stump
14. Kevin Kushez
15. Darrel Howard
16. Karen Howard
17. Steve Sparks
18. Judith Tust
19. Geoff Lest
20. Cyrene Farror
21. Gail Bidins
22. Klint Aryo



Outreach

Various channels were used to inform the public about this upcoming meeting. This included email notifications, event pop-ups and presentations, flyer distribution, and a radio ad.

Notice of Availability

A notice of availability that announced the publication of the Draft EA and included a notice of the meeting was mailed to the agencies, elected officials, community members, and organizations that were contacted during the pre-assessment consultation process of the Draft EA. This included:

State of Hawai'i

- Department of Accounting and General Services – Comptroller Keith A. Regan
- Department of Business, Economic Development & Tourism – Director Chris J. Sadayasu
- Department of Education – Superintendent Keith Hayashi
- Office of Hawaiian Affairs - Hawaii Island Trustee Mililani Trask
- Department of Hawaiian Homelands – Planning Program Manager Andrew Choy
- Department of Health
 - Clean Air Branch – Chief Marianne Rossio
 - Clean Water Branch – Chief Alec Wong
 - Safe Drinking Water Branch – Chief Joanna Seto
 - Solid and Hazardous Waste Branch – Chief Lene Ichinotsubo
 - Wastewater Branch – Chief Sina Pruder
 - Indoor and Radiological Health Branch – Chief Jeffery Eckerd
- Department of Land and Natural Resources – Chairperson Dawn N.S. Chang
- Department of Transportation Highways Division – Administrator George Abcede

County of Hawai'i

- Department of Environmental Management – Director Ramzi I. Mansour
- Fire Department – Fire Chief Todd Kazuo
- Department of Parks & Recreation – Director Maurice Messina
- Planning Department – Director Zendo Kern
- Police Department – Chief Benjamin Moszkowicz
- Department of Public Works – Director Steve Pause
- Department of Water Supply – Manager-Chief Engineer Keith Okamoto

Elected Officials

- Senator Joy San Buenavenutra
- Senator Dru Mamo Kanuha
- Senator Tim Richards
- Representative Greggor Ilagan
- Representative Chris Todd
- Representative Kirstin Kahaloa
- Representative Jeanne Kapela
- Representative Nicole Lowen
- Representative Mark Nakashima

- Representative Richard H.K. Onishi
- Representative David Tarnas
- Mayor Mitch Roth
- Councilmember Ashley Kierkiewicz
- Councilmember Matt Kaneali'i-Kleinfelder
- Councilmember Heather Kimball
- Councilmember Jenn Kagiwada
- Councilmember Sue Lee Loy
- Councilmember Michelle Galimba
- Councilmember Rebecca Villegas
- Councilmember Holeka Goro Inaba
- Councilmember Cindy Evans

Other Interested Organizations

- Leilani Community Association
- Nanawale Community Association
- Ainaloa Community Association
- Orchidland Community Association
- Hawaiian Paradise Park Owners Association
- Friends of the Pāhoa Library
- Pāhoa High and Intermediate School
- Pāhoa Elementary School
- Pāhoa Public and School Library

Events and Pop-Ups

Puna Community Development Plan Action Committee – February 1, 2024

Members of the project team provided a brief presentation to share information about the Pāhoa Transit Hub and Library project describing the upcoming environmental review process and encouraging the Puna Action Committee and community to learn more and provide feedback on the project.

Revitalize Puna – March 9, 2024

Participated in the Revitalize Puna “Resource Row” to share information about Hawai’i County MTA services to include the Pāhoa Transit Hub and Library project.

Flyer

The meeting flyer was shared by the Hawai’i County PD Puna Community Development Plan Action Committee email list. Flyers were also distributed in store fronts in the Puna Kai Shopping Center and Pāhoa Marketplace. These flyers were also posted on the Hele-On buses.

Press Release

A press release was drafted and send to the Mayor’s office for distribution through their mailing list, on their website, and on the County Calendar – while we received confirmation, this may not have been completed.

Radio

A 30-second radio ad was also promoted through KAPA FM and KBIG Fm and ran from April 14 through the 16 to invite the community to the April 17 community meeting.

Project Website

Throughout the duration of the project, information was hosted and maintained/updated on the project website at pahoatransithub.info. The project website also hosted a form where people could join the project mailing list. The mailing list was used to provide notice of the publication of the Draft EA and invitation to the community meeting. This mailing list included 11 people.

Partners and Press

In addition, the meeting notice was promoted through Councilmember Kierkiewicz' and Representative Ilagan's newsletters. Both [Big Island Video News](#) and [Big Island Now](#) published articles announcing the publication of the Draft EA and information about the April 17 community meeting.



Meeting Announcement



Pāhoā Transit Hub and Library



Preferred Alternative Site



The County of Hawai'i Planning Department, Mass Transit Agency, and Hawai'i State Public Library System are continuing the planning phase of a transit hub and co-located library in the Pāhoā region. Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoā community.

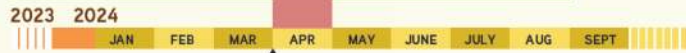
A community meeting is planned to continue the previous planning process. This meeting will discuss the findings reported in the draft Environmental Assessment (EA) and offer an opportunity for the public to provide feedback.

Schedule

DRAFT Environmental Assessment

Public Comment Period

FINAL Environmental Assessment



We Are Here

Visit the project website

Learn more about the project and provide comments in our virtual open house.

SCAN HERE TO VISIT THE PROJECT WEBSITE



<http://pahoatransithub.info>

Share Your Mana'ō

» Join us «



Pāhoā Neighborhood Facility
15-3016 Kauhale Street, Pāhoā, HI 96778

WEDNESDAY
APRIL 17, 2024
5:00 PM-7:00 PM

GET IN TOUCH

Hawai'i State Public Library System
Stacey Aldrich, State Librarian
Email: stlib@librarieshawaii.org

County of Hawai'i Mass Transit Agency
Victor Kandle, Administrator
Phone: (808) 961- 8770
Email: victor.kandle@hawaiicounty.gov

SSFM International
Heather Bartlett, Planner
Phone: (808) 628-5843
Email: hbartlett@ssfm.com



Pāhoā Transit Hub and Library

Project Overview

The County of Hawai'i Transit and Multi-Modal Transportation Master Plan (Master Plan) was completed in August 2018. One of the goals of the Master Plan was to "Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places." To implement this goal, the County of Hawai'i Planning Department and Mass Transit Agency (the Department and MTA) are continuing the planning phase of a Transit Hub in the Pāhoā region.

In addition, the County entered into discussions with the Hawai'i State Public Library System (HSPLS) regarding co-location of the transit hub with a new State library. HSPLS intends to construct a new library in the Pāhoā region and desires to support the County's Transit-Oriented-Development (TOD) initiatives and explore the possibility of co-locating the library with the future transit center. Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoā community and advance TOD principles.

Read the County's Transit and Multi-Modal Transportation Master Plan [here](http://heleonmasterplan.com/final-transit-and-multi-modal-transportation-master-plan/)



<http://heleonmasterplan.com/final-transit-and-multi-modal-transportation-master-plan/>

How to Get Involved



The Pāhoā Transit Hub and Library Draft Environmental Assessment (EA) was published with the State of Hawai'i, Office of Planning and Sustainable Development Environmental Review Program on March 23, 2024. The public comment period will close on May 1, 2024. Please visit our website or contact our project team to review and comment. We appreciate your mana'o.



For more information and to sign up for the project mailing list, please scan the QR code below and visit the project website:



<http://pahoatransithub.info>



Join Us at Our Next Community Meeting!

Location: Pāhoā Neighborhood Center
15-3016 Kauhale St,
Pāhoā, HI 96778





Wednesday, April 17, 2024

5pm to 7pm






Project Factsheet (2/2)

Previous Efforts on Transit Hub Site Selection

-  MTA initiated public outreach in 2019 along with initial identification of locations for consideration of a transit hub.
-  After the public outreach, the Department and MTA added additional locations and ranked 13 potential sites based on the criteria previously identified. Of the 13, three were removed from consideration.
-  Site suitability analysis of the remaining ten sites was conducted, resulting in three alternative sites.
-  Public outreach efforts were conducted in 2023 to determine the preferred alternative site from the three remaining sites.

Previous Efforts on Pāhoā Public Library Site Selection

-  HSPLS initiated community focus groups to gauge public interest in desired uses and services for a new regional library in Puna.
-  The Department of Accounting and General Services (DAGS)' consultant, G70, completed an Environmental Assessment for the Pāhoā Public Library Site Selection in September 2021, with a Finding of No Significant Impact.
-  HSPLS has begun coordinating with State/ County TOD efforts to explore possible co-location of the library with the transit hub.

Project Schedule



Victor Kandle, Administrator
 County of Hawai'i Mass Transit Agency
 Phone: (808) 961- 8770
 victor.kandle@hawaiicounty.gov



Stacey Aldrich, State Librarian
 Hawaii State Public Library System
 Email: stlib@librarieshawaii.org



Heather Barlett, Planner
 SSFM International
 Phone: (808) 628-5843
 Email: hbarlett@ssfm.com



If you need an auxiliary aid/service or other accommodation to attend a meeting due to a disability, contact Heather Bartlett at (808) 628-5843 as soon as possible. Requests made as early as possible will allow adequate time to fulfill your request.

Presentation and Discussions

Victor Kandle, Administrator and General Manager of the MTA began the meeting by welcoming everyone and introducing the project team. Stacy Aldric the Hawai'i State Librarian also stood up to welcome attendees.



The slide titled "Team Introductions" features a decorative graphic of two people talking in the top right corner. It lists the following team members and their roles:

- Hele-On** (County of Hawaii's Bus):
 - Victor Kandle, Mass Transit Agency Administrator and General Manager
- Map of Hawaii**:
 - April Surprenant, Long Range Planning Manager
 - Natasha Soriano, Transportation Planner
- Hawaiian Hibiscus**:
 - Stacey Aldrich, State Librarian
 - Stacie Kaneshige, Public Libraries Branch Director
 - Kathryn Tipton, Branch Manager, Pāhoa Public School and Library
 - Mallory Fujitani, Special Assistant, Office of the State Librarian
- SSFM International** and **FERRARO CHOI**:
 - Austen Drake, Project Manager
 - Jennifer Scheffel, Environmental Lead
 - Michael Packard, Traffic Engineer
 - Tina Zeng, Architect
 - Jo-Anna Herkes, Communications Specialist
 - Cheryl Soon, Transportation Practice Leader
 - Heather Bartlett, Planner
- State Office of Planning and Sustainable Development (OPSD)**:
 - This project is funded in part through the State Office of Planning and Sustainable Development (OPSD)

The consultant team then continued the presentation, which included three main parts. The full presentation is posted on the project website, pahoatransithub.info.

Part One: Project Overview.

Part Two: Outreach, Concept Design, and Site Selection Process.

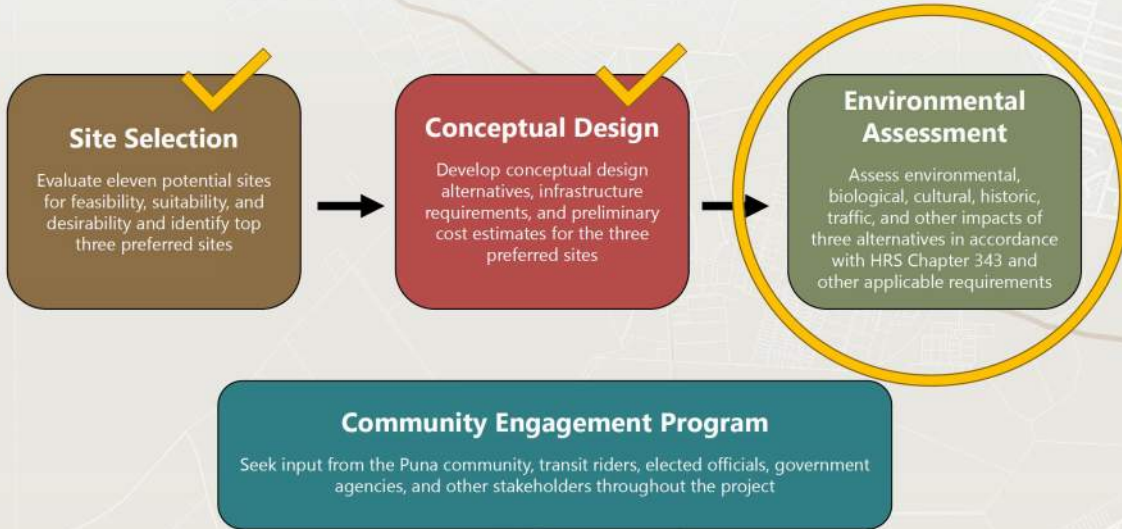
Part Three: Environmental Assessment (EA) Process and Schedule

Meeting Presentation

Heather Bartlett of SSFM kicked off the presentation with an overview of the meeting objective and major milestones for the project. She shared the publication of the Draft EA and the deadline for comments. This was followed by a brief overview of the meeting agenda.



Meeting Objective



3

Current Status of the Environmental Assessment



- The Pāhoā Transit Hub and Library Draft Environmental Assessment was released March 23, 2024
- It was prepared in fulfillment of Hawai'i Revised Statutes, Chapter 343
- Comments on the draft are due May 1, 2024

Project Schedule



4

Project Overview

Austen Drake of SSFM provided an overall background for the project, briefly describing the history, vision, and origin for both the Transit Hub and the Pāhoā Library. This part of the presentation was intended to orient the audience on the overall goals and intentions for the project for anyone who was not previously engaged in the process.

Transit Hub Project Background

- The County completed its Transit and Multi-Modal Transportation Master Plan (Master Plan) in **August 2018**.
- It identified five goals, including the following: **“Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places.”**
- It recommended a hub and spoke system for each district, which led to the proposal for a transit hub in Pāhoā for the Puna District.
- The project is intended to provide transportation services to the community in a central area to provide community gathering spaces, amenities, and other services within a walkable town center area



Scan here to ready the County's
Transit and Multi-Modal
Transportation Master Plan



<http://hleonmasterplan.com/final-transit-and-multi-modal-transportation-master-plan/>

Pāhoā Public Library Background

- In 1991 the Hawai'i State Public Library System (HSPLS) created a Master Plan to guide their future growth and facility needs
- In 2017 they created a new plan to better implement the goals of their master plan while considering current demographics of the Puna district
- **Three core values:**
 - ❖ **Community / Educational / Cultural Hub**
Gathering place, educational opportunities and provide opportunities for cultural practices.
“this core value reinforces the library as a beacon for knowledge, arts, and culture”
 - ❖ **Access**
Provide access to collections/materials, government services and officials through forms and resources
“Give Puna residents and library users access to the entire world”
 - ❖ **Collection and Preservation**
Hardcopy and digital materials, preservation of our history



8



Outreach, Concept Design, and Site Selection Process

Mr. Drake continued to the next section of the presentation which included an overview of the public outreach that had been conducted to date for the project much of which was centered around the site selection process and conceptual design/amenities for the hub and library. He described the three alternative sites that were chosen and the preferred alternative site that was identified as an outcome of the public outreach process. He displayed a conceptual sitemap for the preferred alternative site and walked through the features, inviting attendees to also review the sitemaps on the posterboards in the room.



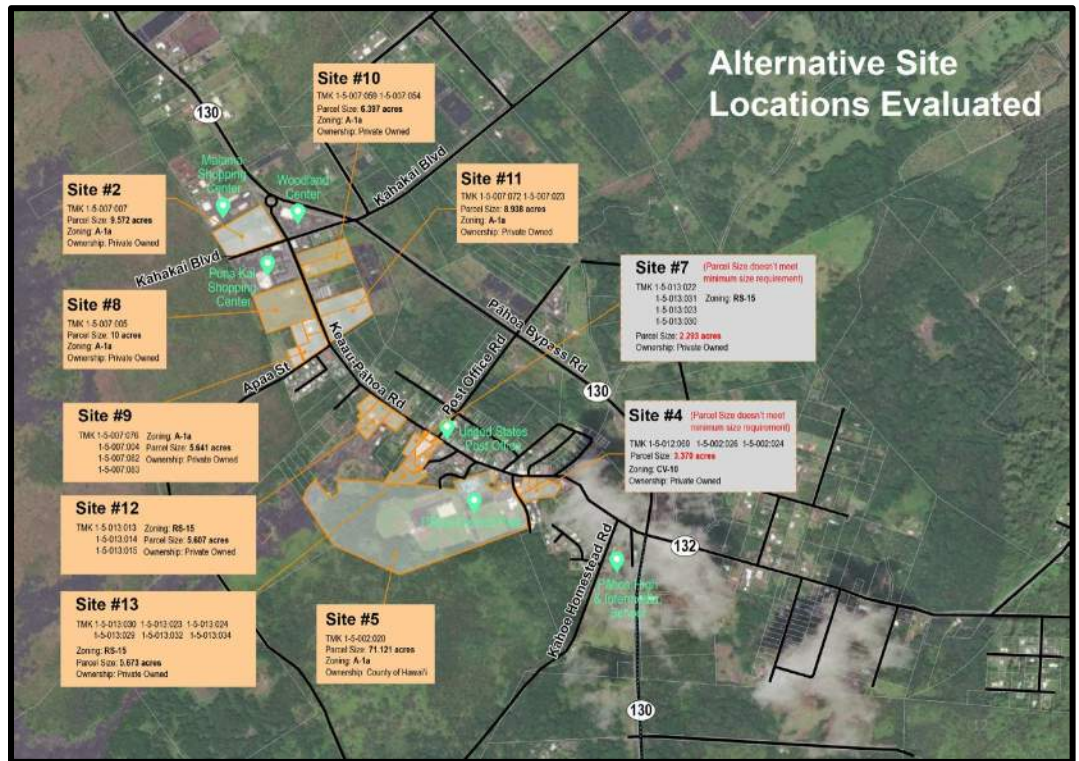
Outreach Conducted to Date

- Elected Officials Outreach
- Community Associations Outreach
- Puna CDP Action Committee Presentations – February 2023 and March 2024
- Pop-up Events:
 - Maku’u Farmers Market – February 2023
 - Pāhoā Public Library Pop-Up – 2023
 - Revitalize Puna – March 2024
- Community Meeting – March 2023
 - Input on Preferred Alternative Site
- Promotions:
 - Website
 - Social media
 - Radio
 - Flyers – buses, businesses, library



11

Alternative Site Locations Evaluated





What We Heard

- **Sites #2, #8, and #9** were identified as the preferred sites
- **Site #2** was the overwhelming preference from community polls
- **Accessibility** around the Pāhoia Town Center is important, emphasis on the need for sidewalks for **safety**
- Make it look like **Pāhoia Town**
- Puna needs community **gathering spaces**
- Need bike storage, garden, and space for kids
- Easy access to **technology** and government **resources**

13



Three Alternative Sites and Preferred Alternative



14



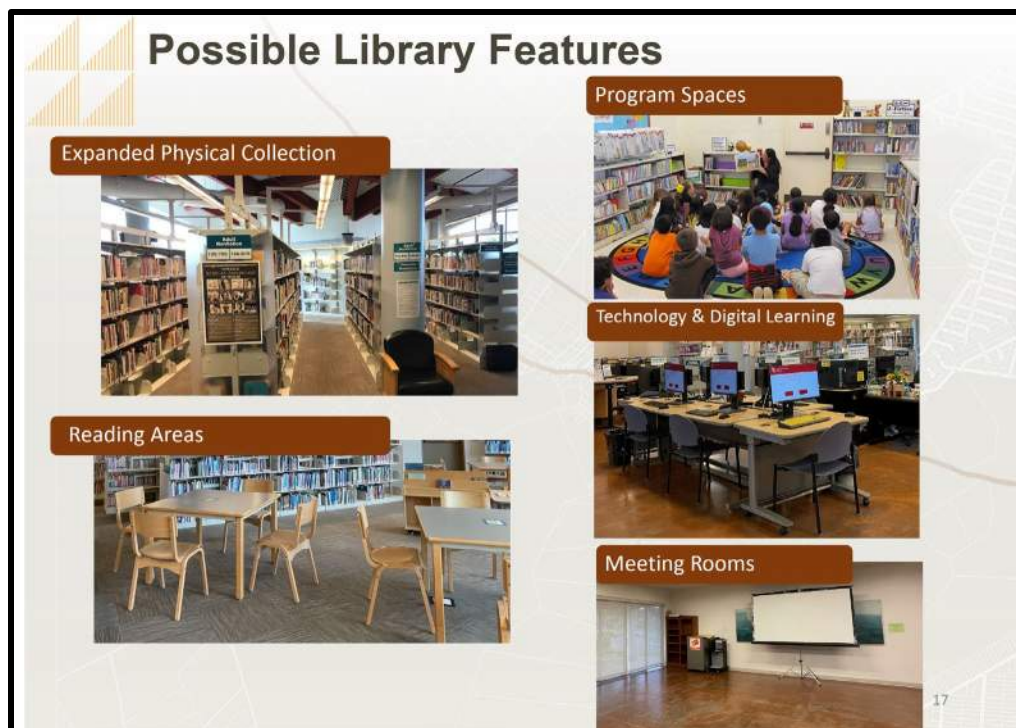
Possible Transit Hub Amenities

Pavilion and Community Gathering Place

Goodwill Dropoff Box

Bike Parking and Storage

Bike Share



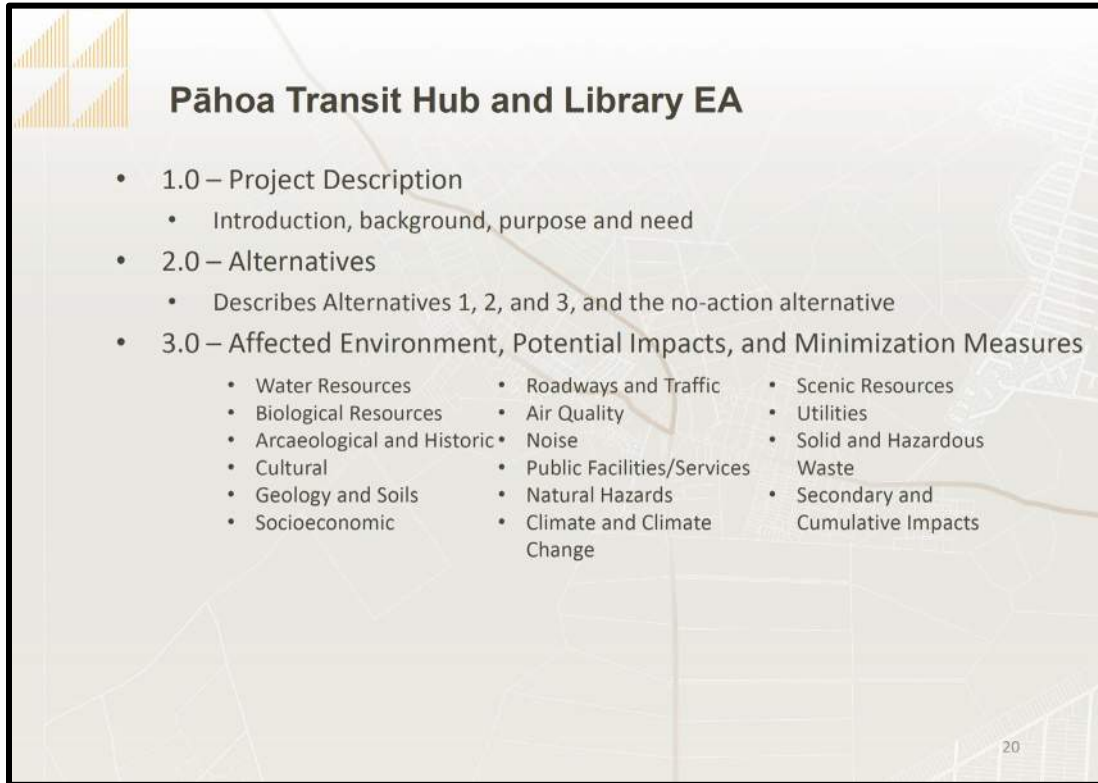
Environmental Assessment (EA) Process and Schedule

Jennifer Scheffel of SSFM then presented on the Environmental Assessment process. She described the origins of the process and “triggers” for projects to require environmental review. She invited participants to sign up for notifications from the Environmental Review Program when new Environmental Impact Statements and Environmental Assessments are published.

Understanding the Environmental Review Process

- The Environmental Review Program (ERP)
 - Responsible for guiding projects through Hawai'i's official environmental review, Chapter 343 of the Hawai'i Revised Statutes, also known as the Hawai'i Environmental Policy Act (HEPA) process.
- Process described in Environmental Impact Statement Rules - HAR 11-200.1
- The Environmental Notice
 - Semi-monthly publication announces the availability of Environmental Assessments (EAs) and Environmental Impact Statements (EISs) for public review and comment

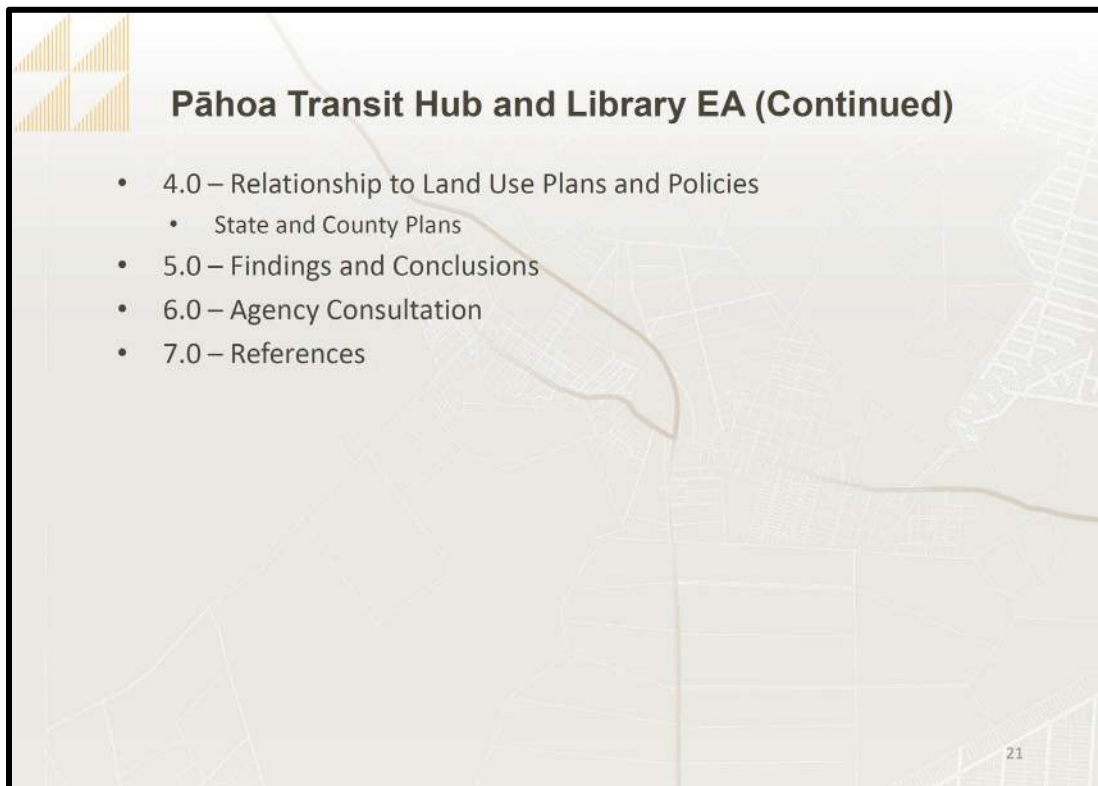
Then Ms. Scheffel walked participants through the outline of the content for the DEA highlighting significant topics covered.



Pāhoa Transit Hub and Library EA

- 1.0 – Project Description
 - Introduction, background, purpose and need
- 2.0 – Alternatives
 - Describes Alternatives 1, 2, and 3, and the no-action alternative
- 3.0 – Affected Environment, Potential Impacts, and Minimization Measures
 - Water Resources
 - Biological Resources
 - Archaeological and Historic
 - Cultural
 - Geology and Soils
 - Socioeconomic
 - Roadways and Traffic
 - Air Quality
 - Noise
 - Public Facilities/Services
 - Natural Hazards
 - Climate and Climate Change
 - Scenic Resources
 - Utilities
 - Solid and Hazardous Waste
 - Secondary and Cumulative Impacts

20

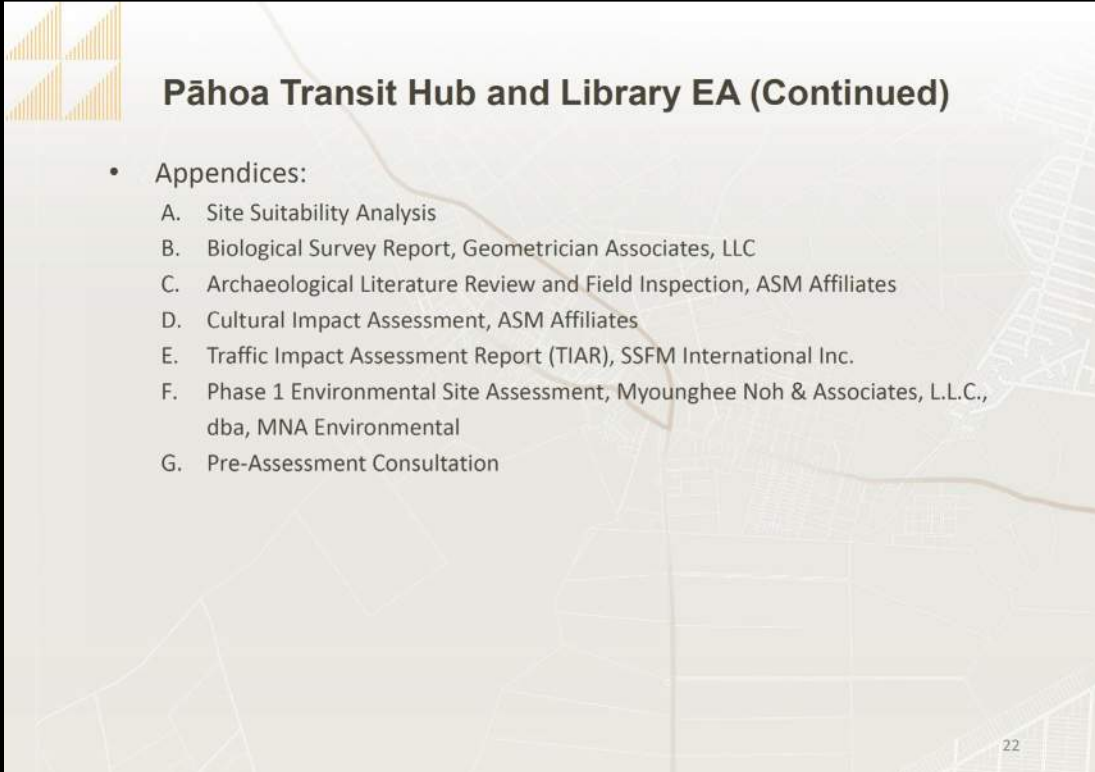


Pāhoa Transit Hub and Library EA (Continued)

- 4.0 – Relationship to Land Use Plans and Policies
 - State and County Plans
- 5.0 – Findings and Conclusions
- 6.0 – Agency Consultation
- 7.0 – References

21

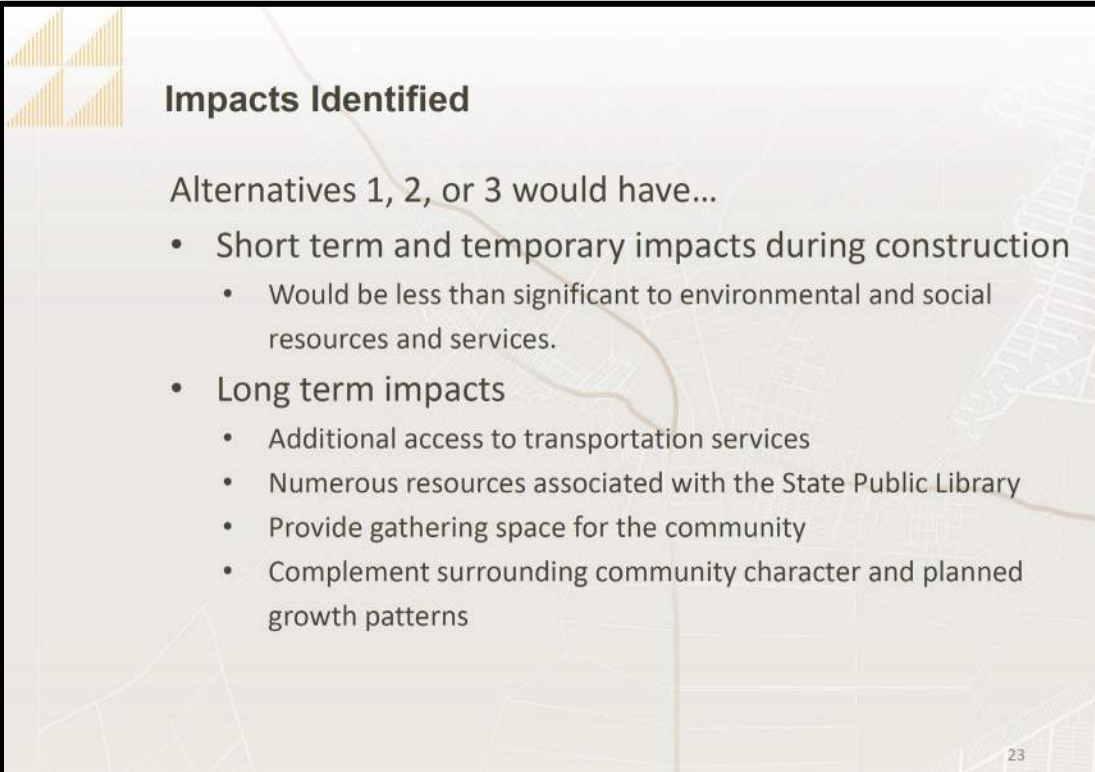
Ms. Scheffel then described the various technical studies that are included in the DEA that provide supporting analysis for the potential impacts and minimization measures discussed.



Pāhoa Transit Hub and Library EA (Continued)

- Appendices:
 - A. Site Suitability Analysis
 - B. Biological Survey Report, Geometrician Associates, LLC
 - C. Archaeological Literature Review and Field Inspection, ASM Affiliates
 - D. Cultural Impact Assessment, ASM Affiliates
 - E. Traffic Impact Assessment Report (TIAR), SSFM International Inc.
 - F. Phase 1 Environmental Site Assessment, Myounghee Noh & Associates, L.L.C., dba, MNA Environmental
 - G. Pre-Assessment Consultation

22



Impacts Identified

Alternatives 1, 2, or 3 would have...

- Short term and temporary impacts during construction
 - Would be less than significant to environmental and social resources and services.
- Long term impacts
 - Additional access to transportation services
 - Numerous resources associated with the State Public Library
 - Provide gathering space for the community
 - Complement surrounding community character and planned growth patterns

23

Attendees were provided an opportunity to ask questions and provide comments during the discussion portion of the presentation.

#	QUESTION/COMMENT	RESPONSE
1	Is the transit hub being prioritized over the library?	There are separate funding streams for the two projects meaning that the ability to construct the library is not dependent on have sufficient funding for the transit hub and vice versa.
2	How much money is needed for the library?	The completion of the EA process will be followed by land use permitting, acquisition of the chosen parcel, design, and construction. The costs can be estimated but a more accurate account for the cost would occur once the preliminary steps have been completed.
3	How does the design of the project influence the impacts identified in the EA? Will you need to modify the EA later if the design changes?	The EA process is generally based on land use and general impacts of the development of the parcel, it is broader in scope to cover a variety of design features and the design/amenities covered in the EA are conceptual in nature, subject to change during the design/permitting phase.
4	Do you have all the data from the hub and spoke transit meetings over the past 5 years? Does the EA consider all bus stops?	The EA relates to immediate potential impacts from the Transit Hub and Library itself. It is designed as a continuance of the previous hub and spoke efforts in order to contribute toward that broader vision; however, it does not cover those external bus stops directly.
5	Will the Pāhoa Library have private spaces for people to access services like telehealth?	Yes, that is one of the ideal amenities and an important feature for a rural and underserved area with limited broadband access for households.

The presentation concluded with instructions on how to review and comment on the Draft EA and a reminder about the May 1st deadline. Following the presentation was another open house session for people to revisit the posterboards, comment, and ask questions of the project team before they left.

Written Comments Received

A Comment form was handed to all attendees when they entered the meeting. The Comment form stated, “Please write down any questions and comments you have on the Pāhoā Transit Hub and Library Draft Environmental Assessment Below.” Three Comment forms were handed in at the end of the meeting.

Attendees were also provided a Feedback form to provide input to the consultant team regarding the meeting. Eight Feedback forms were handed in at the end of the meeting.

All comments received are provided in the following table.

#	Comment
Comment Form 1	As a retired noise consultant (In S.F. CA) I’m disappointed that any library would be situated right next to the noisiest intersection within miles – and right next door to a bus hub! Were any noise measurements actually conducted? So easy to gather such data with modern automatic technologies... I ride these bus routes very often and I know full well noise is inseparable from them. (It seems that county mass transit has noise, both interior and exterior) is a very low priority – even with electric buses.
Comment Form 2	Confused about EA coverage versus a final design. What does EA cover, what does it explicitly not cover. What sorts of things do final design finish off from EA.
Comment Form 3	We need a library; please prioritize that! Are the small bus routes set? Are they going to be contracted or county operated? I think routes should be run by community people. More good local jobs.
Feedback Form 1	<p><u>How did you hear about this meeting?</u> One mention on a Hilo radio station (and nothing on HPR)</p> <p><u>Do you have suggestions for how to better distribute this information?</u> Mini-posters on (at least) the #40 buses</p> <p><u>Did the meeting provide information useful to you?</u> Yes – but kinda late (for me - due to lack of notification of most prior meetings – and this goes back, also, to the earlier hub-and-spoke decision making process which resulted in me personally being very much inconvenienced by the results.)</p> <p><u>What do you want to tell us about it?</u> N.B. I don’t yet have internet at home so have been unable to be guided by your internet-mainly notifications</p> <p><u>Note:</u> this comment was from the same participant that submitted comment form 1 – he requested this be noted in our files</p>
Feedback Form 2	<p><u>How did you hear about this meeting?</u> Library people.</p> <p><u>Do you have suggestions for how to better distribute this information?</u> Good poster at the Kohala Coffee Shop – even more simple notices. Thank you.</p> <p><u>Did the meeting provide information useful to you?</u> Yes – good maps.</p> <p><u>What do you want to tell us about it?</u> I’m sorry I was late!</p>

#	Comment
Feedback Form 3	<p><u>How did you hear about this meeting?</u> Big Island Video News email</p> <p><u>Do you have suggestions for how to better distribute this information?</u> Facebook groups – (may have seen them there too)</p> <p><u>Did the meeting provide information useful to you?</u> Yes</p>
Feedback Form 4	<p><u>How did you hear about this meeting?</u> Neighbor</p> <p><u>Do you have suggestions for how to better distribute this information?</u> 1) Island Naturals Bulletin Board, 2) Bus stops, 3) Ashley K.</p> <p><u>Did the meeting provide information useful to you?</u> Yes</p> <p><u>What do you want to tell us about it?</u> Thank you</p>
Feedback Form 5	<p><u>How did you hear about this meeting?</u> Greg Ilagon’s newsletter, I think. Posted on Facebook groups</p> <p><u>Do you have suggestions for how to better distribute this information?</u> It gets out ok.</p> <p><u>Did the meeting provide information useful to you?</u> Yes!</p> <p><u>What do you want to tell us about it?</u> Super informative, thanks!</p>
Feedback Form 6	<p><u>How did you hear about this meeting?</u> Friends</p> <p><u>Do you have suggestions for how to better distribute this information?</u> Radio and newspaper</p> <p><u>Did the meeting provide information useful to you?</u> Yes</p> <p><u>What do you want to tell us about it?</u> Make sure you keep the big buses out of Pāhoa Town!</p>
Feedback Form 7	<p><u>How did you hear about this meeting?</u> Email from friend / Facebook</p> <p><u>Do you have suggestions for how to better distribute this information?</u> Newspapers – flyers – posters in town – word of mouth</p> <p><u>Did the meeting provide information useful to you?</u> Yes</p> <p><u>What do you want to tell us about it?</u> Very important to get all this info out. Liked the different speakers. Mahalo for having this!</p>

Next Steps

Immediate next steps for this project would include compiling comments received in this meeting and through other means such as the website, mail, and email and incorporating that feedback in the Final EA for the project. Once compliance with the Hawai'i Revised Statutes (HRS) Chapter 343 process has been obtained, the project can then proceed through the final design and construction phases.

Appendix A – Poster Boards

Pāhoa Transit Hub and Library

**Share Your Thoughts
& Ideas with Us!**



E Komo Mai!



Community Meeting #2

 Open house session

Presentation (will begin at 5:30pm)

1) Project Overview

- a) Transit hub background
- b) Pāhoa library background and co-Location
- c) Project goals and scope

2) Outreach, Design, and Site Selection Process

- a) What we heard (previous community outreach)
- b) Site selection process
- c) Three Alternative Sites and Preferred Alternative
- d) Possible Transit Hub and Library design and amenities

3) Environmental Assessment Process and Schedule

- a) Environmental review process
- b) Outline of the Pāhoa Transit Hub and Library Environmental Assessment
- c) Impacts identified

4) Discussion

- a) Questions and comments for the project team

5) Next Steps

- a) Ways to provide input
- b) Project contacts

Open house and talk story (pau at 7pm)

Please Sign-In Here!

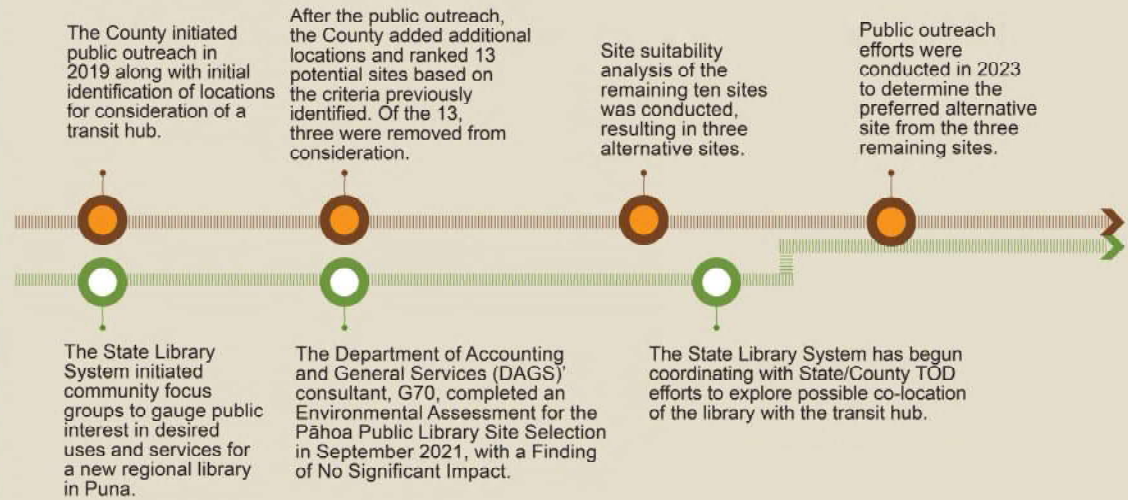
PROJECT OVERVIEW

The County of Hawai'i Transit and Multi-Modal Transportation Master Plan (Master Plan) was completed in August 2018. One of the goals of the Master Plan was to "Create transportation hubs and bus stops with amenities that provide rider comfort and safety and that help support community and village gathering places." To implement this goal, the County of Hawai'i Planning Department and Mass Transit Agency (County) are continuing the planning phase of a transit hub in the Pāhoā region in partnership with the Hawai'i State Public Library System (State Library System).

On this collaborative effort, the County entered into discussions with the State Library System regarding co-location of the transit hub with a new state library. The State Library System intends to construct a new library in the Pāhoā region and desires to support the County's Transit-Oriented-Development (TOD) initiatives for more vibrant and walkable communities. Co-location of these key public services will enhance the ability of both facilities to serve the Pāhoā community.

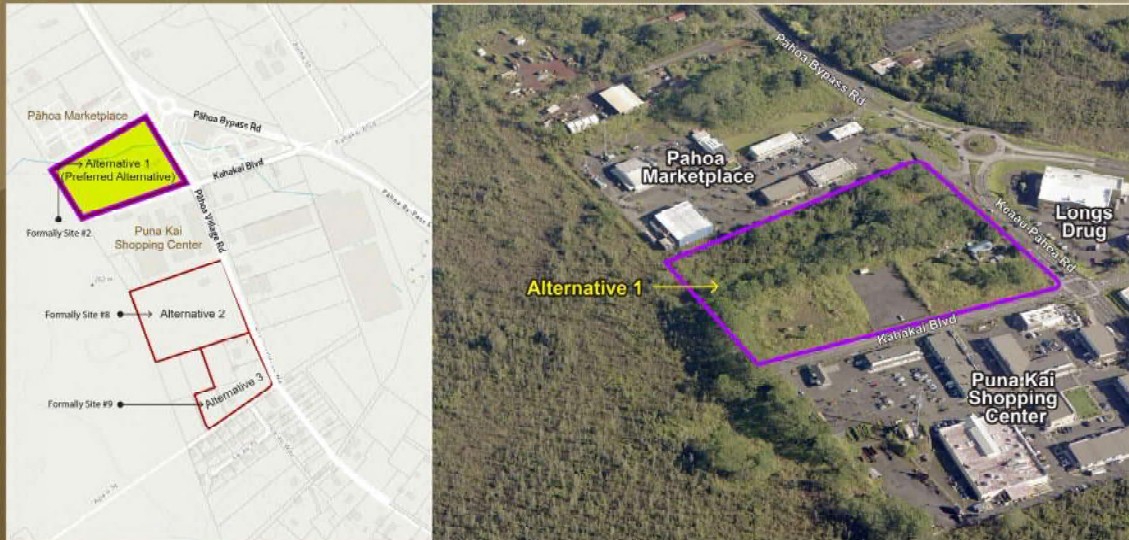
Steps Completed to Date

Previous Efforts on Transit Hub Site Selection



Previous Efforts on Pāhoā Public Library Site Selection

PREFERRED ALTERNATIVE SITE



PROJECT SCHEDULE

Steps Completed to Date



ENVIRONMENTAL ASSESSMENT for the Pāhoā Transit Hub and Library

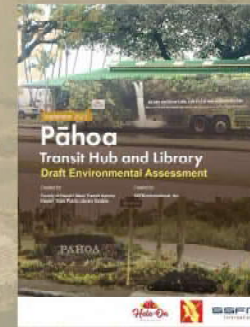
CURRENT STATUS

We Are Here

Was prepared in fulfillment of Hawai'i Revised Statutes, Chapter 343

The Draft Environmental Assessment was released March 23, 2024

Comments on the draft are due May 1, 2024



The Pāhoā Transit Hub and Library Draft Environmental Assessment included several technical studies to inform on and understand potential impacts of the project. These included:

- Biological Survey Report (Geometric Associates, LLC)
- Archaeological Literature Review and Field Inspection (ASM Affiliates)
- Cultural Impact Assessment (ASM Affiliates)
- Traffic Impact Assessment Report (TIAR) (SSFM International Inc)
- Phase 1 Environmental Site Assessment (MNA Environmental)

WHAT IS COVERED IN THE EA?

Purpose and Need

This project would implement longstanding needs heard from community members as reflected in various community plans including the Puna Community Development Plan and the County Transit and Multimodal Master Plan. The design and function of the Pāhoā Transit Hub and Library also corresponds with community planning best practices that would support equitable access to government services and job centers, childcare, as well as arts and cultural programs to support a healthy Pāhoā community.

Alternative Sites and Preferred Alternative

Three alternative sites are being considered all of which are located on the northern side of Pāhoā Village on the mauka side of the Pāhoā Village Road and are close to existing commercial areas. The preferred alternative site is identified as Alternative 1 in the Environmental Assessment.



Impacts Identified

Short Term

Alternatives 1, 2, or 3 would have short-term and temporary impacts during construction that would be less than significant to water resources, biological resources, archaeological and historic resources, cultural practices and beliefs, geology and soils, traffic and transportation, air quality, the existing noise environment, and public facilities and services.

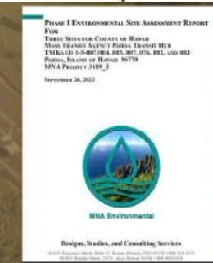
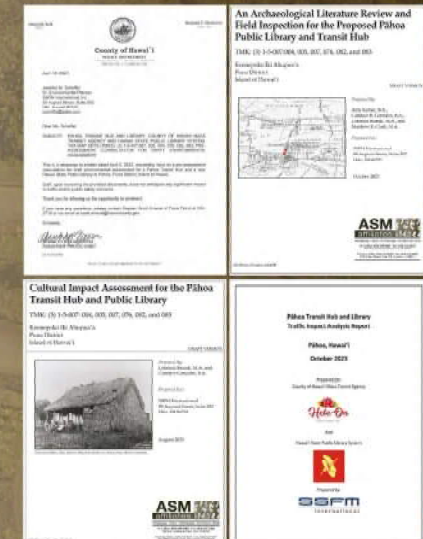
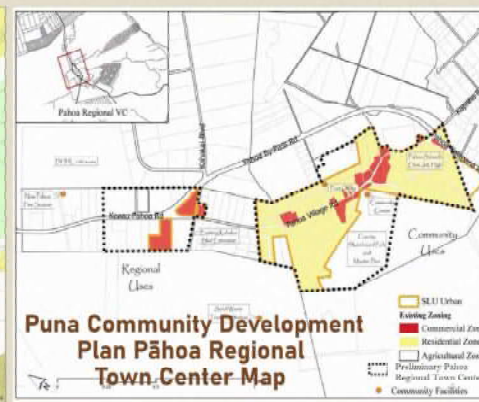
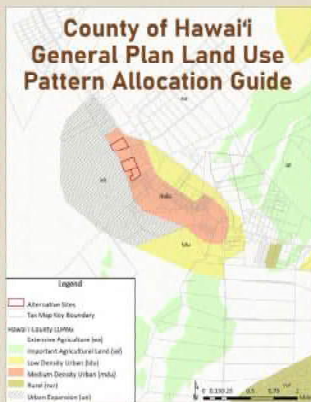
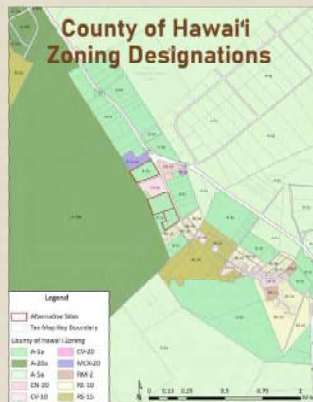
Long Term

They would have beneficial impacts by providing additional access to transportation services, the numerous resources associated with the State Public Library, and provide space to celebrate community arts and culture. Alternatives 1, 2, or 3 would be located within an existing commercial area and designed to be compatible with surrounding community character and planned growth patterns.

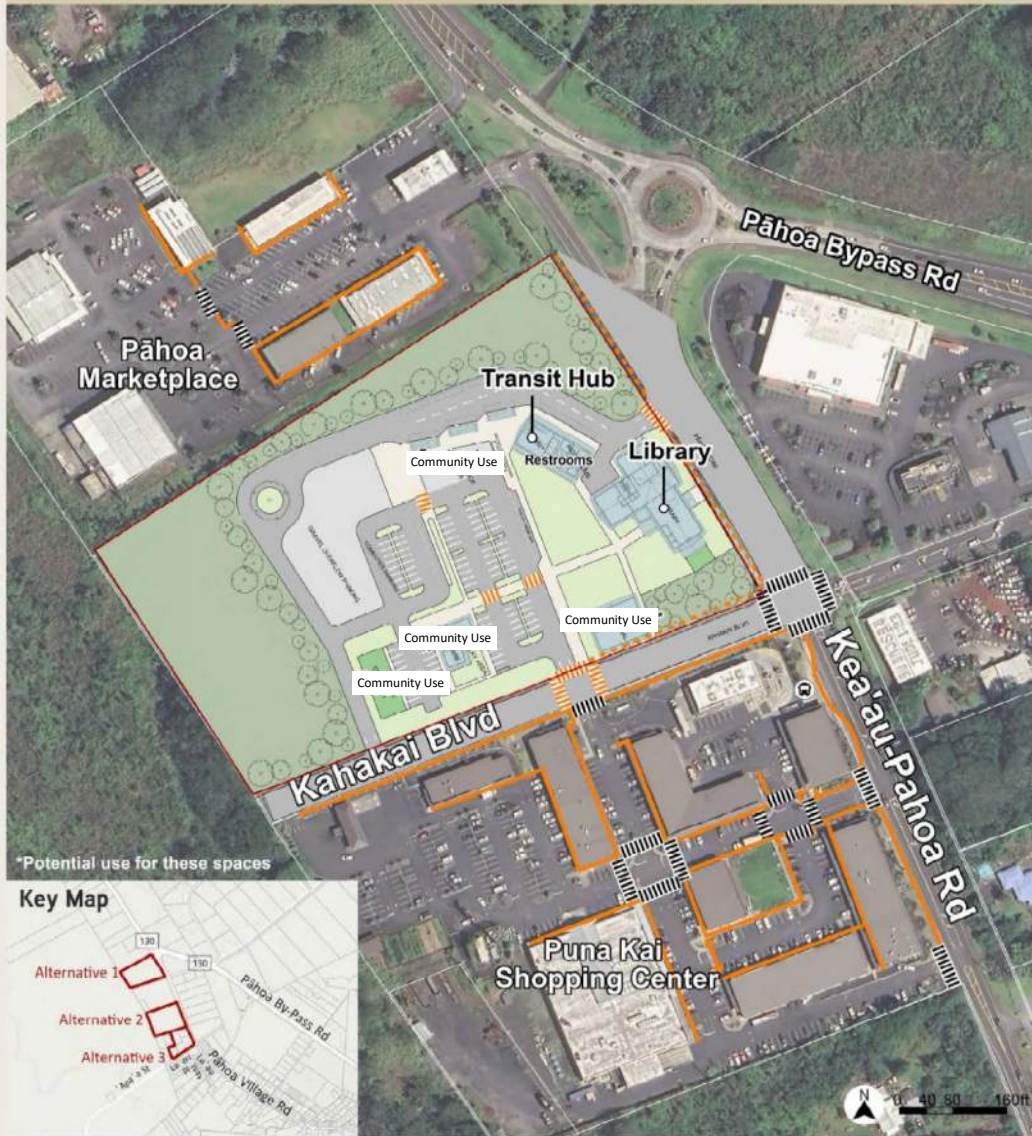
Relationship to Land Use Plans and Policies

Zoning and State Land Use Designation maps were used to ensure that the project on each of the three alternative sites would be consistent with County and State Land Use Regulations. The project was also looked at alongside existing community plans and policies such as the County of Hawai'i General Plan, the Puna Community Development Plan, and the County of Hawai'i Transit and Multi-Modal Transportation Master Plan, to ensure that it would contribute to long-term community goals and growth patterns.

Alternatives 1, 2, or 3 would propose land use that is complementary to nearby and adjacent shopping centers.



ALTERNATIVE 1 (PREFERRED ALTERNATIVE) CONCEPTUAL PLAN



Legend

- | | | |
|---------------------|---------------------------|---|
| Tax Map Key Parcels | Existing Sidewalk/Walkway | Possible Sidewalk with Development |
| Alternative Sites | Existing Crosswalk | Possible Walkway with Development |
| | Existing Bus Stop | Possible Crosswalk Marking with Development |

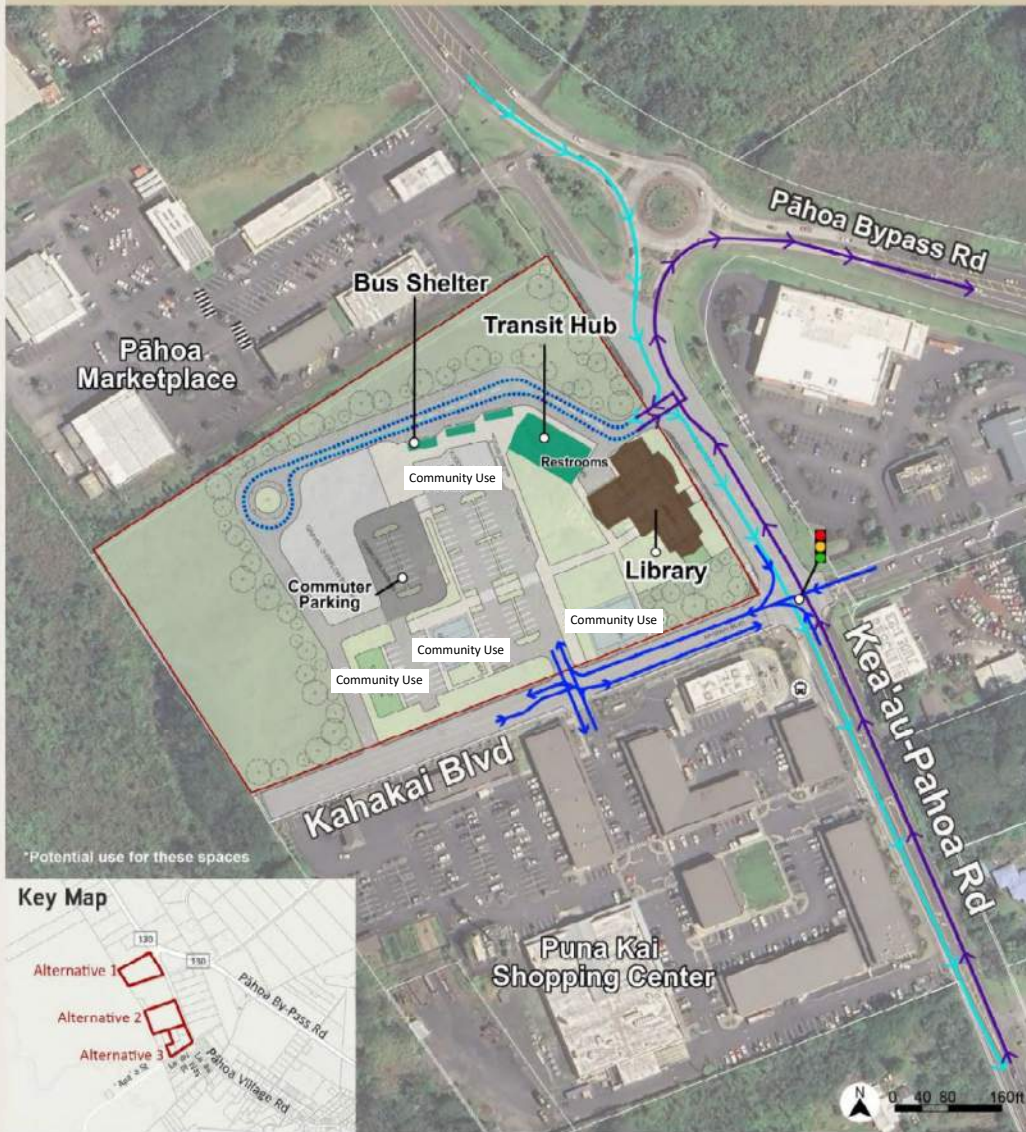
ALTERNATIVE 2 CONCEPTUAL PLAN



ALTERNATIVE 3 CONCEPTUAL PLAN



ALTERNATIVE 1 (PREFERRED ALTERNATIVE) CIRCULATION MAP



*Potential use for these spaces

Key Map



Legend

- | | | |
|---------------------|--------------------------------|-------------------------|
| Tax Map Key Parcels | Bus Circulation | Vehicular Circulation |
| Alternative Sites | NB Route (Route 401) | Signalized Intersection |
| | SB Route (Routes 40, 401, 402) | |
| | Existing Bus Stop | |

ALTERNATIVE 2 CIRCULATION MAP



ALTERNATIVE 3 CIRCULATION MAP



Appendix B – Comment Forms and Feedback Forms



Pāhoa Transit Hub and Library

Your input is important to us. Please write down any questions and comments you have on the Pāhoa Transit Hub and Library Draft Environmental Assessment below.

As a retired noise consultant (in S.F., CA) I'm disappointed that any library would be situated right next to the noisiest intersection within miles — and right next door to a bus hub!

Were any noise measurements actually conducted? So easy to gather such data with modern automatic technologies... I ride these bus routes very often and I know full well noise is inseparable from them. (It seems that county mass transit has noise, both interior and external) is a very low priority — even with new electric buses.

You may also read and comment on the Draft Environmental Assessment via our website at pahoatransithub.info or contact Heather Bartlett of our project team at hbartlett@ssfm.com.

Comments are due by May 1, 2024.





Pāhoa Transit Hub and Library

Your input is important to us. Please write down any questions and comments you have on the Pāhoa Transit Hub and Library Draft Environmental Assessment below.

Confused about EA coverage versus a Final design. What does EA cover, what does it explicitly not cover. What sorts of things do Final design finish off from EA.

You may also read and comment on the Draft Environmental Assessment via our website at pahoatransithub.info or contact Heather Bartlett of our project team at hbartlett@ssfm.com.

Comments are due by May 1, 2024.





Pāhoā Transit Hub and Library

Your input is important to us. Please write down any questions and comments you have on the Pāhoā Transit Hub and Library Draft Environmental Assessment below.

We need a Library; Please prioritize that!
Are the small bus routes set. Are these
going to be contracted or county operated
I think routes should be run by community
people. More good locate jobs

You may also read and comment on the Draft Environmental Assessment via our website at pahoatransithub.info or contact Heather Bartlett of our project team at hbartlett@ssfm.com.

Steve Sparks

Comments are due by May 1, 2024.





Pāhoa Transit Hub and Library

N.B. - I don't yet have internet at home so have been unable to be guided by your internet-based notifications.

Feedback Form:

1) How did you hear about this meeting?

one mention on a Hilo radio station (and nothing on H.P.R.)

2) Do you have suggestions for how to better distribute this information?

mini-posters on (at least) the #40 buses

3) Did the meeting provide information useful to you?

YES but kinda late NO
(for me - due to lack of notification of most prior meetings)

4) What do you want to tell us about it?

and this goes back, also, to the earlier hub-and-spoke decision making process -

which resulted in me personally being very much inconvenienced by the results.



Pāhoā Transit Hub and Library

Feedback Form:

1) How did you hear about this meeting?

Library people

2) Do you have suggestions for how to better distribute this information?

? good poster at the ^{Kohala} coffee shop - even

3) Did the meeting provide information useful to you?

YES good maps NO _____

more simple notices.
Thank you

4) What do you want to tell us about it?

I'm sorry I was late!



Pāhoa Transit Hub and Library

Feedback Form:

1) How did you hear about this meeting?

Big Island Video News email

2) Do you have suggestions for how to better distribute this information?

Facebook groups - (may have seen them there too)

3) Did the meeting provide information useful to you?

YES X NO _____

4) What do you want to tell us about it?



Pāhoa Transit Hub and Library

Feedback Form:

1) How did you hear about this meeting?

Greg Hans' newsletter, I think, Posted on Facebook groups

2) Do you have suggestions for how to better distribute this information?

IT gets out ok.

3) Did the meeting provide information useful to you?

YES Yes! NO _____

4) What do you want to tell us about it?

Super informative, thanks!



Pāhoa Transit Hub and Library

Feedback Form:

1) How did you hear about this meeting?

email from friend / facebook

2) Do you have suggestions for how to better distribute this information?

newspaper - flyers - posters in town - word of mouth

3) Did the meeting provide information useful to you?

YES _____ NO _____

Mahele for having this!

4) What do you want to tell us about it?

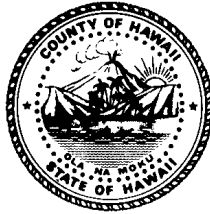
very important to get all this info out. Liked the diff speakers

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Appendix I
Draft Environmental Assessment
Comments and Responses

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Mitchell D. Roth
Mayor



Stephen M. Pause, P.E.
Director

Deanna S. Sako
Managing Director

Malia A. Kekai
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
public_works@hawaiiicounty.gov

APRIL 3, 2024

ATTN: JENNIFER SCHEFFEL
SSFM INTERNATIONAL, INC.
99 AUPUNI STREET, SUITE 202
HILO, HAWAII 96720
(via email to jscheffel@ssfm.com)

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR
PAHOA TRANSIT HUB AND LIBRARY
PUNA DISTRICT, ISLAND OF HAWAII
TMK: (3) 1-5-007:007, 005, 004, 076, 082, 083

We received the subject dated March 22, 2024 and have the following comments:

The subject parcels are in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA). Zone X is an area determined to be outside the 500-year floodplain.

All development-generated runoff shall be disposed of on site and not directed toward any adjacent properties. A drainage study shall be prepared and the recommended drainage system shall be constructed meeting the approval of the Department of Public Works.

All activities shall comply with the requirements of Hawaii County Code (HCC), Chapter 10, Erosion and Sedimentary Control.

Construction within the County right-of-way shall comply with HCC, Chapter 22, County Streets.

Should there be any questions concerning this matter, please contact Ms. Robyn Matsumoto in our Engineering Division at (808) 961-8924.

for 
ALAN K. THOMPSON, Division Chief
Engineering Division

RM

Response to the County of Hawai'i Department of Public Works, letter dated 4/03/2024:

The Mass Transit Agency (MTA) and Hawaii State Public Library System (HSPLS) acknowledges that the subject parcels are located in an area designated as Zone X on the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA), indicating that it is outside the 500-year floodplain.

MTA and HSPLS will ensure that all development-generated runoff is disposed of on site and not directed toward any adjacent properties. A drainage study will be prepared, and the recommended drainage system will be constructed to meet the approval of the Department of Public Works.

MTA and HSPLS will comply with the requirements of Hawaii County Code (HCC), Chapter 10, regarding Erosion and Sedimentary Control for all activities.

Any construction within the County right-of-way will comply with HCC, Chapter 22, concerning County Streets.

Thank you for your guidance and we will ensure compliance with all applicable regulations.

Jennifer Scheffel

From: DOH.CABPDTSS <DOH.CABPDTSS@doh.hawaii.gov>
Sent: Tuesday, April 9, 2024 9:07 AM
To: Jennifer Scheffel
Subject: Draft Environmental Assessment for the Pahoia Transit Hub and Library Project

Email received from **EXTERNAL** sender. Confirm the content is safe prior to opening attachments or links.

Agency: County of Hawaii Mass Transit Agency
Hawaii State Public Library System

Consultant: Jennifer Scheffel
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, HI 96720
jscheffel@ssfm.com
(808) 933-2727

Aloha,

Thank you for the opportunity to provide comments on the Draft Environmental Assessment for the Pahoia Transit Hub and Library Project located in the County of Hawaii. The Clean Air Branch (CAB) would like to make the following comments on the subject:

- For construction and other activities associated with the project, the applicable provisions of Hawaii Administrative Rules §11-60.1-33 shall be followed to mitigate fugitive dust impacts.
- Also, please see our standard comments at:

<https://health.hawaii.gov/cab/files/2022/05/Standard-Comments-for-Land-Use-Reviews-Clean-Air-Branch-2022-1.pdf>

Please let us know if you have any questions or concerns.

Thank you very much,
Colby Nagano
Engineer | Environmental Management Division | Clean Air Branch
Hawai'i State Department of Health | Ka 'Oihana Olakino
Hale Ola | 2827 Waimano Home Road, Room 130 | Pearl City, HI 96782
Office: (808) 586-4200 | Fax: (808) 586-5359

CONFIDENTIALITY NOTICE: This mail message (and attachments) is for the sole use of the intended recipient(s). It may contain confidential and/or privileged information. It might also be protected from disclosure under the Hawaii Uniform Information Practice Act (UIPA) or other laws and regulations. Review, use, disclosure, or distribution by unintended recipients is prohibited. If you are not the intended recipient, please contact the sender immediately in a separate e-mail and destroy the original message and any copies.

Response to the Department of Health, Clean Air Branch, letter dated 4/09/2024:

The Mass Transit Agency and Hawaii State Public Library System will employ best management practices to address and mitigate fugitive dust impacts during the construction of the project. Such measures shall be in full compliance of Hawaii Administrative Rules, Chapter 11-60.1-33.



STATE OF HAWAII
DEPARTMENT OF EDUCATION
KA 'OIHANA HO'ONA'AUAO
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF FACILITIES AND OPERATIONS

April 23, 2024

Ms. Jennifer Scheffel
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo Hawaii 96720

Re: Pahoia Transit Hub and Library
County of Hawaii Mass Transit Agency and the Hawaii State Public Library System
Tax Map Key Nos: (3)1-5-007:007, 005, 004, 076, 082, 083
Notice of Availability of Draft Environmental Assessment

Dear Ms. Scheffel:

Thank you for your letter dated March 22, 2024. The Hawaii State Department of Education previously provided comments on May 1, 2023, and has no additional comments.

Should you have any questions, please contact Cori China, Professional Worker for the Facilities Development Branch, Planning Section, at (808) 784-5080 or via email at cori.china@k12.hi.us.

We appreciate the opportunity to comment.

Sincerely,

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:ctc

c: Facilities Development Branch

Response to the Department of Education, letter dated 4/23/2024:

The Mass Transit Agency and Hawaii State Public Library System has noted that the Department of Education does not anticipate any significant impact on nearby educational institutions or services.

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 2, 2024

MEMORANDUM

FROM:

DLNR Agencies:

Div. of Aquatic Resources

Div. of Boating & Ocean Recreation

Engineering Division (DLNR.ENGR@hawaii.gov)

Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)

Div. of State Parks

Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)

Office of Conservation & Coastal Lands

Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO:

Russell Y. Tsuji, Land Administrator *Russell Tsuji*

SUBJECT:

Draft Environmental Assessment for **Pahoa Transit Hub and Library**

LOCATION:

Pahoa, Island of Hawaii; TMKs: (3) 1-5-007: 007, 005, 004, 076, 082, and 083

APPLICANT:

SSFM International on behalf of County of Hawaii Mass Transit Agency and Hawaii State Public Library System

Transmitted for your review and comment is information on the above-referenced subject matter. The DEA was published on March 23, 2024, by the State Environmental Review Program (formerly the Office of Environmental Quality Control) at the Office of Planning and Sustainable Development in the periodic bulletin, The Environmental Notice, available at the following link:

https://files.hawaii.gov/dbedt/erp/The_Environmental_Notice/2024-03-23-TEN.pdf

Please note that the consultant has extended the comment deadline; therefore, please submit any comments by **April 30, 2024**. If no response is received by this date, we will assume your agency has no comments. Should you have any questions, please contact Darlene Nakamura directly via email 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:

Lindsey Nietmann

Print Name: Lindsey Nietmann, Acting Wildlife Prog. Mgr.

Division: Forestry and Wildlife

Date: May 24, 2024

Attachments

cc: Central Files

Response to the Department of Transportation, letter dated 5/10/2024:

The Mass Transit Agency (MTA) and Hawaii State Public Library System (HSPLS) recognizes that Alternative 1 is the only site with frontage within the state highway jurisdiction, specifically on parcel 007; TMK No. (3) 1-5-007: 007 on Pahoia Village Road. Accordingly, this section of the highway is a controlled-access facility with limited or controlled right-of-access, having two permitted access locations approximately 40 feet wide. Our project team has reached out to the Hawaii District Office in a separate correspondence to coordinate both right-of-access locations and to address the level of service concerns identified in the Traffic Impact Analysis Report (TIAR). This consultation concluded that there was no need to update the project TIAR.

The MTA and HSPLS re-evaluated the TIAR study based on the 2023 Federal Highway Administration Manual on Uniform Traffic Control Devices, which will be adopted on October 1, 2024. This was found to have no substantial impact on the report analysis and conclusions reflected in a final version of the TIAR which will be found in Appendix E of the Final Environmental Assessment. The MTA and HSPLS will also ensure that a Permit to Perform Work Upon State Highways is obtained for any work within the state highway right-of-way.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



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DIVISION OF FORESTRY AND WILDLIFE
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HONOLULU, HAWAII 96813

May 24, 2024

Log no. 4504

MEMORANDUM

TO: RUSSELL Y. TSUJI, Administrator
Land Division

FROM: LINDSEY NIETMANN, Acting Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: Request for Comments on the Draft Environmental Assessment and Anticipated Finding of No Significant Impact for Pāhoa Transit Hub and Library, Pāhoa, Puna, Island of Hawai'i, Hawai'i.

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your request for comments on the Draft Environmental Assessment (DEA) and Anticipated Finding of No Significant Impact (AFONSI) for the proposed Pāhoa Transit Hub and Library in Pāhoa Village on the island of Hawai'i, within Tax Map Keys (TMK): (3) 1-5-007:007, 005, 004, 076, 082, 083. The County of Hawai'i Mass Transit Agency (MTA) and Hawai'i State Public Library System propose to construct a transit hub and public library with additional civic services and community amenities including a day care center and cultural center. The project considers four alternatives: Alternative 1 is on 9.572 acres on TMK (3) 1-5-007:007, Alternative 2 is on 10 acres on TMK: (3) 1-5-007:005, Alternative 3 is on 5.641 acres on four parcels TMKs: (3) 1-5-007:076, 004, 082, 083, and Alternative 4 is no action. Alternative 1 is crossed by a riverine habitat classified as R4SBC (riverine, intermittent, streambed, seasonally flooded) as delineated by the National Wetland Inventory. The MTA is coordinating with the Army Corps of Engineers to assess permitting needs and to ensure compliance with all applicable requirements. A biological survey was also completed for Alternatives 1, 2, and 3 in June 2023.

DOFAW concurs with the measures included in the DEA intended to avoid construction and operational impacts to State-listed species including the 'ōpe'ape'a or Hawaiian Hoary bat (*Lasiurus cinereus semotus*), 'io or Hawaiian Hawk (*Buteo solitarius*), ae'o or Hawaiian Stilt (*Himantopus mexicanus knudseni*), 'alae ke'oke'o or Hawaiian Coot (*Fulica alai*), nēnē or Hawaiian Goose (*Branta sandvicensis*), and seabirds. For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawai'i please visit

<https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf>. We also appreciate the measures outlined to minimize the movement of plant and soil material to prevent the spread of invasive species, for the use of native plant species, as well as the efforts to employ Best Management Practices during and after construction to contain any soils and sediment with the purpose of preventing damage to near-shore waters and marine ecosystems. DOFAW provides the following additional comments regarding the potential for the proposed work to affect listed species in the vicinity of the project area.

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.

DOFAW is concerned about impacts to vulnerable birds from nonnative predators such as cats, rodents, and mongooses. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles. In addition, no feeding of feral cats should occur on the premises.

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,

Lindsay Niemann

LINDSEY NIEMANN
Acting Wildlife Program Manager

Response to the Department of Land and Natural Resources Division of Forestry and Wildlife, letter dated 5/24/2024:

Per your guidance, the Mass Transit Agency (MTA) and Hawaii State Public Library System (HSPLS) have incorporated the concerns and recommendations provided by the Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) into Section 3.2 of the final Environmental Assessment.

The MTA and HSPLS are committed to ensuring the conservation of our native species and will continue to work with your office should the need arise throughout the project process.

Comment 1 Received from the April 17, 2024 Community Meeting:

As a retired noise consultant (In S.F. CA) I'm disappointed that any library would be situated right next to the noisiest intersection within miles – and right next door to a bus hub! Were any noise measurements actually conducted? So easy to gather such data with modern automatic technologies... I ride these bus routes very often and I know full well noise is inseparable from them. (It seems that county mass transit has noise, both interior and exterior) is a very low priority – even with electric buses.

Response:

Mahalo for your comments and for attending our April 26, 2024, community meeting for the Pāhoa Transit Hub and Library project. After careful review and consideration, the Mass Transit Agency (MTA) and Hawaii State Public Library System (HSPLS) have determined that noise pollution concerns related to the operation of the project are more applicable to the design of the buildings, notably the Pāhoa Library, than to overall environmental impacts.

In this instance, noise pollution levels are anticipated to be well within established federal and state regulatory limits for public uses in areas surrounded by busy intersections, roadways, and commercial zones. For concerns regarding the impact of the transit hub operation on the library, please be assured that the design process will prioritize noise isolation and minimization to ensure that activities in and around the library would be pleasant.

The MTA and HSPLS have incorporated your concerns into Section 3.9 of this Final Environmental Assessment and will continue to keep your comments in mind throughout the design process.

Comment 2 Received from the April 17, 2024 Community Meeting:

We need a library; please prioritize that! Are the small bus routes set? Are they going to be contracted or county operated? I think routes should be run by community people. More good local jobs

Response:

Mahalo for your comments and for attending our April 26, 2024, community meeting for the Pāhoā Transit Hub and Library project. Current and future bus routes are listed in the County of Hawai'i Multi-Modal Transportation Master Plan. The Mass Transit Agency (MTA) recognize the value of having routes run by community members and the potential for creating good local jobs and is hopeful that this project would support that in many ways.

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