Draft Environmental Assessment

Pohoiki Road and Highway 137 Road Repair and Water Line Installation

County of Hawai‘i, Hawai‘i

DR-4366-HI PW-55 and PW-53

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FEMA

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Acronyms and Abbreviations

Acronym	Definition
A.D.	Anno Domini
ALISH	Agricultural Lands of Importance to the State of Hawai‘i
APE	area of potential effect
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DHS	Department of Homeland Security
DLNR	Hawai‘i Department of Land and Natural Resources
DPW	County of Hawai‘i Department of Public Works
DWS	County of Hawai‘i Department of Water Supply
EA	environmental assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographical Information Systems
HAR	Hawai‘i Administrative Rules
HI-EMA	Hawai‘i Emergency Management Agency
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHO	Native Hawaiian Organization
NLAA	not likely to adversely affect
NRCS	Natural Resources Conservation Service
PA	Public Assistance
RCRA	Resource Conservation and Recovery Act
ROD	Rapid ‘Ōhi‘a Death
SHPD	Hawai‘i State Historic Preservation Division
USFWS	U.S. Fish and Wildlife Service

1 Introduction

The County of Hawai‘i Department of Public Works (DPW) and the County of Hawai‘i Department of Water Supply (DWS) both applied to the U.S. Department of Homeland Security’s Federal Emergency Management Agency (FEMA) through the Hawai‘i Emergency Management Agency (HI-EMA) for funding to repair roads and install water lines under FEMA’s Public Assistance (PA) Program. HI-EMA is the direct Applicant for the grants, and DPW and DWS are the Subapplicants.

The PA Program provides assistance to state, territorial, tribal, and local governments, as well as private nonprofit organizations, so that communities can respond to and recover from major presidentially declared disasters. The 2018 Kīlauea eruption resulted in the presidentially declared disaster FEMA-DR-4366-HI, dated May 11, 2018.

DPW proposes to realign and reconstruct approximately 9.1 miles of County roads that were inundated with lava from the 2018 Kīlauea volcano eruption in the easternmost portion of the island to bring them back to their pre-disaster function. DWS proposes to install water lines along approximately 7.8 miles of the same County roads. The two projects are collectively referred to as the Proposed Action. **Table 1** summarizes the project components and proposed improvements. **Figure 1** in **Appendix A** shows the project area and location map.

Table 1. Proposed Project Components and Improvements

Section	Location Description (Coordinates)	Length of Road Improvements	Length of Water Line Installation	Proposed Improvements
Pohoiki Road	Intersection of Pohoiki Road and Highway 132 to intersection of Pohoiki Road and Highway 137 (19.480953, -154.903204 to 19.460427, -154.843547)	23,315 feet (4.4 miles)	23,500 feet (4.5 miles)	Realign and reconstruct road, install water line
Leilani Avenue	Along Leilani Avenue between Kahukai Street and Pohoiki Road (19.471849, -154.89259 to 19.469645, -154.894254)	1,000 feet (0.2 mile)	Not Applicable	Reconstruct road
Highway 137 (north, Kalapana-Kapoho Beach Road)	Along Highway 137 from Pohoiki Road to the intersection with Highway 132 and Kumukahi-Lighthouse Road (19.460504, -154.843569 to 19.507936, -154.834805)	18,000 feet (3.4 miles)	17,400 feet (3.3 miles)	Realign and reconstruct road, install water line
Kapoho Beach Road	Along road from Highway 137 (19.502695, -154.833576)	60 feet (0.01 mile)	75 feet (0.01 mile)	Reconstruct road and install water line

Section	Location Description (Coordinates)	Length of Road Improvements	Length of Water Line Installation	Proposed Improvements
Moani Street	Along road from Highway 137 (19.498548, -154.83332)	25 feet (0.005 mile)	Not Applicable	Reconstruct road
Pua O Kapoho Street	Along road from Highway 137 (19.49516, -154.833228)	25 feet (0.005 mile)	Not Applicable	Reconstruct road
Kapoho Kai Drive	Along road from Highway 137 (19.49169, -154.833115)	25 feet (0.005 mile)	Not Applicable	Reconstruct road
Kumukahi-Lighthouse Road	Along road from intersection of Highways 132 and 137 (19.507936, -154.834805 to 19.508319, -154.832218)	892 feet (0.2 mile)	Not Applicable	Reconstruct road
Highway 137 (near MacKenzie State Recreation Area, Kalapana-Kapoho Beach Road)	Along Highway 137 near MacKenzie State Recreation Area (19.450334, -154.851667 to 19.441317, -154.861427)	4,850 feet (0.9 mile)	Not Applicable	Reconstruct road

This environmental assessment (EA) was prepared to evaluate the Proposed Action (i.e., both the DPW and DWS projects) in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations [CFR] Parts 1500 to 1508), U.S. Department of Homeland Security Instruction 023-01-001, and FEMA Instruction 108-01-1, NEPA implementing procedures. FEMA is required to consider potential environmental impacts before funding or approving actions and projects. The purpose of this draft EA is to analyze the potential environmental impacts of the Proposed Action. FEMA will use the findings in this draft EA to determine whether to prepare an environmental impact statement or to issue a Finding of No Significant Impact (FONSI).

Section 428 of the Robert T. Stafford Relief and Emergency Assistance Act (42 U.S. Code 5189f), as amended, authorizes FEMA to provide specific exemptions, or "Alternative Procedures," to PA Program regulations, allowing Subapplicants to drive their own recovery. Subapplicants are allowed flexibility in meeting their post-disaster recovery needs (as opposed to being limited to rebuilding the infrastructure that existed before the disaster). Subapplicants may propose an "alternate" project for disaster recovery funding if the public welfare would be better served by an action other than restoration of the damaged facilities to their pre-disaster design. The 428 Alternative Procedure grant funds are capped and based on an agreed-upon amount in a fixed cost estimate. The County applied to FEMA for an alternate project. The alternate project would realign some inundated roads and install inundated water lines in the project area rather than returning them to their pre-disaster location and would also realign and install water lines along part of Pohoiki Road that was not inundated with lava. FEMA would provide funding for the project as authorized under Section 428 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-707, as amended.

2 Purpose of and Need for Action

For approximately 35 years leading up to April 2018, Kīlauea had been erupting at the Halemaʻumaʻu crater in the Kīlauea Caldera at the summit of Kīlauea volcano. Approximately 10 years before April 2018, Kīlauea also began erupting at Puʻuʻōʻō, a volcanic cone on the East Rift Zone. On April 30, the crater floor of Puʻuʻōʻō collapsed, resulting in the lava lake at Kīlauea summit to drop. Magma drained from the summit of the volcano and moved underground to the East Rift Zone, as tracked by a series of earthquakes.

The first fissure erupted on May 3, 2018, in the residential subdivision of Leilani Estates. Ten additional fissures opened within and near the subdivision between May 3 and May 6, and by May 15 the total number of fissures had increased to 24. On May 4, 2018, a 6.9 magnitude earthquake struck the island and magma continued to move to the East Rift Zone. Over the next 4 months, lava flows moved overland to the southeast and northeast toward the ocean. In August 2018, scientists determined that the eruption had ended. **Figure 2** in **Appendix A** shows the Halemaʻumaʻu crater, Puʻuʻōʻō, the East Rift Zone, and lava cover. **Figure 3** in **Appendix A** shows fissure locations, buildings affected by lava, hardened lava cover, as well as the roads and water lines damaged in the project area.

The volcanic eruption resulted in 875 acres of new land added to the island where the lava flowed into the ocean. Lava flows covered 13.7 square miles of land. Over 723 structures were destroyed, including 612 homes, displacing approximately 2,000 residents. **Photo 1** in **Appendix B** shows lava flow through agricultural lands in the project area.

On May 10, 2018, Hawaiʻi Governor David Y. Ige requested a major disaster declaration due to the eruption and earthquakes. The event was confirmed as presidentially declared disaster DR-4366-HI on May 11, 2018, thereby committing federal assistance to eligible state and local governments and private nonprofit organizations for the repair or replacement of facilities damaged by the eruption and earthquakes.

The County proposes to recover from damage to the transportation network and water utilities caused by the 2018 volcanic eruption and resulting overland lava flows in the Puna district of the Island of Hawaiʻi. The purpose of the project is to reconnect areas isolated by hardened lava to the rest of the island, allowing traffic flow to resume, property owners to recover from the disaster, and residents and visitors to enjoy the recreational areas. In addition, an important objective of the project is to provide emergency response services access to this area, provide multiple emergency evacuation routes, and improve economic stability by providing improved access to homes, businesses, and agricultural lands in the project area.

The project is needed to address three primary concerns in the project area after the 2018 volcanic eruption:

- Inaccessible Roads: The lava flows damaged 6.7 miles of roads in the project area, completely isolating homes, recreational areas, and agricultural fields within and near the project area. After the eruption, the County rebuilt a temporary road across the hardened lava on Highway 137 near MacKenzie State Recreation Area, providing a single access route to the project area for response and recovery operations, and as an emergency evacuation route. A single road to or from the project area does not meet the Department

of Homeland Security (DHS) and U.S. Department of Transportation (USDOT) Transportation System Sector's mission to "continuously improve the security and resilience posture of the Nation's transportation systems in order to ensure the safety and security of travelers and goods," specifically Goal 2 related to improving community resilience (DHS and USDOT 2015).

- Unusable Water Lines: The lava flows damaged 5.9 miles of water lines in the project area. The DHS and U.S. Environmental Protection Agency's (EPA's) Water and Wastewater Systems Sector-Specific Plan describes access to drinking water as "essential to modern life and the Nation's economy" and it is therefore imperative to "enhance the security and resilience of the Nation's drinking water … infrastructure" (DHS and EPA 2015). Without public drinking water service to and through the project area, economic development is restricted, and this part of the island remains unprepared for potential future disasters.

- Economic Recovery Including Access to Recreational Coastline Areas: Hardened lava is as high as approximately 65 feet above the original elevation in some parts of the project area, burying agricultural fields and recreational areas, limiting the economic success of the region as well as access to the recreational coastline areas.

Photo 2 through **Photo 4** in **Appendix B** show the extent of the hardened lava flow across and along the project area roads. **Figure 3** in **Appendix A** shows the roads and water lines that were inundated by hardened lava in 2018. **Figure 4** in **Appendix A** shows the thickness of hardened lava from the 2018 eruption in the project area.

3 Alternatives

This section describes the No Action alternative, the Proposed Action, and alternatives that were considered but dismissed.

3.1 No Action Alternative

The No Action alternative is included in this EA to describe potential future conditions if no additional action is taken. Under this alternative, no FEMA-funded road or water line improvements would be conducted in this hardened lava-inundated area of the island. The project area would remain disconnected from the road network, roads would remain impassable because of the hardened lava inundation, and future development—including redevelopment to pre-disaster conditions—would not occur.

3.2 Proposed Action

The County of Hawai‘i proposes to implement two projects that are geographically connected:

1. Realign and reconstruct approximately 9.1 miles of roads to bring them back to their pre-disaster function (Subapplicant: DPW)
2. Install water lines along approximately 7.8 miles of roads (Subapplicant: DWS)

The two projects, collectively referred to as the Proposed Action, are described in more detail in the following sections.

3.2.1 Project Location

The Proposed Action would be conducted in the Puna district of Hawai‘i along approximately 9.1 miles of former and existing roads. The project components and proposed improvements are summarized in **Table 1**. **Figure 5a through Figure 5c** in **Appendix A** show the project components and proposed improvements.

In addition to the County right-of-way, the work would take place on 55 private parcels adjacent to the County right-of-way. Additional right-of-way would be needed to accommodate the road realignments along Pohoiki Road and Highway 137, grading of the hardened lava from the 2018 eruption to create appropriate roadside slopes, and the water line trench along Pohoiki Road.

3.2.2 Realign and Reconstruct Roads (Subapplicant: DPW)

DPW proposes to reconstruct approximately 9.1 miles of roads in the project area (**Figure 1** in **Appendix A**). Some of the roads would be realigned, in addition to being reconstructed, to avoid important vegetation and/or meet current design standards. **Figure 5a through Figure 5c** in **Appendix A** show the current and proposed road realignments.

Along road sections covered by hardened lava from the 2018 eruption, the road surface would be constructed on top of the hardened lava and would change elevation to follow the grade of the naturally hardened lava. The hardened lava would be graded as needed outside of the roadway to maintain a 1:1 slope adjacent to the roadway and to provide a safe roadway condition for drivers. Stormwater would be directed to the roadway shoulders along the side of the road. Along sections where there is no hardened lava inundation, the road would be widened to meet current design standards. The road widening would be outside of the original roadway footprint in some areas. The widest disturbance of hardened lava would be approximately 70 feet on either side of the road to create a roadway shoulder with appropriate slopes; along most of the alignment, the width of hardened lava disturbance would be less than 20 feet from the edge of the pavement.

Along the eastern portion of Pohoiki Road, approximately 7,000 feet of road (from 19.467539, -154.863231 to 19.460427, -154.843547) would be realigned, or shifted south by approximately 50 to 200 feet, and would run along the edge of an existing agricultural field. This realignment would minimize impacts to the exceptional mango trees that form a canopy over the existing Pohoiki Road in this area. The old alignment would be left in place for use by bike riders and pedestrians (as part of a later, separate project).

Road sections along Pohoiki Road and Highway 137 would be paved to be 34 feet wide with two 5-foot-wide unpaved shoulders. The total depth of the roadway, including crushed sub-base, base, and asphalt, would be 17 inches. After paving is complete, the roadway would be striped, and signage would be installed. **Figure 6** in **Appendix A** shows a typical cross-section for the roadwork.

Along Highway 137, a 60-foot-long section (or “stub-out”) would be paved to the east of Highway 137 along Kapoho Beach Road. Stub-outs that extend to the edge of the County right-of-way would be paved along Moani Street, Pua O Kapoho Street, and Kapoho Kai Drive to allow for future development. The stub-outs would be paved to be 20 feet wide with two 5-foot-wide unpaved shoulders. The total depth of the roadway, including crushed sub-base, base, and

asphalt, would be 17 inches. After paving is complete, the roadway would be striped, and signage would be installed.

Along the westernmost 88 feet of Kumukahi-Lighthouse Road, the paved roadway would be 34 feet wide with two 5-foot-wide unpaved shoulders. Along the remaining 804 feet of the improvements along Kumukahi-Lighthouse Road, the road would be unpaved and 40 feet wide. The total depth of the paved roadway, including crushed sub-base, base, and asphalt, would be 17 inches.

3.2.3 Install Water Lines (Subapplicant: DWS)

DWS proposes to install water lines along Pohoiki Road and the northern portion of Highway 137; approximately 7.8 miles of water lines would be installed. Water lines would be installed along the northern side of Pohoiki Road from just east of the intersection of Pohoiki Road and Highway 132 to the intersection of Pohoiki Road and Highway 137. The water line would then cross Highway 137 and run along the eastern side of Highway 137 to Kapoho Beach Road. A length of 75 feet of water line will be installed along Kapoho Beach Road. Water lines would not be installed on Leilani Avenue, the side streets connecting to Highway 137 (Kumukahi-Lighthouse Road, Moani Road, Pua O Kapoho, and Kapoho Kai Drive), nor along Highway 137 near MacKenzie State Recreation Area. **Figure 5a through Figure 5c** in **Appendix A** show where the water lines would be installed.

Along most of the alignment, trenches would be excavated, and water lines would be installed under the unpaved shoulder of the road, just outside the travel lane. Along Pohoiki Road, ductile iron pipe with a 6-inch inner diameter would be installed and along Highway 137, ductile iron pipe with either a 4-inch or 6-inch inner diameter would be installed. The pipe would be placed in the trench with 6 inches of compacted base course above and below the pipe. There would be a minimum of 2 feet of cover over the pipe. The total depth of trench excavation would be approximately 3 feet. **Figure 7** in **Appendix A** shows a typical cross-section for water line installation.

The water line would be installed under two existing 24-inch culverts along Highway 137 north of Pohoiki Road. Depending on the amount of cover available, the water line may be routed to the east or west side of the roadway in this area. A concrete jacket (10 inches of concrete surrounding the pipe to increase structural stability) may be used if needed to route the water line near one or both culverts. The minimum vertical clearance between the water line and other utilities would be 12 inches if a concrete jacket is used, and 18 inches if a concrete jacket is not used. **Figure 5c** in **Appendix A** shows culvert locations.

In road sections where the remnant heat of the hardened lava is too high to install water lines underground (such as along the western portion of Pohoiki Road near the fissures), the water line would be installed in a V-shaped riprap trench, which would widen the project footprint 16 feet north. The V-shaped riprap trench would allow heat to continue to dissipate from the hardened lava while allowing the water line to be installed and operated. To allow for private property access, the V-shaped riprap trench will be bridged by a roadway. **Figure 8** in **Appendix A** shows a typical cross-section for the V-shaped riprap trench water line installation.

Fire hydrants would be installed along the water line at appropriate intervals. DWS proposes to add 10-foot-long laterals to connect to adjacent properties. The laterals would be within the existing and newly acquired right-of-way.

3.2.4 Construction

Right-of-Way Acquisition

To implement the road realignments, the County would purchase portions of 55 private properties adjacent to the existing road footprint; portions of 26 private properties would be purchased along Pohoiki Road and Leilani Avenue, and portions of 29 private properties would be purchased along Highway 137. Properties would be purchased through a combination of voluntary sales and eminent domain. No structures would be acquired.

Construction Staging and Access

The County proposes to stage equipment within the existing road footprint and on eight construction staging areas on parcels owned by the County near the project area. Some excavation may be needed to level the hardened lava from the 2018 eruption on the parcels to accommodate staging, storage, and stockpiling activities. Excavation would be no more than 5 feet deep and would not extend into previously undisturbed ground under the hardened lava from the 2018 eruption. **Figures 5a** through **5c** in **Appendix A** shows the construction staging areas.

The project area would be accessed using open local roads including Highway 132 and Highway 137. The contractor would implement a traffic control plan to manage traffic and maintain safety protocols during construction. The contractor would be required to keep one travel lane open in each direction all day; from 2:30 p.m. to 9 a.m. traffic would be allowed to flow at the posted speed limit. The contractor would perform their work in a manner that minimizes congestion. The contractor would provide and install all travel control devices in conformance with the current edition of the Federal Highway Administration's "Manual on Uniform Traffic Control Devices for Streets and Highways."

Construction Methods

Construction methods would be determined by the construction contractor and subject to permit conditions. All work would be performed in accordance with the State's "Hawai‘i Standard Specifications for Road and Bridge Construction," dated 2005, as revised, and the Hawai‘i Department of Transportation, Highways Division, Standard Plans, dated 2008.

The County anticipates needing the following construction equipment for the duration of the main construction period: excavators, bulldozers, hydraulic impact hammers, backhoes, loaders, graders, dump trucks, compactors or rollers, an asphalt paver, rock crushers, rock haulers, and water trucks.

The County anticipates using the rock crushers to crush excavated hardened lava to create base course material to be used onsite. Some fill may need to be brought in from an on-island, pre-existing and permitted quarry site depending on the hardened lava temperature and gradation. Excavated asphalt concrete base and sub-base material would be transported to the designated stockpile location at the Highway Maintenance quarry site. Demolition and excess excavation

material that cannot be accepted at the Highway Maintenance quarry site would be disposed of at the West Hawai‘i Landfill.

Some roadside vegetation, including trees, may need to be cleared along the eastern portion of Pohoiki Road where the road would be realigned. Woody plants greater than 15 feet tall would not be disturbed, removed, or trimmed during the Hawaiian hoary bat (*Aeorestes semotus*) birthing and pup rearing season (June 1 through September 15). Trees containing Hawaiian hawk or ‘Io (*Buteo solitarius*) nests would not be trimmed or cut at any time. Vegetation removal would be limited to areas immediately adjacent to paved surfaces to minimize impacts on Blackburn’s sphinx moth (*Manduca blackburni*).

A new roadbed would be created along the eastern portion of Pohoiki Road where the road would be realigned. This area was not inundated by lava and grading to create the roadbed would extend up to 5 feet below the existing ground surface in order to create a smooth continuous base for the road surface. New roadbeds would also be graded into pre-2018 lava in places where the new roadway would connect to existing roads and where post-2018 lava is not present. Roadbeds are created by grading with a road grader and equipment such as bulldozers.

The contractor would remove silt and debris that results from grading drainage facilities, roadways, and other areas. The contractor would be required to develop a grated inlet erosion control plan. In addition, the contractor would be required to install temporary sediment control filters at grated drain inlets and catch basins, sandbag barriers, sand snakes (monofilament weave bag filled with sand or gravel providing a sediment barrier), stabilized construction entrances, and temporary sediment straw wattles. A site-specific, best management practices (BMP) plan would be prepared.

The contractor would prevent and control spills of petroleum products. The contractor would be required to dispose of hazardous materials as specified by local or state regulations. The contractor would be required to follow good housekeeping BMPs and would prepare a Materials Pollution Prevention Plan, Hazardous Material Pollution Prevention Plan, an Onsite and Offsite Product-Specific Plan (relating to petroleum-based products, fertilizers, paints, and concrete trucks), and a Spill Control Plan.

The contractor would be required to implement temporary dust control measures, including dampening the site at the end of each day.

Schedule and Project Duration

Phase 1 of project construction would begin with road reconstruction along Kumukahi-Lighthouse Road, as well as Highway 137 from the intersection with Highway 132 to Kapoho Beach Road and is anticipated to take 9 months. Phase 2 would begin approximately 3 months after the start of Phase 1. Phase 2 would include road reconstruction and water line installation along Pohoiki Road and is anticipated to take 18 months. Phase 3 would start approximately 3 months after Phase 2 begins. Phase 3 would include road reconstruction and water line installation along Highway 137 from Kapoho Beach Road to Pohoiki Road and is anticipated to take 12 months. Phase 4 would begin once Phases 1, 2, and 3 are complete. Phase 4 would include road reconstruction along Highway 137 near MacKenzie State Recreation Area and is anticipated to take 7 months. The total project is anticipated to take 32 months to finalize the

project design, obtain right-of-way access, and complete construction, as shown on **Figure 9** in **Appendix A**.

Construction would take place up to 7 days per week from 7 a.m. to 7 p.m. Construction would not occur at night; therefore, artificial lighting would not be used.

3.2.5 Maintenance

Follow-up maintenance is not part of the proposed federal grant funding; however, it is a requirement of the grant award and may be considered an effect of the Proposed Action. Maintenance activities associated with the roads and water lines would include standard activities such as cleaning road shoulders after large storms, clearing rubbish, and patching potholes. Debris and rubbish collected during maintenance activities would be taken to a permitted landfill. Maintenance activities would be completed by DPW and DWS on their respective systems.

3.3 Additional Action Alternatives Considered and Dismissed

An alternative to the proposed project would be to excavate the hardened lava down to the pre-2018 hardened lava elevation and reconstruct the roads and water lines at their original elevation. This alternative, however, would require substantial additional excavation and grading as compared to the Proposed Action and would consequently be prohibitively expensive. Also, because the hardened lava is still very hot in places and is expected to remain hot for many more years, this alternative would not be feasible throughout the project area. This alternative would not allow adjacent properties that are now at the post-2018 elevation to easily connect to the road grade. This alternative would not meet the purpose and need.

Another alternative to the proposed project would be the continued use or expansion of temporary roads in the project area. At this time, a temporary road is in place along the southern portion of Highway 137 near MacKenzie State Recreation Area; however, this road does not provide access to all areas served by the Proposed Action. This temporary road does not meet the County's current design standards for road width and construction (i.e., safety and durability). Creating new temporary roads to provide access to the remainder of the project area would not be feasible given the depth of the hardened lava. Grading would be needed to install such temporary roads and the effort and impacts would be similar to the Proposed Action. This alternative would not meet the purpose and need.

4 Affected Environment, Potential Impacts, and Mitigation

This section describes the environment potentially affected by the alternatives, evaluates potential environmental impacts, and recommends measures to avoid or reduce those impacts. When possible, quantitative information is provided to establish potential impacts. Potential impacts are evaluated qualitatively based on the criteria listed in **Table 2**. The study area generally includes the project area and access and staging areas needed for the Proposed Action. If the study area for a particular resource category is different from the project area, the differences will be described in the appropriate subsection.

Table 2. Evaluation Criteria for Potential Impacts

Impact Scale	Criteria
None or Negligible	The resource area would not be affected, or changes or benefits would be either nondetectable or, if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.
Minor	Changes to the resource would be measurable, although the changes would be small and localized. Impacts or benefits would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects.
Moderate	Changes to the resource would be measurable and have either localized or regional-scale impacts or benefits. Impacts would be within or below regulatory stands, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary, and the measures would reduce any potential adverse effects.
Major	Changes would be readily measurable and would have substantial consequences on a local or regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, although long-term changes to the resource would be expected.

4.1 Resources Not Affected and Not Considered Further

The resources identified in **Table 3** would not be affected by either the No Action alternative or the Proposed Action because they do not exist in the project area, or the alternatives would have no effect on the resources. These resources were removed from further consideration in this EA.

Table 3. Resources Eliminated from Further Consideration

Resource Topic	Reason for Elimination
Wild and Scenic Rivers	According to the National Wild and Scenic Rivers System map, there are no designated wild and scenic rivers in the State of Hawai‘i; therefore, the alternatives would have no effect on wild and scenic rivers (National Wild and Scenic Rivers System 2022).
Sole Source Aquifers	According to the EPA’s sole source aquifer map, there are no sole source aquifers designated on the Island of Hawai‘i; therefore, the alternatives would have no effect on sole source aquifers (EPA 2022e).
Coastal Barrier Resources Act	According to the U.S. Fish and Wildlife Service (USFWS), there are no defined Coastal Barrier Resources Units in the State of Hawai‘i; therefore, the alternatives would have no effect on Coastal Barrier Resources Units (USFWS 2022a).

4.2 Geology, Topography, and Soils

The Island of Hawai‘i is evidence of a long history of volcanic eruptions. The area near Kumukahi-Lighthouse Road was inundated by lava in 1960, and then the 2018 volcanic eruption covered approximately one-third of the project area. Both the 1960 and 2018 eruptions extended the island’s shoreline near the project area. The topography of the project area is gently sloping down towards the ocean, with Ka Wai O Pele (also known as Green Lake, which is a hill) near the intersection of Highways 132, 137, and Kumukahi-Lighthouse Road.

There are six soil map units in the project area (NRCS 2022):

- Pohoiki Road is comprised of complex lava flows, 2 to 20 percent slopes; Opihikao highly decomposed plant material, 2 to 20 percent slopes; ʻaʻa lava flows, 2 to 20 percent slopes; and Malama extremely cobbly highly decomposed plant material, dry, 2 to 40 percent slopes.
- The northern portion of Highway 137, from Pohoiki Road to Kumukahi-Lighthouse Road, is comprised of complex lava flows 2 to 20 percent slopes.
- The southern portion of Highway 137, near MacKenzie State Recreation Area, is comprised of ʻaʻa lava flows, 2 to 20 percent slopes and Opihikao highly decomposed plant material, dry, 2 to 20 percent slopes.
- The Kumukahi-Lighthouse Road area is comprised of pahoehoe lava flows, 2 to 20 percent slopes.

The Farmland Protection Policy Act requires federal agencies to minimize the unnecessary conversion of farmland into non-agricultural uses. The Natural Resources Conservation Service (NRCS) does not consider any of the project area to be prime farmland; however, approximately 95.4 acres of the project area is identified as Agricultural Lands of Importance to the State of Hawaiʻi (ALISH), or farmland of statewide importance. Approximately 9.2 acres of ALISH is covered by the 2018 lava flow, 0.5 acres are ALISH-designated as "unclassified," and 85.7 acres are ALISH-classified as "other lands" (Hawaiʻi Statewide GIS Program 2022b). The agricultural fields along the eastern portion of Pohoiki Road are currently fallow but are designated for papaya production (Hawaiʻi Statewide GIS Program 2022a). This agricultural property is accessed from Pohoiki Road.

4.2.1 No Action Alternative

Under the No Action alternative, there would be no change to the existing geology or topography; there would be no impacts from the No Action alternative on geology or topography.

Under the No Action alternative, there is limited access to farmland (for agricultural purposes) in and near the project area because of the existing narrow roadways and hardened lava inundation in the project area. No ALISH would be converted as part of the No Action alternative; however, access to these lands would be limited. Therefore, there would be no impact on farmland from the No Action alternative.

4.2.2 Proposed Action

Implementation of the Proposed Action would involve minor alterations to topography by grading the hardened lava to reconstruct the roadway. The widest disturbance of hardened lava would be approximately 70 feet on either side of the road center to create a roadway shoulder with appropriate slopes; along most of the alignment, the width of hardened lava disturbance would be less than 20 feet from the edge of the pavement. Grading would vary along the alignment depending on the depth of hardened lava and road design with a maximum disturbance depth of 5 feet. The road has been designed to minimize the amount of grading as much as possible. The scope and scale of the alterations to topography from the project are minimal

compared to the changes resulting from the 2018 lava inundation. The Proposed Action would therefore result in no short-term and minor long-term impacts on geology or topography.

Under the Proposed Action, approximately 86.2 acres of farmland would be converted to non-agricultural (transportation) uses along the eastern portion of Pohoiki Road. The Subapplicant selected an alignment through agricultural land that avoids the exceptional mango trees that grow along Pohoiki Road and are protected by a state statute and local County ordinance. Although the Proposed Action would convert farmland into non-agricultural uses, farming would still be viable in this area. The improved roadways in the project area would benefit agriculture in the project area because the wider roadways would allow larger vehicles to access the remaining agricultural land; the eastern portion of Pohoiki Road has become overgrown with large trees, limiting the size of vehicles that are able to pass. Because some farmland would be permanently converted to non-agricultural land, there would be minor short- and long-term impacts on farmland.

In compliance with the Farmland Protection Policy Act, FEMA filed a Farmland Conversion Impact Rating for Corridor Type Projects Form (form NRCS-CPA-106) with NRCS on August 11, 2022. NRCS responded on September 1, 2022, noting that given the total rating of the project using the form, no further consideration is required.

4.3 Visual Quality and Aesthetics

The analysis of visual quality is a qualitative analysis that considers the visual context of implementing the project, potential for changes in character and contrast, the number of people who can view the site and their activities, and the extent to which those activities are related to the aesthetic qualities of the area.

Approximately one-third of the project area was inundated by the 2018 volcanic eruption and is now covered with as much as 65 feet of hardened lava. The area that was not inundated by hardened lava is primarily along the eastern portion of Pohoiki Road. The existing road itself is a densely vegetated tunnel of mango trees and other vegetation, while the areas adjacent to the road are primarily fallow agricultural fields.

4.3.1 No Action Alternative

Under the No Action alternative, there would be no change to the visual aesthetics of the project area. There would be no changes to the existing hardened lava, Pohoiki Road, or the adjacent agricultural fields. Therefore, there would be no impact on visual quality and aesthetics from the No Action alternative.

4.3.2 Proposed Action

During construction of the Proposed Action, residents and drivers through the project area will see construction equipment and temporary silt fencing. The silt fencing is required for sediment control, is made from filter fabric, and can be up to 3 feet high. The Proposed Action would therefore have minor short-term impacts on visual quality and aesthetics.

As part of the Proposed Action, roads would be paved on top of the hardened lava. In some locations, the hardened lava would be graded to maintain a 1:1 slope adjacent to the roadway to provide a safe roadway condition for drivers. Along the portions of the project where there is

hardened lava from the 2018 eruption, the reconstructed roads and graded hardened lava throughout the project area would be a minimal change to the character and context compared to existing conditions (inundated lava) for residents and drivers through the project area. The project would allow drivers along Highway 137 to obtain views of the coastline compared to existing conditions.

Along the eastern portion of Pohoiki Road, the Proposed Action would be realigned to the south and cut through an open, fallow agricultural field rather than sending drivers through the existing Pohoiki Road, which is a tunnel of dense vegetation and exceptional mango trees. The Proposed Action would therefore have minor long-term impacts on visual quality and aesthetics.

4.4 Air Quality and Climate

The Clean Air Act, amended in 1990, requires EPA to set National Ambient Air Quality Standards for six pollutants harmful to human and environmental health, including ozone, particulate matter, nitrogen dioxide, carbon monoxide, sulfur dioxide, and lead. According to the EPA's Green Book (2022b), Hawai‘i County is currently in attainment for all criteria pollutants. In other words, Hawai‘i County currently meets EPA's National Ambient Air Quality Standards and does not exceed pollution levels for any of the criteria pollutants.

"Climate change" refers to changes in the Earth's climate caused by a general warming of the atmosphere. Its primary cause is emissions of greenhouse gases, including carbon dioxide and methane. Climate change can affect species distribution, temperature fluctuations, and weather patterns. The CEQ's *Final NEPA Guidance on Consideration of Greenhouse Gas Emissions and the Effects on Climate Change* (CEQ 2016) suggested that quantitative analysis should be done if an action would release more than 25,000 metric tons of greenhouse gases per year.

The climate in the project area is mild, with an annual high temperature of 81 degrees Fahrenheit, and an annual low temperature of 67 degrees Fahrenheit. The average annual precipitation is approximately 126 inches per year, with November as the wettest month, averaging more than 15 inches during the month (U.S. Climate Data 2022).

The average annual air temperature in Hawai‘i is increasing at approximately 0.3 degrees Fahrenheit per decade. Rainfall has declined over the past 30 years, and Hawai‘i is anticipated to experience more drought and heavy rains, which could cause flash flooding, infrastructure damage, runoff, and sedimentation. Sea surface temperatures have increased over the past 40 years, and the rate of increase is expected to accelerate, with temperatures increasing an additional 2.3 to 4.9 degrees Fahrenheit before the end of the century. Sea level rise has also increased over the last century at approximately 0.5 to 1.3 inches per decade. Sea level is expected to continue to rise 1 to 3 feet by the end of this century (University of Hawai‘i Sea Grant College Program 2014).

4.4.1 No Action Alternative

Under the No Action alternative, there would be no road improvements and consequently no change to the number of vehicles traveling the project area roads. There would be no change to air quality. The No Action alternative would not affect climate change. There would be no impact on air quality and climate from this alternative.

4.4.2 Proposed Action

Construction of the Proposed Action would require the use of heavy equipment, which would negatively impact air quality in the project area because of emissions from travel to the project site and use during construction. During construction of the Proposed Action, contractors would comply with state and federal guidance regarding vehicle and equipment idling times to minimize emissions. Construction work would be done in conformance with the Air Pollution Control Rules of the State Department of Health to control the release of particulates as fugitive dust (Hawai‘i Administrative Rules [HAR] 11-60.1, Fugitive Dust). The Proposed Action would therefore have minor short-term impacts on air quality from vehicle and equipment use and activities contributing to the release of fugitive dust.

Although there is a temporary road in place along the section of Highway 137 near MacKenzie State Recreation Area, implementation of the Proposed Action would allow vehicles to travel more freely to and though the project area (particularly along Pohoiki Road and the northern stretch of Highway 137, which are currently blocked by hardened lava), increasing the amount of pollutants emitted compared to current conditions. Given the amount of construction as well as typical traffic anticipated to pass through the project area after construction is complete, construction and implementation of the project would release less than CEQ's threshold of 25,000 metric tons of greenhouse gases per year, and a quantitative greenhouse gas analysis is not needed. In addition, as electric vehicles become more common, emissions are expected to decrease.

The Proposed Action would not be affected by projected sea level rise, and the Proposed Action would not affect sea level rise. The Proposed Action would therefore have minor long-term air quality impacts from increased traffic flow to and through the project area.

4.5 Surface Waters and Water Quality

The Clean Water Act of 1977, as amended, establishes requirements for states and tribes to identify and prioritize waterbodies that do not meet water quality standards. The project area spans two watersheds: Kaimū Beach and Puna Forest Reserve. EPA identifies four waterbodies within these two watersheds: Kapoho Bay, Kapoho Tidepools (Vacationland), Ahalanui Pond (Puala'a), and Pohoiki Beach (Bay) (EPA 2022c). The Hawai‘i State Department of Health Clean Water Branch, in their 2022 State of Hawai‘i Water Quality Monitoring and Assessment Report lists these four water bodies as "dry" because they were inundated by the 2018 eruption (Hawai‘i State Department of Health 2022).

Chapter 11-54 of the HAR addresses Water Quality Standards. MacKenzie State Recreation Area is classified as inland Class 1 water and the shoreline near the project area is classified as marine Class AA. The objective of inland Class 1 water is to "remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. To the extent possible, the wilderness character of these areas shall be protected." The objective of marine Class AA is similar, with the objective to "remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected."

The water line along Highway 137 just north of Pohoiki Road would cross two existing stormwater drainage culverts, as shown on **Figure 5c** in **Appendix A**.

4.5.1 No Action Alternative

Under the No Action alternative, access to Pohoiki Bay would continue to be limited, with the only route available from Highway 137 from the south. The No Action alternative would have negligible impacts on surface waters and water quality.

4.5.2 Proposed Action

Construction work would be done in conformance with the applicable provisions of the HAR Chapter 11-54 (Water Quality Standards) and Chapter 11-55 (Water Pollution Control), the erosion and sedimentation control standards and DPW guidelines, and the Hawai‘i Department of Transportation (HDOT) Construction Best Management Practices Field Manual. Therefore, the Proposed Action would have negligible short-term impacts on surface waters and water quality.

The Proposed Action would not cross surface waterbodies within the Kaimū Beach and Puna Forest Reserve watersheds, and there would be no in-water work. By reconstructing the project roads, there would be increased access to Pohoiki Bay from Pohoiki Road and from Highway 137 from the north and south; however, impacts on surface waterbodies related to increased usage of Pohoiki Bay would be negligible. Therefore, the Proposed Action would have negligible long-term impacts on surface waters and water quality.

4.6 Coastal Resources

The Hawai‘i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands oversees land use conservation regulations to protect watersheds and water supplies; preserve scenic areas; provide park lands, wilderness, and beach reserves; conserve endemic plants, fish, and wildlife; prevent floods and soil erosion; and other related activities. The Office of Conservation and Coastal Lands designates Conservation Districts and Subzones, as regulated by HAR 13-5 and Chapter 183C of the Hawai‘i Revised Statutes. There are five subzones, the first four of which are arranged in order of environmental sensitivity from high to low: Protective, Limited, Resource, and General. The fifth subzone is Special, which is for unique land uses on specific sites. To the east of the northern section of Highway 137 the project area abuts a Resource subzone that runs along the coast. The HAR states that the objective of the Resource subzone is “to ensure, with proper management, the sustainable use of the natural resources of those areas.” Kumukahi-Lighthouse Road runs along Limited and General subzones (Hawai‘i DLNR 2012). The HAR states that the objective of the Limited subzone is “to limit uses where natural conditions suggest constraints on human activities,” and the objective of the General subzone is “to designate open space where specific conservation uses may not be defined, but where urban use would be premature.” The project area also abuts a Special Management Area (SMA) as defined by the Hawai‘i Revised Statues Chapter 205A, the Coastal Zone Management law. The SMA permitting system provides for “the effective management, beneficial use, protection, and development of the Coastal Zone.”

4.6.1 No Action Alternative

Under the No Action alternative, there would be no change to coastal resources. Access would be limited because of the hardened lava from the 2018 eruption. Impacts on coastal resources would be negligible under the No Action alternative.

4.6.2 Proposed Action

During construction of the Proposed Action, stormwater controls, including a stormwater pollution prevention plan, would be implemented to minimize potential impacts on coastal areas, such as runoff to the coastline. The Proposed Action would therefore have negligible short-term impacts on coastal resources. An SMA permit is not required due to the nature of the project.

The Proposed Action would be consistent with the goals of the conservation regulations by protecting watersheds and water supplies (**Section 4.5**). It would provide additional access to scenic areas and beaches. Exceptional mango trees along the eastern portion of Pohoiki Road would be avoided. The Proposed Action would therefore have long-term benefits to coastal resources.

4.7 Wetlands

Executive Order (EO) 11990, Protection of Wetlands requires federal agencies to consider alternatives to work in wetlands and limits potential impacts on wetlands if there are no practicable alternatives. FEMA regulation 44 CFR Part 9, Floodplain Management and Protection of Wetlands sets forth the policy, procedures, and responsibilities to implement and enforce EO 11990 and prohibits FEMA from funding activities in a wetland unless no practicable alternatives are available.

According to the USFWS National Wetland Inventory maps, no wetlands are present within the project area. The wetland feature nearest to the project area that was not affected by the 2018 lava inundation is a small 0.6-acre forested/shrub wetland approximately 0.7 miles southwest of Pohoiki Road in the Leilani Estates area (USFWS 2022h).

4.7.1 No Action Alternative

There are no wetlands in the project area; therefore, the No Action alternative would have no impact on wetlands. Wetland areas near the project area would not be affected by the No Action alternative.

4.7.2 Proposed Action

There are no wetlands in the project area; therefore, the Proposed Action would have no short- or long-term impacts on wetlands. Wetland areas near the project area would not be affected by the Proposed Action.

4.8 Floodplains

EO 11988, Floodplain Management requires federal agencies to avoid, to the extent possible, short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is

a practicable alternative. FEMA regulations (44 CFR Part 9.7) use the 1-percent annual chance flood as the minimal area for floodplain impact evaluation.

Pohoiki Road is shown on FEMA Flood Insurance Rate Map (FIRM) panel 1551661435F, effective September 29, 2017 (FEMA 2022a). A portion of the project area lies within Zone D, an area of undetermined flood hazard.

Kumukahi-Lighthouse Road and the northern extent of Highway 137 are shown on FEMA FIRM panel 1551661204F, effective September 29, 2017 (FEMA 2022a). These areas do not fall within the 1-percent floodplain.

The southern extent of Highway 137 is shown on FEMA FIRM panel 1551661212F, effective September 29, 2017 (FEMA 2022a). Portions of the project area along Highway 137, north of Pohoiki Road, are within Zone AE, the 1-percent floodplain. Base flood elevations in this area range from 0 to approximately 19 feet.

Highway 137 near MacKenzie State Recreation Area is shown on FEMA FIRM panel 1551661213F, effective September 29, 2017 (FEMA 2022a). Portions of the project area are within Zone AE, the 1-percent floodplain. Base flood elevations where the floodplain intersects with the former alignment of Highway 137 are approximately 20 feet.

All areas within Zone D and the 1-percent floodplain are in areas that were inundated by the 2018 lava flow. The floodplain maps were all created before the 2018 eruption and do not present existing conditions. The hardened lava raised the land elevation by as much as 65 feet on Highway 137 north of Pohoiki Road, and approximately 20 feet along by the stretch of Highway 137 near MacKenzie State Recreation Area. This lava inundation raised the ground surface elevation above the base flood elevation and, consequently, the project area—specifically, where the road and water lines would be installed—is no longer within the floodplain. Because flood risk throughout the project area is related to coastal flooding and high tides, and the ground level is now higher from the lava inundation, ocean-based floodwater can no longer reach the project area. **Photo 5** in **Appendix B** shows lava inundation along ocean's edge near the northern portion of Highway 137.

4.8.1 No Action Alternative

The project area is no longer within the floodplain because of lava inundation that has raised the ground surface above the base flood elevation; therefore, the No Action alternative would have no impact on floodplains.

4.8.2 Proposed Action

The project area is no longer within the floodplain because of lava inundation that has raised the ground surface above the base flood elevation; therefore, the Proposed Action would have no short-or long-term impacts on floodplains.

4.9 Vegetation

The project site is situated within the Hawaiian lowland rainforest ecological system. This system in most areas has been substantially altered by invasive species and human activities (Stone and Stone 1988), which is also the situation for the project location. Vegetation for all of

Hawai‘i was mapped for the Carbon Storage of Hawai‘i project (U.S. Geological Survey 2017). The associated Geographical Information Systems (GIS) data was used to determine the areas covered by different vegetation types in the project Action Area, which is the term used for impact analysis for all biological resources and defined here as the project construction and staging area footprint plus a buffer distance of 250 feet **(Figure 10** in **Appendix A)**. Adjustments were made to the data to remove the areas inundated by lava in 2018 and the results for different vegetation types, totaling 300 acres, are shown in **Table 4**. Areas that were covered by hardened lava from the 2018 eruption have no to minimal vegetation. The vegetated areas are covered with a mix of native and alien vegetation types and agricultural and minimal vegetation areas. The primary vegetation community types characterized by native plants in the project area are those dominated by the endemic ‘ōhi‘a (*Metrosideros polymorpha*) tree, a foundational species in Hawaiian forests and a colonizer of recent lava flows. The open ‘ōhi‘a mesic forest at the project site occurs closer to the coast than the closed wet forest that is further inland where conditions are more favorable. The understory in open mesic ‘ōhi‘a forests is often dominated by the native staghorn fern uluhe (*Dicranopterus linearis*), which covers the ground thickly and can prevent other plants from establishing themselves there (Russell et al. 1998). Uluhe fern is present in the understory of the ‘ōhi‘a forest in the project area. Alien vegetation and agricultural/minimal vegetation areas are the primary vegetation types in the Action Area.

Table 4. Vegetation Types in the Project Action Area

Vegetation Category	Vegetation Type	Area (acres)
Native	Closed ‘ōhi‘a mesic forest	3.1
Native	Closed ‘ōhi‘a wet forest	0.2
Native	Open ‘ōhi‘a mesic forest	15.9
Native	Open ‘ōhi‘a wet forest	4.2
Native	Native mesic shrubland	8.4
Native	Native wet shrubland	1.6
Alien	Alien wet forest	7.3
Alien	Alien mesic forest	39.5
Alien	Alien wet shrubland	2.7
Alien	Alien mesic shrubland	14.3
Alien	Alien wet grassland[1]	12.8
Alien	Alien mesic grassland[1]	94.7
Agricultural or minimal	Cultivated agriculture[2]	60.0
Agricultural or minimal	Developed open space	6.7
Agricultural or minimal	Low intensity developed	20.2
Agricultural or minimal	Very sparse vegetation to unvegetated	8.0

[1] Areas mapped as alien grassland may currently have scattered shrubs.

[2] Areas mapped as cultivated agriculture may not be actively farmed and possibly have vegetation consisting of various alien shrubs and grasses.

Source: USGS 2017

In November and December 2022 field surveys were conducted within the project potential disturbance footprint, a more limited area than the Action Area, to assess the extent of the ‘ōhi‘a

forest and any other native vegetation. The ʻōhiʻa forest within the footprint occurs only along Pohoiki Road and totaled 3.1 acres of open ʻōhiʻa forest and 0.3 acres of closed ʻōhiʻa forest. No other native vegetation types were observed within the footprint.

Along the eastern portion of Pohoiki Road, overarching the existing roadway, are many large mango (*Mangifera indica*) trees. These trees are well known on the Island of Hawaiʻi and have been designated Exceptional Trees under Hawaiʻi Act 105 – The Exceptional Tree Act and are protected further under County Ordinance 938, Chapter 14, Article 10. The law was passed in 1975 because it was recognized that rapid development had led to the destruction of many of the State's exceptional trees. The Act recognizes that trees are valuable for their beauty, and that they provide crucial ecological functions.

Other common non-native trees that are evident along roadsides in the area are the invasive gunpowder tree (*Trema orientalis*), guava species (*Psidium spp.*), Guinea grass (*Panicum maximum*) and various other grasses, and the introduced Polynesian candlenut or kukui (*Aleurites moluccana*), kamani (*Calophyllum inophyllum*), and Noni (*Morinda citrifolia*). The native screw pine or hala (*Pandanus tectorius*) is also mixed in with these non-native species.

4.9.1 Invasive Species

EO 13112 requires federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species cause.

The Hawaiian lowland forest is dominated by non-native (alien) plant species nearly everywhere in the state (Cuddihy and Stone 1990), including in most of the project Action Area. Many of these non-native species are highly invasive. Highly invasive plant species in the project Action Area, in addition to those mentioned in the previous discussion, include Koster's curse (*Clidemia hirta*), a designated noxious weed under HAR Chapter 4-68 (Noxious Weeds), Albizia (*Falcataria moluccana*), and Strawberry Guava (*Psidium cattleianum*), the latter two are listed by the Hawaiʻi Invasive Species Council (2022).

A relatively recent phenomena, Rapid ʻŌhiʻa Death (ROD) is a fungal disease (*Ceratocystis fimbriata*) affecting ʻōhiʻa (Fortini et al. 2019), the dominant native tree in forests of the project region and in other areas of the state. Because of the severe threat to this dominant native tree and its associated ecosystems, an amendment to HAR Chapter 4-72 was enacted that places a quarantine on movement of ʻōhiʻa or soil from ROD-infested areas.

4.9.2 No Action Alternative

Under the No Action alternative, vegetation would not be changed from its present conditions; therefore, the No Action alternative would have no impact on vegetation.

4.9.3 Proposed Action

The Proposed Action would occur primarily in areas covered by the 2018 lava flows where no vegetation or some scattered early colonizing common plants are present. Where the lava did not flow and destroy the vegetation, approximately 11 percent of the 300 acres in the project Action Area are native-dominated based on the existing statewide vegetation mapping. Only a fraction of this project Action Area consists of the project construction footprint where vegetation may be

affected and includes a total of 3.4 acres of ʻōhiʻa forest. Consequently, only a small amount of native vegetation could potentially be removed adjacent to the existing roadway corridor. Along the eastern portion of Pohoiki Road where the new roadway would be moved outside of its existing corridor, the entire area is dominated by non-native vegetation, including mango, kamani, and kukui trees. Any vegetation clearing that would be required would be strictly limited to that which is necessary for project completion. Based on the small amount of removal of native vegetation, there would be minor long-term impacts from removal of vegetation. Given the local cultural significance of kukui trees **(Section 4.12**), archaeological monitors during project construction will be aware of their location and aim to minimize impacts to them.

The spread of invasive plant species due to construction activities would be prevented by following the specific avoidance and minimization measures that are described in the Programmatic Standard Local Operating Procedures for the Hawaiian and Pacific Islands (USFWS 2021c). The specific procedures that would apply to the project for impacts on vegetation are those related to biosecurity and preventing the spread of ROD and Rat Lungworm Disease. Refer to **Appendix C** for the complete description of these procedures. With implementation of these measures, there would be minor impacts on vegetation from invasive species due to construction activities. Long-term impacts from invasive species due to increased use of the roads and greater public access would result in minor impacts on native vegetation.

4.10 Terrestrial and Aquatic Wildlife

The faunal groups evaluated for this project include birds, mammals, reptiles, and invertebrates that may occur in the project Action Area or its general vicinity. Species listed under the federal Endangered Species Act are discussed separately in the next section of this EA. The impact analysis considers both direct and indirect effects. Direct impacts are associated with construction or operation and usually involve habitat loss or injury or mortality to species. Indirect impacts are caused by or result from project-related activities such as from lighting, noise, pollutants, or introduction and spread of invasive species or diseases.

The project area includes bird species protected under the Migratory Bird Treaty Act (MBTA). The MBTA of 1918, as amended (16 U.S. Code 703–712), which provides protection for migratory birds and their nests, eggs, and body parts. It prohibits harm, possession, sale, or other injurious actions, except under the terms of a valid permit issued pursuant to federal regulations. Under current interpretation this includes incidental as well as intentional harm. All migratory native birds are protected by the MBTA, and this includes native Hawaiian species potentially present in the project area. Existing habitat in the project area has the potential to support bird species protected by the MBTA as described in the following discussion.

The project area is not mapped as a Region of Conservation Importance under the Birdlife International Important Bird Area designations. The nearest Important Bird Area is the Mauna Loa-Kīlauea Forests which are west of Highway 130 (Birdlife International 2022). However, several species of birds that are likely to occur in the project area are of particular note because they are listed as USFWS Birds of Conservation Concern, which are a set of species that have been determined to warrant special attention. These include the following three species:

- Apapane (*Himatione sanguinea*), breeds December 1 to July 31
- Hawaiʻi ʻAmakihi (*Hemignathus virens*), breeds November 15 to August 15

- Black Noddy (*Anous minutus melanogenys*), breeds April 1 to November 30

The first two listed are native forest birds that may be present in portions of the project Action Area that have native forest, approximately 23 acres out of the total 300-acre project Action Area. The Black Noddy is a seabird that occurs primarily close to the coastline.

Camp et al. (2019) studied the two forest Birds of Conservation Concern in the Puna region in connection with the rapid ʻōhiʻa death outbreak in the Puna area. Overall, they described the habitat loss and degradation and the introduction of invasive pathogens, predators, and competitors that led to the near complete extirpation of native forest birds from the lowlands of Hawaiʻi with the exception of the Hawaiʻi ʻAmakihi and Apapane, where ʻōhiʻa forests are still present. In surveys comparing numbers from 2003 to 2004 to 2016 ʻAmakihi and Apapane were much less common in 2016. Camp et al. (2019) estimated the density of ʻAmakihi in 2016 where ʻōhiʻa was present was 1.23 birds per hectare (0.5 birds per acre). Apapane density was not estimated due to their much lower numbers in both time periods. The Cornell Lab of Ornithology eBird database for Isaac Kepoʻokalani Hale Beach Park (the only designated "hotspot" for the general project area shown on the eBird map) had the last record for the Hawaiʻi ʻAmakihi in early 2022 and the last record for the Apapane as April of 2018 (eBird 2022b).

The Black Noddy is a seabird that feeds in ocean waters and in coastal ponds and, in the main Hawaiian islands, nests on sea cliffs (Pyle and Pyle 2017). On the Island of Hawaiʻi, the population is estimated at 2,000 breeding pairs (Pyle and Pyle 2017). It was last reported at Isaac Kepoʻokalani Hale Beach Park in June 2022 (eBird 2022b).

The ʻio, or Hawaiian hawk (*Buteo solitarius*) is an endemic Hawaiian raptor that is state-listed as endangered and was recently delisted (February 2020) under the federal Endangered Species Act by the USFWS. The eBird database contains 32 observations of the ʻio since the start of 2018 in the general area of the project (within approximately 3 miles) from the various project components (eBird 2022a).

Other native birds protected by the MBTA reported on eBird (2022b) at Isaac Kepoʻokalani Hale Beach Park since 2016 are: Hawaiʻi elepaio (*Chasiempis sandwichensis*; last observed on April 20, 2018); Bulwer's petrel (*Bulweria bulwerii*; last observed on June 25, 2022); Pacific golden plover (*Pluvialis fulva*; last observed on February 14, 2022); Wedge-tailed shearwater (*Ardenna pacifica*; last observed on March 28, 2022); Wandering tattler (*Tringa incana*; last observed on October 27, 2020); Great frigatebird (*Fregata minor*; last observed on October 27, 2020); Ruddy turnstone (*Arenaria interpres*; last observed on Feb 17, 2020); White-tailed tropicbird (*Phaethon lepturus*; last observed on April 20, 2018); and the Short-eared owl (*Asio flammeus sandwichensis*; last observed on Oct 31, 2016).

The online NatureServe page for the Hawaiʻi Lowland Rainforest ecological system (NatureServe 2022) lists an insect, the ʻōhiʻa long-horned woodborer (*Plagithmysus bilineatus*), with a NatureServe Global Status at G1 (indicating critical imperilment on a global basis). This species bores into and sometimes kills the native ʻōhiʻa tree, often after it has been weakened by other stressors (Friday and Herbert 2006). It is unknown whether the species is currently present in or near the project location. A literature review for the presence of the species in the Puna region found only one study from the late 1970s (Papp and Samuelson 1981) that documented its occurrence at a site there.

No other rare or special-designation species (other than the species listed in **Section 4.11**) of invertebrates are known from the project area.

Other non-native invertebrates reported in the area include three non-native butterfly species. These reports are from research-grade observations in the iNaturalist database (iNaturalist 2022) for the general project area. The three species are the monarch (*Daneus plexippus*), sleepy orange (*Abaeis nicippe*), and lesser grass blue (*Zizina otis*).

Aquatic species potentially present near the project Action Area include those found in anchialine pools, which are brackish water pools connected underground to the ocean and groundwater. A group of these pools has formed behind the black sand/stone beach at Isaac Kepoʻokalani Hale Beach Park after the 2018 eruption. According to a news release from DLNR – Division of Aquatic Resources (DLNR 2022b), seven pools were confirmed in late 2019 at Pohoiki, and small shrimp endemic to Hawaiʻi that live in anchialine pools have been observed there. One species named in the referenced news release is the ʻōpaeʻula (*Halocaridina rubra*). The distribution of this species of anchialine pool shrimp is widespread in Hawaiʻi (DLNR 2015). More recently the anchialine pool shrimp have not been seen, probably due to the increased water temperatures measured according to state surveys (Sakihara, Pers. Comm. 2022).

4.10.1 Invasive Species

The project is in the Hawaiian lowland rainforest ecological system where the fauna in most areas (as well as the vegetation) has been drastically altered by invasive species and human activities (Stone and Stone 1988; Cuddihy and Stone 1990). In addition to invasive plants, other disturbances in Hawaiʻi's lowlands include feral pigs that disturb soils and vegetation, introduced birds that compete for food with native birds and spread invasive plant seeds, and invertebrates (especially noted as destructive are various ant species) that prey upon native species or cause diseases.

Because invasive species are widespread and abundant in lowlands of the Island of Hawaiʻi, the project location would have numerous species of fauna considered invasive. These include the following species that are included in HAR Chapter 13-124, List of Species of Injurious Wildlife in Hawaiʻi: coqui frog (*Eleutherodactylus coqui*), little fire ant (*Wasmannia auropunctata*), and small Indian mongoose (*Herpestes javanicus*).

In the forest bird studies by Camp et al. (2019), the most abundant non-native forest bird species reported was the Japanese white-eye (*Zosterops japonicus*) with an estimated density in 2016 of 21 birds per hectare (8.5 birds per acre), which was approximately the same in habitats with or without ʻōhiʻa. Other abundant non-native bird species documented in the study area were the Northern cardinal (*Cardinalis cardinalis*) and the House sparrow (*Heamorhous mexicanus*).

4.10.2 No Action Alternative

Under the No Action alternative, no disturbance from construction or operation related to the proposed project would take place and current conditions would be maintained. Consequently, there would be no impact on terrestrial wildlife or aquatic species evaluated in this EA section.

4.10.3 Proposed Action

The Proposed Action could remove a small amount of native forest dominated by ʻōhiʻa through construction activities. This forest type is used by the two native forest birds that are designated Birds of Conservation Concern, the Hawaiʻi ʻAmakihi and Apapane. Although much of the region is dominated by non-native forests, there are still substantial areas with native ʻōhiʻa trees in the general project region. For comparison purposes, estimates of an average home range for the Hawaiʻi ʻAmakihi varied from 1.1 acre (van Riper 1987) to 9.2 acres (Fukunaga et al. n.d.) and for the Apapane an average home range determined was 395 acres (Smetzer et al. 2021). Removal of a small amount of ʻōhiʻa forest would result in a minor impact on these two bird species or other native forest bird species that might use the area.

For the Hawaiian hawk, foraging occurs over large areas and nesting could occur in the project area. To avoid impacts several avoidance and minimization measures would be employed as recommended in recent guidance by USFWS (2022g). If work is to be conducted during the Hawaiian hawk breeding season of March 1 through September 30, a biologist familiar with the species would conduct a nest search of the project footprint and surrounding areas immediately before the start of construction activities. Surveys would be considered valid for 2 weeks, after which another survey would be completed. Clearing of vegetation or construction activities would not occur within 1,600 feet of any active Hawaiian hawk nest during the breeding season until the young have fledged. Throughout the year trimming or cutting trees containing a hawk nest would not occur because nests are sometimes re-used during consecutive breeding seasons. With this avoidance measure, impacts on the Hawaiian hawk would be minor.

Black noddies occur along the coast in the project area and may nest in sea cliffs in the region. Given their breeding location and diet, there would be no impact from project actions.

Other native birds protected under the MBTA are either uncommonly observed in the project region (Hawaiʻi elepaio and Short-eared owl [Pueo]), are abundant in many areas of Hawaiʻi (Pacific golden plover [Kolea] and Wedge-tailed shearwater), and/or use habitat that would not be affected by the project (Wedge-tailed shearwater, Wandering tattler, White-tailed tropicbird, Great frigatebird, Ruddy turnstone, and Bulwer's petrel). Impacts on these species would not occur or would be minor.

The ʻōhiʻa long-horned woodborer, described as an imperiled species by NatureServe, is potentially present in the project area. Removal of a small amount of ʻōhiʻa trees that may harbor the beetle, given the large number of ʻōhiʻa trees in the project region, would result in a minor impact on the species.

The spread of invasive faunal species would be prevented by following the specific avoidance and minimization measures that are described in the Programmatic Standard Local Operating Procedures for the Hawaiian and Pacific Islands (USFWS 2021c). The specific procedures that apply for impacts on fauna are those related to biosecurity and preventing the spread of Little Fire Ants. Refer to **Appendix C** for the complete description of these procedures. With implementation of these measures, impacts on fauna in the project area from invasive species would be minor.

Because of the increased traffic and use of the area due to the roadway being opened to areas currently inaccessible by vehicle, there would be more general disturbance and increased

potential for spread of invasive species that would result in minor long-term impacts on bird species protected by the MBTA and other native faunal species potentially present.

4.11 Threatened and Endangered Species and Critical Habitat

The Endangered Species Act (ESA) of 1973 gives USFWS and the National Marine Fisheries Service authority for the protection of threatened and endangered species. This protection includes a prohibition on direct take (e.g., killing, harassing) and indirect take (e.g., destruction of habitat).

The ESA defines the Action Area as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR 402.02). Therefore, the Action Area where effects on listed species must be evaluated may be larger than the areas where project construction activities would occur. The project Action Area used for this analysis was defined to include the greatest identified extent of potential impacts and was set at 250 feet beyond the project construction and staging footprint.

The USFWS Information for Planning and Consultation system was used to identify proposed, threatened, and endangered species potentially present in the project area or in areas potentially affected by project activities. The Information for Planning and Consultation list was subsequently reviewed and refined by staff of the Pacific Islands Fish and Wildlife Office. The final species list is provided in **Table 5** and the species are discussed in this section. FEMA submitted a letter for informal consultation to USFWS on August 9, 2022. USFWS responded on January 30, 2023, concurring with FEMA's determination that the project may affect but is not likely to adversely affect the federally listed species in **Table 5**; with the implementation of Service-recommended avoidance and minimization measures, the potential for adverse effects to the listed species is insignificant. The consultation documentation, which includes project-specific avoidance and minimization measures is included in **Appendix C**.

Table 5. Federally Listed Species Identified by USFWS as Potentially Present in the Project Area

Common Name	Scientific Name	Status (ESA)	Impact Determination
ʻōpeʻapeʻa or Hawaiian Hoary Bat	*Lasiurus cinereus semotus*	Endangered	NLAA
ʻuaʻu or Hawaiian Petrel	*Pterodroma sandwicensis*	Endangered	NLAA
ʻakēʻakē or Band-rumped Storm-Petrel	*Oceanodroma castro*	Endangered (Hawaiʻi distinct population segment)	NLAA
ʻaʻo or Newell's Shearwater	*Puffinus auricularis newelli*	Threatened	NLAA
Nēnē or Hawaiian Goose	*Branta sandvicensis*	Threatened	NLAA
aeʻo or Hawaiian Stilt	*Himantopus mexicanus knudseni*	Endangered	NLAA
ʻalae keʻokeʻo or Hawaiian Coot	*Fulica alai*	Endangered	NLAA

Common Name	Scientific Name	Status (ESA)	Impact Determination
Honu or Green Sea Turtle	*Chelonia mydas*),	Endangered (Central North Pacific distinct population segment)	NLAA
Honu ʻea or Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	NLAA
Blackburn's Sphinx Moth	*Manduca blackburni*	Endangered	NLAA
Hilo Ischaemum	*Ischaemum byrone*	Endangered	NLAA
Haiwale	*Cyrtandra nanawaleensis*	Endangered	NLAA
Nanu	*Gardenia remyi*	Endangered	NLAA
ʻaku ʻaku	*Cyanea platyphylla*	Endangered	NLAA

NLAA = not likely to adversely affect

The ʻōpeʻapeʻa or Hawaiian hoary bat (*Lasiurus cinereus semotus*; federally listed as endangered) is a solitary, tree-roosting bat. It occurs on all of the major Hawaiian islands; however, population numbers on the islands are unknown (USFWS 2021a). In a study on Hawaiʻi Island, the trend in occupancy suggested that the population on the island was stable to slightly increasing based on breeding season records over 5 years of surveys (Gorresen et al. 2013). In most locations where acoustic monitoring has been conducted, Hawaiian hoary bats have been present at some point during the year, including in urban, semiurban, and agricultural areas (USFWS 2021a).

The Hawaiian goose or Nēnē (*Branta sandvicensis*; federally listed as threatened) is present in Hawaiʻi between sea level and 7,800 feet elevation on the islands of Hawaiʻi, Maui, Kauaʻi, and Molokaʻi (DLNR 2022a). On the Island of Hawaiʻi, according to the most recent Recovery Plan for the Nēnē (USFWS 2004), the species has been documented in seven areas. The two areas closest to the project Action Area are at Hawaiʻi Volcanoes National Park and an area along the coast south of Hilo at Kings Landing and Shipman Estate (this population is described in the Recovery Plan as semi-captive). Nēnē are occasionally observed in the Puna area (Pyle and Pyle 2017). The most recent sighting known in the immediate area of the project was reported at Isaac Kepoʻokalani Hale Beach Park on April 20, 2018 (eBird 2022b).

Federally listed seabird species that are known to nest on the Island of Hawaiʻi may fly over the project area but are not known to nest in the project Action Area. The ʻuaʻu or Hawaiian petrel (*Pterodroma sandwicensis*) and ʻakēʻakē or Band-rumped storm-petrel (*Oceanodroma castro*, are currently known to nest only at high elevations on the Island of Hawaiʻi. The presence and potential nesting colony of the ʻaʻo or Newell's shearwater (*Puffinus auricularis newelli*) was documented in surveys conducted by Reynolds and Ritchotte (1997) at Puulena crater, approximately 0.4 mile from the closest point to the project Action Area along Pohoiki Road (this feature was not destroyed by the 2018 lava flow).

The Honu or green sea turtle (*Chelonia mydas*) nests and hauls out (basks) on beaches. The project Action Area that comes closest to the shoreline where there is a beach is near the intersection of Pohoiki Road and Highway 137 at and adjacent to Isaac Kepoʻokalani Hale Beach Park, which is approximately 300 feet away. At this location, the beach area is a black stone and

sand beach that has developed since the 2018 lava flows and is now an area exposed to rough surf. No reports were found of green sea turtles hauling out there since the 2018 flows.

The honu ʻea or hawksbill sea turtle (*Eretmochelys imbricata*) was not previously known to nest in the project are"s coastal region, and with the 2018 lava flows, the areas that may have provided some habitat for basking were destroyed.

The Blackburn's sphinx moth (*Manduca blackburni*) is an endemic moth that primarily occurs in coastal, lowland, and dry forests in areas receiving less than 127 centimeters (50 inches) of rain per year according to historical records (DLNR 2015). It is known from the islands of Maui, Kahoʻolawe, and Hawaiʻi. At the latter, it is known from the west side of the island at Puʻu anahulu and Puʻu Waʻawaʻa areas, as well as along Saddle Road (USFWS 2022b). The host plant of this endemic moth is ʻaiea, which is the Hawaiian name for several indigenous tree species (genus *Nothocestrum*), its indigenous host. However, most of the current Blackburn's sphinx moth range is now based on the presence of the invasive host tree tobacco (*Nicotiana glauca*; USFWS 2022b). During a plant survey in December 2022 for the project, tree tobacco was not observed within the construction footprint. Critical habitat is designated in the western part of the Island of Hawaiʻi, north of Hualālai mountain (USFWS 2022b).

The Hilo ischaemum (*Ischaemum byrone*) is a plant in the grass family and found on wet or moist rocky areas, typically along the coastline. Historically *Ischaemum byrone* was reported on the islands of Kauaʻi, Oʻahu, Molokaʻi, east Maui, and Hawaiʻi. On the Island of Hawaiʻi a recent report (USFWS 2021b) noted that some of the few wild occurrences known may have been extirpated by the 2018 lava flows and recommended further surveys for a current assessment of the status of the species. There is a 500-foot segment of coastline that was not covered by the 2018 lava flows within the Action Area, but outside the construction footprint, in the southern segment of the project along Highway 137. Critical habitat has been designated (USFWS 2022c) in two units (393 acres and 510 acres) along the coast within Hawaiʻi Volcanoes National Park, with the closest being approximately 15 miles from the project Action Area boundary. The plant was not observed within the construction footprint during a field survey conducted in December 2022 for the endangered species identified as potentially present by USFWS.

Haiwale (*Cyrtandra nanawaleensis*) is a shrub that occurs in wet forests of ʻōhiʻa along the eastern coast of Hawaiʻi island and is known from five locations in the Puna district (USFWS 2022d). No critical habitat has been established for this species. The plant was not observed within the construction footprint during a field survey conducted in December 2022 for endangered plant species identified as potentially present by USFWS.

The native gardenia Nanu (*Gardenia remyi*) is a tree that occurs on multiple islands in Hawaiʻi at elevations from 397 to 4,577 feet and on Hawaiʻi island it occurs in shrubby forest and koa or ʻōhiʻa wet forest (USFWS 2022e). No critical habitat has been established for this species. Very little area above 397 feet in elevation that is not covered by lava and has vegetation occurs within the project construction footprint. The plant was not observed within the area of potential effect (APE) during a field survey conducted in December 2022 for endangered plant species identified as potentially present by USFWS.

A member of the bellflower family, ʻaku ʻaku (*Cyanea platyphylla*) is an unbranched palm-like shrub that occurs in areas dominated by ʻōhiʻa or koa in lowland to montane wet forests (USFWS 2022f). Critical habitat has been established in two small areas in uplands, one along the Hamakua coast and one west of Hilo. The plant was not observed within the construction footprint during a field survey conducted in December 2022 for endangered plant species identified as potentially present by USFWS.

Other species identified by USFWS as potentially present were evaluated and determined not to occur in the project area based on a review of recent reports and reported occurrences after the 2018 lava flows. Those species are the aeʻo or Hawaiian stilt (*Himantopus mexicanus knudseni*), and ʻalae keʻokeʻo or Hawaiian coot (*Fulica alai*). Water features that were known or potential habitat for these species, such as occurred at Ka Wai O Pele (Green Lake, in Kapoho Crater), the Kaphoho pools, and the coastal area northeast of the project area were covered by the 2018 lava flows.

4.11.1 No Action Alternative

Under the No Action alternative, no disturbance from construction or operation from the proposed project would take place and current conditions would be maintained. Consequently, there would be no impact on endangered or threatened species.

4.11.2 Proposed Action

A total of 11 threatened or endangered species were identified by USFWS as having the potential to occur in the project area region where the Proposed Action is located. This section summarizes the evaluation for potential impacts to each of these species. As a general precaution for all listed plant species, photos would be provided to educate construction workers on their appearance and requirement for avoidance and the importance of keeping work activities within the defined construction footprint. Indirect potential impacts that may occur to these species due to invasive species would be avoided or minimized by the procedures described previously in **Section 4.9** (Vegetation) and **Section 4.10** (Terrestrial and Aquatic Wildlife).

Hawaiian Hoary Bat (Lasiurus cinereus semotus)

The Hawaiian hoary bat is present throughout the island based on extensive surveys. No critical habitat has been designated for the species. During the birthing and pup-raising period from June 1 to September 15, the species is known to use the types and species of large native and non-native trees present in the Action Area. The realignment of the road and installation of utilities would result in the disturbance or removal of some of these types of trees.

To avoid and minimize any potential impacts on the Hawaiian hoary bat the following specific avoidance measures would be implemented:

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season, June 1 to September 15.
- Do not use barbed wire for fencing.

With implementation of these measures and invasive species avoidance and minimization measures, short-term impacts on the Hawaiian hoary bat during construction would be minor.

There would be increased traffic and use of the area over the long term due to the roadway being opened to areas currently inaccessible by vehicle. However, this use is not expected to reduce the habitat amount or quality for the Hawaiian hoary bat. Impacts from this long-term impact on the Hawaiian hoary bat would be negligible.

Nēnē or Hawaiian Goose (Branta sandvicensis)

On the Island of Hawai‘i, Nēnē have been documented as occurring in numerous areas scattered throughout the island. The two closest populations are an area south of Hilo along the coast (with the birds there described by USFWS as semi-captive), approximately 9 miles from the project Action Area, and an area within Hawai‘i Volcanoes National Park, more than 12 miles from the Action Area. Although there is potentially suitable habitat for the species in the project Action Area, the substantial distance to the nearest populations and the few occurrences reported in the general project area make it unlikely to occur there. Nonetheless, Nēnē could fly to the area from known populations. If they were present, they could be temporarily disturbed by project construction activities.

To avoid and minimize any potential impacts on the Nēnē, the following specific avoidance measures would be implemented:

- Do not approach, feed, or disturb Nēnē.
- If Nēnē are observed loafing or foraging within the Action Area during the breeding season (September 1 to April 30), halt work and have a qualified biologist familiar with the nesting behavior of Nēnē survey for nests in and around the Action Area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of three or more days (during which the birds may attempt to nest).
- Cease all work immediately and contact USFWS for further guidance if a nest is discovered within 100 feet of project activities. A 100-foot boundary will be clearly marked around the nest with guidance from a qualified biologist, and actions will remain outside the boundary.
- In Action Areas where Nēnē are known to be present or observed during construction, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species onsite.
- The following conservation measures are required for actions that have the potential to result in the exposure of Nēnē to noise levels above 65 decibels:
    - Special attention will be given to ensure that no ESA-listed animal species are within 150 feet of equipment prior to any action (e.g., clearing, etc.).
    - Operations will immediately shut down should Nēnē enter the Action Area within the mandatory 150-foot shut down range.
    - Equipment operators will employ “soft starts” when initiating work to reduce initial sound pressure levels. The soft start method is intended to be a warning

mechanism for fauna so that they can vacate the Action Area before maximum sound pressure levels are reached.

With implementation of these proposed avoidance and minimization measures and conservation measures, short-term impacts on the Nēnē during construction would be negligible.

There would be increased traffic and use of the area over the long term due to the roadway being opened to areas currently inaccessible by vehicle. This may result in a small potential for bird strikes by vehicles or human harassment. Given the minimal use of the area by the species, long-term impacts on the Nēnē would be minor.

Waterbirds other than the Nēnē

Potential habitat in the project region for the Hawaiian stilt (*Himantopus mexicanus knudseni*) and Hawaiian coot (*Fulica alai*) was destroyed by the 2018 lava flows. Consequently, there would be no impacts on these species from the project.

Seabirds

The three seabirds that may potentially fly over the project area are Hawaiian petrel (*Pterodroma sandwicensis*), Band-rumped storm-petrel (*Oceanodroma castro*), and Newell's shearwater (*Puffinus auricularis newelli*). These birds are subject to fallout that can occur when young birds fledge and leave their nest for the first time (and sometimes also includes adults). They normally use natural lighting such as moonlight to navigate out to sea to feed but can become disoriented by artificial lighting such as might occur during night-time construction or with installation of improper permanent lighting. They might then either circle lights or collide with structures, and then fall to the ground due to exhaustion or injury from collision and then also become vulnerable to predators or be hit by vehicles. Because no night-time work is proposed and no new streetlights are proposed, there would be no short- or long-term impacts from the proposed project on any of the three seabird species.

Sea Turtles

Green sea turtle (*Chelonia mydas*) habitat is shallow, protected, or semi-protected water around coral reefs and coastal areas with appropriate habitat for foraging and sandy beaches for nesting. The only beach present near the Action Area is adjacent to Isaac Kepoʻokalani Hale Beach Park and is over 300 feet from the nearest project Action Area boundary. This beach has not been reported being used by green sea turtles since the 2018 lava flows. Based on this information and the restriction on night-time work for the project, there would be no impact from construction activities on green sea turtles. Since no new streetlights are proposed, there would be no long-term impact on the species from the project.

No habitat for the hawksbill sea turtle (*Eretmochelys imbricata*) is present in the project region; therefore, there would be no impacts on this species.

Blackburn's Sphinx Moth (Manduca blackburni)

Blackburn's sphinx moth is found in dry to mesic habitats. Established critical habitat is on the western side of the Island of Hawaiʻi. Most of the current Blackburn's sphinx moth range is now based on the presence of the invasive host, tree tobacco. Blackburn's sphinx moth is unlikely to be present in the project Action Area due to lack of habitat and lack of records of the host plant

in the area. Based on this information, there would be no short-term impacts from construction on the species. If long-term increases in use of the area due to the reopening of access result in the spread of tree tobacco into the area, additional habitat could develop with potential benefits for the species.

Hilo Ischaemum (Ischaemum byrone)

The Hilo ischaemum plant occurs near the ocean among rocks or on moist or wet basalt cliffs. During a field survey in December 2022 this species was not observed in the project construction footprint, therefore short-term construction would not be expected to have an impact on the species. As an added precaution for this species, in addition to providing worker education for all listed plant species in **Table 5,** workers would be informed of the importance of keeping equipment and any work activities within the defined construction footprint in the region where the construction corridor occurs within 400 feet of the coastline due to a known occurrence of the species in the project vicinity. Increased long-term use of the area would have a negligible effect on the plant due to the lack of public recreation facilities in most of the potential habitat near the project action areas and the rugged terrain that would limit access to these areas.

Haiwale (Cyrtandra nanawaleensis)

Haiwale occurs in wet forests of ʻōhiʻa. Small forested areas of ʻōhiʻa do occur in the construction footprint but the species was not observed in a plant survey conducted in December 2022. Since the potential habitat for the species is limited in the project area and it is not present based on a field survey, short-term construction and long-term use of the area would not be expected to have an impact on the species.

Nanu (Gardenia remyi)

Nanu occurs in shrubby forest and koa or ʻōhiʻa wet forest. The species was not observed in a plant survey conducted in December 2022. Since the potential habitat for the species is limited in the project area and it is not present based on a field survey, short-term construction and long-term use of the area would not be expected to have an impact on the species.

ʻaku ʻaku (Cyanea platyphylla)

The ʻaku ʻaku shrub occurs in areas dominated by ʻōhiʻa or koa in lowland to montane wet forests. No critical habitat has been established in the vicinity of the project. Since the potential habitat for the species is limited in the project area and it is not present based on a field survey, short-term construction and long-term use of the area would not be expected to have an impact on the species.

4.12 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S. Code 470f), requires that activities using federal funds undergo a review process to consider potential effects on historic properties that are listed or may be eligible for listing in the National Register of Historic Places (NRHP). Cultural resources may include prehistoric or historic archaeology sites; historic standing structures; historic districts; objects; artifacts; cultural properties of historic or traditional significance, referred to as Traditional Cultural Properties that may have religious or cultural significance to federally recognized tribes; or other physical evidence of human activity

considered to be important to culture, subculture, or community for scientific, traditional, religious, or other reasons.

Pursuant to 36 CFR 800.4(a)(1), an APE was defined to include the areas within which the undertaking may directly or indirectly affect cultural resources. The Direct APE for the Proposed Action consists of all areas within which construction and ground-disturbing activity would occur. An Indirect APE was considered to determine the potential for indirect effects (e.g., visual) within the proposed project viewshed. The Indirect APE for the Proposed Action includes a 0.5-mile radius around the Direct APE. Along Kumukahi-Lighthouse Road, the Indirect APE extends an additional 1.5 miles to the east. The expanded Indirect APE to the end of Kumukahi-Lighthouse Road was added because of concerns expressed by lineal descendants, interested parties, and as recommended by the SHPD.

4.12.1 Historical Context

Current knowledge of the Pre-contact Era and settlement of Hawai‘i and of Puna indicate a cultural sequence that is explained as the Foundation Period (Anno Domini [A.D.] 800 to 1200), the Developmental Period (circa A.D. 1100 to 1350), and the Expansion Period (A.D. 1350 to 1650) (Kirch and McCoy 2007).

The Native Hawaiian Cultural Landscape defines how the early Hawaiians established and developed cultural practices that utilized the landscape and resources (Van Tilburg et al. 2017). The landscape and its resources provide opportunities for Hawaiians to practice their traditional beliefs and practices, thus creating a cultural identity and connection to the land through space and time. In the Development Period we see the invention and technical improvements in Hawaiian traditional tools using locally derived materials, such as volcanic stone and seashells. The Early Expansion Period established the Hawaiian system of land tenure—the ahupua‘a system; and in the Late Expansion and Proto-Historic Periods, an increased hierarchy of the Hawaiian chiefly class is seen with the use of religious ideology, and the chiefly class structure was legitimized over the common people (the maka‘āinana); “this is reflected in the archaeological record as the temple (heiau) system” (Kirch 2017).

At first European contact, Captain James Cook visited the Sandwich Islands (Hawai‘i) on board the *Discovery* and *Resolution* in 1778. The following year from the ship *Discovery*, Lieutenant King and the ship’s surgeon, David Samwell, recorded the first accounts of Puna: “The East part of Opoona [Puna] is flat, covered with Coco nut trees, and 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” (Beaglehole 1967).

Further exploration and explanation of early settlements is provided from the missionary accounts. In 1823, missionary William Ellis documented the extensive field system of dryland farming stretching from Kaimū almost to Kapoho (Newman 1971). Shortly after that time, King Kamehameha III instituted vast changes in Hawaiian government; a Bill of Rights was signed in 1839, and a constitution was set in place for the Kingdom of Hawai‘i in 1840. Then in 1848, Ka Māhele (The Land Division) established a system of private land ownership, which concentrated 99.2 percent of Hawai‘i’s lands among 245 chiefs, the Crown, and the Government. Under the Māhele system commoners were given land grants based upon a dual system of land

“ownership”: one passed down or inherited from previous generations and one coming from the authority of a ruling chief or lord.

During the period of the Māhele, most Puna lands were either public lands held by the monarchy, or as “Crown” lands held by the government of the Hawaiian Kingdom. With the establishment of private property ownership in 1848, Hawaiians were able to compete in the market economy along with their European and American contenders. Commercial ventures in Puna focused on the rich, available local resources, such as coastal fishing, forestry products such as pulu (the hairy fibers from the hāpuʻu fern), ʻōhiʻa timber, and utilized open land for ranching (McGregor 2007). Sugar, coffee, and lumber were the three main commodities produced in the region. With the Treaty of Reciprocity of 1876, Hawaiian sugar was able to enter the United States of America as a duty-free product and international trading provided new marketing opportunities.

In 1899, the Hilo Railroad Company was incorporated to connect a new deep-water port in Hilo to the Olaʻa Sugar Mill followed by a line to the Puna Sugar Plantation at Kapoho, and then a line from Kapoho to Kamaili (The Hilo Railroad Company 1910, 1911, 1913). The Hilo Railroad expanded from the Olaʻa plantation over 35 miles to also use the Hilo-Hawaiʻi Consolidated Railway lines. But in 1916, the Hilo Railroad went into foreclosure and was sold to the Hawaiʻi Consolidated Railway (Treiber 2005; The Hilo Railroad Company 1914, 1915).

Commercial sugar production in Puna stretched from South Hilo to Cape Kumukahi. In addition to sugar plantations, patches of coffee were cultivated, and logging koa and ʻōhiʻa became important to supply the railroad with wood for ties. However, because of economic problems with the railroad, supply issues with the sugar mills, and change in ownership and business management problems, industry in Puna continued to decline.

Very little was reported in the newspapers concerning the economic troubles over the years. Then on April 1, 1946, a huge tidal wave struck Hilo, and virtually shut the railroad transportation to ʻŌlaʻa down. This disaster completely stopped service of the Hawaiʻi Consolidated to the north and left very little service south to Puna which also curtailed many business opportunities in Puna (Conde and Best 1973).

4.12.2 Prior Surveys

FEMA conducted a Phase I Literature and Records Search. As part of records search, FEMA consulted the Hawaiʻi Cultural Resource Information System (HICRIS), and the State Historic Preservation Division (SHPD) of the State of Hawaiʻi’s DLNR to review site records, maps, reports, and other materials on file for the Direct and Indirect APE. FEMA also reviewed files at the SHPD library and the Hamilton Library. Other relevant data bases and websites were also consulted.

Early archaeological studies of the project area included the work of Thrum (1907), Stokes 1906 (Stokes 1991), and Hudson (1932). Since that time there have been 14 investigations. in and near the project area that occurred between 1970 and 2016. (**Table 6**).

Table 6. Previous Cultural Resources Investigations in and near the Project Area

Author and Date	Investigation	Ahupuaʻa
Stokes 1906	Archaeological Assessment	Keahialaka
Thrum 1907	Archaeological Assessment	Keahialaka
Hudson 1932	Archaeological Assessment	Various
Loo & Bonk 1970	Historical Site Study and Evaluation	Pohoiki
Crozier & Barrère 1971	Intensive Survey	Pūʻālaʻa, Ahalanui, Laepaoʻo
Bevacqua & Dye 1972	Reconnaissance Survey	Various
Barrera 1973	Intensive Survey	Pūʻālaʻa, Kapoho
USACE 1978	Feasibility and Cost Study	Pohoiki
Kennedy et al. 1991	Intensive Survey	Pūʻālaʻa, Ahalanui, Laepaoʻo
Dunn et al. 1995	Archaeological Inventory Survey	Ahalanui, Oneloa, Laepaoʻo
Sweeney & Burtchard 1995	Reconnaissance Survey	Various
Devereux et al. 1998	Archaeological Assessment	Pohoiki, Ahalanui, Laepaoʻo
Elmore & Kennedy 2003	Archaeological Assessment	Pohoiki, Malama 1, Keahialaka, Kaukulau, Ki (b)
Clark & Rechtman 2005	Archaeological Assessment	Ahalanui, Laepaoʻo
Clark et al. 2014	Archaeological Inventory Survey	Pohoiki, Keahialaka, Ahalanui, Laepaoʻo
ASM Affiliates 2016	Archaeological Inventory Survey	Pohoiki

4.12.3 Existing Conditions

An archaeological reconnaissance survey of the Direct APE for the Proposed Action was conducted from June 6 to July 8, 2022. Three newly recorded cultural resources were encountered: SIHP 50-10-46-31353, (Temporary Site [TS])-4366-001; SIHP 50-10-46-31354, TS-4366-002; and SIHP 50-10-46-31355, TS-4366-004. The three historic properties recorded by Bevaqua and Dye (1972) and ASM (2016) were also relocated and updated (50-10-46-02512, 50-10-46-02513, and 50-10-46-30583). Recorded resources were related to prehistoric and historic human occupation and use of the area, including a historic railroad alignment. **Table 7** summarizes the resources encountered.

Table 7. Newly Recorded Cultural Resources, Significance, and Treatment Recommendations

SIHP Site Number / Temporary Site Number	Resource Type	Temporal Affiliation	Significance	Treatment Recommendation
SIHP 50-10-46-31353 / TS-4366-001	Railroad alignment	Historic	Criteria A, B, D	Preservation
SIHP 50-10-46-31354 / TS-4366-002	Rock Wall Enclosure with associated historic artifacts	Historic	Criterion D	Preservation
SIHP 50-10-46-31355 / TS-4366-004	Terrace Mound Complex	Pre-Contact	Criteria D, E	Preservation
SIHP 50-20-46-02512	Stone Enclosure	Historic	Criterion D	Preservation

SIHP Site Number / Temporary Site Number	Resource Type	Temporal Affiliation	Significance	Treatment Recommendation
SIHP 50-20-46-02513	Stone Enclosure Complex	Pre-Contact	Criterion D	Preservation
SIHP 50-20-46-30583	Rock Wall	Historic	Criterion D	Preservation

4.12.4 Consultations with Native Hawaiian Organizations and Lineal Descendants

On September 2, 2022, in compliance with the Programmatic Agreement between FEMA, the Hawai‘i State Historic Preservation Officer, the Office of Hawaiian Affairs, and the State of Hawai‘i Department of Defense and Hawai‘i Revised Statutes Chapter 6E, FEMA sent consultation letters to Native Hawaiian Organizations (NHOs) and five interested parties about the Proposed Action to solicit their comments and request any additional information about cultural resources that may be affected. NHOs contacted include the County of Hawai‘i Burial Council; the Office of Hawaiian Affairs; Compliance Enforcement for the Office of Hawaiian Affairs; the No Koa Ikaika KaLahui Hawai‘i; and the Hawaiian Civic Club Ka‘u. Two Interested Parties responded to FEMA’s letter with the following concerns:

- One Interested Party requested any identified burials be left in place and that the water lines be placed at an appropriate distance from any archaeological discoveries. This Interested Party also noted that FEMA should follow Section 106 and consider the native perspective.
- One Interested Party requested that archaeological sites be retained in place. This Interested Party also expressed concern regarding the reopening of Kumukahi-Lighthouse Road and requested it not be opened until a Burial Treatment and Preservation Plan is instituted.

In addition to the written response from the interested parties, FEMA participated in a site visit to the project area with Hawaiian lineal descendants on August 25, 2022. The Hawaiian lineal descendants expressed the following concerns during the site visit:

- Hawaiian lineal descendants expressed concerns regarding the potential for disturbance of burials in the area. They advised FEMA that a Burial Treatment and Preservation Plan was under negotiation between the Hawaiian lineal descendants and interested parties, the University of Hawai‘i, and local landowners. The purpose of the treatment plan would be to facilitate the return of desecrated burials to their proper burial location and to build a protective wall to discourage future desecration.
- Hawaiian linear descendants expressed concerns about potential impacts to lava tubes from heavy construction equipment along Highway 137 near MacKenzie State Recreation Area. In response to this concern, FEMA reached out to the DLNR to request any information they may have; however, they did not have any maps showing lava tubes in this area. Archaeological monitors will be present during project construction; if lava tubes are encountered during construction, the archaeological monitors will inspect them for burials before construction resumes.

- Hawaiian lineal descendants also expressed concerns about potential impacts to kamani trees. During the site visit, they showed FEMA the location of the kamani trees, and it was determined that the kamani trees are outside the project footprint.

FEMA sent letters to representatives of Pōhaku Pelemaka, Miulan P. Young Kealoha Trust, and Leihulu Emma Cooper Trust on January 31, 2023. FEMA received the following comments from this outreach:

- One NHO expressed concern about potential impacts on native plant species with cultural significance in the project area, specifically kukui trees. In response to this concern, FEMA performed a site visit of the project area to evaluate whether kukui trees are located within the project footprint. Kukui trees were identified at the intersection of Pohoiki Road and Highway 137 within the project footprint; however, the trees are unlikely to be affected by project construction. Archaeological monitors will provide a Cultural Awareness Training workshop before construction. The archaeological monitors will monitor construction to protect cultural resources, traditional cultural resources of concern, and culturally sensitive plants. The archaeological monitors will note the locations of kukui trees to minimize impacts to them.

- One NHO expressed concern about the reopening of Kumukahi-Lighthouse Road and recommended a stewardship and management plan be developed, and a burial treatment plan be in place before the road is reopened.

- The NHO noted that cultural resources now covered by lava should be respected; the County should work with NHOs and lineal descendants to mitigate impacts related to residents and visitors accessing the area once construction is complete.

- One NHO requested that Pohoiki Road be reopened without delay.

FEMA also sent a letter to representatives from the University of Hawai‘i Office of Strategic Development and Partnership on March 3, 2023. No comments were received.

Appendix D contains copies of correspondence with NHOs and interested parties.

4.12.5 Consultation with the State Historic Preservation Division

Based on the nature of the Proposed Action, the cultural resources present, and proposed avoidance and minimization measures, FEMA has determined that the Proposed Action would result in No Historic Properties Affected. On December 15, 2022, FEMA initiated consultation with the SHPD and submitted the Reconnaissance Survey Report for their review. The SHPD responded on January 12, 2023, concurring with FEMA’s determination and agreeing with FEMA’s proposal that archaeological monitoring occur during project construction and requesting and archaeological monitoring plan.

Appendix D contains copies of correspondence with the SHPD.

4.12.6 No Action Alternative

Under the No Action alternative, there would be no soil disturbance that would affect cultural resources and there would be no change to the surrounding landscape. There would be no impacts on cultural resources.

4.12.7 Proposed Action

The Proposed Action would include ground-disturbing activities over portions of the Direct APE. There are no historic buildings or structures within the APE. There are six recorded cultural resources within the APE. There may be additional cultural resources hidden from view by the existing heavy vegetation. Construction-related ground disturbance may impact unrecorded archaeological resources.

The Proposed Action would avoid and minimize potential impacts to cultural resources by implementing archaeological monitoring during construction. An archaeological monitoring program and historic properties treatment plan would mitigate adverse impacts to above ground and subsurface cultural resources. Procedures for the treatment of cultural resources will be developed before the start of construction in the event these locations cannot be avoided by the project. Construction will be monitored by an archaeologist who meets the Secretary of the Interior Qualifications. If any burials (iwi kupuna) or cultural resources are inadvertently discovered, work will stop in the immediate area and SHPD, Office of Hawaiian Affairs, NHOs, and Native Hawaiian lineal descendants and the appropriate Hawaiian Burial Council will be contacted for consultation, as necessary. With the implementation of the mitigation monitoring program, short-term impacts on cultural resources during construction would be minor.

Implementation of the Proposed Action would bring increased traffic to the project area; however, this use would not affect cultural resources. The Proposed Action would therefore have negligible long-term impacts on cultural resources.

4.13 Environmental Justice

Environmental justice is defined by EO 12898 (59 Federal Register 7629) and CEQ guidance (1997). Under EO 12898, demographic information is used to determine whether minority or low-income populations are present in the areas potentially affected by the range of project alternatives. If so, a determination must be made whether implementation of the alternatives may cause disproportionately high and adverse human health or environmental impacts on those populations.

Per FEMA's Environmental Justice Interim Guidance for Environmental and Historic Preservation (EHP) Reviews, dated October 2022 (FEMA 2022b), this environmental justice analysis is focused at the local level. The local area included in this analysis is where project-related impacts would occur, potentially causing a disproportionately high and adverse effect on neighboring minority and low-income populations. The affected environment for this environmental justice analysis is the project footprint including construction staging areas. A minority or low-income population exists if the People of Color Population and/or Low-Income Population equals or exceeds the 50th percentile compared to the average for the state of Hawai‘i or the County of Hawai‘i. This means that the minority and/or low-income population exceeds the statewide average.

According to EPA's Environmental Justice Screening and Mapping Tool (EPA 2022a), the population in the affected environment (project area plus 0.2-mile buffer to account for other potential impacts from the Proposed Action) for this environmental justice analysis is 108 persons.

4.13.1 Minority Populations

CEQ (1997) defines the term "minority" as persons from any of the following groups: Black, Asian or Pacific Islander, American Indian or Alaskan Native, and Hispanic. The Environmental Justice Screening and Mapping Tool determined that the State of Hawai‘i is 78 percent people of color and the County of Hawai‘i is 70 percent people of color; however, there is no minority population in the affected environment area for this environmental justice analysis per the criteria.

4.13.2 Low-Income Populations

Residents of areas with a high percentage of people living below the federal poverty level may be considered low-income populations. The Environmental Justice Screening and Mapping Tool determined that there is a low-income population in the affected environment area for this environmental justice analysis per the criteria.

4.13.3 No Action Alternative

Under the No Action alternative, the residents and visitors to the project area would continue to have limited roadway capacity and limited roads to evacuate the area in the event of an emergency. Environmental justice communities could be disproportionately and adversely affected by not implementing the Proposed Action because of their inability to access their property and benefit economically from the property, as well as their inability to evacuate the area in case of emergency, depending on the scale and type of emergency.

4.13.4 Proposed Action

The Proposed Action would construct roads and water lines throughout the project area. Temporary and localized impacts from the Proposed Action, such as noise, would impact those near the work location, including low-income residents. Bus service is anticipated to be restored to the project area after completion of construction, which would benefit residents, including low-income residents. Although the County would acquire property to construct the project, the County intends to purchase only the portions of properties that would be directly needed for the project; the remainder of the parcel would not be purchased. By purchasing only the part of the parcel needed for the project, the property acquisitions would not significantly affect the property owner's ability to profit from or use their land. At the time of publication, all property owners (except a small number) have agreed to sell the affected portion of their property to the County; all owners would be paid market price for their property. These effects would not disproportionately impact low-income residents, because these short-term effects would affect all residents near project activities. The benefits of the project would be applicable to the entire population and visitors to the project area, including low-income populations. Therefore, no disproportionately high and adverse impacts on low-income populations would result from the Proposed Action.

4.14 Hazardous Materials

Hazardous materials are those substances defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act. The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste amendments, defines hazardous wastes. In general, both hazardous materials and waste include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or to the environment when released or otherwise improperly managed.

Hazardous materials may be encountered during a project, or they may be generated by the project activities. To determine whether any hazardous waste facilities exist near or upgradient of the proposed project area or whether there is a known and documented environmental issue or concern that could affect the proposed project area, a search for Superfund sites, toxic release inventory sites, water dischargers (i.e., municipal and industrial wastewater treatment facilities), hazardous facilities or sites, and multiactivity sites was conducted using EPA's NEPAssist website (2022d). According to the database, there is one hazardous waste handler (RCRA Large Quantity Generator) near the project area (Puna Geothermal Venture at 14-3860 Kapoho-Pahoa Road in Pahoa); this facility is approximately 1,000 feet from the project area at its closest point, along Pohoiki Road, and creates ignitable waste (compressed gas), cadmium, and lead waste. There are no toxic releases, Superfund sites, brownfields, or Toxic Substances Control Act sites near the project area.

4.14.1 No Action Alternative

Under the No Action alternative, existing conditions would not change. Because the roads are closed due to hardened lava inundation, there is limited traffic through the project area that could pose a risk of hazardous leaks or spills. Therefore, potential impacts from hazardous materials in the project area would be negligible.

4.14.2 Proposed Action

There is one RCRA Large Quantity Generator near the project area; there would be no impact on this RCRA Large Quantity Generator from project construction or implementation.

The Proposed Action would include the use of construction equipment such as excavators and graders, which would pose the threat of leaks or spills. The short-term duration of the use of equipment at any individual location in the project area and the use of equipment in good condition would reduce the potential effect to an insignificant level. All equipment and project activities would adhere to local regulations to reduce the risk of hazardous leaks and spills. Any spills during construction would be immediately contained and cleaned up. The Proposed Action would therefore have a negligible short-term threat of contamination from vehicle and equipment use during construction.

After construction, there is a risk of leaks or spills from vehicles traveling along the roads. Spills from vehicles would be cleaned and contained in accordance with local regulations. The Proposed Action would therefore have a minor long-term threat of contamination from vehicles driving along project area roads.

4.15 Noise

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are considered noise. Noise events that occur during the night (10 p.m. to 7 a.m.) are more annoying than those that occur during normal waking hours (7 a.m. to 10 p.m.). Assessment of noise impacts includes the proximity of the Proposed Action to sensitive receptors. A sensitive receptor is defined as an area of frequent human use that would benefit from a lowered noise level. Typical sensitive receptors include residences, schools, churches, hospitals, nursing homes, and libraries. Sensitive receptors near the project area consist of residences. Any noise-generating activities near residences could have the potential to adversely affect these receptors.

The project area is sparsely developed with agricultural areas, a residential neighborhood near Leilani Avenue, as well as some residences along Pohoiki Road. Much of the area was inundated by the 2018 lava flow, and consequently is undeveloped. One sensitive receptor was identified near the project area: the Kirpal Meditation and Ecological Center on Pohoiki Road. Typical noise events in the project area are presently associated with climatic conditions (e.g., wind, rain), light traffic noises from nearby roadways, and other intermittent residential conditions (e.g., lawnmowers, leaf blowers).

4.15.1 No Action Alternative

Under the No Action alternative, there would be no road construction and no new development in the project area; therefore, there would be no change in existing noise levels that could affect sensitive receptors in the project area.

4.15.2 Proposed Action

Under the Proposed Action, noise would be generated by the construction of the road and installation of the water line. The loudest equipment likely to be used during construction would be hydraulic impact hammers, which can produce noise levels up to 95 decibels when perceived from approximately 50 feet away. Graders, excavators, and pavers would be used and can produce noise levels around 85 decibels when perceived from approximately 50 feet away (Federal Highway Administration 2017, San Diego County 2018). Hydraulic impact hammers and graders would only be used in areas where there is lava; excavators and pavers would be used throughout the project area. Construction of the Proposed Action would increase noise levels within the immediate vicinity of the construction work for the duration of the work. However, increases in noise levels would be minor and of short duration at any one location, and there would be no construction work at night. The Kirpal Meditation and Ecological Center building that would be closest to the construction is approximately 200 feet from construction; however, it is unlikely that hydraulic impact hammers would be used in this area because it was not covered by lava during the 2018 eruption. Vehicle and equipment runtimes would be kept to a minimum. The Proposed Action would therefore have minor short-term noise impacts.

Vehicle traffic through the project area would increase after construction of the Proposed Action; consequently, there would be more noise along project area roadways than under existing conditions. The new road alignment along the eastern portion of Pohoiki Road would be further from the private residences and the Kirpal Meditation and Ecological Center than the existing alignment; therefore, road noise as observed from the Kirpal Meditation and Ecological Center

and residences along this portion of the project would be less than existing conditions. The Proposed Action would therefore have minor long-term noise impacts.

4.16 Transportation

Access to the project area is currently from open local roads including Highway 132 and Highway 137. Much of the project area, including large portions of Pohoiki Road and Highway 137 are inaccessible due to the 2018 lava inundation. Highway 137 near MacKenzie State Recreation Area was rebuilt after the 2018 lava inundation to provide limited access to the project area but does not meet the County's current design standards. The eastern portion of Pohoiki Road is narrow and provides limited access for residents, visitors, and emergency services. To access Isaac Kepo'okalani Hale Beach Park or existing residences along Pohoiki Road, drivers from Pahoa must travel south along Highway 130 then north along Highway 137; what was once a 15-minute drive from Pahoa to Isaac Kepo'okalani Hale Beach Park currently takes more than 35 minutes.

Hele-On is the Hawai'i County bus service; however, there currently are no bus routes through the project area.

4.16.1 No Action Alternative

Under the No Action alternative, there would be no improvements to the transportation network in the project area. This portion of the island would remain difficult to access and the existing transportation network would remain unaffected. Emergency services would have limited access to this area, and there would continue to be only one evacuation route in the event of a natural disaster or emergency. Therefore, there would be no potential impacts on the transportation network in the project area.

4.16.2 Proposed Action

Under the Proposed Action, construction work would be staged such that access to the project area would be maintained. The contractor would implement a traffic control plan to manage traffic and maintain safety protocols during construction. The contractor would be required to keep one travel lane open in each direction all day; from 2:30 p.m. to 9 a.m. traffic would be allowed to flow at the posted speed limit. The contractor would perform their work in a manner that minimizes congestion. The contractor would provide and install all travel control devices in conformance with the current edition of the Federal Highway Administration's "Manual on Uniform Traffic Control Devices for Streets and Highways." The Proposed Action would therefore have minor, localized short-term impacts on transportation.

In the long term, the Proposed Action would improve the transportation network in the project area and allow emergency services to better access the area. Bus service is anticipated to be restored to the project area after completion of the project, improving the transit connectivity of this area. The Proposed Action would provide multiple evacuation routes and improve the community's resilience in the event of a natural disaster or emergency. The Proposed Action would therefore have major long-term benefits on transportation.

4.17 Utilities

DWS provided public water service and Hawai‘i Electric Light Company provided public electric services in the project area until they were damaged by the 2018 lava inundation. **Figure 3** in **Appendix A** shows the water lines in the project area before the 2018 lava inundation. Buildings in the project area are connected to individual onsite sewage disposal systems, many of which were also damaged during the 2018 lava inundation. Inhabited buildings in the project currently obtain water from rain catchment systems and have water delivered as needed. For electricity, they use solar panels and/or have generators.

4.17.1 No Action Alternative

Under the No Action alternative, there would continue to be limited utilities serving the project area. Redevelopment of the project area would be limited because of the lack of utilities. Thus, impacts on utilities under the No Action alternative would be major.

4.17.2 Proposed Action

Because there currently is no public water service in the project area, construction of the Proposed Action would not affect existing utilities. The Proposed Action would therefore have no short-term effect on utilities.

Implementation of the Proposed Action would provide water service to the project area. Water lines would be installed along Pohoiki Road and Highway 137. Fire hydrants would be installed along the water line and laterals would be added to connect to adjacent properties. The Proposed Action would have no impact on electrical utilities or onsite sewage disposal systems; however, the Proposed Action would therefore have major long-term benefits related to water utilities.

4.18 Public Health and Safety

Emergency services and evacuation routes are limited in the project area because of the 2018 lava inundation that affected the project area roads and water service. The Hawai‘i County Police Department and Hawai‘i County Fire Department serve the project area.

4.18.1 No Action Alternative

Under the No Action alternative, emergency services would continue to have limited access to the project area. There would be limited evacuation routes in the event of a natural disaster. Residents or visitors to the area would be negatively impacted because of their inability to evacuate the area in the event of an emergency, depending on the scale and type of emergency. The lack of water service could adversely affect fire response and suppression. Therefore, the No Action alternative would have a moderate effect on public health and safety.

4.18.2 Proposed Action

Under the Proposed Action, construction work would be staged such that access to the project area would be maintained and emergency services would not be impeded. The Proposed Action would therefore have negligible short-term impacts on public health and safety.

Implementation of the Proposed Action would improve access to the project area for emergency services. Residents and visitors to the area would benefit from having multiple evacuation routes

from the project area in the event of an emergency or natural disaster. The restoration of water service and the installation of fire hydrants would benefit project area residents, improving resilience against impacts from future disasters. The Proposed Action would therefore have major long-term benefits on public health and safety.

4.19 Land Use and Zoning

NEPA directs federal agencies to confirm their actions are consistent with state and local land use plans. Zoning within Hawai‘i County is established and regulated by the County. The County of Hawai‘i General Plan (2005) lays out long-range goals and objectives regarding land use throughout the County. The Hawai‘i State Land Use Law (Hawai‘i Revised Statutes Chapter 205) establishes a Land Use Commission and its responsibilities, and Hawai‘i County Code Chapter 25 addresses zoning and defines zoning districts and land use designations.

The designated land uses throughout the project area are within an agricultural district, with some portions of Highway 137 also identified as with a conservation district.

The project area is within agricultural zoning districts with differing lot sizes. Most of the project area falls within Zone A-1a (minimum lot size of 1 acre), with some sections of the project running along the border between Zone A-1a and A-10a (minimum lot size of 10 acres). Along Highway 137 near MacKenzie State Recreation Area, the project area runs along the border between Zone A-1a and Zone A-20a (minimum lot size of 20 acres).

Figure 11 shows current land uses throughout the project area and **Figure 12** shows current zoning. The maps also show the extent of the 2018 lava inundation, which makes agriculture unfeasible throughout much of the project area.

4.19.1 No Action Alternative

Under the No Action alternative, there would be no change to the existing land use and zoning. Development within the project area would be limited because of the impacts on access and utilities from the 2018 lava inundation. Although the land use and zoning is primarily agricultural throughout the project area, the lava inundation would continue to limit access and limit farming of areas that were not inundated. The No Action alternative would therefore have negligible impacts on land use and zoning.

4.19.2 Proposed Action

Under the Proposed Action, there would be a negligible change to existing land uses and no change to zoning. The project would rebuild roads that existed before the 2018 Kīlauea eruption and lava inundation. Work would primarily be within the previous rights-of-way except for along the eastern portion of Pohoiki Road where the Proposed Action would convert some agricultural land to roadway. The project area was designated as agricultural before the 2018 Kīlauea eruption, and the Proposed Action would provide access to maintain those uses in areas that were not inundated. Construction of the project would not affect land use or zoning. The Proposed Action would therefore have no short-term impacts and negligible long-term impacts on land use or zoning.

4.20 Summary of Effects and Mitigation

Table 8 provides a summary of the potential environmental effects from implementation of the Proposed Action, any required agency coordination efforts or permits, and any applicable proposed mitigation or BMPs.

Table 8. Summary of Effects and Mitigation

Affected Resource Area	Impacts	Agency Coordination or Permits	Mitigation and BMPs
Geology, Topography, and Soils	No short- or long-term impacts on geology. No short-term impacts on topography; minor long-term impacts on topography from grading the hardened lava for the road. Minor short- and long-term impacts on farmland soils by converting agricultural land to other uses.	NRCS	• FEMA coordinated with NRCS regarding conversion of agricultural land to other uses; NRCS determined that no further consideration is required.
Visual Quality and Aesthetics	Minor short-term impacts from construction equipment. Minor long-term impacts from realigning the eastern portion of Pohoiki Road.	Not Applicable	Not Applicable
Air Quality and Climate	Minor short-term impacts from construction vehicle and equipment use. Minor long-term impacts from increased traffic through the project area.	Not Applicable	• Contractors would comply with state and federal guidance regarding vehicle and equipment idling times. • Construction work would comply with state air quality regulations.
Surface Waters and Water Quality	Negligible short- and long-term impacts on surface water and water quality.	Not Applicable	• Construction work would comply with state and local water quality, water pollution control, erosion, and sedimentation regulations and guidance.
Coastal Resources	Negligible short-term impacts. Long-term benefits from conformance with local conservation guidelines.	Not Applicable	• Construction work would comply with state and local stormwater regulations and guidance.
Wetlands	No short- or long-term impacts on wetlands.	Not Applicable	Not Applicable

Affected Resource Area	Impacts	Agency Coordination or Permits	Mitigation and BMPs
Floodplains	No short- or long-term impacts on floodplains.	Not Applicable	Not Applicable
Vegetation	Minor long-term impacts from the removal of vegetation.	Not Applicable	• Vegetation clearing would be limited to that which is necessary for project completion. • Implement measures described in the informal consultation with USFWS, specifically those related to biosecurity and preventing the spread of ROD and Rat Lungworm Disease.
Terrestrial and Aquatic Wildlife	No long-term impacts on Black Noddy. Minor long-term impacts on the Hawaiian ʻAmakihi, Apapane, Hawaiian hawk, other native birds protected under the MBTA, and the ʻōhiʻa long-horned woodborer.	Not Applicable	• Pre-construction nest surveys would be conducted in areas of native forest or areas with other large trees suitable for Hawaiian hawk nests. Disturbance would be prohibited within 1 kilometer of any active nest until the nest fails or the chick fledges. • Implement measures described in the informal consultation with USFWS, specifically those related to biosecurity and preventing the spread of Little Fire Ants.

Affected Resource Area	Impacts	Agency Coordination or Permits	Mitigation and BMPs
Threatened and Endangered Species and Critical Habitat	Negligible or no short-term impacts on the Nēnē, Blackburn's sphinx moth, and Hilo ischaemum. Minor short-term impacts on the Hawaiian hoary bat. Negligible long-term impacts on the Hawaiian hoary bat and Hilo ischaemum. Minor long-term impacts on the Nēnē. Potential long-term benefits on Blackburn's sphinx moth. No short- or long-term impacts on the Hawaiian stilt, Hawaiian coot, Hawaiian petrel, Band-rumped storm-petrel, Newell's shearwater, green sea turtle, and hawksbill sea turtle.	USFWS	• Do not disturb, remove, or trim woody plants greater than 15 feet tall from June 1 to September 15. • Do not use barbed wire for fencing. • Do not approach, feed, or disturb Nēnē. • Stop work if a Nēnē is observed in the Action Area from September 1 to April 30, and perform nest survey. • Stop work if a Nēnē nest is discovered within 100 feet of project activities. • If Nēnē are known to be present or observed during construction, reduce speed limits and inform project personnel about the presence of endangered species onsite. • Implement conservation measures for activities that would generate noise levels above 65 decibels. • Provide worker education for listed plants including photos of all listed plants and educate construction workers on their appearance and requirement for avoidance and the importance of keeping work activities within the defined construction footprint. • For Hilo Ischaemum, workers would be informed that the species has been reported in the project vicinity and the importance of keeping equipment and any work activities within the defined construction footprint, especially in the region where the construction corridor occurs within 400 feet of the coastline.

Affected Resource Area	Impacts	Agency Coordination or Permits	Mitigation and BMPs
Cultural Resources	Minor short-term impacts on cultural resources. Negligible long-term impacts on cultural resources.	SHPD	• Implement archaeological monitoring during construction in accordance with the Archaeological Monitoring and Treatment Plan. Archaeological monitors will provide a Cultural Awareness Training workshop, and will monitor construction to protect cultural resources, traditional cultural resources of concern, and culturally sensitive plants.
Environmental Justice	No disproportionately high and adverse impacts on minority or low-income populations.	Not Applicable	Not Applicable
Hazardous Materials	Negligible, short-term contamination threat from vehicle and equipment use during construction. Minor long-term contamination threat from vehicles driving along the project area roads.	Not Applicable	• All equipment and project activities would adhere to local regulations. • Any spills during construction would be immediately cleaned and contained. • Spills from vehicles would be cleaned and contained in accordance with local regulations.
Noise	Minor short-term impacts from increased noise during construction. Minor long-term noise impacts from additional traffic through the project area.	Not Applicable	• Construction work would be limited to daytime hours. • Vehicle and equipment runtimes would be kept to a minimum.

Affected Resource Area	Impacts	Agency Coordination or Permits	Mitigation and BMPs
Transportation	Minor localized short-term impacts from construction activities. Major long-term benefits by improving the transportation network.	Not Applicable	• Construction work would be staged to maintain access to the project area. • The contractor would implement a traffic control plan. • A minimum of one travel lane would remain open in each direction all day. From 2:30 p.m. to 9 a.m. traffic would be allowed to flow at the posted speed limit. • Travel control devices would be installed in conformance with federal guidance.
Utilities	No short-term impacts. Major long-term benefits by providing water lines throughout the project area.	Not Applicable	Not Applicable
Public Health and Safety	Negligible short-term impacts. Major long-term benefits by providing improved access throughout the project area.	Not Applicable	Not Applicable
Land Use and Zoning	No short-term impacts. Negligible long-term impacts.	Not Applicable	Not Applicable

SHPD = Hawai'i State Historic Preservation Division

5 Cumulative Impacts

This section addresses the potential cumulative impacts associated with the implementation of the Proposed Action. Cumulative impacts can be defined as the impacts of a Proposed Action when combined with impacts of past, present, or reasonably foreseeable future actions undertaken by any agency or person. CEQ's regulations for implementing NEPA require an assessment of cumulative impacts during the decision-making process for federal projects. Cumulative impacts can result from individually minor but collectively significant actions.

In response to the 2018 Kīlauea eruption and lava inundation in the Puna district, the County worked with the community to develop the *Kīlauea Recovery and Resilience Plan* (the Plan, 2020). The Plan lays out the projects to be implemented to recover from the eruption's damage, prepare for future disasters, and build community resilience. Included in the Plan is the Voluntary Housing Buyout Program that supports the voluntary buyout of homes that were affected by lava flows from the 2018 eruption or are threatened by future volcanic events. The

County would buy homes through the Community Development Block Grant Disaster Recovery program and then maintain the area as open space.

Also included in the Plan is the Parks and Recreation Recovery Initiative and the Pohoiki Boat Ramp Access project, which involves the County and DLNR working with FEMA to rebuild Isaac Kepoʻokalani Hale Beach Park including the boat ramp, which is near the intersection of Highway 137 and Pohoiki Road. The Proposed Action would allow the park to be more easily accessible for public use and rebuilding the park would allow fishermen to maintain their livelihood.

There is the potential for these projects to combine potential effects with the Proposed Action with respect to air quality and noise, but overall, the combined impacts from these projects would be beneficial to the region. They would allow the community to rebuild after the 2018 Kīlauea eruption and lava inundation. These activities would result in long-term cumulative beneficial effects and would complement the Proposed Action by bringing the community back to the project area.

6 Agency Coordination, Public Involvement, and Permits

This section provides a summary of the agency coordination efforts and public involvement process for the proposed project. An overview of the permits that would be required under the Proposed Action is provided.

6.1 Agency Coordination

FEMA submitted a letter for informal consultation to USFWS on August 9, 2022. USFWS responded on January 30, 2023, concurring with FEMA's determination. **Appendix C** contains the consultation documentation with USFWS.

On September 2, 2022, consultation letters were sent to NHOs and five interested parties about the Proposed Action to solicit their comments and request any additional information about cultural resources that may be affected. NHOs and individuals contacted include the County of Hawaiʻi Burial Council; the Office of Hawaiian Affairs; Compliance Enforcement for the Office of Hawaiian Affairs; No Koa Ikaika KaLahui Hawaiʻi; and the Hawaiian Civic Club Kaʻu. FEMA attended a site visit with lineal descendants on August 25, 2022. On January 31, 2023, letters were sent to representatives of Pōhaku Pelemaka, Miulan P. Young Kealoha Trust, and Leihulu Emma Cooper Trust. FEMA also sent a letter to representatives from the University of Hawaiʻi System on March 3, 2023. Interested Parties and NHOs provided comments during the site visit and in response to FEMA's letters, as discussed in Section 4.12.

On December 15, 2020, FEMA submitted the Reconnaissance Survey Report to SHPD for their review. The SHPD responded on January 12, 2023, concurring with FEMA's determination of No Historic Properties Affected. SHPD concurred with FEMA's proposal that archaeological monitoring be conducted during construction and requested an archaeological monitoring plan be conducted. **Appendix D** contains copies of correspondence with NHOs, interested parties, and the SHPD.

6.2 Public Participation

6.2.1 Previous Public Engagement

The County has been engaging the community about this project to obtain feedback and gain community consensus since January 2021. The County held four large-scale virtual and in-person community events, called Revitalize Puna, from June 2021 to April 2022. Between January 2021 and March 2022, the County held five meetings with stakeholders from Lower Puna, including community organizations, homeowner associations, property owners, and Hawaiian lineal descendants from the areas impacted by the 2018 Kīlauea eruption. Specific to Kumukahi-Lighthouse Road, the County met with property owners and Hawaiian lineal descendants of the area as well as senior officials from the State of Hawai‘i DLNR, Office of Hawaiian Affairs, and the University of Hawai‘i over a series of 11 meetings from April 2021 through October 2022. Project-specific public meetings were held on February 16, 2021, October 28, 2021, and March 18, 2022. The County hosted consultation meetings with Hawaiian lineal descendants and property owners of the Pohoiki area as well as visioning sessions as part of the Revitalize Pohoiki process. Although Revitalize Pohoiki was focused on redevelopment of Isaac Kepo‘okalani Hale Beach Park, community members brought up road improvements in the project area during these meetings. In addition, the County met with community and homeowner associations eight times between March 2021 and April 2022.

6.2.2 NEPA Public Involvement Process

In accordance with NEPA, this draft EA will be released to the public and resource agencies for a 30-day public review and comment period. Comments on this draft EA will be incorporated into the final EA, as appropriate. The draft EA reflects the evaluation and assessment of the federal government, the decision-maker for the federal action; however, FEMA will take into consideration any substantive comments received during the public review period to inform the final decision regarding grant approval and project implementation. If no substantive comments are received from the public or agency reviewers, this draft EA will be assumed to be final and FEMA will issue a Finding of No Significant Impact (FONSI).

A public scoping notice about the project action was published on FEMA’s website (https://www.fema.gov/disaster-federal-register-notice/dr-4366-ca-public-notice-002), on the County’s website (https://www.dpw.hawaiicounty.gov/Home/Components/News/News/3215/1599?backlist=%2fresources%2fbulletins), as well as in the Hawai‘i Tribune Herald and West Hawai‘i Today to notify and provide the public with an opportunity to comment on the Proposed Action, potential alternatives, and preliminary identification of environmental issues. The public comment period and public notice closed on November 11, 2022. FEMA and the County received three comments. Comments included concerns about the timeline for road reopening, the potential for disturbance to burials in the project area, and the current lack of emergency access.

The draft EA will be available to the public for review on FEMA’s website at: https://www.fema.gov/emergency-managers/practitioners/environmental-historic/nepa-repository. The County will make the draft EA available on its website at: https://www.dpw.hawaiicounty.gov/resources/bulletins#Engineering. Hard copies of the draft EA will be made available at two locations:

- Hawai‘i County Department of Public Works Office (Aupuni Center, 101 Pauahi Street, Suite 7, Hilo, HI 96720)
- Hawai‘i County Department of Public Works Office (West Hawai‘i Civic Center, 75-5044 Ane Keohokalole Highway, Bldg. D, 1st Floor, Kailua-Kona, HI 96740)

The comment period for the draft EA will start when the public notice of EA availability is published and will extend for 30 days. Comments on the draft EA may be submitted to fema-rix-ehp-documents@fema.dhs.gov (include "Puna Road Repair and Water Line Installation" in the subject line). Comments also may be submitted via mail to: Regional Environmental Officer, FEMA Region 9, 1111 Broadway, Suite 1200, Oakland, CA 94607-4052.

Appendix E contains the scoping notice and notice of EA availability.

6.3 Permits

The County would be responsible for obtaining any necessary local, state, or federal permits needed to conduct the proposed work.

7 List of Preparers

The following is a list of preparers who contributed to the development of this EA for FEMA. The individuals listed in this section had principal roles in the preparation of this document. Many others, including senior managers, administrative support personnel, and technical staff, contributed and their efforts were no less important to the development of this EA.

Preparers	Experience and Expertise	Role in Preparation
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FEMA

Reviewers	Role in Preparation
Herdrich, David	NHPA and Consultations
Klatzker, Adam	ESA

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Appendix A: Figures

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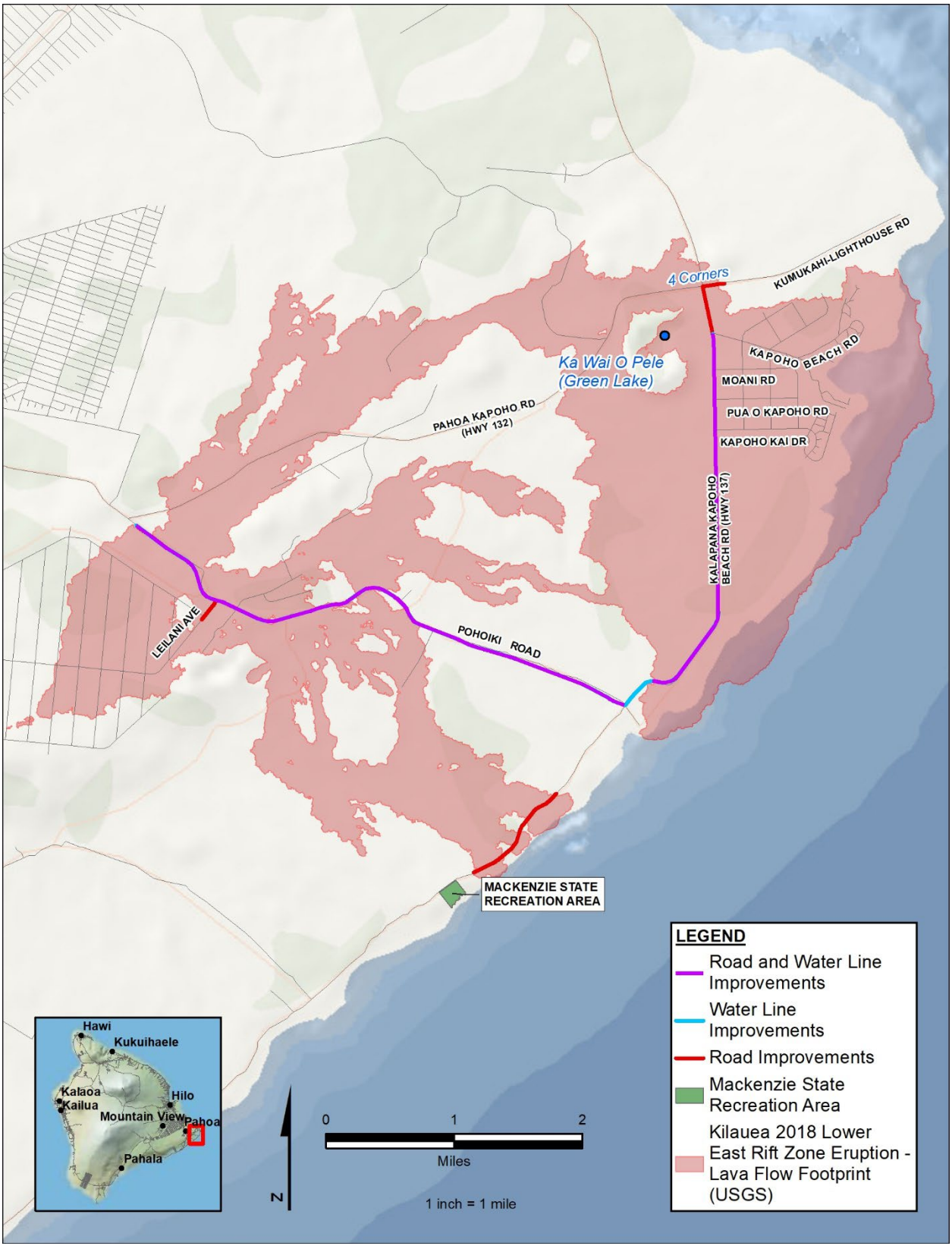


Figure 1. Project Area and Location

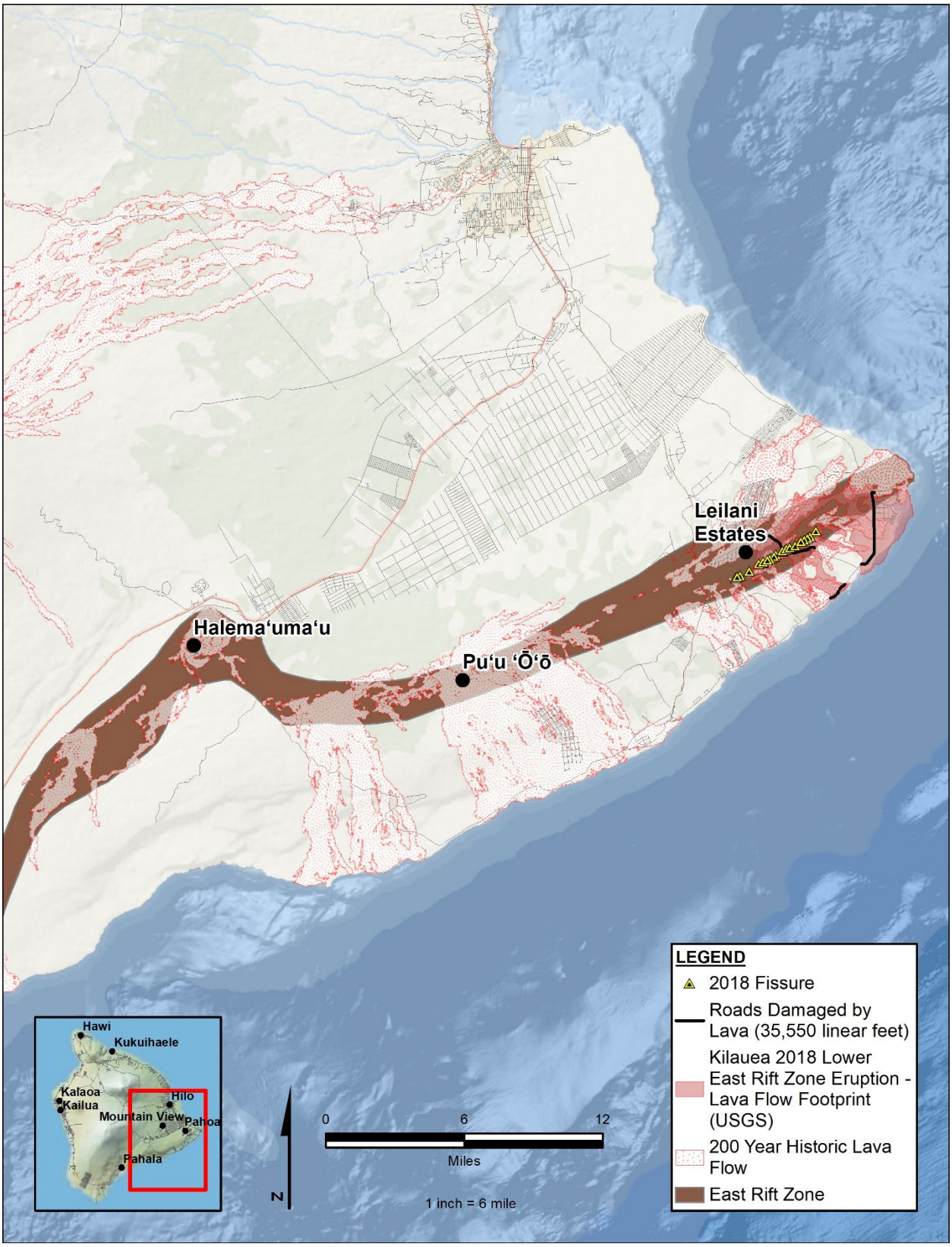


Figure 2. Halemaʻumaʻu crater, Puʻuʻōʻō, East Rift Zone, Leilani Estates, and Lava Cover

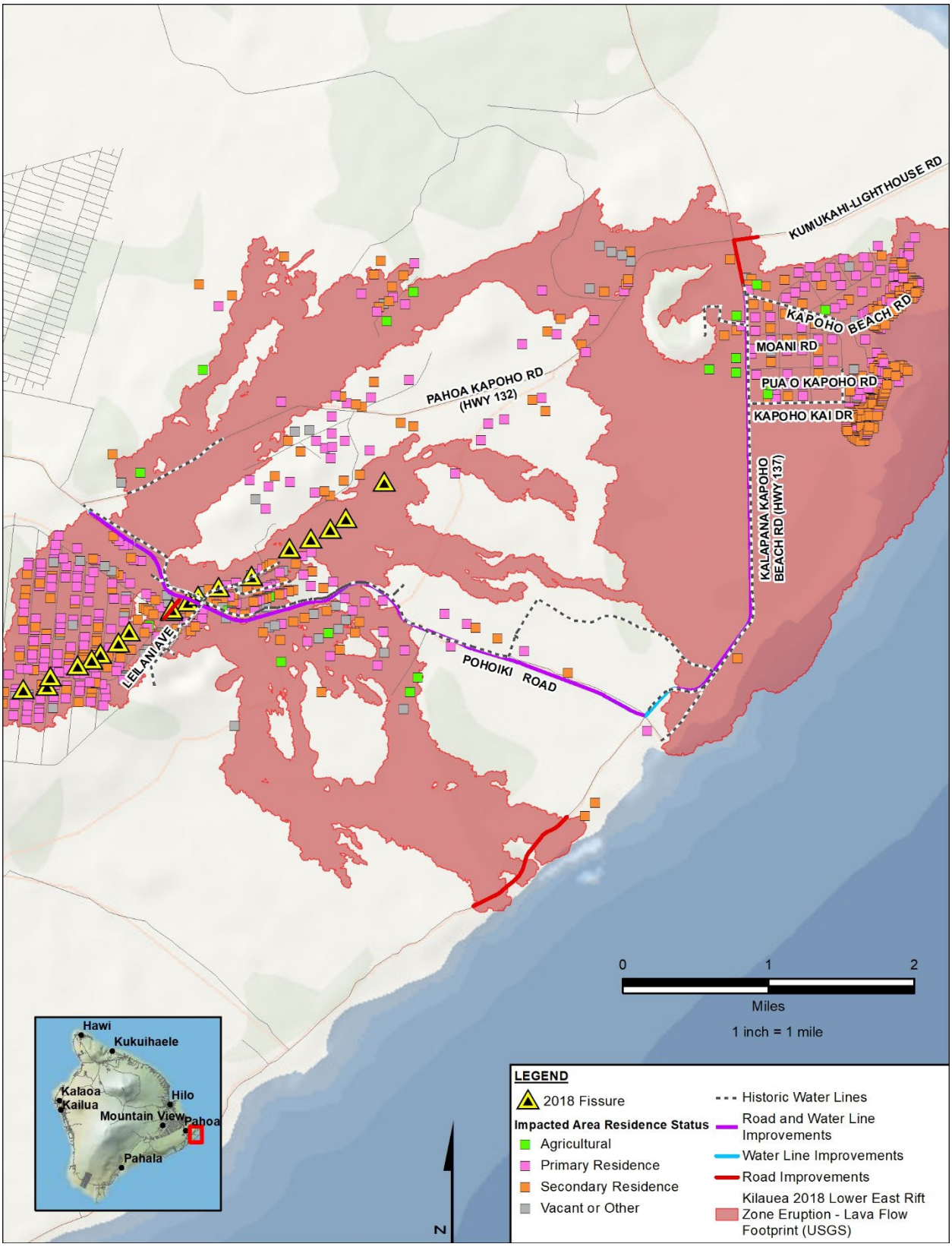


Figure 3. Lava Fissure Locations, Buildings Affected by Lava, Lava Cover, Damaged Roads, and Damaged Water Lines

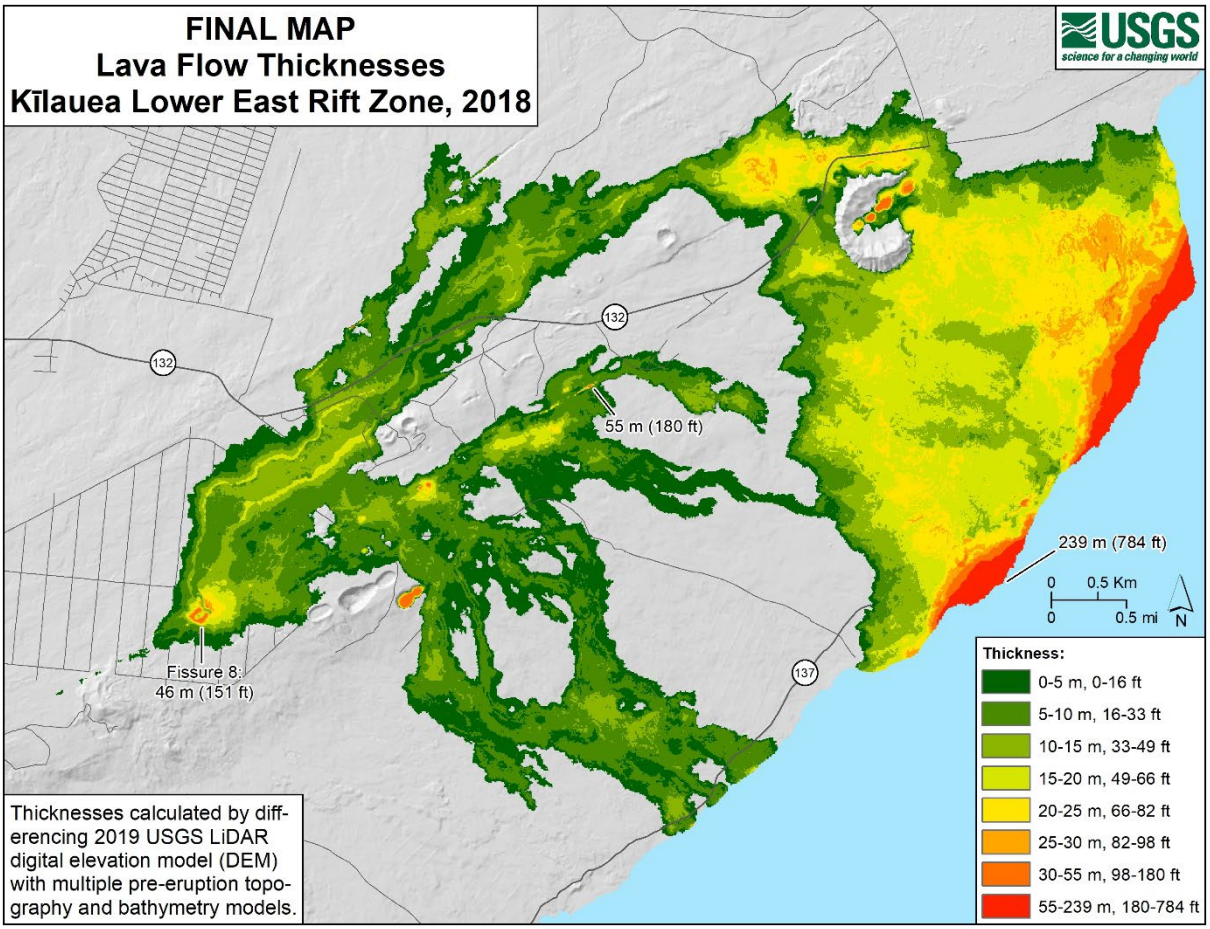


Figure 4. Lava Thickness from 2018 Eruption

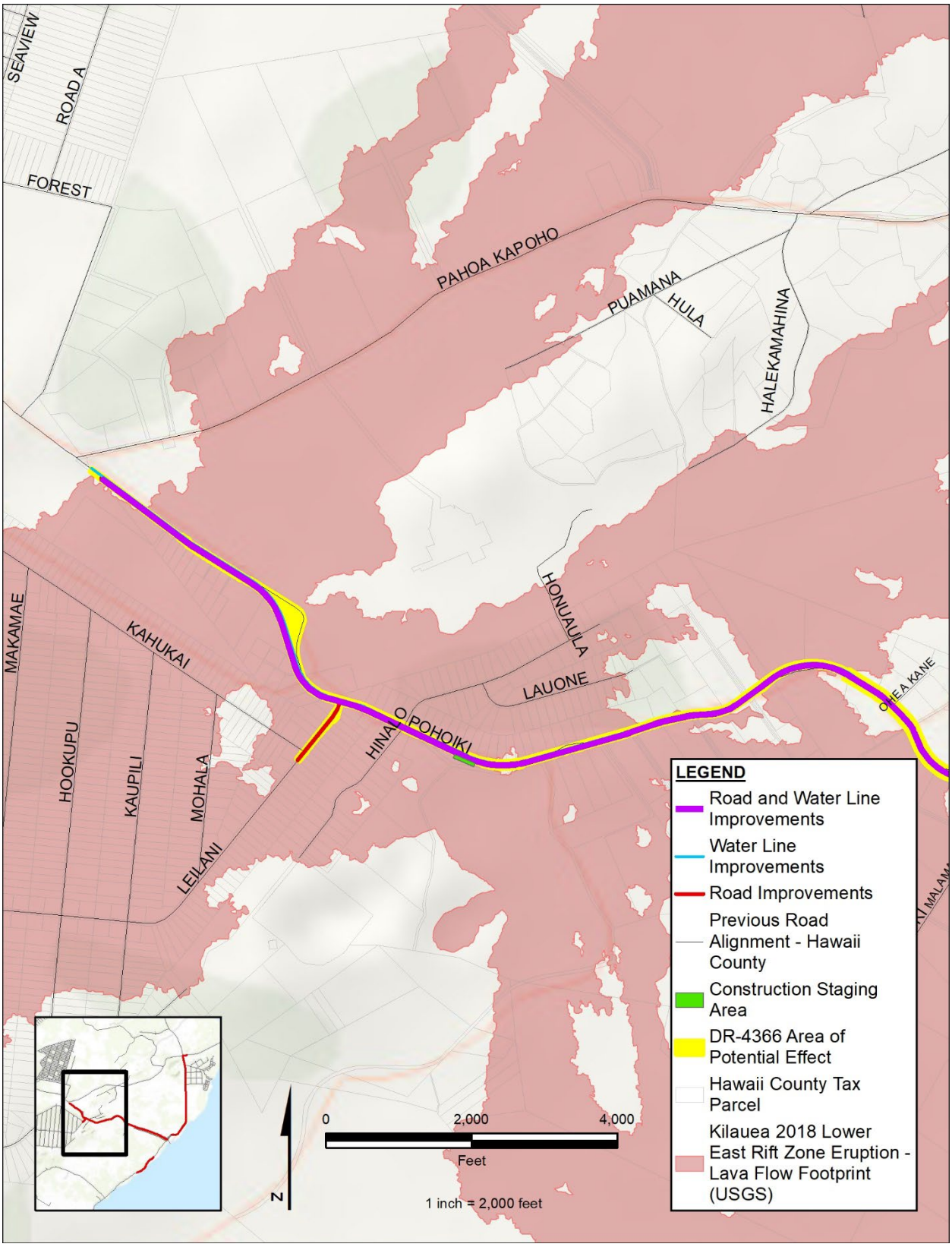


Figure 5a. Detailed Project Area Maps Showing Project Components and Proposed Improvements

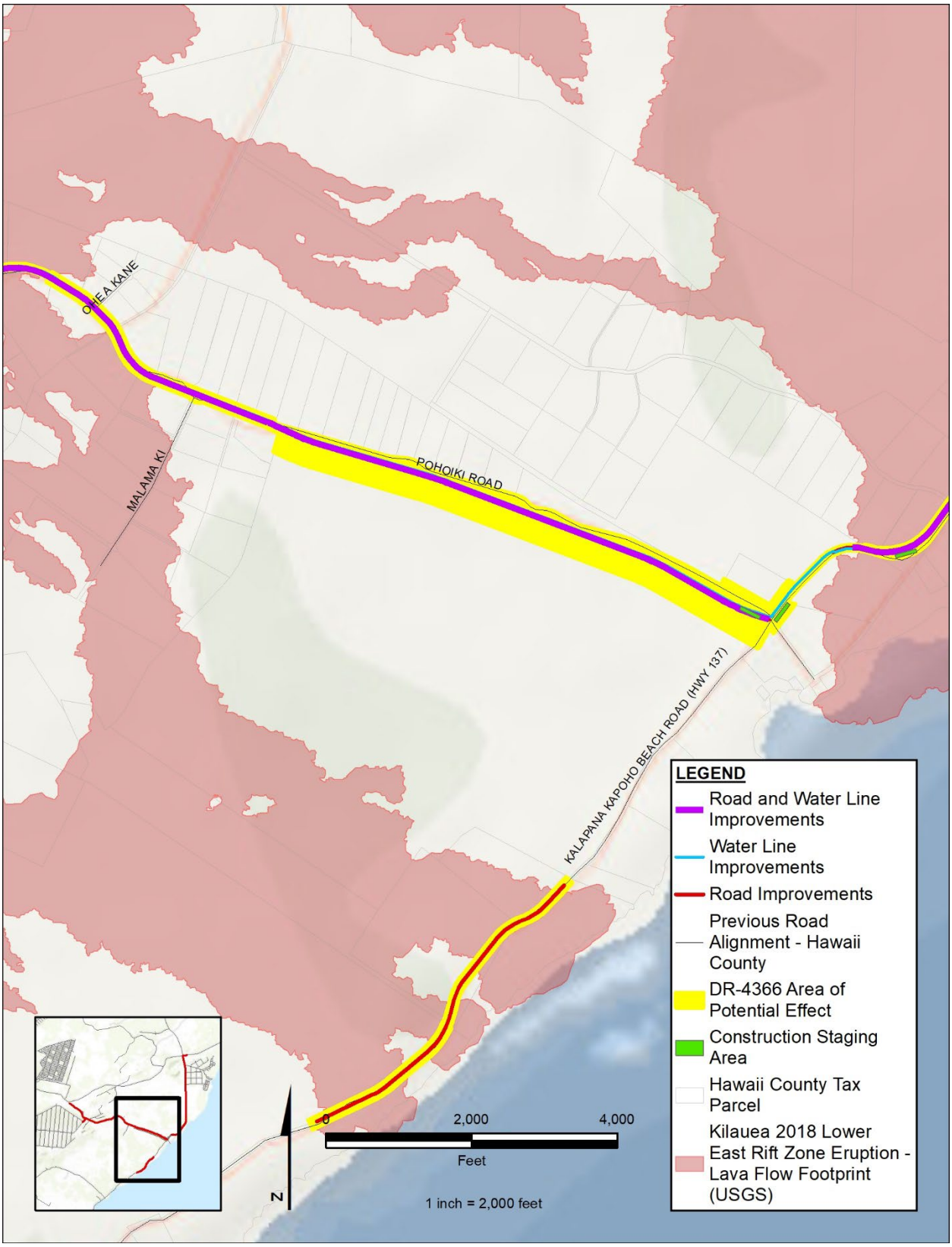


Figure 5b. Detailed Project Area Maps Showing Project Components and Proposed Improvements

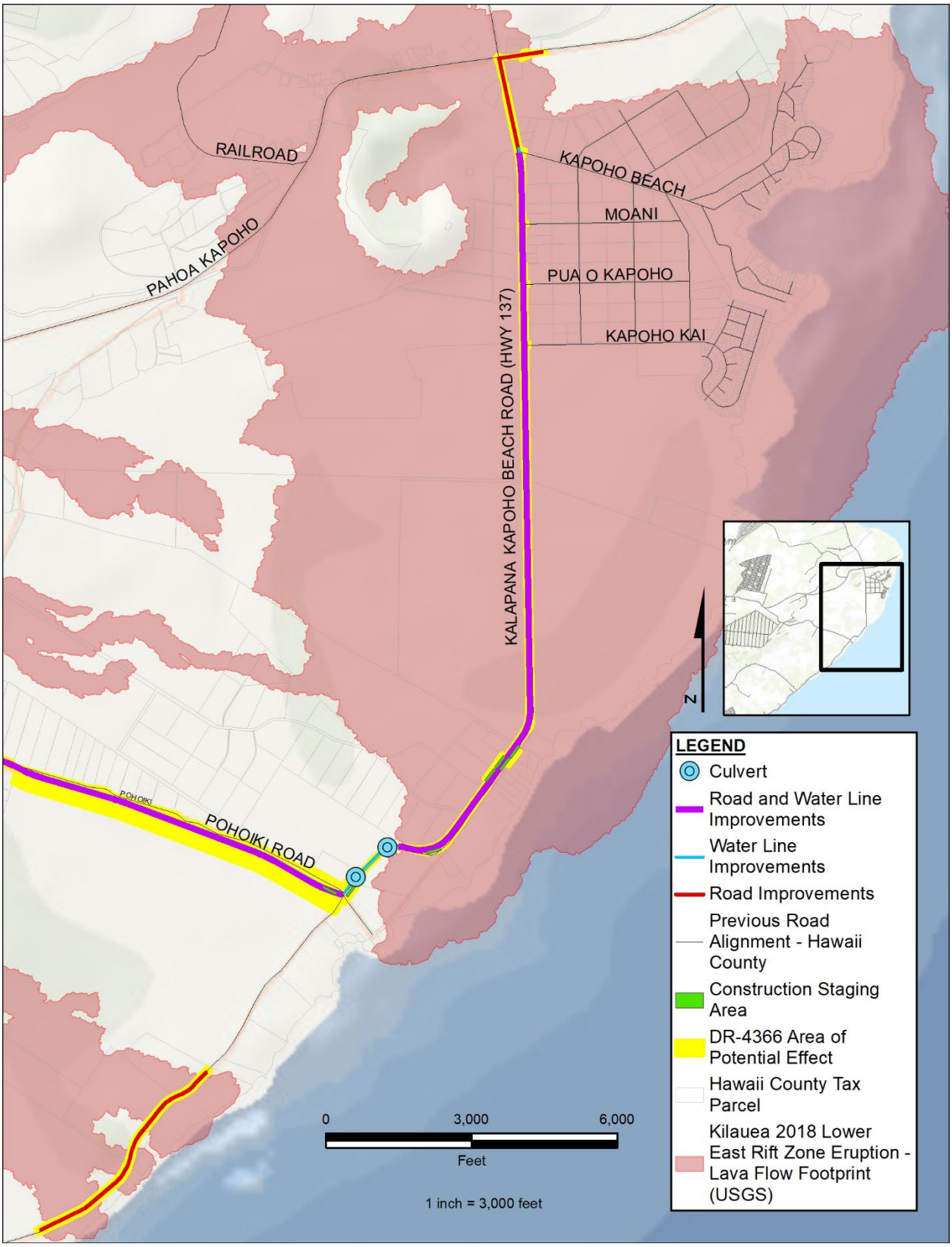


Figure 5c. Detailed Project Area Maps Showing Project Components and Proposed Improvements

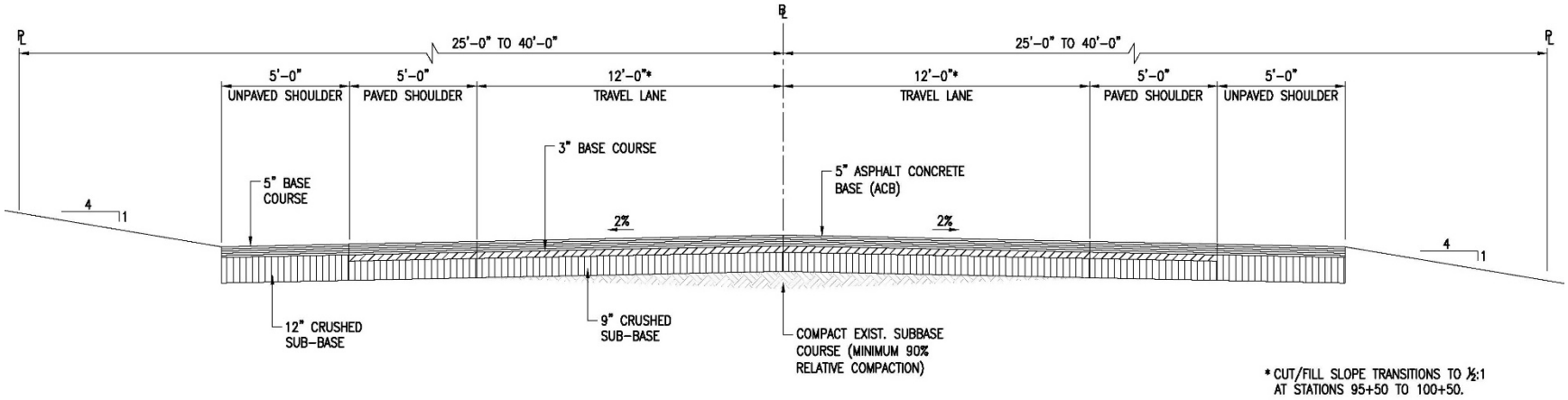
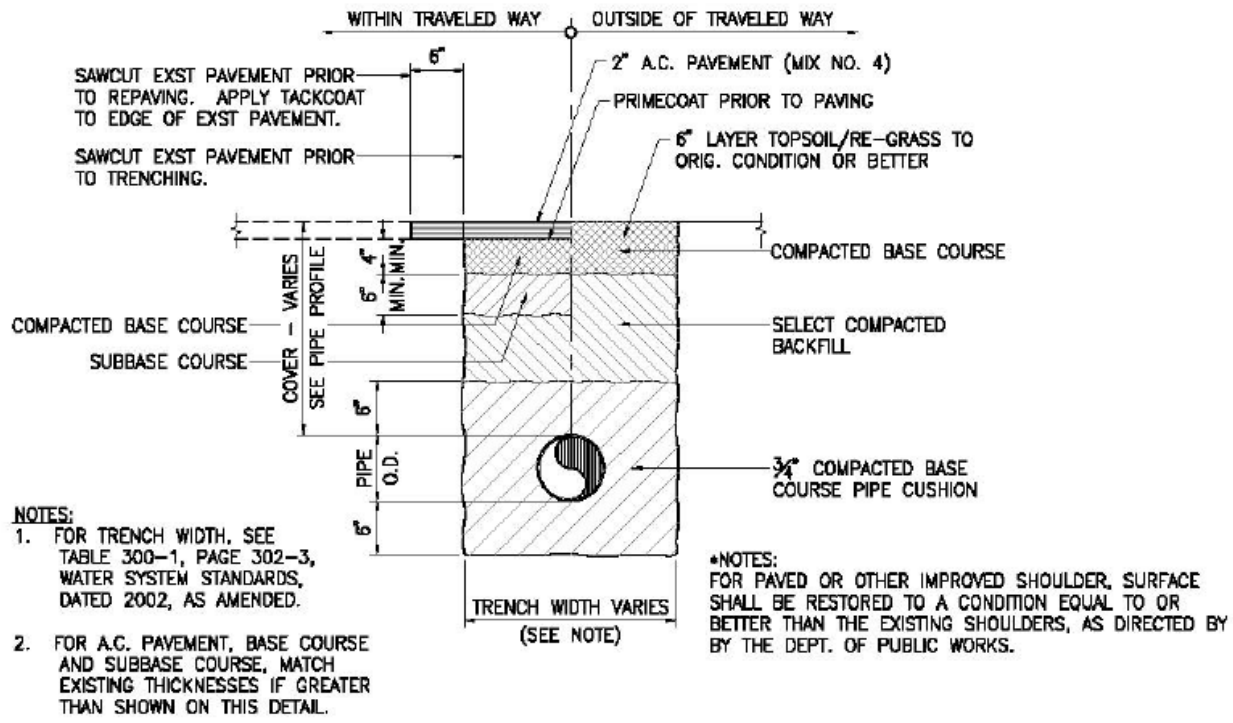


Figure 6. Typical Cross-Section for Roadwork



TYPICAL DUCTILE IRON PIPE TRENCH SECTION
FOR COUNTY ROADS
NOT TO SCALE

Figure 7. Typical Section for Water Line Installation

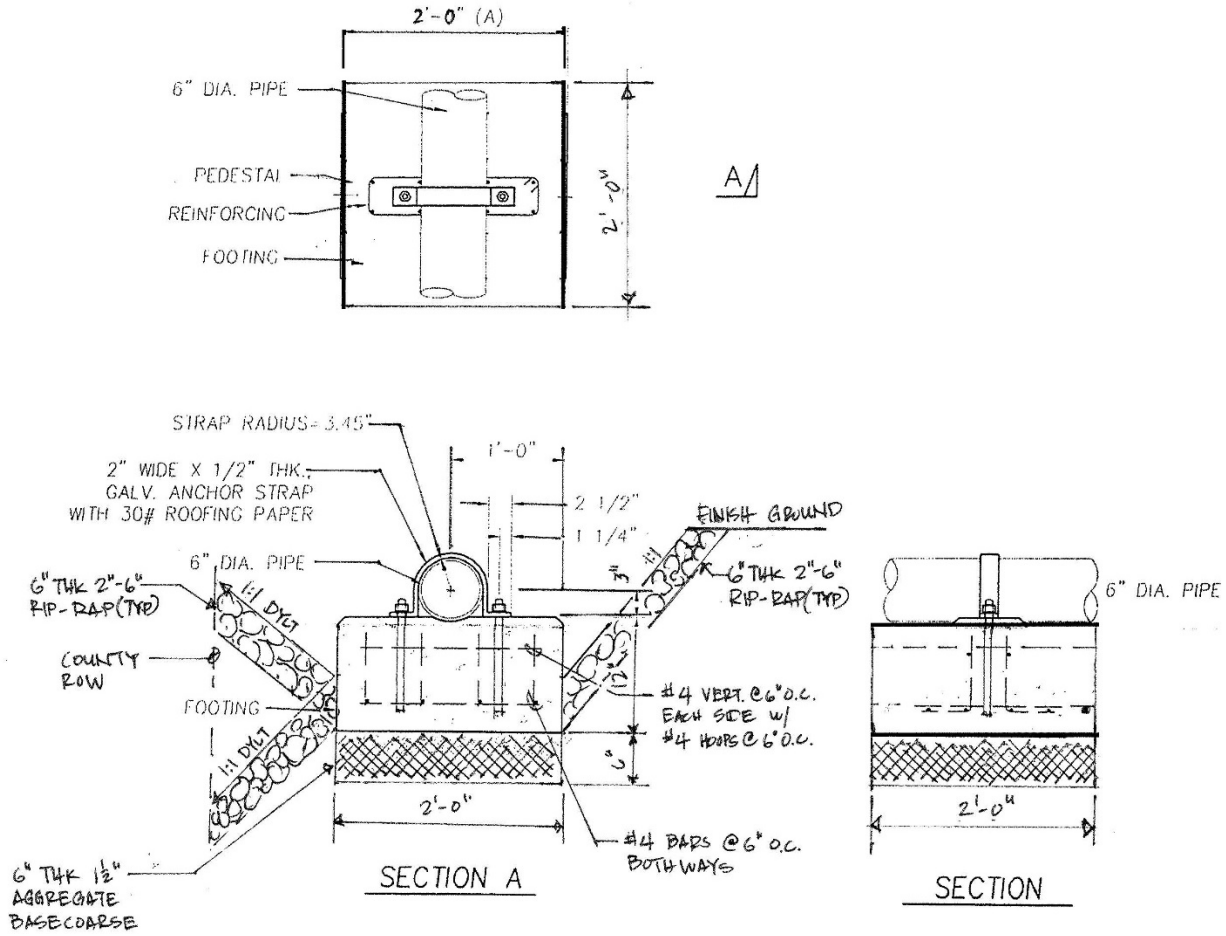


Figure 8. Typical Section for Water Line Installation in V-Shaped Riprap Trench

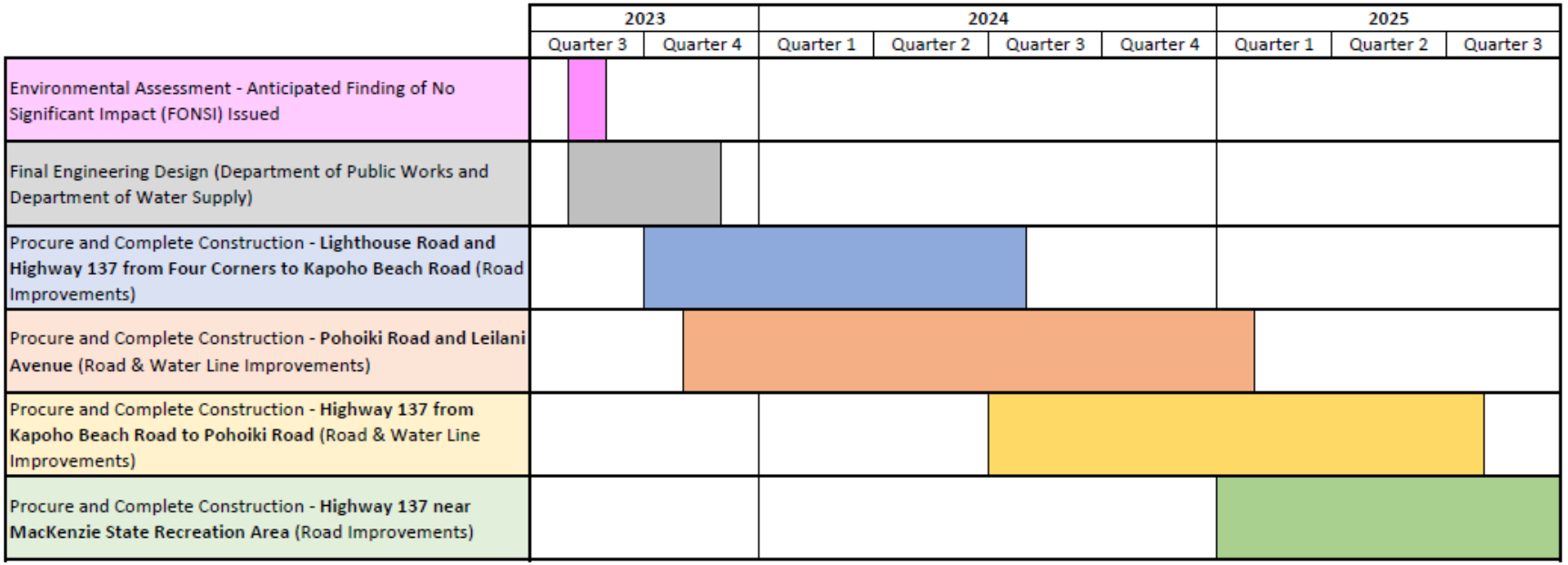


Figure 9. Construction Sequencing

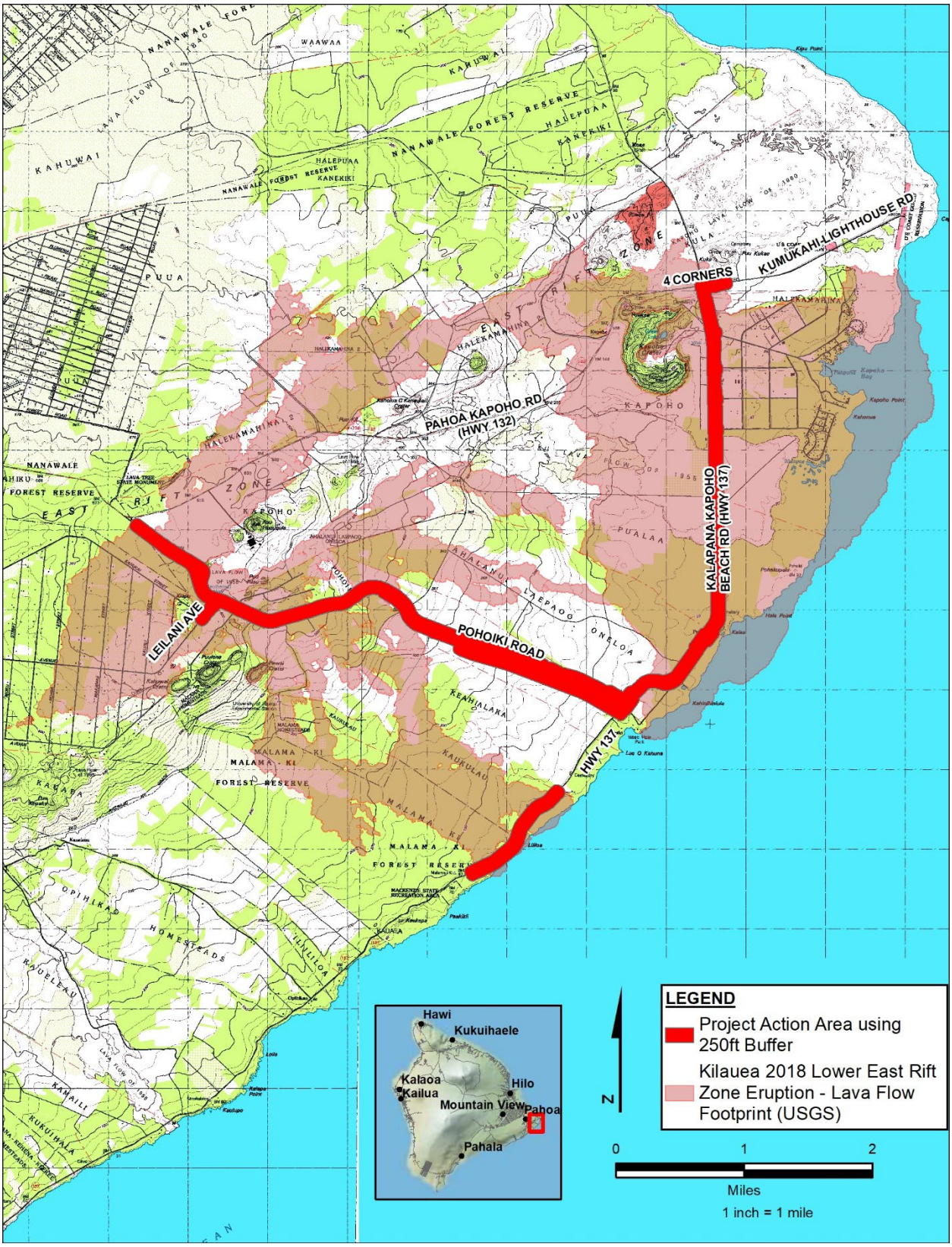


Figure 10. Action Area for Biological Resources

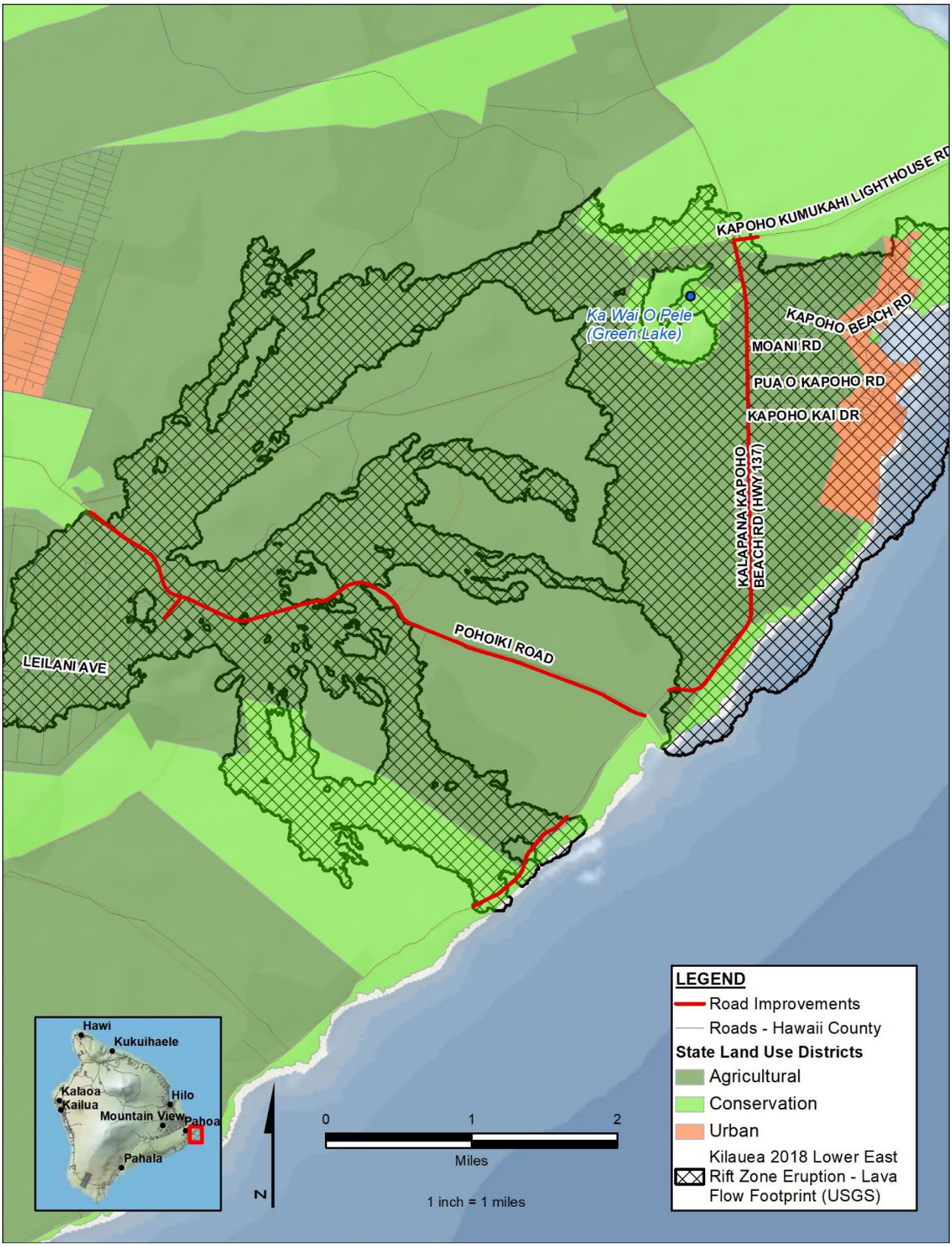


Figure 11. Land Use within Project Area

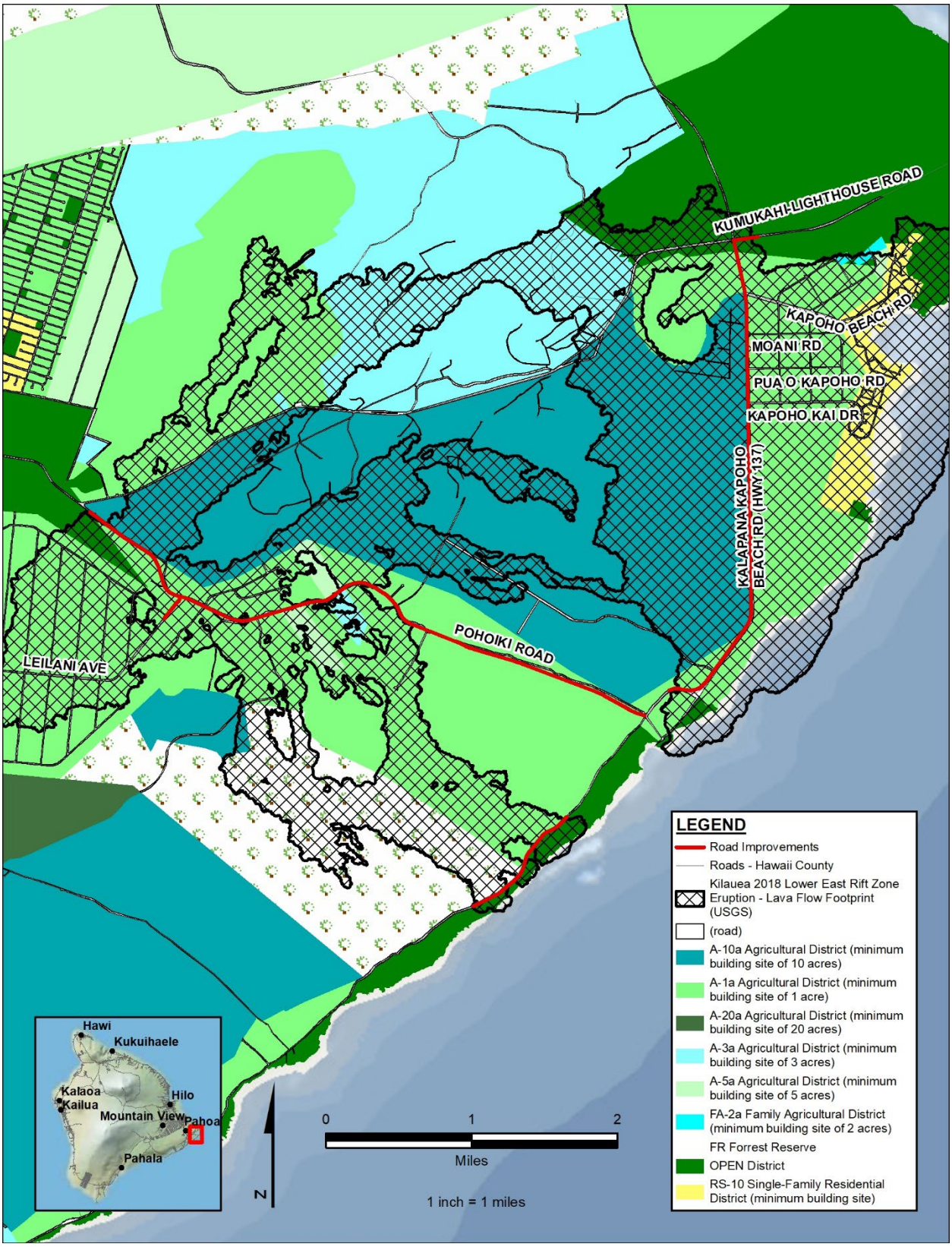


Figure 12. Zoning within Project Area

Appendix B: Project Area Photographs

Photo 1. Photo of lava flow in the project area, facing southeast (Ka Wai O Pele [Green Lake] in upper left-hand corner)

Photo 2. Hardened lava near Pohoiki Road, facing northwest

Photo 3. Hardened lava across Highway 137, just north of intersection with Pohoiki Road, facing northeast

Photo 4. Hardened lava across Highway 137 near MacKenzie State Recreation Area, facing northeast (photo shows temporary road rebuilt after 2018 lava flow)

Photo 5. Hardened lava along coastline near the northern portion of Highway 137, facing northeast (photo shows depth of lava at ocean's edge; palm trees and vehicles on left side of photo provide approximate scale)

Appendix C: USFWS Consultation Documentation

U.S. Department of Homeland Security
Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

FEMA

August 9, 2022

IN REPLY REFER TO:
AK-4366-PW-55/53

Earl Campbell
Field Supervisor
Pacific Islands Fish and Wildlife Office
Maui Nui and Hawai‘i Island Team
U.S. Fish and Wildlife Service
154 Waianuenue Avenue Suite 103
Hilo, Hawai‘i 96720-2452

Re: Puna Roads and Water Line Project
FEMA-4366-HI, PW #55/53
County of Hawai‘i Department of Public Works and Department of Water Supply
Request for Informal Consultation under Section 7 of the ESA with USFWS

Dear Earl Campbell:

The U.S. Department of Homeland Security’s Federal Emergency Management Agency (FEMA) through the Hawai‘i Emergency Management Agency (HI-EMA), proposes to provide federal financial assistance under the Public Assistance (PA) Program to the County of Hawai‘i Department of Public Works (DPW) and the County of Hawai‘i Department of Water Supply (DWS) for the Puna Road and Water Line Project. HI-EMA is the direct Applicant for the grants, and DPW and DWS are the Subapplicants. DPW proposes to repair, repave, and realign approximately 9.2 miles of county roads that were inundated with lava from the 2018 Kīlauea volcano eruption in the easternmost portion of the island to bring them back to their pre-disaster function. DWS proposes to concurrently install new water lines along approximately 7.6 miles of the same county roads. The two projects are collectively referred to as the Proposed Action. These roads and water lines were damaged as a result of the 2018 Kīlauea volcano eruption, a declared Presidential disaster (FEMA-4366-DR-HI).

This letter report represents FEMA’s request for informal consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA) for the Proposed Action. This letter report describes the Proposed Action and environmental setting and analyzes the potential effects and measures to avoid and/or minimize potential adverse effects of the Proposed Action in accordance with Section 7 of the ESA (16 U.S. Code [U.S.C.] 1536) on the species listed in the official species list transmitted by email from Melissa Cady,

USFWS (Maui Nui and Hawai‘i Island Team, Pacific Islands Fish and Wildlife Office), to Adam Klatzker of FEMA on May 17, 2022 (included as an attachment to this letter). The species listed in the email are the following:

- The endangered ‘ōpe‘ape‘a or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)
- The endangered ‘ua‘u or Hawaiian Petrel (*Pterodroma sandwicensis*)
- The endangered ‘akē‘akē or Hawai‘i distinct population segment (DPS) of the Band-rumped Storm-petrel (*Oceanodroma castro*)
- The threatened ‘a‘o or Newell’s Shearwater (*Puffinus auricularis newelli*)
- The threatened nēnē or Hawaiian Goose (*Branta sandvicensis*)
- The endangered ae‘o or Hawaiian Stilt (*Himantopus mexicanus knudseni*)
- The endangered ‘alae ke‘oke‘o or Hawaiian Coot (*Fulica alai*)
- The threatened honu or Central North Pacific DPS of Green Sea Turtle (*Chelonia mydas*)
- The endangered honu ‘ea or Hawksbill Sea Turtle (*Eretmochelys imbricata*)
- The endangered Blackburn’s Sphinx Moth (*Manduca blackburni*)
- The endangered Hilo Ischaemum (*Ischaemum byrone*)

The memo notes that there is no critical habitat for listed species near the proposed project.

FEMA is not consulting separately with the National Marine Fisheries Service (NMFS) because the Proposed Action would have no effect on federally listed species and/or critical habitats protected under the ESA under their jurisdiction, or Essential Fish Habitat protected under the Magnuson-Stevens Fishery Conservation and Management Act.

Table 1 provides a summary of the ESA effect determinations on federally listed species and their critical habitat.

Table 1: Summary of Effects Determinations

Common Name (Scientific Name)	Effects Determination
‘ōpe‘ape‘a or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)	May affect, but is not likely to adversely affect
‘ua‘u or Hawaiian Petrel (*Pterodroma sandwicensis*)	No effect
‘akē‘akē or Band-rumped Storm-Petrel (*Oceanodroma castro*), Hawai‘i DPS	No effect
‘a‘o or Newell’s Shearwater (*Puffinus auricularis newelli*)	No effect
Nēnē or Hawaiian Goose (*Branta sandvicensis*)	May affect, but is not likely to adversely affect
ae‘o or Hawaiian Stilt (*Himantopus mexicanus knudseni*)	No effect
‘alae ke‘oke‘o or Hawaiian Coot (*Fulica alai*)	No effect
Honu or Green Sea Turtle (*Chelonia mydas*), Central North Pacific DPS	No effect
Honu ‘ea or Hawksbill Sea Turtle (*Eretmochelys imbricata*)	No effect
Blackburn’s Sphinx Moth (*Manduca blackburni*)	No effect
Hilo Ischaemum (*Ischaemum byrone*)	No effect

1.0 PROPOSED ACTION

1.1 Project Description

The proposed project is in Hawai‘i County in the state of Hawai‘i. It is approximately 30 kilometers (km; 19 miles) south-southeast of Hilo, Hawai‘i. Project components, including staging areas, occur along or adjacent to Highway 137, Pohoiki Road, a short segment of Lighthouse Road, and several road stub-outs (**Figure 1**). The project includes two elements with two different Subapplicants. The project is composed of the following Project Worksheet (PW) elements: PW-55, road improvements, and PW-53, Water Line Installation, and they are described as follows.

Realign and Repave Roads (Subapplicant: DPW)

DPW proposes to repave approximately 9.2 miles of roads in the project area. Some of the roads would be realigned, in addition to being repaved, to reduce property acquisitions, avoid important vegetation, and/or meet current design standards. **Figure 1** shows the project area and location map.

Along road sections covered by lava from the 2018 eruption, the road would be constructed on top of the hardened lava and would change elevation to follow the grade of the naturally hardened lava. The lava would be regraded as needed outside of the roadway to maintain a 1:1 slope adjacent to the roadway to maintain a safe roadway condition for drivers. Stormwater would be directed to the roadway shoulders along the side of the road. Along sections where there is no lava inundation, the road would be widened to a uniform 44-foot width to meet current design standards. The road widening would be outside of the original footprint in some areas. The widest lava disturbance would be approximately 70 feet on either side of the road to create a roadway shoulder with appropriate slopes; along most of the alignment, the width of lava disturbance would be less than 20 feet from the edge of the pavement.

Road sections along Pohoiki Road and Highway 137 would be paved to be 34 feet wide with two 5-foot-wide unpaved shoulders. The total depth of the roadway, including crushed sub-base, base, and asphalt, would be 17 inches. After paving is complete, the roadway would be striped, and signage would be installed.

Along Highway 137, a 75-foot-long section (or “stub-out”) would be paved to the east of Highway 137 along Kapoho Beach Road. Stub-outs that extend to the edge of the County right-of-way would be paved along Moani Street, Pua O Kapoho Street, and Kapoho Kai Drive to allow for future development. The stub-outs would be paved to be 20 feet wide with two 5-foot-wide unpaved shoulders. The total depth of the roadway, including crushed sub-base, base, and asphalt, would be 17 inches. After paving is complete, the roadway would be striped, and signage would be installed. No roadway lighting would be installed.

Along the westernmost 88 feet of Lighthouse Road, the paved roadway would be 34 feet wide with two 5-foot-wide unpaved shoulders. Along the remaining 804 feet of Lighthouse Road, the road would be unpaved and 40 feet wide. The total depth of the paved roadway, including crushed sub-base, base, and asphalt, would be 17 inches.

Install Water Lines (Subapplicant: DWS)

DWS proposes to install water lines along Pohoiki Road and the northern portion of Highway 137 concurrent with the roadwork. Water lines would be installed along the northern side of Pohoiki Road from just east of the intersection of Pohoiki Road and Highway 132 to the intersection of Pohoiki Road and Highway 137. The water line would then cross Highway 137 and run along the eastern side of Highway 137 to Kapoho Beach Road. Water lines would not be installed on Leilani Avenue, the side streets connecting to Highway 137 (Lighthouse Road, Kapoho Beach Road, Moani Road, Pua O Kapoho, and Kapoho Kai Drive), or along Highway 137 in MacKenzie State Recreation Area.

Along most of the alignment, water lines would be installed under the unpaved shoulder of the road, just outside the travel lane. Along Pohoiki Road, ductile iron pipe with a 6-inch outer diameter would be installed, and along Highway 137, ductile iron pipe with either a 4-inch or 6-inch outer diameter would be installed. The pipe would be placed with 6 inches of compacted base course above and below the pipe. There would be a minimum of 3 feet of cover over the pipe.

The new water line would be installed under two existing 24-inch culverts along Highway 137 north of Pohoiki Road. Depending on the amount of cover available, the water line may be routed to the east or west side of the roadway. A concrete jacket (10 inches of concrete surrounding the pipe to increase structural stability) may be used if needed to route the water line near one or both culverts. The minimum vertical clearance between the water line and other utilities would be 12 inches if a concrete jacket is used, and 18 inches if a concrete jacket is not used.

In road sections where the remnant heat of the lava is too high to install water lines underground (such as along Upper Pohoiki Road near the fissures, from approximate stations 45+00 to 65+00), the water line would be installed in a V-shaped riprap trench, which would extend the project footprint 16 feet to the north. The V-shaped riprap trench would allow heat to continue to dissipate from the lava while allowing the water line to be installed and operated.

Fire hydrants would be installed along the water line. DWS proposes to add laterals to connect to adjacent properties. The laterals would be within the existing right-of-way.

1.2 Construction Staging, Access, and Methods

The County proposes to stage equipment within the existing road footprint and on eight construction staging areas on parcels owned by the County near the project area. Some excavation may be needed to level the lava from the 2018 eruption on the parcels to accommodate staging, storage, and stockpiling activities. Excavation would be no more than 5 feet deep and would not extend into previously undisturbed ground under the 2018 lava. The project area would be accessed using open local roads including Highway 132 and Highway 137.

Construction methods would be determined by the construction contractor and subject to permit conditions. All work would be performed in accordance with the State's "Hawai‘i Standard Specifications for Road and Bridge Construction," dated 2005, as revised, and Hawai‘i Department of Transportation, Highways Division, Standard Plans, dated 2008.

The County anticipates needing the following construction equipment for the duration of the main construction period: excavators, bulldozers, hydraulic impact hammers, backhoes, loaders, graders, dump trucks, compactors/rollers, an asphalt paver, rock crushers, rock haulers, and water trucks.

The County anticipates using the rock crushers to crush excavated lava to create base course material to be used on-site. Some fill may need to be brought in from an on-island quarry site depending on the lava temperature and gradation. Demolition and excess excavation material would be disposed of at the West Hawai‘i Landfill or Hilo Landfill. Excavated asphalt concrete base and subbase material would be transported to the designated stockpile location at the Highway Maintenance quarry site.

There would be excavation beneath the pre-2018 lava elevation along Lower Pohoiki Road (which was not inundated by lava) and where the new road would connect to existing roads.

The contractor would implement a variety of practices to protect water quality including removing silt and debris that results from grading from drainage facilities, roadways, and other areas. Other water quality protection measures would include installing temporary sediment control filters at grated drain inlets, developing a grated inlet erosion control plan, installing temporary sediment control filters at catch basins, sandbag barriers, sand snakes (monofilament weave bag filled with sand or gravel providing a sediment barrier), stabilized construction entrance, and temporary sediment straw wattles. A site-specific, best management practices (BMP) plan would be prepared, and the contractor would prevent and control spills of petroleum products. Other than sediment control fencing as needed, no other temporary or permanent fencing would be constructed.

Hazardous materials would be disposed of as specified by local or state regulations. The contractor would follow good housekeeping BMPs and would prepare a Materials Pollution Prevention Plan, Hazardous Material Pollution Prevention Plan, an On-site and Off-site Product-Specific Plan (relating to petroleum-based products, fertilizers, paints, and concrete trucks), and a Spill Control Plan.

Temporary dust control measures would be implemented including dampening the site at the end of each day.

1.3 Project Duration

Construction along Upper Pohoiki Road is anticipated to take 38 weeks to construct the road and install the water line. Once complete, construction would take place along Lower Pohoiki Road, and is anticipated to take 34 weeks. Once Lower Pohoiki Road is complete, work along Highway 137 from Pohoiki Road to Kapoho Beach Road would take place and is anticipated to take 30 weeks. Construction along Highway 137 in MacKenzie State Recreation Area, the intersection of Highways 132 and 137, and Lighthouse Road would start concurrently with work along Upper Pohoiki Road and is anticipated to last up to 26 weeks. The total project is anticipated to take 33 months to finalize the project design, solicit bids, award contracts, and complete construction.

Construction would take place up to 7 days per week from 7am to 7pm. Construction would not occur at night.

1.4 Action Area

The project construction footprint (approximately 197 acres) includes corridors required for the installation of roadway improvements and waterlines (**Section 1.1**) and staging areas (**Section 1.2**). The proposed project Action Area (**Figure 2**) includes these elements plus a 250-foot buffer beyond those construction and staging areas and totals 784 acres. Staging areas are shown in more detail in **Figure 3**.

The project Action Area is set to include any areas where harassment, mortality, and/or injury could occur during any life stage of the threatened or endangered species in the official species list provided by the USFWS for the project. This includes any potential for behavior modification and the ability of individuals, populations, or the species to feed, breed, shelter, or migrate.

2.0 METHODS

The general area was evaluated through aerial imagery available on Google Earth Pro as of July 11, 2022, and other public and project information. Vegetation was described based on GIS data for vegetation of Hawai‘i (USGS 2017).

The potential for federally listed species to occur in the Action Area was evaluated based on a review of the existing publicly available data. Sources of existing data are referenced for each species evaluated and listed in the References section of this document.

2.1 Project Action Area General Description and Vegetation

The project Action Area totals 784 acres. That area includes approximately 300 acres of vegetated land, and the remainder was covered by the 2018 lava flows. The general topography is flat or with gradual rises, but the 2018 lava flows resulted in areas of mounding within the project footprint that reach as high as 75 feet. The thickness of the 2018 lava flows have been calculated to be as great as 780 feet along the coast, with lesser thicknesses inland. The ocean coastline is within the 250-foot buffer of the project Action Area along the southern Highway 137 segment near McKenzie State Recreation Area. In this portion of the Action Area, there are cliffs dropping to the ocean and most, but not all, of that part of the coastline is new lava from the 2018 flows.

Vegetation for all Hawai‘i was mapped for the Carbon Storage of Hawai‘i project (USGS 2017). The associated GIS data was used to determine the areas covered by different vegetation types in the project Action Area. In the project Action Area and in the general project vicinity, alien vegetation and areas in agriculture, otherwise disturbed, or with minimal vegetation are the primary types, with smaller areas of native vegetation. To determine the specific mapped vegetation types in the project Action Area, adjustments were made to the data to remove the areas inundated by lava in 2018; results are shown in **Table 2**. Along Lower Pohoiki Road and overarching the existing roadway are many large mango (*Mangifera indica*) trees. These trees

are well known on Hawai‘i Island and have been designated Exceptional Trees under Hawai‘i Act 105 - The Exceptional Tree Act. The Act was passed in 1975 because it was recognized that rapid development had led to the destruction of many of the State's exceptional trees. The Act recognizes that trees are valuable for their beauty, and they provide crucial ecological functions.

Table 2. Vegetation Types in the Project Action Area not Covered by Lava in 2018

Vegetation Type	Area (acres)	Combined
Closed ohia mesic forest	3.1	Native vegetation, 33.4 acres
Closed ohia wet forest	0.2	
Open ohia mesic forest	15.9	
Open ohia wet forest	4.2	
Native mesic shrubland	8.4	
Native wet shrubland	1.6	
Alien wet forest	7.3	Alien vegetation, 171.3 acres
Alien mesic forest	39.5	
Alien wet shrubland	2.7	
Alien mesic shrubland	14.3	
Alien wet grassland[1]	12.8	
Alien mesic grassland[1]	94.7	
Cultivated agriculture[2]	60.0	Agricultural or minimal vegetation, 94.9 acres
Developed open space	6.7	
Low intensity developed	20.2	
Very sparse vegetation to unvegetated	8.0	

[1] Areas mapped as alien grassland may currently have scattered shrubs.

[2] Areas mapped as Cultivated Agriculture may not be actively farmed and possibly have vegetation consisting of various alien shrubs and grasses.

No waterbodies other than a short section of coastline are present within the project Action Area. Close to the Action Area is Isaac Hale Park (also known as Pohoiki Park; see **Figure 3**) and the associated beach on the coast near the intersection of Highway 137 and Pohoiki Road. At the park, anchialine pools have formed behind the black sand/stone beach after the 2018 eruption. Anchialine pools are brackish water pools connected underground to the ocean and groundwater. According to the Hawai‘i Department of Land and Natural Resources (HDLNR) – Division of Aquatic Resources (HDLNR 2022a), seven pools were confirmed in late 2019 at Pohoiki, and in some anchialine pools shrimp were seen. However, since that time, monitoring by HDLNR-DAR has measured increasing water temperatures and anchialine pool shrimp have disappeared, except temporarily after high tide events that may bring in cooler water (Sakihara, Pers. Comm. 2022). The pools at the park are near the edge of the vegetation line and at the back of the wide black sand/stone beach along the ocean shore. The closest pool is approximately 300 feet from the nearest project Action Area location.

3.0 FEDERALLY LISTED SPECIES AND CRITICAL HABITAT

The sections below describe, for each species included on the official species list provided by the USFWS for the project, the status and range, life history, and potential to occur in the project Action Area. Analysis of critical habitat is also included where applicable.

A summary of the listing status, regulatory actions, habitat, reproduction, and potential to occur in the project Action Area for the species evaluated herein is included in **Table 3** and details are provided in the subsequent subsections for each species.

Table 3. Summary of Species Information

Scientific Name	Common Name	Listing Status	Critical Habitat / Recovery Plan	General Habitat	Nesting or Lactation Period /Blooming Period	Potential to Occur in the Action Area
Mammal						
Lasiurus cinereus semotus	Hawaiian Hoary Bat	Endangered (35 FR 16047-16048; 10/13/1970)	None/Recovery Plan for the Hawaiian Hoary Bat (05/11/1998)	Day roost and habitat for raising young is tall, shady trees; foraging is in native and non-native forests	Lactation period June 15 to September 1 (young cannot fly)	**Potential to Occur:** The species is present throughout the island and is known to roost in the types of trees present in the Action Area.
Seabirds						
Pterodroma sandwichensis	Hawaiian Petrel	Endangered (32 FR 4001; 03/11/1967)	None/Amendment to the Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan: Hawaiian Petrel Recovery Criteria (08/07/2019)	On Hawai‘i island nests in xeric habitats with very sparse vegetation, with most nests in existing crevices in the lava	Nesting through fledging May to December	**Potential to Occur:** The species may fly over or near the Action Area flying to or from nesting colonies or when fledging.
Oceanodroma castro	Band-rumped Storm-petrel	Endangered (81 FR 67786 67860; 10/31/2016)	None/Notice of Draft Recovery Plan for 50 Hawaiian Archipelago Species (02/24/2022)	On Hawai‘i island nests on high, barren lava flows	Nesting through fledging May to October (limited information available)	**Potential to Occur:** The species may fly over or near the Action Area flying to or from nesting colonies or when fledging.
Puffinus auricularis newelli	Newell's Townsend's shearwater	Threatened (40 FR 44149 44151; 10/28/1975)	None/Amendment to the Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan: Newell's Townsend's Shearwater Recovery Criteria (08/07/2019)	Nests in burrows beneath ferns and tree roots in dense forest and on steep slopes and cliffs	Nesting through fledging April to early November	**Potential to Occur:** The species may fly over or near the Action Area flying to or from nesting colonies or when fledging.

Scientific Name	Common Name	Listing Status	Critical Habitat / Recovery Plan	General Habitat	Nesting or Lactation Period /Blooming Period	Potential to Occur in the Action Area
Waterbirds						
Branta (=Nesochen) sandvicensis	Hawaiian Goose	Threatened (originally listed endangered 32 FR 4001; 03/11/1967) (downlisted 84 FR 69918 69947; 12/19/2019)	None/ Draft Revised Recovery Plan for the Nēnē or Hawaiian Goose (*Branta sandvicensis*) (09/24/2004)	Wide variety of native and non-native habitats from coastal to alpine except dense forest	Nesting in all months except May, June, and July	**Potential to Occur:** There is potentially favorable habitat for the species in the Action Area, and it has been observed periodically in the general Action Area.
Himantopus mexicanus knudseni	Hawaiian Stilt	Endangered (35FR 16047-16048; 10/13/1970)	None/Recovery Plan for Hawaiian Waterbirds, Second Revision (10/28/2011)	A variety of aquatic habitats primarily at lower elevations, in shallow flooded wetlands, exposed tidal flats, or taro patches	Nesting through fledging generally from mid-February through August	**No Potential to Occur:** There is a lack of suitable habitat for the species in the Action Area.
Fulica americana alai	Hawaiian Coot	Endangered (35FR 16047-16048; 10/13/1970)	None/Recovery Plan for Hawaiian Waterbirds, Second Revision (10/28/2011)	Lowland wetland habitats with water less than 30 centimeters (12 inches) deep and with suitable emergent plant growth	Year-round	**No Potential to Occur:** There is a lack of suitable habitat for the species in the Action Area.
Sea Turtles						
Chelonia mydas	Green Sea Turtle	Endangered (Pacific population) (81 FR 20058-20090; 04/06/2016)	None (for Pacific population)/ Recovery Plan for U.S. Pacific Populations of the Green Turtle (01/12/1998)	Shallow, protected or semi-protected, water around coral reefs and coastal areas; nesting on sandy beaches	Nesting Mid-April through September, occasionally later	**No Potential to Occur:** The species would not be present in the Action Area due to the distance to potentially suitable beach habitat for nesting or basking.

Scientific Name	Common Name	Listing Status	Critical Habitat / Recovery Plan	General Habitat	Nesting or Lactation Period /Blooming Period	Potential to Occur in the Action Area
Eretmochelys imbricata	Hawksbill Sea Turtle	Endangered (35 FR 8491 8498; 06/02/1970)	None in Hawaii/Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle (01/12/1998)	Shallow waters around reefs, bays, and inlets; nesting on beaches with a preference for areas with woody cover	Nesting late May through November	**No Potential to Occur:** The species would not be present in the Action Area due to the distances to a potential basking area and known nesting habitat.
Invertebrate						
Manduca blackburni	Blackburn's Sphinx Moth	Endangered (65 FR 4770 4779; 02/01/2000)	Designated (68 FR 34710; June 10, 2003)/ Recovery Plan for Blackburn's Sphinx Moth (09/28/2005)	Dry to mesic habitats, now usually associated with tree tobacco	NA	**No Potential to Occur:** The current known habitat type for the species does not occur in the Action Area and there are no reports of host plants in the project vicinity.
Plant						
Ischaemum byrone	Hilo ischaemum	Endangered (59 FR 10305 10325; 03/04/1994)	Designated (81 FR 1778918110; March 30, 2016)/ Recovery Plan for the Big Island Plant Cluster (09/26/1996)	Near to the ocean among rocks; frequently on moist or wet basalt cliffs	Not reported	**Potential to Occur:** There is short segment of coastline within the Action Area that may provide habitat for the species.

Note:

FR = Federal Register

3.1 ʻōpeʻapeʻa or Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)

Status and Range

Federal ESA listing: Endangered; No Critical Habitat

Genetic studies indicate geographic variation in genetic structure of the Hawaiian Hoary Bat across the State of Hawaiʻi. This may potentially reflect divergence of Hawaiian Hoary Bat populations among the various islands, or the presence of multiple clades with partially overlapping island distributions and some hybridization among the groups (USFWS 2021a). As a result of the review, USFWS concluded that there was not yet an accepted consensus on taxonomic classification at the species or subspecies level that would change the classification of the current subspecies.

All of the major Hawaiian islands are now recognized as providing roosting, breeding, and/or foraging habitat for the species; however, population numbers on the islands are unknown (USFWS 2022a). In most locations where acoustic monitoring has been conducted, Hawaiian Hoary Bats have been present at some point during the year, including in urban, semiurban, and agricultural areas (USFWS 2021a).

Studies of the Hawaiian Hoary Bat have been most extensive on Hawaiʻi Island. Todd (2012) found its activity varied seasonally among elevations. They are most active at elevations of less than 3,300 feet from late spring through summer and early fall, during the reproductive period (pupping season). High-elevation sites generally had the least activity during the reproductive period. These results were confirmed by Gorresen et al. (2013) and they found highest occupancy in the coastal lowlands peaked in mid-September, which corresponded to the August to September fledging season of the young from that year. The trend in occupancy on Hawaiʻi Island suggested that the population on the island was stable to slightly increasing based on breeding season records over the 5 years of surveys (Gorresen et al. 2013).

Life History

Habitat Requirements

The day-roost habitat requirement for the Hawaiian Hoary Bat is tall (crown height greater than 15 feet), shady trees. Tree species used frequently include mature native ʻōhiʻa, but also include a wide variety of introduced species such as lychee (*Litchi chinensis*), various species of eucalyptus, mango (*Mangifera indica*), and numerous other tree species (Bonaccorso et al. 2015).

As described by several authors (Bonaccorso et al. 2015, Gorresen et al. 2013) foraging can occur in areas that are extremely varied in physical structure, including forest gaps and clearings, forest edges along planted windrows of trees, above forest canopies, and along roads. These areas can occur in a range of habitats including undisturbed native forest, mature eucalyptus plantations having mixed understory trees and shrubs, lowland forest dominated by introduced trees, suburban and urban areas planted with ornamental trees, grassland/pasture, river gorges, arboretums, macadamia nut orchards, and coastal bays. Although the Hawaiian Hoary Bat seems to be a habitat generalist species and occurs from sea level to the highest volcanic peaks on

Hawai‘i Island, there was a significant association noted between occupancy and the prevalence of mature forest cover (Gorresen et al. 2013).

Food Habits

Hoary bats in Hawai‘i consume a wide variety of insects. Todd (2012) identified seven orders of insects in their diet: moths (Lepidoptera), beetles (Coleoptera), termites (Blattodea), flies (Diptera), true bugs (Hemiptera), bees and wasps (Hymenoptera), and lacewings (Neuroptera). Moths and beetles were the most frequently consumed prey.

Reproductive Strategy

Hawaiian Hoary Bats roost in native and non-native vegetation from 1 to 9 meters (3 to 29 feet) above ground level (HDLNR 2015). Females usually give birth to twins during June and mother bats likely stay with their pups until they are 6 to 7 weeks old, leaving roosts to feed at night (HDLNR 2015). Reproduction and pup rearing tend to take place in the low- to mid-elevations and movement to higher elevations occurs after pups fledge.

Potential to Occur

Numerous recent surveys have occurred on Hawai‘i Island and, along with historical records, indicate that the species is widespread there. It roosts and raises young in native and non-native large, dense-foliage trees. The species also uses corridors through forested areas for foraging. Given the several forest types with large trees within and near the project area and the presence of the roadway corridor through the forest, the Hawaiian Hoary Bat may occur in the project Action Area.

3.2 ‘ua‘u or Hawaiian Petrel (*Pterodroma sandwicensis*)

Status and Range

Federal ESA listing: Endangered; No Critical Habitat

Although the Hawaiian Petrel had once been abundant on all the Hawaiian islands, by the 1980s the Hawaiian Petrel population had experienced a significant range contraction and today breeding colonies are found only in remote or high elevation areas on the islands of Hawai‘i, Maui, Moloka‘i, Lāna‘i, and Kaua‘i (USFWS 2022b). On Hawai‘i island a documented colony is present on Mauna Loa within the subalpine zone of Hawai‘i Volcanoes National Park (HVNP) (Misajon et al. 2019). As summarized by Pyle and Pyle (2017) observations of calling, nesting, and recovered individuals have indicated presence in various mountainous areas on the island that may indicate the presence of 300 pairs overall.

Life History

Habitat Requirements

Hawaiian Petrels nest at a variety of remote, inland habitats. On the islands of Hawai‘i and Maui, colonies are above 8,200 feet in xeric habitats with very sparse vegetation, with most nests in existing crevices in the lava (HDLNR 2015). Misajon et al. (2019) note that they persist only in

remnant colonies at the margins of their former range where nesting birds are best able to evade introduced mammalian predators.

Food Habits

In Hawai‘i, Hawaiian Petrels feed primarily on squid, but also on fish, especially goatfish and lantern fish, and crustaceans (HDLNR 2015). Satellite tagged birds have been tracked travelling vast distances on a single foraging trip, but they also make trips of several nights (USFWS 2022b).

Reproductive Strategy

Hawaiian Petrels arrive at their colonies at different times, with those on Maui arriving in late February, whereas those on Hawai‘i and other islands are up to a month later (Kaua‘i Seabird Project 2022).

Hawaiian Petrels nest in burrows, crevices, or cracks in lava tubes with nest chambers from 3 to 30 feet deep (HDLNR 2015). Petrel colonies on islands other than Hawai‘i Island and Maui are found in a very different wet forest habitat (Kaua‘i Seabird Project 2022). Most eggs (one per pair) are laid in May and June, incubated, then fed after hatching by both parents, with most birds fledging by December (HDLNR 2015).

Potential to Occur

The species nests in a variety of remote, inland habitats in Hawai‘i. Current habitat that would support Hawaiian Petrels is not known within or near the project Action Area. The species flies long distances foraging out at sea and may fly over the area at night to the nesting area that is known on Mauna Loa. No records of flyovers such as radar studies for the area are known but this may reflect a lack of studies. Birds flying over are subject to fallout (HDLNR 2022b), which happens when seabirds such as the Hawaiian Petrel leave their nest for the first time (and sometimes also includes adults). They normally use natural lighting such as moonlight to navigate out to sea to feed but can become disoriented by artificial lighting such as might occur during nighttime construction or with installation of improper permanent lighting. They might then either circle lights or collide with structures, and then fall to the ground due to exhaustion or injury from collision and then also become vulnerable to predators or hit by vehicles.

Based on potential flyovers, the species may occur within airspace above the project Action Area or general vicinity flying to or from nesting colonies or when fledging.

3.3 ‘akē‘akē or Band-rumped Storm-petrel (*Oceanodroma castro*), Hawai‘i DPS

Status and Range

Federal ESA listing: Endangered; No Critical Habitat

The Hawai‘i Distinct Population Segment (DPS) of the Band-rumped Storm-petrel nests in the Hawaiian archipelago, and ranges throughout the Pacific Ocean basin while foraging. In Hawai‘i breeding is confirmed or likely on Lehua, Kaua‘i, Lāna‘i, and Hawai‘i Island (USFWS 2021b). Due to its cryptic nature and remote nesting habitat, only four active nests have been confirmed in Hawai‘i, all on the northern slope of Mauna Loa (USFWS 2021b). Historically, Band-rumped

Storm-petrels were likely present on all the main Hawaiian Islands from Niihau to Hawai‘i (USFWS 2022c). Band-rumped Storm-petrels are observed in coastal waters flying and in rafts (regular concentrations on the water of a few birds to as many as 100), primarily near the suspected breeding colonies (Pyle and Pyle 2017).

Life History

Habitat Requirements

Studies summarized by USFWS (2021b) indicate that during breeding the species use dry cliff (dry grasslands and shrublands), wet cliff (wet forest), coastal cliff, and barren lava field habitat types. On Hawai‘i Island, colonies occur on high, barren lava flows where they nest in burrows or crevices in rock.

Food Habits

The diet for Band-rumped Storm-petrels consists primarily of fish and squid (USFWS 2021b).

Reproductive Strategy

The only active nests that have been confirmed are on Hawai‘i Island at the Pōhakuloa Training Area (PTA) on the slope of Mauna Loa, at an elevation of 2,100 to 2,200 feet. The PTA nests were in lava tubes, in extremely rocky terrain (Galase 2019). The Galase study also documented 447 Band-rumped Storm-petrel visual sightings during 84 hours of night vision surveys between July and September of 2015. Recorded calls indicate likely nesting locations in other locations within HVNP, and at Haleakala National Park, other locations on Maui, and other islands (USFWS 2021b).

Raine et al. (2017) estimated that the arrival time for Band-rumped Storm-petrels in Hawai‘i would be mid-May, with egg laying in mid-June, incubation until early August, and fledging in October. However, birds may arrive earlier in the year and go through a pre-laying period of reproduction where they head out to sea after prospecting for burrows or attempting to breed (USFWS 2021b).

Potential to Occur

Known colonies on Hawai‘i Island occur on high, barren lava flows, which do not occur in or near the project Action Area. The species flies long distances foraging out at sea and may fly over or near the project Action Area at night to the nesting area that is known on Mauna Loa. No records of flyovers such as radar studies for the area are known but this may reflect a lack of studies. Band-rumped Storm Petrels flying over are subject to fallout, a potential danger to the species in the same way as described above for the Hawaiian Petrel. Fallout can occur for the Band-rumped Storm Petrel as already described above for the Hawaiian Petrel.

Based on potential flyovers, the species may occur within airspace above the project Action Area or general vicinity flying to or from nesting colonies or when fledging.

3.4 ‘a‘o or Newell’s Shearwater (*Puffinus auricularis newelli*)

Status and Range

Federal ESA listing: Threatened; No Critical Habitat

Kaua‘i holds most of the remaining population of the Newell’s Shearwater with smaller populations on the islands of Hawai‘i and Maui, as well as a possible breeding population on Lehua. Historically the species also bred on Moloka‘i and O‘ahu (USFWS 2022d).

Surveys conducted by Reynolds and Ritchotte (1997) documented the presence of the Newell's Shearwater in the Puna District of Hawai‘i Island at three surveyed locations, including one possible breeding colony at Puulena Crater. This crater was not destroyed by the 2018 lava flows.

Life History

Habitat Requirements

The Newell’s Shearwater nests in burrows beneath ferns and tree roots in dense forest and on steep slopes and cliffs (USFWS 2022d). At the Puulena site mentioned above, nests were on the crater walls and vegetation, where present, was predominantly uluhe fern (*Dicranopteris linearis*) with an open canopy consisting of hala (*Pandanus tectorius*) and ohia (*Meterosideros polymorpha*) trees (Reynolds and Ritchotte 1997).

Food Habits

The Newell’s Shearwater feeds at sea eating schooling fish and squid. They forage during the day and at night (USFWS 2022d).

Reproductive Strategy

Newell’s Shearwater are thought to start visiting their breeding colonies at 2 to 3 years of age, but likely do not breed until 5 or 6 years of age, at which time pairs lay one egg (USFWS 2022d). During the breeding season from April to early November the chick develops over 5 to 7 months during which one of the parents return each night to feed it (USFWS 2022d).

Potential to Occur

The Newell’s Shearwater nests in burrows beneath ferns and tree roots in dense forest and on steep slopes and cliffs. A possible colony of the species was documented in Puulena Crater, which is approximately 0.4 miles from the closest point to the project Action Area along Upper Pohoiki Road (this feature was not destroyed by the 2018 lava flow). As with other Hawaiian seabirds, the species flies long distances foraging out at sea and may fly over the area at night to the nesting area that is known on Mauna Loa. Given the close distance of Puulena Crater, if there is a colony there or in other areas in the Puna district then the Newell’s Shearwater would very likely be flying over or near the project Action Area at night. Newell’s Shearwaters flying over are subject to fallout, a potential danger to the species in the same way as described above for the Hawaiian Petrel.

Based on potential flyovers, the species may occur within airspace above the project Action Area or general vicinity flying to or from nesting colonies or when fledging.

3.5 Nēnē or Hawaiian Goose (*Branta sandvicensis*)

Status and Range

Federal ESA listing: Threatened (downlisted from Endangered in December 2019)

Nēnē were downlisted in 2018 because USFWS determined that implementation of recovery actions for the species has significantly reduced the risk of extinction for the species (USFWS 2018a).

Nēnē are present between sea level and 7,800 feet elevation on the islands of Hawai‘i, Maui, Kaua‘i, and Moloka‘i, and a single pair was reported on O‘ahu in 2014 (HDLNR 2022c). Historically, the species was found on all main Hawaiian islands and was likely widespread (HDLNR 2022c).

On Hawai‘i Island, according to the most recent Recovery Plan for the Nēnē (USFWS 2004), the species has been documented in seven areas (some of which include sub-areas). The two areas closest to the project Action Area are at HVNP and an area along the coast south of Hilo at Kings Landing and Shipman Estate (this population is described in the Recovery Plan as semi-captive).

The 2017 statewide Nēnē count of individuals provided to USFWS from HDLNR was a statewide population of 3,252 individuals comprised of 1,104 individuals on Hawai‘i, 1,482 individuals on Kaua‘i, 627 individuals on Maui, 37 individuals on Moloka‘i, and 2 individuals on O‘ahu (USFWS 2022e). Nēnē populations are currently stable on most islands and increasing on Kaua‘i (USFWS 2022e).

Life History

Habitat Requirements

Nēnē currently use a wide variety of habitats including coastal dune vegetation and nonnative grasslands (e.g., golf courses, pastures, rural areas), sparsely vegetated low- and high-elevation lava flows, mid-elevation native and nonnative shrubland, early successional cinderfall, cinder deserts, native alpine grasslands and shrublands, and open native and non-native alpine shrubland-woodland community interfaces (HDLNR 2022c).

Food Habits

Nēnē graze and browse on the leaves, seeds, flowers, and fruits of at least 50 native and nonnative grasses, sedges, composites, and shrubs (HDLNR 2022c). Their diet varies by location and habitat, and they may require a diverse suite of food plants.

Reproductive Strategy

Nēnē pairs mate for life. They have an extended breeding season, and nesting may occur in all months except May, June, and July. Although the majority of birds nest between October and March, most clutches are laid between October and December (HDLNR 2022c).

Nesting occurs in a variety of habitats, including beach strand, shrubland, grassland, and lava rock, and at a range of elevations. On the islands of Hawai‘i and Maui, most nests are built under native vegetation, such as pūkiawe (*Styphelia tameiameiae*), ‘a‘ali‘i (*Dodonaea viscosa*), and ‘ōhi‘a (*Metrosideros polymorpha*) (HDLNR 2022c).

Goslings are flightless for about 10 to 14 weeks after hatching. Family groups begin flocking soon after the young can fly and remain in their breeding areas for about a month (USFWS 2022e).

Potential to Occur

Nēnē use a wide variety of generally open habitats dominated by grasses or shrubs for foraging and nesting. Some areas within and near the project Action Area fit this habitat description. The reported Nēnē populations nearest the site are the Kings Landing and Shipman Estate site (population described as semi-captive) and at HVNP. The semi-captive birds are unlikely to spread. The reported populations at the Kings Landing and Shipman Estate site are approximately 9 miles from the project Action Area. The shortest distance from the project Action Area to the boundary of HVNP is approximately 12 miles and the distance to the Nēnē population in HVNP shown in the USFWS (2004) Recovery Plan is greater. Although documented populations are not present near the project Action Area, they are seen occasionally along the Puna coast (Pyle and Pyle 2017, eBird 2022).

Since Nēnē are known to occur occasionally along the Puna area coast and there is potentially suitable Nēnē habitat in the project Action Area, the species may potentially occur in the project Action Area or vicinity.

3.6 ae‘o or Hawaiian Stilt (*Himantopus mexicanus knudseni*)

Status and Range

Federal ESA listing: Endangered (proposed for downlisting to Threatened on 03/25/2021); No Critical Habitat

The Hawaiian Stilt is generally found in wetland habitats below 200 meters (660 feet) elevation on all the main Hawaiian Islands except for Kaho‘olawe (HDLNR 2015). On Hawai‘i Island, the largest number are found on the Kona coast, in anchialine and freshwater ponds, in wastewater treatment ponds, and in wetlands and river valleys along the Hamakua coast and Kohala mountains (HDLNR 2015).

In the Puna district much of the shoreline that might have provided habitat for the Hawaiian stilt from Kapoho to Pohoiki was destroyed by the 2018 lava flows. This was the area with most of the documented wetlands in the region (USFWS 2018b).

Winter and summer surveys show a fluctuating state population, which generally increased from 1985 to 2004 and since then has been roughly stable at 1,500 to 2,000 individuals (USFWS 2022f).

Life History

Habitat Requirements

Foraging habitat consists of shallow, ephemeral freshwater, brackish water, or saltwater habitats and they frequently move among wetland habitats in search of food (HDLNR 2015). Nesting and foraging habitats differ, and individuals may move daily between the two (HDLNR 2015; see below for nesting habitat).

Food Habits

Hawaiian stilts are opportunistic feeders and eat a wide variety of invertebrates and other aquatic organisms such as insects, worms, crabs, and fish, as available in shallow water and mudflats (USFWS 2022f).

Reproductive Strategy

Hawaiian stilts generally nest on freshly exposed mudflats interspersed with low-growing vegetation or islands in freshwater or brackish ponds (USFWS 2022f). The nesting season normally extends from mid-February through August, but the timing can vary (USFWS 2022f). Usually, 3 to 4 eggs are laid and the chicks hatch in an advanced stage (precocial) approximately 24 days later after which both parents brood the young for several months (HDLNR 2015).

Potential to Occur

Foraging habitat consists of shallow, ephemeral freshwater, brackish water, or saltwater habitats. Nesting habitat consists of freshly exposed mudflats interspersed with low growing vegetation or islands in freshwater or brackish ponds. Much of the potential habitat for the species in the region was destroyed by the 2018 lava flow. The project Action Area and nearby adjacent areas contain no substantial standing water, either permanent or ephemeral. A possible exception is the anchialine pools at coastline adjacent to Isaac Hale Park. However, the area with pools is used regularly by the public, which, along with their small size, make the ponds unlikely to be habitat for Hawaiian Stilts. The last observance of the Hawaiian Stilt at Isaac Hale Park recorded in the eBird database was April 20, 2018 (eBird 2022).

Based on the lack of suitable habitat this species is not expected to occur in the project Action Area.

3.7 ʻalae keʻokeʻo or Hawaiian Coot (*Fulica alai*)

Status and Range

Federal ESA listing: Endangered; No Critical Habitat

The Hawaiian Coot typically occurs in coastal plain wetlands and usually below 400 meters (1,320 feet) elevation, on all the main Hawaiian Islands except for Kahoʻolawe, with most of the

population on Kauaʻi and the remainder on other islands in coastal ponds, wastewater treatment ponds, and wetlands (HDLNR 2015). These include several ponds on the west side of Hawaiʻi Island and in Waiākea and Loko Waka ponds in the Hilo area of Hawaiʻi Island (HDLNR 2015). The population is estimated at 1,500 to 2,800 individuals (HDLNR 2015).

Life History

Habitat Requirements

The Hawaiian coot uses lowland wetland habitats with water less than 30 centimeters (12 inches) deep and with emergent plant growth interspersed with open water, especially freshwater wetlands and taro fields, but also freshwater reservoirs, canefield reservoirs, sewage treatment ponds, brackish wetlands, and, rarely, saltwater habitats (HDLNR 2015). Ephemeral wetlands support large numbers during the nonbreeding season and may provide a key habitat requirement (HDLNR 2015).

Food Habits

Hawaiian coots feed on seeds and leaves, snails, crustaceans, insects, tadpoles, and small fish. They also graze on grass in areas adjacent to wetlands and travel long distances, including between islands, when local food sources are depleted (HDLNR 2015).

Reproductive Strategy

Nesting habitat includes freshwater and brackish ponds, irrigation ditches, and taro fields where floating nests are constructed of aquatic vegetation in open water or are anchored to emergent vegetation, whereas nests in emergent vegetation are typically platforms constructed from buoyant stems of plants (HDLNR 2015). Nesting occurs primarily between March and September, but can occur year-round because initiation is tied to appropriate water levels, which vary with rainfall (HDLNR 2015). The young birds (from 3 to 10 eggs) hatch in an advanced stage after a 25-day incubation period (HDLNR 2015).

Potential to Occur

The Hawaiian Coot uses lowland wetland habitats with shallow water and with emergent plant growth interspersed with open water. The project Action Area and nearby adjacent areas contain no substantial standing water, either permanent or ephemeral. Standing water ponds of the type that could be potential habitat for the coot were destroyed in the project vicinity by the 2018 lava flows.

Based on the lack of suitable habitat, this species is not expected to occur in the project Action Area.

3.8 Honu or Green Sea Turtle (*Chelonia mydas*), Central North Pacific DPS

Status and Range

Federal ESA listing: Endangered; No Critical Habitat in Hawai‘i

The Central North Pacific Distinct Population Segment of the Green Sea Turtle occurs around all the Hawaiian Islands with foraging areas along the coasts of O‘ahu, Moloka‘i, Maui, Lānai, Hawai‘i Island, Lisianski Island, and Pearl and Hermes Reef (HDLNR 2015). Ninety percent of nesting in Hawai‘i occurs on the French Frigate Shoals of the Northwest Hawaiian Islands (NWHI), with small numbers of nests on the other islands and atolls of the NWHI and main Hawaiian islands (HDLNR 2015).

Life History

Habitat Requirements

Green Sea Turtles are typically found in shallow, protected or semi-protected, water around coral reefs and coastal areas with appropriate habitat for foraging (see below) and shelter from predators such as tiger sharks (HDLNR 2015). They use sandy beaches for nesting.

Food Habits

Subadult and adult turtles in nearshore benthic environments are almost completely herbivorous, feeding primarily on macroalgae and seagrasses, whereas juveniles whose habitat is the open ocean are carnivorous (HDLNR 2015).

Reproductive Strategy

Green Sea Turtles reach sexual maturity at about 35 to 40 years of age, after which the females swim onshore to excavate a nest and lay eggs once every 2 years or more (HDLNR 2015). Nesting occurs on minimally disturbed sandy beaches where females may lay up to six clutches per season, often returning to the same site for each clutch every 12 to 15 days; incubation then takes about 60 days and hatchlings emerge from their nests at night (HDLNR 2015). Green Sea Turtles often haul out on beaches to bask in the sun. Nesting in Hawai‘i occurs mid-April through September; however, nesting can extend into December (USFWS 2022g).

Potential to Occur

Green Sea Turtles are most often found in shallow, at least somewhat protected water around coral reefs and coastal areas with algae for foraging and shelter from predators. Nesting requires sandy beaches. Much of the coast adjacent within or near the project Action Area has rocky cliffs and with rough surf, most of which is from new lava from the 2018 flows. The project Action Area that comes closest to the shoreline where there is a beach is near the intersection of Lower Pohoiki Road and Highway 137 at and adjacent to Isaac Hale Park, which is approximately 300 feet away. At this location the beach area is a black rock and sand beach that has developed since the 2018 lava flows and is now an area exposed to rough surface. No reports of Green Sea Turtles hauling out there since the 2018 flows were found.

The species is not expected to occur in the project Action Area based on the lack of records of nesting in the area and the distance of the Action Area to the nearest nesting or basking area.

3.9 Honu ʻea or Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Status and Range

Federal ESA listing: Endangered; No Critical Habitat in Hawaiʻi

Worldwide, the Hawksbill Sea Turtle nests on inland and mainland sandy beaches throughout the tropics and subtropics and occurs in coastal waters of numerous countries. They occur in waters around the main Hawaiian islands and limited nesting occurs in the main Hawaiian islands primarily along the southeast coast (district of Kaʻū) of Hawaiʻi Island (DLRN 2015). Four nesting areas were recently documented on Hawaiʻi Island in the Gaos et al. (2021) study, three on the Kaʻū coast and one on the Hamakua coast. The three areas on the Kaʻū coast (which were identified as the Pōhue, Kamehame, and ʻĀpua complexes) each had several nesting locations. The ʻĀpua complex is within HVNP. These Hawaiʻi Island sites comprise approximately 85 percent of all confirmed hawksbills nests in the State of Hawaiʻi (Gaos et al. 2021).

As summarized by Gaos et al. (2021) field monitoring efforts between 1988 and 2018 documented an annual average of 14 (range: 5 to 26) nesting females and 48 (range: 12 to 93) nests, with a cumulative total of 178 individual nesting females and 1,280 nests recorded across all years.

Life History

Habitat Requirements

Hawksbill Sea Turtles are most often seen in shallow waters around reefs, bays, and inlets, primarily around the main Hawaiian islands (HDLNR 2015).

Food Habits

Hawksbill Sea Turtles often forage in coral reef ecosystems (Gaos et al. 2021). They are omnivorous and eat marine algae, corals, mollusks, tunicates, crustaceans, sea urchins, small fish, and jellyfish, but their preferred food in many areas is sea sponges (NOAA 2022).

Reproductive Strategy

According to the HDLNR (2015) summary, Hawksbill Sea Turtles in Hawaiʻi reach sexual maturity at around 17 to 22 years of age. Sea turtles mate at sea and females nest once every 3 to 4 years from late May through November. Nesting occurs within 15 feet of the high-water line on beaches, with a preference for areas with woody cover, and sand is not necessary but often used. Females may lay up to six clutches per season, often returning to the same site for each clutch approximately every 14 to 20 days. Each clutch contains about 140 eggs. Eggs incubate for approximately 60 days.

Potential to Occur

Hawksbill Sea Turtles are most often seen in shallow waters around reefs, bays, and inlets. When nesting, they typically use areas within 5 meters (15 feet) of the high-water line on beaches and with a preference for areas with woody cover. Most of the coast in or near the project Action Area has rocky cliffs and with rough surf, most of which is from new lava from the 2018 flows. The project Action Area that comes closest to a low-lying or coastal habitat is near the

intersection of Lower Pohoiki Road and Highway 137 at the black rock and sand beach adjacent to Isaac Hale Park, approximately 300 feet away. In back of the new beach and towards the project Action Area the substrate is primarily rock with minimal soil cover and would not be habitat for the species. Nesting beaches for the species are known within HVNP. There are no records of nesting or hauling out at Isaac Hale Park or the adjacent beach.

The species is not expected to occur in the project Action Area based on the lack of records of nesting in the area and the distance of the Action Area to the nearest nesting or basking area.

3.10 Blackburn's Sphinx Moth (*Manduca blackburni*)

Status and Range

Federal ESA listing: Endangered, Critical Habitat Designated in Hawai‘i

Historical records indicate that Blackburn's Sphinx Moth primarily occurs in coastal, lowland, and dry forests in areas receiving less than 127 centimeters (50 inches) of rain per year (HDLNR 2015).

Current information on the overall distribution of Blackburn's Sphinx Moth is based largely on incidental sightings and indicates it is present on Maui, Kaho‘olawe , and Hawai‘i Island. At the latter it is known from the Pu‘u anahulu and Pu‘u Wa‘awa‘a areas, as well as along Saddle Road (USFWS 2022h).

Critical Habitat

Critical habitat is established in the western part of Hawai‘i Island, north of Hualālai mountain (USFWS 2022h; **Figure 4**). The distance from the project Action Area is approximately 60 miles.

Life History

Habitat Requirements

Blackburn's Sphinx Moth is found in dry to mesic habitats. The host plant of this endemic moth is ‘aiea, which is the Hawaiian name for several indigenous tree species (genus *Nothocestrum*; its indigenous host). Most of the current Blackburn's Sphinx Moth range is now based on the presence of the host invasive tree tobacco (*Nicotiana glauca*) and is also found where remnant ‘aiea trees persist (USFWS 2022h). USFWS (2022h) notes that not all areas where tree tobacco occurs are occupied because it is likely that other limiting factors determine its presence, including parasites and predators, distance from occupied areas, presence of food resources for adults, and moisture regime.

Food Habits

Rubinoff and San Jose (2010) examined larval host plant preferences for this species and confirmed findings of previous studies that Blackburn's Sphinx Moth larvae could develop on a range of native and non-native plants in the Solanaceae (nightshade) family. In addition to using known larval hosts like the native and endangered ‘aiea and the invasive tree tobacco, Blackburn's Sphinx Moth also have the ability to develop on the native olohua (glossy

nightshade; *Solanum americanum*) and popolo aikeakua (*Solanum sandwicense*) in a laboratory setting (Rubinoff and San Jose 2010).

Reproductive Strategy

The reproductive strategy is summarized by USFWS (2022h). Sphinx moths usually mate quickly after reaching adulthood. The female sphinx moth may lay as many as 1,000 eggs on the host plant, after which the male and female die. A few days later, the eggs hatch and each develops into a large caterpillar followed by an underground pupal stage, then emerging as an adult moth.

Moths are found year-round but may be most active between January and April and again between September and November, especially after rains (HDLNR 2015).

Potential to Occur

Based on historical records, Blackburn's Sphinx Moth primarily occurred in coastal, lowland, and dry forests in areas receiving less than 127 centimeters (50 inches) of rain per year (HDLNR 2015). This varies significantly from the project Action Area, which is in a wet location with a range of 78 to 108 inches rainfall annually (Giambelluca et al. 2013). The nearest project Action Area is approximately 6 miles to the east of the unofficial range shown for the species on the USFWS Environmental Conservation Online System (ECOS) species profile page. The majority of the current Blackburn's Sphinx Moth range is now based on the presence of its host invasive tree tobacco (*Nicotiana glauca*). According to Molly O'Brien of the Hawai'i Island Invasive Species Committee (Pers. Comm. June 30, 2022), they have no records or reports of any tree tobacco in the Puna region, the location of the project Action Area.

Based on the lack of suitable habitat and no reports of the tree tobacco host in the area, the species is not expected to occur in the project Action Area.

3.11 Hilo Ischaemum *(Ischaemum byrone)*

Status and Range

Federal ESA listing: Endangered, Critical Habitat Designated in Hawai'i

Historically *Ischaemum byrone* was reported on the islands of Kaua'i, O'ahu, Moloka'i, east Maui, and Hawai'i (USFWS 2022i). The recent 5-year review of the species (USFWS 2021c) summarized its current status. In 2021, approximately 100 individuals were observed on Maui at 'Ōhi'a (Pauwalu Point) and other occurrences on Maui and offshore islets numbering more than 500 individuals may still remain. Plants were also documented in 2021 on Moloka'i. The review noted that on Hawai'i Island some of the few wild occurrences may have been extirpated by the 2018 lava flows and recommended further surveys for a current assessment of the status of the species. The unofficial range map on Hawai'i island (USFWS 2022i) extends along the coast from the Hilo area to HVNP and extending into the park coastline approximately another 5 miles. .

Critical Habitat

Critical habitat has been designated (USFWS 2022i) in two units (393 acres and 510 acres) along the coast within HVNP (**Figure 4**). The closest point of the project Action Area boundary to the critical habitat is 24 km (15 miles).

Life History

Habitat Requirements

Hilo Ischaemum occurs near the ocean among rocks or frequently on moist or wet basalt cliffs in windward coastal shrubland from sea level to 190 meters (623 feet) elevation (USFWS 2022i). Pratt et al. (2011) in their report of rare and endangered species at HVNP describes the species as occurring on rocky cliffs near the ocean, rooted in cracks within the pāhoehoe surface. They describe it as growing among lava boulders near the sea on other islands.

Potential to Occur

Ischaemum byrone occurs near the ocean among rocks or on moist or wet basalt. Most of the coast within the project Action Area was covered by the 2018 lava flows. Some of the project Action Area in the southern segment of the project along Highway 137 overlaps the coastline and includes a 500-foot segment of coastline that was not covered by recent lava from the 2018 flows. In this segment there is a potential for the species to occur.

Based on the presence of a small amount of coastal cliff habitat in the project Action Area that was not covered by lava in the 2018 flows, this species has potential to occur in the project Action Area.

3.12 Critical Habitat

The project does not overlap any designated critical habitat. For those species with designated critical habitat, the closest distance (for Hilo Ischaemum) from the project Action Area is approximately 15 miles.

4.0 AVOIDANCE AND MINIMIZATION MEASURES AND BEST MANAGEMENT PRACTICES

This section describes avoidance and minimization measures (AMMs) that the Subapplicant will implement for the Proposed Action. The general (GEN) AMMs are drawn from the Pacific Islands Fish and Wildlife Office's (PIFWO) July 27, 2021, Programmatic Informal Consultation (PIC) with FEMA for the Hawaiian and Pacific Islands.

If there are situations where one or more of the avoidance and minimization measures cannot be implemented, a responsible party (i.e., applicant, site manager, or project supervisor) will work with PIFWO to develop alternative measures for implementation that would avoid or minimize adverse effects on federally listed species and/or critical habitat.

4.1 General Avoidance and Minimization Measures

The following general AMMs are applicable to the Proposed Action. The General AMMs are drawn from the PIFWO's PIC with FEMA. Where noted, and to improve clarity, these AMMs have been modified to eliminate elements that are not applicable to this project. The name of each general AMM is the same as the name used in the PIC.

GEN AMM-1 General Conditions

FEMA, its applicants, and contractors will implement the following set of general conditions for the action described in this letter. Additionally, action-specific conservation measures described herein will be required, as applicable.

- Each applicable conservation measure will be included as an enforceable part of the approval document.

- FEMA and USFWS will be provided reasonable access to projects described in this letter to monitor the compliance with and efficacy of approval conditions.

- FEMA will require that approved applicants document and report all interactions with ESA-listed species to FEMA and USFWS. Should it become apparent that an ESA-listed species may be adversely affected by the project, all non-emergency work must stop pending completion of formal ESA Section 7 consultation between FEMA and USFWS for the action.

- Constant vigilance will be kept for the presence of ESA-listed species during all aspects of the approved action:

    - Any site at which listed species have been identified will have a biological monitor present during all work. The biological monitor will have the authority to stop and resume work, and enforce buffer distances.

    - No one will attempt to feed, touch (e.g., pet, relocate), or otherwise intentionally interact with any protected species.

- Project footprints will be limited to the minimum area necessary to complete the project and project work limits must be clearly defined.

- Sensitive resource areas, such as ESA-listed species, if found within the Action Area. must be visibly flagged; however, fencing with non-natural material and smaller than 3- by x3- inch mesh size, and loose-weave joints for projects on or near the coast or suitable waterbird habitat, is prohibited due to the ensnarement hazard potential that exists with this type of material.

- Project operations will cease under unusual conditions, such as large tidal events, heavy rains and strong storms, and high surf conditions, with the exception of emergency protective measures implemented to preserve life and property resulting from such conditions.

- A stormwater management plan, commensurate to the size of the project must be prepared and carried out, for any project that will produce any new impervious surface or a land cover conversion that will slow the entry of water into the soil, to ensure that effects to water quality and hydrology are minimized.

- A pollution and erosion control plan for the Action Area and adjacent areas must be prepared and carried out. As a minimum, this plan will include:
    - Proper installation and maintenance of silt fences, booms, equipment diapers, or drip pans;
    - A contingency plan to control and clean spilled petroleum products and other toxic materials;
    - Appropriate materials to contain and clean potential spills will be stored at the action area, and be readily available;
    - All project-related materials and equipment placed in the water will be free of pollutants;
    - Daily pre-work inspections of heavy equipment for cleanliness and leaks, with all heavy equipment operations postponed or halted until leaks are repaired and equipment is cleaned;
    - Fueling of project-related vehicles and equipment will take place at least 50 feet away from the water, preferably over an impervious surface;
    - A plan will be developed to prevent trash and debris from entering the environment during the project; and
    - All construction discharge water (e.g., concrete washout, pumping for work action area isolation, vehicle wash water, drilling fluids, etc.) must be treated prior to discharge or disposed of in an approved waste disposal facility.

- Erosion controls must be properly installed before any alteration of the action area may take place. When erosion control is necessary selecting products with biodegradable netting (natural fiber, biodegradable polyesters) is preferred as well as netting with flexible, non-welded, rectangular shaped mesh with openings no smaller than three inches by three inches. Additional options exist that include open weave textile, rolled erosion control products with woven, natural fiber netting. Erosion control products that require UV-light to biodegrade, netting with square mesh, plastic mesh are not authorized.

- Vegetation clearing will be strictly limited to that which is required for project completion. Indiscriminate clearing will not be permitted.

- Temporary access roads and drilling pads must avoid steep slopes of 15 degrees or steeper where grade, soil types, or other features suggest a likelihood of excessive erosion or failure; existing access routes must be used or improved whenever possible, in lieu of the construction of new access routes.

- All disturbed areas must be immediately stabilized in accordance with aforementioned erosion controls following cessation of actions in advance or any break in work longer than four days.

- Authorized work must comply with all applicable general, action- and species-specific conditions.

GEN AMM-2 Biosecurity Protocols

- All work vehicles, machinery, and equipment are to be cleaned, inspected by its user, and be free of mud, dirt, debris, and organisms prior to entry into and exit from the Action Area, as well as prior to transport to or from another island.
    - Vehicles, machinery, and equipment must be thoroughly pressure-washed in a designated cleaning area (designated by the responsible land manager) and visibly free of mud, dirt, plant debris, insects, frogs (including frog eggs), and other vertebrate species such as rats, mice and non-vegetative debris. A hot water wash is preferred. Areas of particular concern include bumpers, grills, hood compartments, areas under the battery, wheel wells, undercarriage, cabs, and truck beds (truck beds with accumulated material intentionally placed or fallen from trees are prime sites for accidental transport of invasive species).
    - The interior and exterior of vehicles, machinery, and equipment must be free of garbage and food. The interiors of vehicles and the cabs of machinery must be vacuumed clean. Floor mats will be sanitized with a solution of at least 70-percent isopropyl alcohol or a freshly mixed 10-percent bleach solution.
    - Any machinery, vehicles, equipment, or other supplies found to be infested with ants (or other invasive species) must not enter Action Area. Treatment is the responsibility of the equipment or vehicle owner and operator.
    - If slinging in a load (equipment, supplies, etc.) into the forest, everything should be wrapped up if it is to be sitting at the landing zone prior to sending out.
- Base yards and staging areas inside and outside natural areas and native habitat must be kept free of invasive species.
    - Base yards and staging areas will be inspected at least weekly for invasive species and any invasive species found is to be removed immediately. The local land manager(s) will determine what species are to be targeted in these inspections and removal procedures. The local land manager will also ensure regulatory compliance with all actions. Land managers are to pay particular attention to where vehicles are parked overnight, keeping areas within 30 feet of vehicles free of debris. Parking on pavement and not under trees, while not always practical, is best.
    - Project vehicles or equipment stored outside of Action Area, such as a private residence, are to be kept in a pest free area as defined by the on-site land or project manager.

GEN BMP-1 Preventing the spread of Little Fire Ants

- All work vehicles, machinery, and equipment are to be inspected for invasive ants prior to entering the Action Area.
    - A visual inspection for little fire ants (*Wasmannia auropunctata*) will be conducted prior to entry into Action Area.
    - Hygiene is paramount but even the cleanest vehicle may transport little fire ants. Place insect bait into refillable tamper resistant bait stations. Larger vehicles, such as trucks, may require multiple stations. Monitor bait stations frequently (every week at a minimum) and replace bait as needed. If the station does not have a sticker to identify the contents, apply a sticker listing contents of the station. More detailed information on baiting can be found here: https://littlefireants.com/wp-content/uploads/02a-LFA-Fact-Sheet_v2.5_May2020.pdf.
    - Any machinery, vehicles, equipment, or other supplies found to be infested with ants (or other invasive species) will not be allowed to enter Action Area until it is sanitized and re-tested following a resting period of at least 24 hours. Infested vehicles must be sanitized following recommendations by the Hawai‘i Ant Lab (http://www.littlefireants.com) or other ant control expert and in accordance with all State and Federal laws. Treatment is the responsibility of the equipment or vehicle owner and operator.
- For individuals working in the Action Area:
    - Before going into the Action Area, visually inspect and clean clothes, boots, pack, radio harness, tools, and other personal gear and equipment, for seeds, soil, plant parts, insects, and other debris. A small brush is handy for cleaning boots, equipment, and gear. Soles of shoes are to be sanitized using a solution of greater than 70 percent isopropyl alcohol or a freshly mixed 10 percent bleach solution.
    - Immediately before leaving the Action Area, visually inspect and clean clothes, boots, pack, radio harness, tools, and other personal gear and equipment, for seeds, soil, plant parts, insects, and other debris. Soles of shoes are to be sanitized using a solution of greater than 70 percent isopropyl alcohol or a freshly mixed 10 percent bleach solution.
    - Little fire ants nest in trees. If you are under a tree and that tree is bumped or somehow stressed, the threat response of the ants is to fall from the leaves and sting the person under the tree. If you are subject to an ant attack, do not panic. The ants are extremely small, but their stings are painful, so make sure you remove all ants from your body and clothing. The stings produce inch long welts that are itchy and painful and can last for weeks.
    - Treat stings as like other insect stings. In some persons, stings can produce life threatening reactions. Stocking antihistamine in the first aid kit is a reasonable precaution.

GEN BMP-2 Preventing the spread of Rapid Ohia Death and Rat Lungworm Disease

- Procedures for Rapid Ohia Death (ROD) fungus:
    - Avoid wounding ohia trees and roots with mowers, chainsaws, weed eaters, and other tools. Cut only the minimum number of trees and branches as approved for the project.
    - All cutting tools, including machetes, chainsaws, and loppers must be sanitized to remove visible dirt and other contaminants prior to entry into Action Area. Tools may be sanitized using a solution of greater than 70 percent isopropyl alcohol or a freshly mixed 10 percent bleach solution. One minute after sanitizing, you may apply an oil-based lubricant to chainsaw chains or other metallic parts to prevent corrosion.
    - Only dedicated tools and chainsaws are to be used to sample known or suspected ROD-infected trees.
    - Vehicles, machinery, and equipment must be cleaned as described above.
    - Ohia firewood, logs, and parts are not to be transported. For State guidance see: https://hdoa.hawaii.gov.
- Rat Lungworm disease is caused by a parasite that can infect humans who consume raw or undercooked infected snails or slugs or consume raw produce that contains a small, infected snail or slug. Infection is rare but can be serious. Symptoms can include severe headache, neck stiffness, low grade fever, nausea, and vomiting anywhere from 1 to 6 weeks after exposure. The disease is not spread person to person. Anyone who handles snails or slugs is to wear gloves or wash hands. Eating unwashed produce is discouraged.

GEN BMP-3 Water Quality

The following measures will be required, as applicable, to minimize the degradation of water quality and minimize the negative consequences to fish and wildlife resources.

- Turbidity and siltation from project-related work will be minimized and contained within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal or weather conditions.
- No project-related materials (fill, revetment rock, pipe, etc.) will be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.
- No contamination (trash or debris disposal, non-native species introductions, attraction of non-native pests, etc.) of adjacent habitats will result from project-related actions. This will be accomplished by implementing a litter-control plan and developing a Hazard Analysis and Critical Control Point (HACCP) Plan to prevent attraction and introduction of non-native species.
- Fueling of project-related vehicles and equipment will take place at least 50 feet away from the water and a Spill Prevention, Control, and Countermeasure (SPCC) plan to

control petroleum products accidentally spilled during the project will be developed. Absorbent pads and containment booms will be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.

- Any under-layer fills used in the project will be protected from erosion with stones (or core-loc units) as soon after placement as practicable.
- Any soil exposed near water as part of the project will be protected from erosion (with geotech, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

GEN BMP-4 Utility Lines

The following conservation measures are required for actions associated with the construction, maintenance, improvement, or repair of utility lines:

- Maximum utility corridor width will be limited to the minimum width necessary for safe operation and maintenance.
- Utilities will be designed and constructed in a manner that minimizes negative consequences on aquatic and marine waters due to runoff and erosion, including adequate stormwater treatment.
- Utilities will be constructed as near as possible to pre-construction contours and elevations.

GEN BMP-5 Roads

The following conservation measures are required for actions associated with the maintenance, improvement, or repair of roads:

- Maximum road width will be limited to the minimum width necessary for safe operation.
- Road will be designed and constructed in a manner that minimizes negative consequences on surface and marine waters due to runoff and erosion, including adequate stormwater treatment.
- Road will be constructed as near as possible to pre-construction contours and elevations.
- Road water crossings will be bridged, or culverts installed, based on present or future (e.g., based on climate change data) 100-year flood flows, and in a manner that maintains surface flows with minimal modification to flow direction or velocity.

4.2 Species-specific Avoidance and Minimization Measures

The following species-specific AMMs were developed for the project.

Hawaiian Hoary Bat

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season, June 1 to September 15.

- Do not use barbed wire for fencing.

***Hawaiian Goose (Nēnē*)**

- Do not approach, feed, or disturb Nēnē.
- If Nēnē are observed loafing or foraging within the Action Area during the breeding season (September 1 to April 30), halt work and have a qualified biologist familiar with the nesting behavior of Nēnē survey for nests in and around the Action Area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of three or more days (during which the birds may attempt to nest).
- Cease all work immediately and contact USFWS for further guidance if a nest is discovered within a radius of 100 feet of project activities. A 100-foot boundary will be clearly marked around the nest with guidance from a qualified biologist, and actions will remain outside the boundary.
- In Action Areas where Nēnē are known to be present or observed during construction, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.
- The following conservation measures are required for actions that have the potential to result in the exposure of Nēnē to noise levels above 65 decibels:
    - Special attention will be given to ensure that no ESA-listed animal species are within 150 feet of equipment prior to any action (e.g., dredging, clearing, etc.).
    - Operations will immediately shut down should Nēnē enter the Action Area within the mandatory 150-foot shut down range.
    - Equipment operators will employ “soft starts” when initiating work to reduce initial sound pressure levels. The soft start method is intended to be a warning mechanism for fauna so that they can vacate the Action Area before maximum sound pressure levels are reached.

5.0 ESA DETERMINATION

Hawaiian Hoary Bat (*Lasiurus cinereus semotus*)

The species is present throughout the island based on extensive surveys. No critical habitat has been established for the species. During the birthing and pup-raising period of June 1 to September 15, it is known to use the types and species of large native and non-native tree species present in the Action Area. The realignment of the road and installation of utilities would result in the disturbance or removal of these types of trees.

To avoid and minimize any potential impacts the general and specific AMMs that are described in **Section 4** will be implemented.

With implementation of the proposed BMPs and AMMs, FEMA has determined that the Proposed Action may affect, but is not likely to adversely affect the Hawaiian Hoary Bat.

Hawaiian Petrel (*Pterodroma sandwicensis*)

The Hawaiian Petrel may fly over the Action Area at night during the nesting and fledging season to reach the known colony on Mauna Loa or other mountainous areas on Hawai‘i Island where they might be present. No critical habitat has been established for the species. Birds flying over or near the Action Area are subject to fallout if disoriented by nighttime lighting and subject to predation when on the ground.

Night-time work is not authorized; therefore, FEMA has determined that the Proposed Action would not affect the Hawaiian Petrel.

Band-rumped Storm-petrel (*Oceanodroma castro*)

The Band-rumped Storm-petrel may fly over the Action Area at night during the nesting and fledging season to reach the known colony on Mauna Loa or other mountainous areas on Hawai‘i island where they might be present. No critical habitat has been established for the species. Birds flying over or near the Action Area are subject to fallout if disoriented by nighttime lighting and subject to predation when on the ground.

Night-time work is not authorized; therefore, FEMA has determined that the Proposed Action would not affect the Band-rumped Storm Petrel.

Newell's Shearwater (*Puffinus auricularis newelli*)

The Newell's Shearwater may fly over the Action Area at night during the nesting and fledging season to reach potential colonies, at least one of which has been documented in the 1990s in the nearby Puulena Crater, or other areas on Hawai‘i island with rugged terrain and adequate shelter necessary for nesting and raising young. No critical habitat has been established for the species. Birds flying over or near the Action Area are subject to fallout if disoriented by nighttime lighting and subject to predation when on the ground.

Night-time work is not authorized; therefore, FEMA has determined that the Proposed Action would not affect the Newell's Shearwater.

Nēnē or Hawaiian goose (*Branta sandvicensis*)

On Hawai‘i Island, Nēnē have been documented as occurring in numerous areas scattered throughout the island. The two closest populations are an area south of Hilo along the coast (with birds there described by USFWS as semi-captive), which is approximately 9 miles from the project Action Area and an area within HVNP, which is more than 12 miles from the Action Area. Although there is potentially favorable habitat for the species in the project Action Area, the substantial distance to the nearest populations and the few occurrences reported in the general project vicinity make it unlikely to occur there. However, Nēnē are strong flyers and could fly to the area from known populations. If they were present, they could be temporarily disturbed by project construction activities.

To avoid and minimize any potential impacts the general and specific AMMs that are described in **Section 4** will be implemented.

With implementation of the proposed BMPs and AMMs, FEMA has determined that the Proposed Action may affect, but is not likely to adversely affect the Nēnē.

Hawaiian Stilt (*Himantopus mexicanus knudseni*)

The Hawaiian Stilt habitat preference is shallow, calm water for foraging and mudflats for nesting. In the Puna district of Hawai‘i Island, where the project is located, much of the area that might have provided that habitat was destroyed by the 2018 lava flows extending from Kapoho to Pohoiki. The Action Area and surrounding area contains no documented wetlands or suitable bodies of water. Most of the shoreline near the project Action Area is rugged cliffs. Therefore, the species is unlikely to be present near or in the Action Area due to lack of habitat.

FEMA has determined that the Proposed Action would not affect the Hawaiian Stilt.

Hawaiian Coot (*Fulica alai*)

The Hawaiian coot uses lowland wetland habitats with water less than 12 inches deep and with suitable emergent plant growth. In the Puna district of Hawai‘i Island, where the project is located, much of the shoreline that might have provided habitat of shallow water or mudflats for the Hawaiian stilt was destroyed by the 2018 lava flows extending from Kapoho to Pohoiki. The Action Area and surrounding area contains no documented wetlands or suitable bodies of water. Most of the shoreline near the project Action Area is rugged cliffs. Therefore, the species is unlikely to be present near or in the Action Area due to lack of habitat.

FEMA has determined that the Proposed Action would not affect the Hawaiian Coot.

Green Sea Turtle (*Chelonia mydas*)

Green Sea Turtle habitat is shallow, protected or semi-protected, water around coral reefs and coastal areas with appropriate habitat for foraging and sandy beaches for nesting. The only beach present near the Action Area is adjacent to Isaac Hale Park and is over 300 feet from the nearest project Action Area boundary. Therefore, the species is unlikely to be present in the Action Area. Green Sea Turtles, especially newly hatched turtles, can be disoriented by artificial lights.

Night-time work is not authorized; therefore, FEMA has determined that the Proposed Action would not affect the Green Sea Turtle.

Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Hawksbill Sea Turtles are most often seen in shallow waters around reefs, bays, and inlets and are known to nest on beaches within HVNP. The species is not known to nest along the coast near the project Action Area and the distance from the nearest Action Area boundary to the potentially suitable beach basking area is farther than the species would travel over land.

FEMA has determined that the Proposed Action would not affect the Hawksbill Sea Turtle.

Blackburn’s Sphinx Moth (*Manduca blackburni*)

Blackburn’s Sphinx Moth is found in dry to mesic habitats. Established critical habitat is on the western side of Hawai‘i Island. The majority of the current Blackburn’s Sphinx Moth range is now based on the presence of the invasive host, tree tobacco. Blackburn’s Sphinx Moth is unlikely to be present in the project Action Area due to lack of habitat in the Action Area and lack of records of the host plant in the area.

FEMA has determined that the Proposed Action would not affect the Blackburn’s Sphinx Moth.

Hilo Ischaemum (*Ischaemum byrone*)

Hilo Ischaemum occurs near the ocean among rocks or on moist or wet basalt cliffs in windward coastal shrubland from sea level to 190 meters (623 feet) elevation. Although a small segment of coastal cliff habitat that was not covered by lava in 2018 (approximately 500 feet in length) is present in the project Action Area , that coastline is approximately 150 feet from the project construction footprint. Therefore, if present, the species would not be disturbed.

FEMA has determined that the Proposed Action would not affect the Hilo Ischaemum.

Critical Habitat and Other Federally Listed Species

FEMA has determined that the Proposed Action would result in no effect to other federally listed species or critical habitat not described above.

FEMA requests a letter of concurrence from USFWS that the project may affect, but is not likely to adversely affect, the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) or the Nēnē (*Branta sandvicensis*) and would have no effect on any other ESA-listed species. If you have questions about the Proposed Action or FEMA's request, please contact Adam Klatzker at (510) 627-7073 or adam.klatzker@fema.dhs.gov. Thank you in advance for your assistance.

Sincerely,

KENNETH G SESSA

Digitally signed by KENNETH G SESSA
Date: 2022.08.09 12:48:54 -04'00'

Kenneth G. Sessa
Acting Regional Environmental Officer
FEMA Region IX

Attachments:
Figures
References
Official Species List Memo

cc: Cara Binger, HI EMA
Douglas Le, County of Hawaii

FIGURES

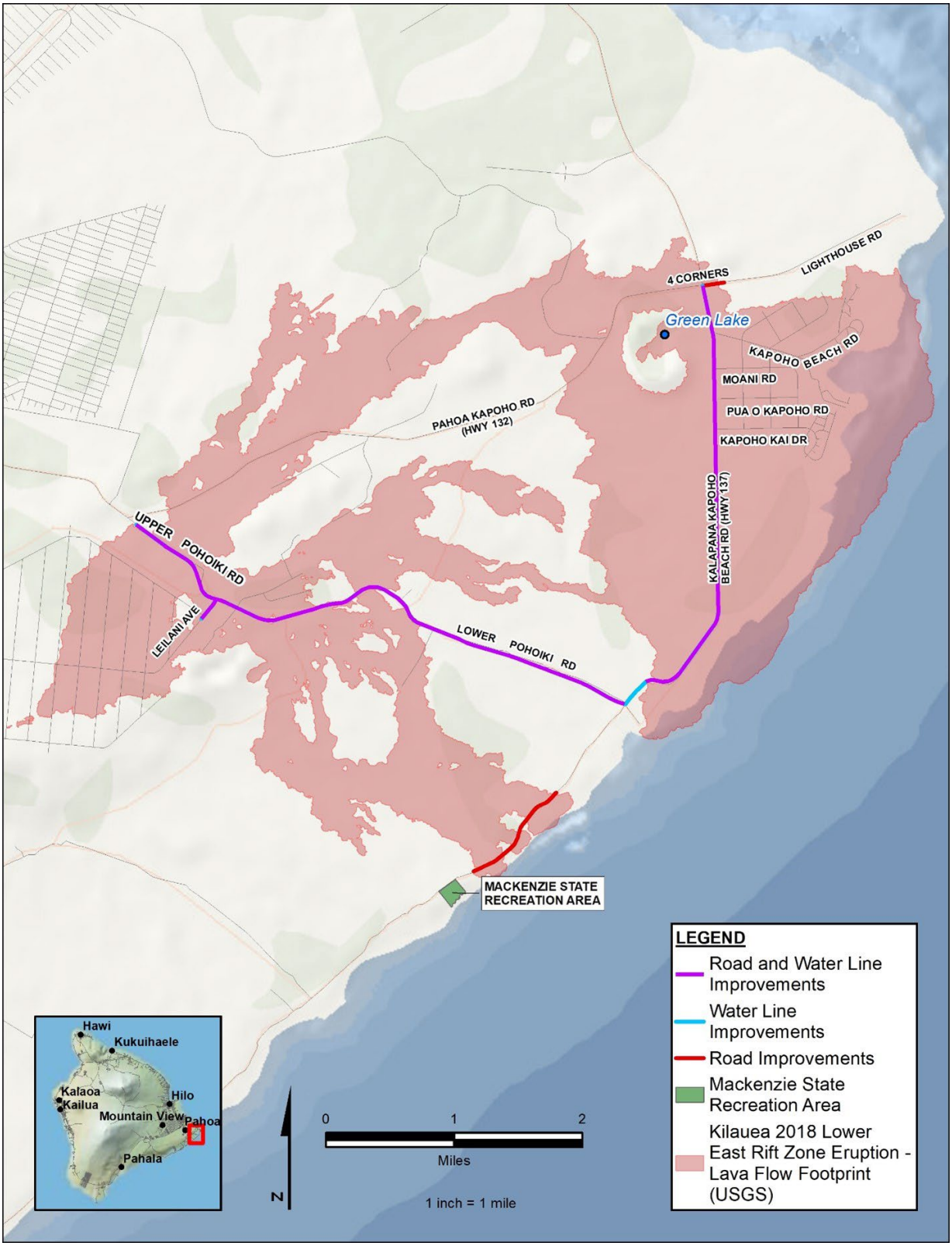


Figure 1. Project Area and Location

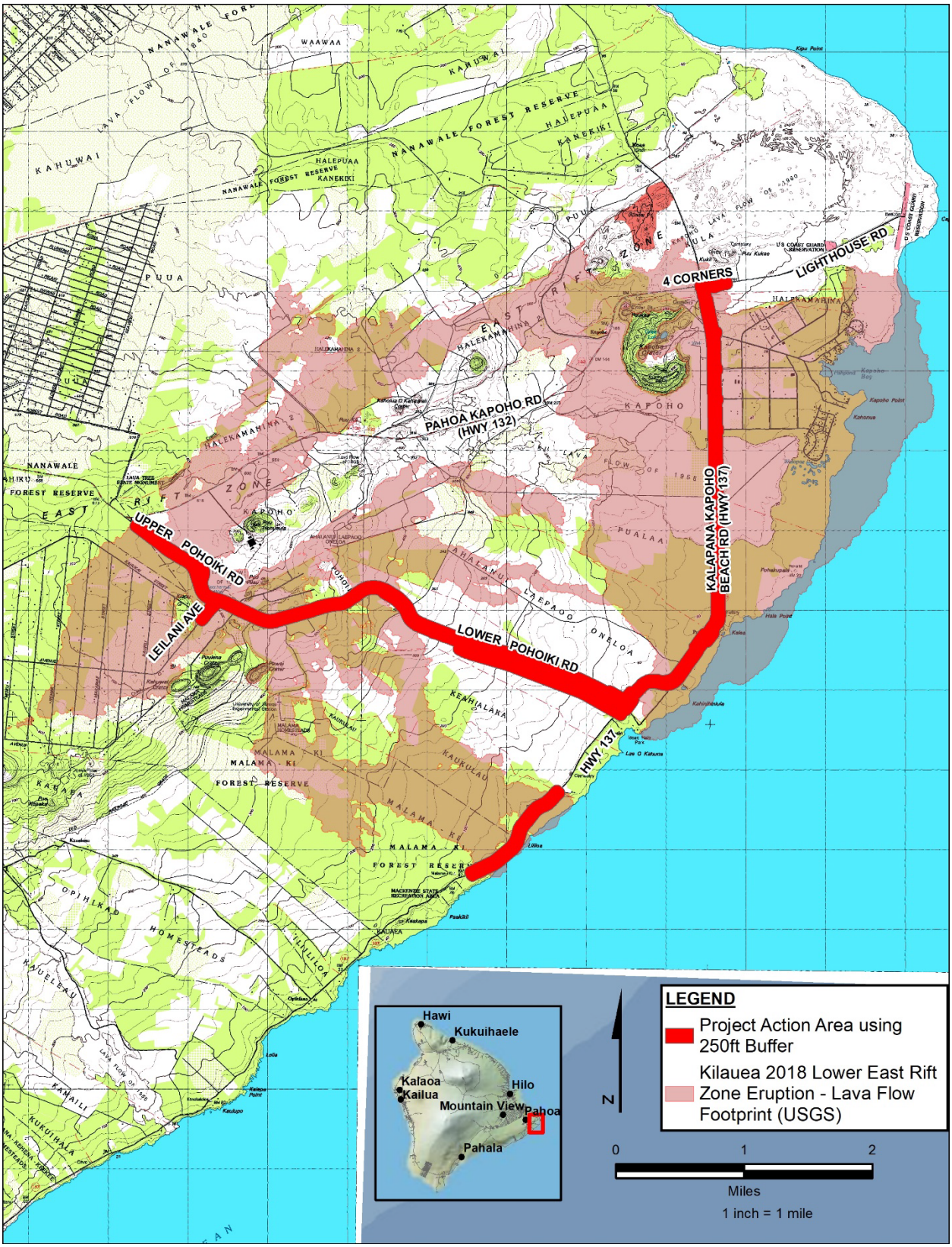


Figure 2. Project Action Area

Figure 3. Construction Staging Areas

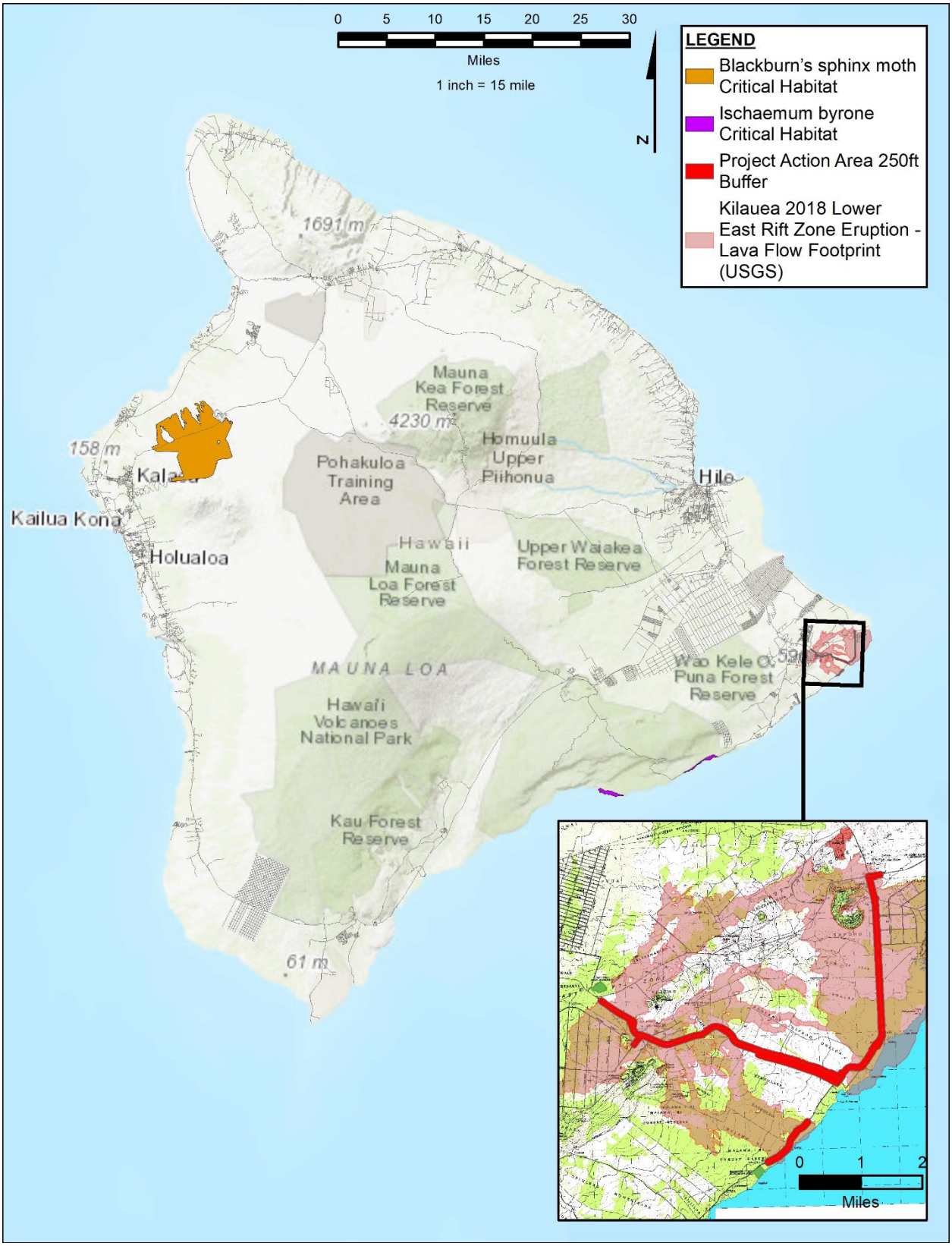


Figure 4. Critical Habitat for the Species Evaluated

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OFFICIAL SPECIES LIST MEMO

From: Cady, Melissa N <melissa_cady@fws.gov>
Sent: Tuesday, May 17, 2022 4:31 PM
To: Klatzker, Adam <adam.klatzker@fema.dhs.gov>
Subject: Re: [EXTERNAL] RE: DR4366-PW00055 Pohoiki Road - HWY137 Road Repair

Hi Adam,

I got the 10ft shapefile to work. It didn't gain you much-just cut down by one plant. Here is your revised list. Please use the links in the IPaC letter you generated to review the recommended avoidance and minimization measures. Please let me know if you have any questions about this list, how to use it, or next steps.

the threatened nēnē or Hawaiian goose (*Branta sandvicensis*),
the endangered ʻōpeʻapeʻa or Hawaiian hoary bat (*Lasiurus cinereus semotus*),
the endangered ʻuaʻu or Hawaiian petrel (*Pterodroma sandwicensis*),
the endangered ʻakēʻakē or Hawaiʻi distinct population segment (DPS) of the band-rumped storm-petrel (*Oceanodroma castro*),
the threatened ʻaʻo or Newell's shearwater (*Puffinus auricularis newelli*),
the endangered aeʻo or Hawaiian stilt (*Himantopus mexicanus knudseni*),
the endangered ʻalae keʻokeʻo or Hawaiian coot (*Fulica alai*),
the threatened honu or Central North Pacific DPS of green sea turtle (*Chelonia mydas*),
the endangered honu ʻea or hawksbill sea turtle (*Eretmochelys imbricata*),
the endangered Blackburn's sphinx moth (*Manduca blackburni*),
the endangered *Ischaemum byrone* (Hilo ischaemum).
There is no critical habitat for listed species in the vicinity of this proposed project.

Thank you for reaching out!

Melissa Cady
(she/her)
Maui Nui & Hawaiʻi Island Team
Pacific Islands Fish and Wildlife Office
U.S. Fish and Wildlife Service
154 Waianuenue Avenue Suite 103
Hilo, Hawaiʻi 96720-2452

Office Phone: 808-933-6963

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U.S. Fish and Wildlife Service
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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai‘i 96850

In Reply Refer To:
2022-0039656-S7-001

January 30, 2023

Kenneth G. Sessa
Acting Regional Environmental Officer
Federal Emergency Management Agency (FEMA), Region IX
U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

Subject: Informal Consultation for Upper and Lower Pohoiki Road and Kalapana Kapoho Beach Road (Highway 137) road and waterline repair project, Puna, Hawai‘i (FEMA Project Number AK-4366-PW-55/53, Hawai‘i Department of Public Works Project Number FEMA-4366-HI, PW #55/53)

Dear Kenneth G. Sessa:

The U.S. Fish and Wildlife Service (Service) received your request for informal consultation on August 9, 2022, requesting our concurrence with your determination that the proposed road and water line project may affect, but are not likely to adversely affect the following species:

- Hawaiian hoary bat or ‘ōpe‘ape‘a (*Lasiurus cinereus semotus*),
- Hawaiian goose or nēnē (*Branta sandvicensis*),
- Hawaiian waterbirds, including the Hawaiian stilt or ae‘o (*Himantopus mexicanus knudseni*), and the Hawaiian coot or ‘alae ke‘oke‘o (*Fulica americana alai*),
- Hawaiian seabirds, including the Hawaiian petrel or ‘u‘au (*Pterodroma sandwichensis*), Newell’s Townsend’s shearwater or ‘a‘o (*Puffinus auricularis newelli*), and the Hawai‘i distinct population segment of the band-rumped storm-petrel or ‘akē‘akē (*Oceanodroma castro*),
- Blackburn’s sphinx moth (*Manduca blackburni*), and
- The federally listed plants, *Cyrtandra nanawaleensis or* ha‘iwale*, Gardenia remyi* or nānū*, Cyanea platyphylla* or ‘aku‘aku, and *Ischaemum byrone*.

Through the Hawai‘i Emergency Management Agency, FEMA proposes to provide Federal financial assistance under the Public Assistance Program to the County of Hawai‘i Department of Public Works (DPW) and the County of Hawai‘i Department of Water Supply (DWS) for the

proposed road and waterline project. The Hawai‘i Emergency Management Agency are the direct applicants of the grants, the DPW and DWS are the Subapplicants. This letter has been prepared under the authority of, and in accordance with, section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq*.) as amended (ESA).

Project Description

The project is located approximately 19 miles south-southeast of Hilo, Hawai‘i. Project components, including staging areas, occur along or adjacent to Highway 137, Pohoiki Road, a short segment of Lighthouse Road, and several road stub-outs (Figure 1). The DPW proposes to repair, repave, and realign approximately 9.2 miles of County roads that were inundated with lava from the 2018 Kīlauea volcano eruption in the easternmost portion of the island to bring them back to their pre-disaster function. The DWS will concurrently install new waterlines along approximately 7.6 miles of the same county roads. These roads and waterlines were damaged from the 2018 Kīlauea volcano eruption, a declared Presidential disaster (FEMA-4366-DR-HI). The entire project is anticipated to take 33 months: Upper Pohoiki Road - 38 weeks; Lower Pohoiki - 34 weeks; Highway 137 from Pohoiki Road to Kapoho Beach Road - 30 weeks, Lighthouse Road - 26 weeks. Construction will only occur during daylight hours, from 7 am to 7 pm, no work at night will occur.

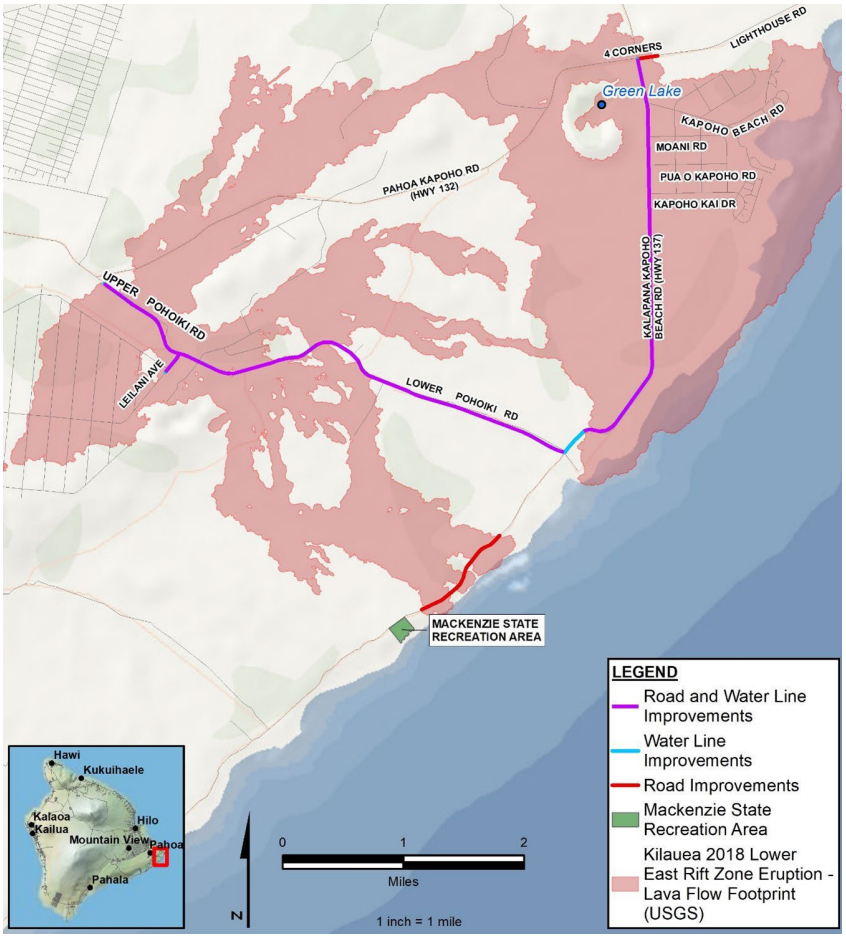


Figure 1. Proposed project area.

Realign and Repave Roads

The DPW proposes to repave approximately 9.2 miles of roads in the project area; some will be realigned and repaved to avoid important vegetation and meet current design standards. Along road sections covered by lava the road would be constructed on top of the hardened lava and would change elevation to follow the grade of the naturally hardened lava. The lava would be re-graded as needed outside of the roadway to maintain a 1:1 slope adjacent to the roadway to maintain a safe roadway condition for drivers. Stormwater would be directed to the roadway shoulders along the side of the road. Where there is no lava inundation, the road will be widened to a uniform 44-ft width to meet current design standards and this may extend outside the original footprint in some areas. The widest disturbance would extend into the lava approximately 70 ft on either side of the road to create a roadway shoulder with appropriate slopes; however, along most of the alignment the width of lava disturbance would be less than 20 ft from the edge of the pavement. After paving is complete, the roadway would be striped, and signage would be installed. No roadway lighting would be installed.

Install Water Lines

The DWS proposes to install water lines along Pohoiki Road and the northern portion of Highway 137 concurrent with the roadwork. Water lines would be installed along the northern side of Pohoiki Road from just east of the intersection of Pohoiki Road and Highway 132 to the intersection of Pohoiki Road and Highway 137. The water line would then cross Highway 137 and run along the eastern side of Highway 137 to Kapoho Beach Road. Water lines would not be installed on Leilani Avenue, the side streets connecting to Highway 137 (Lighthouse Road, Kapoho Beach Road, Moani Road, Pua O Kapoho, and Kapoho Kai Drive), or along Highway 137 in MacKenzie State Recreation Area.

Along most of the alignment, water lines would be installed under the unpaved shoulder of the road, just outside the travel lane. The new water line would be installed under two existing 24-inch culverts along Highway 137 north of Pohoiki Road. In road sections where the remnant heat of the lava is too high to install water lines underground (such as along Upper Pohoiki Road near the fissures), the water line would be installed in a V-shaped riprap trench, which would extend the project footprint 16 ft to the north. The V-shaped riprap trench would allow heat to continue to dissipate from the lava while allowing the water line to be installed and operated. Fire hydrants would be installed along the water line. The DWS proposes to add laterals to connect to adjacent properties and these laterals would be within the existing right-of-way.

Construction Staging, Access, and Methods

The County proposes to stage equipment within the existing road footprint and on eight construction staging areas on parcels owned by the County near the project area. Some excavation may be needed to level the lava where staging, storage, and stockpiling will occur. Excavation would be less than 5 ft-deep and would not extend into previously undisturbed ground under the lava, except along Lower Pohoiki Road (which was not inundated by lava) and where the new road would connect to existing roads. The project area would be accessed using open local roads including Highway 132 and Highway 137.

The County anticipates needing the following construction equipment for the duration of the construction: excavators, bulldozers, hydraulic impact hammers, backhoes, loaders, graders, dump trucks, compactors, rollers, asphalt pavers, rock crushers, rock haulers, and water trucks. The County anticipates using the rock crushers to crush excavated lava to create base course

material to be used on-site. Some fill may need to be brought in from an on-island quarry site depending on the lava temperature and gradation. Demolition and excess excavation material would be disposed of at the West Hawai‘i Landfill or Hilo Landfill. Excavated asphalt concrete base and subbase material would be transported to the designated stockpile location at the Highway Maintenance quarry site.

Avoidance and Minimization Measures

The contractor would implement extensive conservation measures, including those that protect water quality including removing silt and debris associated with grading, drainage facilities, roadways, and other areas. Other water quality protection measures would include installing temporary sediment control filters at grated drain inlets, developing a grated inlet erosion control plan, installing temporary sediment control filters at catch basins, sandbag barriers, sand snakes (monofilament weave bag filled with sand or gravel providing a sediment barrier), stabilized construction entrance, and temporary sediment straw wattles. A site-specific, best management practices plan will be prepared, and the contractor would prevent and control spills of petroleum products. Other than sediment control fencing as needed, no other temporary or permanent fencing would be constructed. Additionally, many other protective measures will be implemented. For a full description of all the avoidance and minimization measures and best management practices that will be implemented for this project, please see Section 4.0 of the consultation request letter which is on file at our office.

Effects to Listed Species

Hawaiian hoary bat

The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they forage. Hawaiian hoary bats may be present and exposed to project-related effects. If trees or shrubs 15 ft or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away. Additionally, Hawaiian hoary bats forage for insects from as low as 3 ft to higher than 500 ft above the ground and can become entangled in barbed wire used for fencing.

To avoid adverse effects to the Hawaiian hoary bat the project will implement the following recommended avoidance and minimization measures:

- Avoid disturbing, removing, or trimming woody plants greater than 15-ft tall during the bat birthing and pup rearing season (June 1 through September 15).
- Avoid use of barbed wire.

If Hawaiian hoary bats are present during construction, we expect human presence and disturbance will cause them to leave the site. Based on the proposed project design and implementation of these avoidance and minimization measures, Hawaiian hoary bats are extremely unlikely to be injured, killed, or measurably disrupted from their normal behaviors. Therefore, effects to the Hawaiian hoary bat are insignificant.

Hawaiian goose

The Hawaiian goose may be observed in a variety of habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. Hawaiian geese are unlikely to be present within the proposed area prior to construction because the project area currently does not provide suitable habitat. However, when the site is cleared for construction or if suitable habitats are created, the Hawaiian goose may be attracted to the project location.

The following species-specific measures will be implemented to avoid adverse effects to the Hawaiian goose:

- Project personnel will not approach, feed, or disturb Hawaiian geese.
- If Hawaiian geese are observed loafing or foraging within the project area during the breeding season (September through April), a biologist familiar with Hawaiian goose nesting behavior will survey for nests in and around the project area prior to the resumption of any work. A biologist will repeat surveys after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest).
- If a nest is discovered within a radius of 150 ft of proposed project, or a previously undiscovered nest is found within the 150-ft radius after work begins the work will cease immediately, and project proponents will contact the Service for further guidance.
- In areas where Hawaiian geese are known to be present, reduced speed limits will be posted and enforced, and project personnel and contractors will be informed of the presence of federally listed species on-site.

Service-recommended avoidance and minimization measures for the Hawaiian goose will be implemented. Hawaiian goose present and exposed to any project-related work may be temporarily disturbed but are unlikely to be measurably disrupted from their normal behaviors. We do not expect any nest failure, injury, or mortality of Hawaiian goose. Therefore, effects to the Hawaiian goose are insignificant.

Hawaiian waterbirds

Hawaiian waterbirds are currently found in a variety of wetland habitats including freshwater marshes and ponds, coastal estuaries and ponds, artificial reservoirs, *Colocasia esculenta* (kalo or taro) loʻi or patches, irrigation ditches, and sewage treatment ponds. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur. The project area currently does not provide these types of suitable habitats. However, Hawaiian waterbirds may be attracted to areas of standing water that are inadvertently created during construction activities. The following measures will be implemented to avoid creating attractive habitat and associated adverse effects to Hawaiian waterbirds:

- In areas where waterbirds are known to be present, the project will post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on site.
- If water resources are located within or adjacent to the project site, the project will incorporate applicable best management practices for work in aquatic environments into the project design (enclosed).
- A biological monitor that is familiar with the species' biology will conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the

proposed project site prior to project initiation. The monitor will repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found, the project will:

- Contact the Service within 48 hours for further guidance.
- Establish and maintain a 100-ft buffer around all active nests and/or broods until the chicks have fledged where potentially disruptive activities or habitat alteration would be avoided within this buffer.
- A biological monitor that is familiar with the species' biology will be present on the project site during all construction or earth-moving activities until the chicks fledge to ensure that Hawaiian waterbirds and nests are not adversely affected (i.e., mortality of young, or parents kept from the nest).

The project will implement Service-recommended measures as outlined above to avoid and minimize impacts to Hawaiian waterbirds. Hawaiian waterbird nests, chicks, and fledglings would not be injured or killed, and adults would not be kept from the nests. Hawaiian waterbirds are unlikely to be measurably disrupted from their normal behaviors. Therefore, effects to Hawaiian waterbirds are insignificant.

Hawaiian seabirds

Hawaiian seabirds may traverse the project area at night during the breeding, nesting, and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable to light attraction.

The following measures will be implemented to avoid adverse effects to Hawaiian seabirds:

- Fully shield all outdoor lights so lighting can only be seen from below.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

The project will implement Service-recommended avoidance and minimization measures to avoid adverse effects to Hawaiian seabirds. Hawaiian seabirds traversing the area at night are unlikely to be measurably disrupted from their normal behaviors. Therefore, effects to Hawaiian seabirds are insignificant.

Blackburn's sphinx moth

The adult Blackburn's sphinx moth feeds on nectar from native plants, including *Ipomoea pes-caprae* (beach morning glory), *Plumbago zeylanica* (ʻilieʻe), *Capparis sandwichiana* (maiapilo), and others. Blackburn's sphinx moth larvae feed on nonnative *Nicotiana glauca* (tree tobacco),

and native, federally listed, *Nothocestrum* spp. (‘aiea). To pupate, the larvae burrow into the soil and can remain in a state of torpor for a year or more before emerging from the soil. Soil disturbance can result in death of the pupae.

The following measures will be implemented to avoid adverse effects to the Blackburn’s sphinx moth:

- Monitor the project site for emerging tree tobacco, the principal host plant for the moth, and remove plants less than 3-ft tall to prevent use and presence by the moth.
- A biologist familiar with the species will survey areas of proposed activities for Blackburn’s sphinx moth and its larval host plants prior to work initiation.
    - Surveys will be conducted during the wettest portion of the year (usually November through April or several weeks after a significant rain) and within 4 to 6 weeks prior to construction.
    - Surveys will include searches for adults, eggs, larvae, and signs of larval feeding (i.e., chewed stems, frass, or leaf damage).
    - If moths, eggs, larvae, or native ‘aiea or tree tobacco over 3-ft tall, are found during the survey, the project will contact the Service for additional guidance to avoid impacts to this species.

If no Blackburn’s sphinx moth, ‘aiea, or tree tobacco are found during surveys, it is imperative that measures be taken to avoid attraction of Blackburn’s sphinx moth to the project location and prohibit tree tobacco from entering the site. Tree tobacco can grow greater than 3-ft tall in approximately 6 weeks. If it grows over 3-ft tall, the plants may become a host plant for Blackburn’s sphinx moth. Therefore, the following avoidance and minimization measures will be implemented:

- Any tree tobacco less than 3-ft tall will be removed.
- The construction site will be monitored every 4 to 6 weeks for new tree tobacco growth before, during, and after the proposed ground-disturbing activity.
    - Monitoring for tree tobacco can be completed by any staff, such as groundskeeper or regular maintenance crew, provided with picture placards of tree tobacco at different life stages.

The project will implement Service-recommended measures to avoid adverse effects to the Blackburn’s sphinx moth. Because the recommended avoidance and minimization measures will be implemented, Blackburn’s sphinx moth are unlikely to be injured, killed, or measurably disrupted from their normal behaviors. Therefore, effects to the Blackburn’s sphinx moth are insignificant.

Listed plants

Service records indicate the federally endangered plants *Cyrtandra nanawaleensis, Gardenia remyi*, *Cyanea platyphylla, and Ischaemum byrone* may occur in the project area. However, a FEMA contracted biological survey (Metzler 2022) conducted in December of 2022 revealed no federally listed plant species were present within the Proposed Action Area. One individual *Ischaemum byrone* plant was discovered 25 ft outside of the project footprint, which is outlined in the survey report (Metzler 2022). Project workers will be educated on the presence of the federally listed plants, or potential for their presence, and instructed to remain within currently

disturbed areas to minimize disturbance to native vegetation outside of the proposed Action Area. If any of the listed plants are observed during vegetation clearing, workers will stop clearing the area and notify the project manager who will relay the information to the Service.

Because the recent survey found no listed plants within the proposed project footprint, and the project description includes the education of workers to avoid harming listed plants during vegetation, we do not expect federally listed plants would be present or exposed to project-related activities associated with construction of the proposed project. Therefore, effects to federally listed plants are discountable.

Summary

Based on the information provided, including the 2022 botanical survey report, implementation of Service-recommended avoidance and minimization measures, and our assessment of potential project impacts, we anticipate that the potential for adverse effects to the Hawaiian hoary bat, Hawaiian goose, Hawaiian waterbirds, Hawaiian seabirds, Blackburn's sphinx moth, and the endangered plants *Cyrtandra nanawaleensis*, *Gardenia remyi*, *Cyanea platyphylla*, and *Ischaemum byrone* are insignificant or discountable. We concur with your determination that this project may affect but is not likely to adversely affect these federally listed species. Reinitiation of consultation is required and shall be requested:

- If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
- If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the written concurrence; or,
- If a new species is listed or critical habitat designated that may be affected by the identified actions.

Thank you for protecting federally listed species. If you have any questions, please contact Carrie Harrington at carrie_harrington@fws.gov or by telephone at 808-792-9400. When referring to this project, please include this reference number: 2022-0039656-S7-001.

Sincerely,

LINDSY ASMAN

Digitally signed by LINDSY ASMAN
Date: 2023.01.31 09:45:59 -10'00'

Lindsy Asman
Island Team Manager
Maui Nui and Hawai‘i Island

cc: David Cohen, FEMA
Kenneth Sessa, FEMA
David Herdrich, FEMA

References

Meztler, Glenn. 2022. Field Survey for ESA-listed Plants, Pohoiki Road and Highway 137, December 7 and 8, 2022. 16 pp. FEMA Contractor CH2MHill-CDM PA-TAC Recovery Services (CCPRS).

U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices (BMPs)

The U.S. Fish and Wildlife Service (Service) recommends the following measures are incorporated into project planning to avoid or minimize impacts to fish and wildlife resources. Incorporation of these BMPs may reduce negative impacts to aquatic habitats from project construction-related activities. These BMPs are recommended in addition to, and do not over-ride any terms, conditions, or other recommendations prepared by the Service, other Federal, state, or local agencies. Please contact the Service Aquatic Ecosystems Conservation Program at 808-792-9400 with any questions.

1. Authorized dredging and filling-related activities that may result in the temporary or permanent loss of aquatic habitats should be designed to avoid indirect, negative impacts to aquatic habitats that extend beyond the planned project area.
2. Dredging/filling in the marine environment should be scheduled to avoid coral spawning and recruitment periods, and sea turtle nesting and hatching periods. Because these periods vary throughout the Pacific islands, we recommend contacting the relevant local, state, or Federal fish and wildlife resource agency for site specific guidance.
3. Turbidity and siltation from project-related work should be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. The BMPs should occur for the life of the construction period until turbidity and siltation within the project area is stabilized. All project construction-related debris and sediment containment devices should be removed and disposed of at an approved site.
4. All project construction-related materials and equipment (i.e., dredges, vessels, backhoes, silt curtains, etc.) to be placed in an aquatic environment should be inspected for pollutants including, but not limited to; marine fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use. Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (HACCP – see https://www.fws.gov/policy/A1750fw1.html) can prevent attraction and introduction of non-native species.
5. Project construction-related materials (i.e., fill, revetment rock, pipe, etc.) should not be stockpiled in, or in close proximity to aquatic habitats and should be protected from erosion (e.g., with filter fabric, etc.), to prevent materials from being carried into waters by wind, rain, or high surf.
6. Fueling of project-related vehicles and equipment should occur away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the project should be developed. The plan should be retained on site with the person responsible for compliance with the plan. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of accidental petroleum releases.
7. All deliberately exposed soil or under-layer materials used in the project near water should be protected from erosion and stabilized as soon as possible with geotextile, filter fabric or native or non-invasive vegetation matting, hydro-seeding, etc.

Appendix D: Cultural Resources Consultation Documentation

On September 2, 2022, FEMA sent letters to Native Hawaiian Organizations and Interested Parties. The list of addressees is below.

Mr. Jordan V. Calpito
County of Hawai'i
Burial Council

Mr. Palikapu Dedman
Interested Party

Dr. Sylvia M. Hussey
Ka Pouhana
Chief Executive Officer
Office of Hawaiian Affairs

Mr. Keone Kalawe
Interested Party

Mr. Keiki Kekipi
Interested Party

Mr. Kai Markell
Ka Pou Kāko'o
Manager
Kia'i Kānāwai
Compliance Enforcement
Office of Hawaiian Affairs

Ms. Susan Osborne
Interested Party

Ms. Mililani Trask
Na Koa Ikaika KaLahui Hawaii

Ms. Hannah H. Veloria
Interested Party

Mr. Berkeley Yoshida
Pelekikena
Hawaiian Civic Club Ka'u

On January 31, 2023, FEMA sent letters to Native Hawaiian Organizations:

Ku'ulei Kealoha Cooper, Trustee
Miulan P. Young Kealoha Trust
Leihulu Emma Cooper Trust

Leila Kealoha
Executive Director
Pōhaku Pelemaka

On March 3, 2023, FEMA sent a letter to a representative of the University of Hawaii:

Michael Shibata
Director of Strategic Development and Partnership
University of Hawai'i System

An example letter is included in this attachment.

U.S. Department of Homeland Security
Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

FEMA

IN REPLY REFER TO:
DH-PA-4366 PW 00053 PW 00055

September 2, 2022

Mr. Jordan V. Calpito
County of Hawai‘i
Burial Council
Email: Jordan.V.Calpito@hawaii.gov

Re: Pohoiki Road and Highway 137 Road Repair and Water Line Installation, County of Hawai‘i:
FEMA-DR-4366-HI PW 00055, GM [46851] PW 00053 GM [45259]
Subrecipients County of Hawai‘i, Department of Public Works & Department of Water Supply

Dear Mr. Calpito:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) proposes to provide a federal grant, through the Hawai‘i Emergency Management Agency (HI-EMA) (Recipient), to the County of Hawai‘i, Department of Public Works and Department of Water Supply (Subrecipients), for the repair, repaving, and realignment of approximately 9.1 miles of county roads and associated installation of approximately 7.9 miles of new waterlines in the Puna District (Undertaking). Volcanic eruptions from Kīlauea Volcano in May of 2018, resulted in presidentially declared disaster FEMA-DR-4366-HI. Numerous roads in the county were inundated with lava, including Upper and Lower Pohoiki Road, Highway 137, and Kumukahi/Lighthouse Road. The federal award would be provided through FEMA's Public Assistance Program.

FEMA is reviewing the proposed Undertaking in accordance with the 2016 Section 106 Programmatic Agreement among FEMA, the State Historic Preservation Officer (SHPO), the State Office of Hawaiian Affairs (OHA), and HI-EMA (Agreement). This letter also serves as notification to Native Hawaiian Organizations and interested parties under Hawai‘i's Chapter 6E historic preservation regulations. OHA provided FEMA with a list of Native Hawaiian Organizations and interested parties that may have an interest in this project. You are receiving this letter because you were included on this list. FEMA is requesting your input on any potential effects the Undertaking may have on historic properties or cultural resources in the vicinity, including properties of religious and cultural significance to Native Hawaiians.

Undertaking

The Undertaking consists of the repair, repaving, and realignment of approximately 9.1 miles of county roads that were inundated with lava from the 2018 Kīlauea volcano eruption in the easternmost portion of the island of Hawai‘i (Puna District) to bring them back to their pre-disaster function. The Undertaking also includes installation of approximately 7.9 miles of replacement and new waterlines. No blasting of the hardened lava would be necessary to reconstruct any of the road

segments nor for the waterline installation. Figure 1 shows the locations of the proposed road and waterline improvements and the extent of the Kīlauea 2018 Lower East Rift Zone eruption lava flow footprint.

The roads subject to this work include the upper and lower segments of Pohoiki Road, a section of Leilani Avenue branching off from upper Pohoiki Road, sections of Highway 137 (projects A and B) with small sections of Kapoho Beach Road, Moani Road, Pua O Kapoho Road, and Kapoho Kai Drive all of which branch off from Highway 137. Most or all of Upper Pohoiki Road, Leilani Avenue, Highway 137 (projects A and B), Kapoho Beach Road, Moani Road, and Kapoho Kai Drive and Kumukahi/Lighthouse Road were inundated by lava in 2018 while Lower Pohoiki Road was not covered in lava. Lower Pohoiki Road would be realigned to accommodate the upgrades to Upper Pohoiki Road and to avoid exceptional mango trees along the existing road. Most of the Lower Pohoiki Road realignment would be along the edge of an agricultural field to the west of the existing road.

Water lines would be installed along Upper and Lower Pohoiki Road and along Highway 137A from the intersection with Lower Pohoiki Road to the intersection with Kumukahi/Lighthouse Road. Table 1 summarizes the proposed Undertaking.

Table 1. Proposed Project Components and Improvements

Section	Description	Length	Proposed Improvements
Upper Pohoiki Road	Intersection of Pohoiki Road and Highway 132 to western end of Lower Pohoiki Road	12,389 feet (2.3 miles)	Realign road, repave, install water line
Leilani Avenue	Along Leilani Avenue between Kahukai Street and Pohoiki Road	1,000 feet (0.2 mile)	Repave
Lower Pohoiki Road	Eastern end of Upper Pohoiki Road to intersection of Pohoiki Road and Highway 137	11,096 feet (2.1 miles)	Realign road, repave, install water line
Highway 137a (north)	Along Highway 137 from Pohoiki Road to the intersection with Highway 132 and Kumukahi/Lighthouse Road	18,000 feet (3.4 miles)	Realign road, repave, install water line
Kapoho Beach Road	Along road from Highway 137	60 feet (0.01 mile)	Repave
Moani Street	Along road from Highway 137	25 feet (0.005 mile)	Repave
Pua O Kapoho Street	Along road from Highway 137	25 feet (0.005 mile)	Repave
Kapoho Kai Drive	Along road from Highway 137	25 feet (0.005 mile)	Repave
Kumukahi/Lighthouse Road	Along road from intersection of Highways 132 and 137	892 feet (0.2 mile)	Repave

Section	Description	Length	Proposed Improvements
Highway 137b (MacKenzie State Recreation Area)	Along Highway 137 through MacKenzie State Recreation Area	4,850 feet (0.9 mile)	Repave

Road Construction Activity

The reconstruction of the roadways would involve the use of heavy construction equipment (excavators and graders) to construct a new paved road on top of the original road covered by hardened lava that has covered the original road. In some cases, the existing road was not covered in hardened lava and those sections would be excavated and repaved to meet current standards. Lower Pohoiki Road would be realigned, and a new segment of road would be constructed on the edge of a previously disturbed agricultural field. All excavated hardened lava material would be repurposed to fill depressed areas that are below the planned road grade. Any visible asphalt sections of the existing road would be excavated along with the subbase material and would be transported to the designated stockpile location at the Highway Maintenance quarry site.

With a few exceptions, noted below, the 44-foot-wide roadway would contain two 12-foot-wide paved lanes and a 10-foot-wide shoulder on either side. The shoulders would be comprised of a 5-foot-wide paved section abutting an outermost 5-foot-wide unpaved section of shoulder. Excavations would be less than 1.5 feet deep except where the hardened lava is at a higher elevation than the surrounding area. In no case would excavations extend below the hardened lava. Figure 2 shows a typical cross section of the road.

Along road sections constructed on top of the hardened lava the road would change elevation to follow the grade of the naturally hardened lava. The hardened lava would be graded as needed outside of the roadway to maintain a 1:1 slope adjacent to the roadway to maintain a safe roadway condition for drivers; in some cases, the new roadway would be as much as 80 feet higher than the original roadway. The road widening would be outside of the original road footprint in some areas. The widest disturbance of hardened lava would be approximately 70 feet on either side of the road to create a roadway shoulder with appropriate slopes; along most of the alignment, the width of hardened lava disturbance would be less than 20 feet. Stormwater would be directed to the roadway shoulders along the side of the road.

To accommodate the road realignments and grading of hardened lava, the Subrecipient would purchase and acquire portions of adjacent private property parcels to expand their right-of-way (ROW), as discussed further below. All construction work would be completed within either the Subrecipient's current ROW, or areas expanded by the acquisition of private properties to accommodate road realignments.

Water Line Construction Activity

The Undertaking would include installation of water lines along Upper and Lower Pohoiki Road as well as Highway 137a. Water lines would be installed concurrently with the road construction. Water lines would be installed along the northern side of Pohoiki Road from just east of the intersection of Pohoiki Road and Highway 132 to the intersection of Pohoiki Road and Highway 137. The water

line would then cross Highway 137 and run along the eastern side of Highway 137 to Kapoho Beach Road. Water lines would not be installed on Leilani Avenue, the side streets connecting to Highway 137 (Kumukahi/Lighthouse Road, Kapoho Beach Road, Moani Road, Pua O Kapoho, and Kapoho Kai Drive), nor along Highway 137 in MacKenzie State Recreation Area.

Along most of the alignment, water lines would be installed under the unpaved shoulder of the road, just outside the travel lane. Figure 3 shows a typical cross section. In some road sections where the remnant heat of the hardened lava is too high to install water lines underground (such as along Upper Pohoiki Road near the fissures) the water line would be installed in a V-shaped riprap trench, which would extend the project footprint 16 feet to the north. The V-shaped riprap trench would allow heat to continue to dissipate from the hardened lava while allowing the water line to be installed and operated (Figure 4).

Upper Pohoiki Road

Along Upper Pohoiki Road, approximately 12,000 feet of the hardened lava would be graded and shaped to create a road surface that conforms as close as possible to the original road alignment. Approximately 450 feet of existing road not covered by hardened lava would be repaved. In addition, approximately 1,000 feet of hardened lava-covered Leilani Avenue, which is connected to Upper Pohoiki Road, would be graded and repaved (Figure 5). Along Upper Pohoiki Road and Leilani Avenue, the Subrecipient would acquire portions of 26 adjacent parcels, totaling an additional 1,041,199 square feet of ROW. Road construction along Upper Pohoiki Road and Leilani Avenue along with water line installation along Upper Pohoiki Road is expected to take 8 months to complete.

Lower Pohoiki Road

Along Lower Pohoiki Road, approximately 11,096 feet of road would be realigned and paved. Starting where Upper and Lower Pohoiki Road meet, approximately 4,096 feet would be resurfaced and widened. To the east of that, approximately 7,000 feet of road would be realigned along the edge of an existing agricultural field (Figure 6). This realignment would minimize impacts to the exceptional mango tress that form a canopy over the existing Lower Pohoiki Road. The old alignment would be left in place for use by bike riders (as part of a later, separate project). Road construction and water line installation along Lower Pohoiki Road is expected to take 8 months to complete.

Highway 137 Project A

Along Highway 137a, approximately18,000 feet of the hardened lava flow would be graded and shaped to create a road surface that conforms as close as possible to the original road alignment. Approximately 250 feet of existing road not covered by hardened lava would be repaved. In addition, connections to four lava-inundated roads that connect to Highway 137a would be graded and repaved: 60 feet of Kapoho Beach Road, 25 feet of Moani Road, 25 feet of Pua O Kapoho Road, and 25 of Kapoho Kai Drive (Figure 7). Along Highway 137a, the Subrecipient would acquire portions of 29 adjacent parcels, totaling an additional 228,510 square feet of ROW. Road construction and water line installation along Highway 137a is expected to take 6 months to complete.

Highway 137 Project B

Along Highway 137b, approximately 3,425 feet is covered by hardened lava and would be graded to create a road surface that conforms as close as possible to the original road alignment. Approximately 1,425 linear feet of existing road not covered by hardened lava would be repaved (Figure 8). Road construction along Highway 137b is expected to take 5 months to complete.

Kumukahi/Lighthouse Road

Along Kumukahi/Lighthouse Road, approximately 645 feet is covered by hardened lava and would be graded to create a road surface that conforms as close as possible to the original road alignment. Approximately 232 feet of existing road not covered by hardened lava would be repaved (Figure 9). Kumukahi/Lighthouse Road would have two sections, paved and unpaved, with different dimensions. The paved section would be approximately 95 feet long and would be 44 feet wide, the middle 34 feet of which would be paved and the remaining unpaved. The unpaved section of this road would be 782 feet long and would be 40 feet wide. Road construction along Kumukahi/Lighthouse Road is expected to take 5 months to complete.

Area of Potential Effects (APE)

FEMA determined that the direct Area of Potential Effect (APE) for the Undertaking is limited to the areas within which construction and ground-disturbing activity would be confined to excavation on the hardened lava (22,400 linear feet) and excavation of the road section not covered by hardened lava (12,400 linear feet). The APE encompasses four sections of roadwork (Kumukahi/Lighthouse Road, Highway 137a and 137b, and Lower Pohoiki Road) and the staging areas.

The vertical APE for archaeological resources is limited to excavations into the hardened lava from the 2018 eruption along 22,400 linear feet of the road corridor and 12,400 linear feet excavation to repave the road not covered by hardened lava. The ground-disturbing construction activity on the hardened lava (22,400 linear feet) would not extend below the hardened lava from the 2018 eruption. The ground-disturbing activity on the road not covered by hardened lava (12,400 linear feet) would be in previously disturbed soil. An indirect APE of 0.5-mile radius from the Undertaking was considered to determine the potential for indirect effects (e.g., visual) outside the proposed project viewshed.

Identification and Evaluation of Historic Properties

FEMA conducted a records search of the area affected within the APE and a surrounding 0.5-mile buffer using the State of Historic Preservation Division's Hawai‘i Cultural Resource Information System (HICRIS) and Library, the National Park Service's online National Register of Historic Places and National Historic Landmarks database, the Hawai‘i State Public Library system, the Pacific Collection of the Hamilton Library, the Ulukau Database and (https://ulukau.org), the Hawai‘i State Archives Electronic Database 2022 (https://digitalcollections.hawaii.gov), and newspaper archives (https://www.newspapers.com).

The records search indicated that 14 cultural resources have been previously recorded within the direct APE. Of those, two sites are not inundated with lava, four sites are partially inundated with

hardened lava, and eight sites are completely inundated with hardened lava. The records search also identified 98 cultural resources in the indirect APE. Of those, 58 sites are completely inundated with hardened lava, and 40 sites are not inundated with lava. Table 1 shows 14 cultural resources within the direct APE, and Table 2 shows the 98 cultural resources within the indirect APE.

None of the sites within the direct or indirect APE are listed on the National Register of Historic Places (NRHP). One site is listed on the Hawai`i Register (SIHP 50-10-46-02529, MacKenzie Petroglyphs); it is in the indirect APE, 790 feet from the project area.

FEMA also conducted a reconnaissance archaeological survey in the four areas not inundated with hardened lava within the direct APE:

- Survey Area #1, Lower Pohoiki Road
- Survey Area #2, the section starting at the intersection of Lower Pohoiki Road and Highway 137a to the beginning of the hardened lava flow at Highway 137a
- Survey Area #3, sections of Highway 137b near MacKenzie State Recreation Area
- Survey Area #4, Kumukahi/Lighthouse Road

The reconnaissance survey was not conducted on hardened lava because the planned excavations for proposed roads and waterlines would not extend below the hardened lava into the original ground surface and there is no possibility of potential archaeological or historic sites existing within the hardened lava. The survey was also not extended into the indirect APE because these areas had been previously surveyed and any indirect effects by the Undertaking on known archaeological or historic sites in these areas could be assessed without a direct survey.

The survey reidentified two of the previously recorded sites within the direct APE that were not covered in hardened lava. Sites 50-10-46-0512 and -0513 were initially recorded by Bevacqua and Dye (1972) as part of the proposed Kapoho-Kalapana Highway project in the 1970s; these sites were rerecorded under this current investigation. The four previously recorded sites within the direct APE that were partially inundated with hardened lava (sites 50-10-46-02521, -02522, 02529, and -04300) could not be relocated during the survey.

Site 02512 is within the Ahupua‘a of Pohoiki, Puna District, Island of Hawai‘i. It is an enclosure with associated historic artifacts (one farm machinery part, several glass bottles, and glass bottle fragments). The site is interpreted to have been constructed in the historic era and was most likely used for habitation or agriculture.

Site 02513 is within the Ahupua‘a of Pohoiki, Puna District, Island of Hawai‘i. It appears as an enclosure complex comprised of four features with five associated sub features: Feature 1 - Stacked core-filled rock wall, Feature 1A - Circular Enclosure, Feature 1B - Ditch/drainage; Feature 2 - Linear rock wall, Feature 2A - Ditch/drainage, Feature 2B - Circular alignment; Feature 3 - Linear Terrace Retaining Wall; Feature 4 - Linear Terrace Retaining Wall, and Feature 4A - Ditch/drainage. The site is interpreted to have been constructed in the pre-Contact era and was most likely used for agriculture.

As a result of the current investigation, four new archaeological sites were identified during the field site survey:

- Site TS-4366-001 is a segment of the Hawai‘i Consolidated Railroad within the Ahupua‘a of Pohoiki, Puna District, Island of Hawai`i. The historic railroad alignment consists of a Hilo Railroad branch line segment of the Hawai‘i Consolidated Railroad, as shown on USGS Topographical Maps 1924 and 1928. No evidence of any surficial features of the railroad segment were evident. No cultural material was found on the ground surface.
- Site TS-4366-002 is within the Ahupua‘a of Pohoiki, Puna District, Island of Hawai`i. The site is approximately 1 to 3 meters southwest of Pohoiki Road. The site is comprised of one feature: Feature 1 – Linear Wall with curved corners and associated Historic Artifacts. The site functioned in the historic period for agriculture. Two USGS topographical maps (1894 and 1902) feature a rendering of the wall, referring to it as “Rycroft’s Orchard; ancient cultivating ground,” which operated under R. Rycroft Grant 3209 for the Olaa Sugar Company.
- Site TS-4366-003 is within the Ahupua‘a of Pohoiki, Puna District, Island of Hawai`i and is approximately 1 to 3 meters northeast of Pohoiki Road. The site is comprised of one feature: Feature 1 - Linear Wall. The historic wall’s function is interpreted to be related to agriculture.
- Site TS-4366-004 is within the Ahupua‘a of Pohoiki, Puna District, Island of Hawai`i and is approximately 6 meters southeast of Government Road. The site is comprised of three features spaced at approximately 3 meters apart: Feature 1 – Mound; Feature 2 – A small mound; Feature 3 - Linear Terrace/Wall. The site’s function is most likely related to agriculture and shelter and is interpreted to have been constructed in the pre-Contact period.

This Project area has been bulldozed and dry farmed in recent times. Given this information, there is low likelihood of any previously unknown sites eligible for listing on the National Register to be present. Due to the extensive nature of previous ground disturbances within the area, it is unlikely that any unknown, intact archaeological deposits are extant in the Project area. Therefore, the potential for project construction to encounter unknown, subsurface archaeological deposits is considered unlikely.

Conclusion

Should you have any knowledge of historic properties or cultural resources in the vicinity of the Undertaking, or if you have questions or concerns related to the Undertaking, please do not hesitate to contact me within 30-days after receipt of this letter. Please use the reply reference code “DH-PA-4366 PW 00053 PW 00055” in your response. Also, feel free to share this letter with any other Native Hawaiian individuals or organizations that are not on the Notification List, who may have information about any properties or resources that may be affected by the proposed Undertaking.

Should you have any other related questions or comments, please do not hesitate to contact David Herdrich, FEMA Environmental Protection Specialist and Archaeologist at FEMA's Pacific Area Office in Honolulu at david.herdrich@fema.dhs.gov or 808-228-2064, or contact me directly at kenneth.sessa@fema.dhs.gov or 816-283-7960.

Sincerely,

DAVID R COHEN Digitally signed by DAVID R COHEN
Date: 2022.09.02 23:41:17 -07'00'

David R. Cohen
Senior Environmental Protection Specialist
for Kenneth Sessa
(Acting) Environmental Officer
FEMA Region IX

Enclosures

cc:
Keone Kalawe, Interested Party
Keiki Kekipi, Interested Party
Hannah H. Veloria, Interested Party
Berkeley Yoshida, Hawaiian Civic Club of Ka'u
Palikapu Dedman, Interested Party
Mililani Trask, Na Koa Ikaika KaLahui Hawaii
Dr. Sylvia M. Hussey, Office of Hawaiian Affairs
Kai Markell, Office of Hawaiian Affairs
Susan Osborne, Interested Party

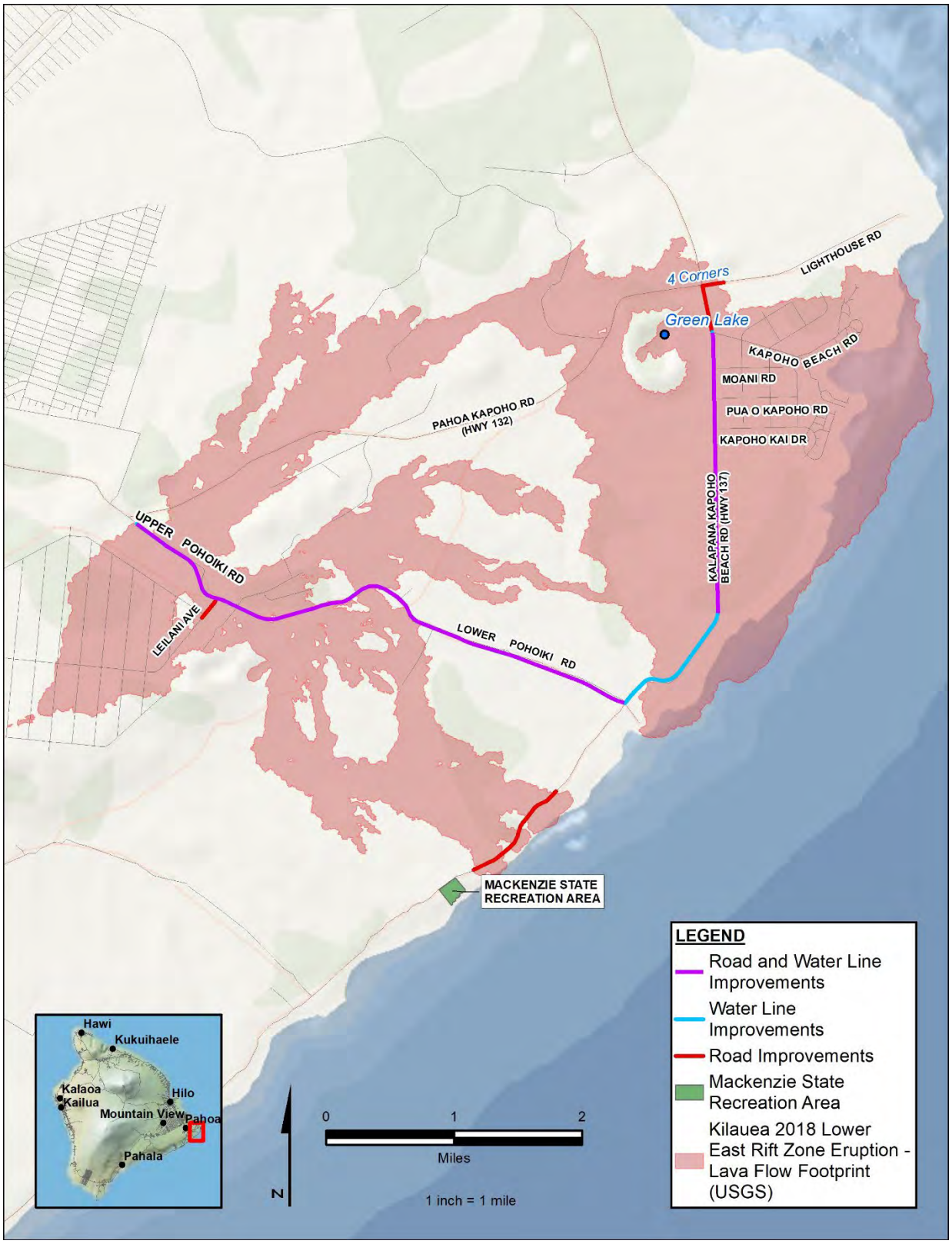


Figure 1. Location map of proposed road and waterline improvements

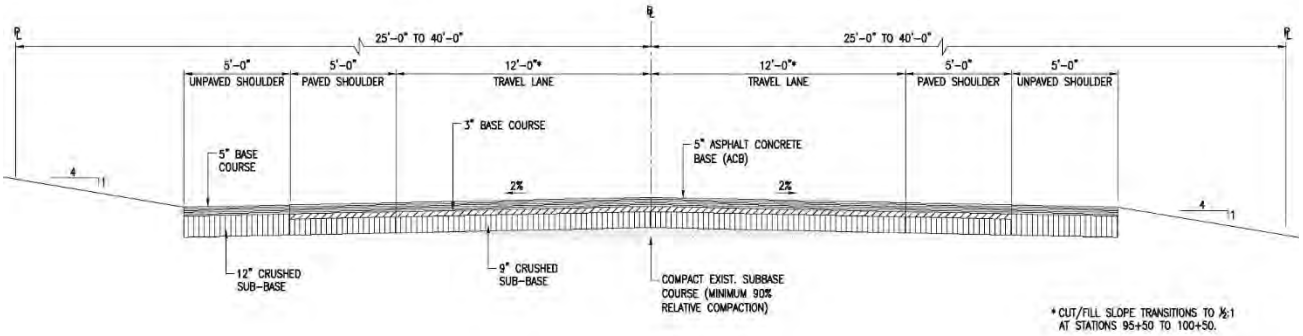
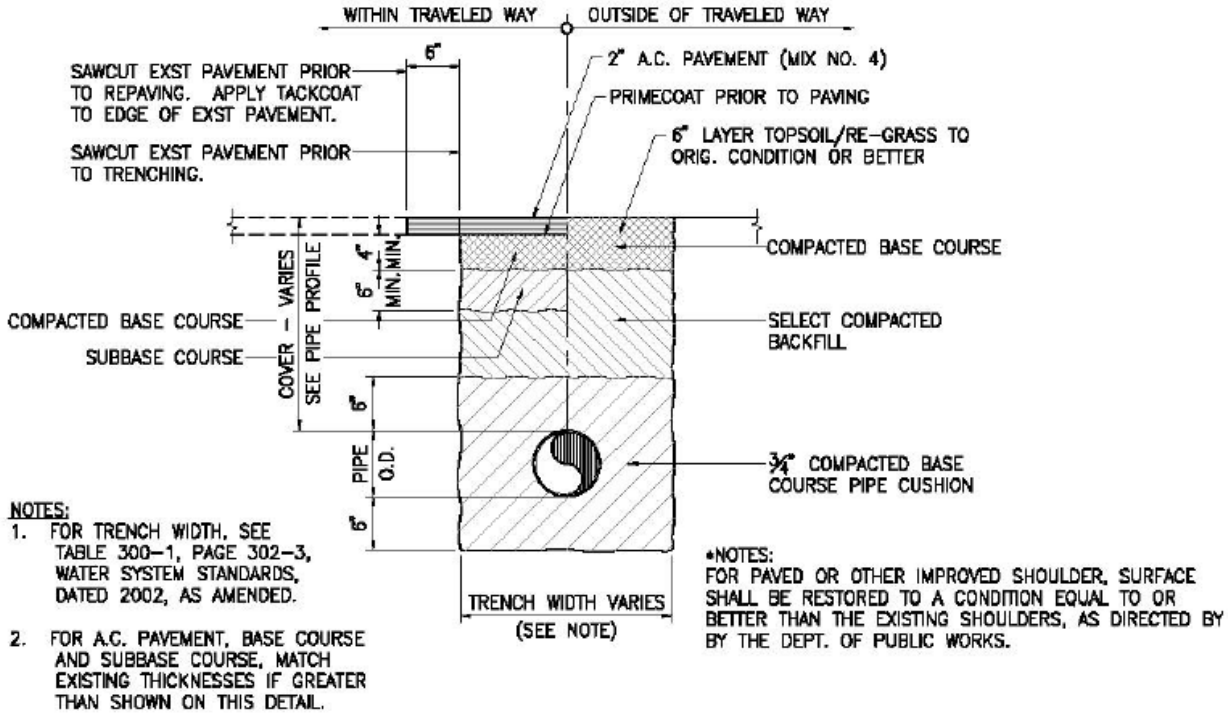


Figure 2. Typical cross section of proposed road



TYPICAL DUCTILE IRON PIPE TRENCH SECTION FOR COUNTY ROADS
NOT TO SCALE

Figure 3. Typical Section for Water Line Installation

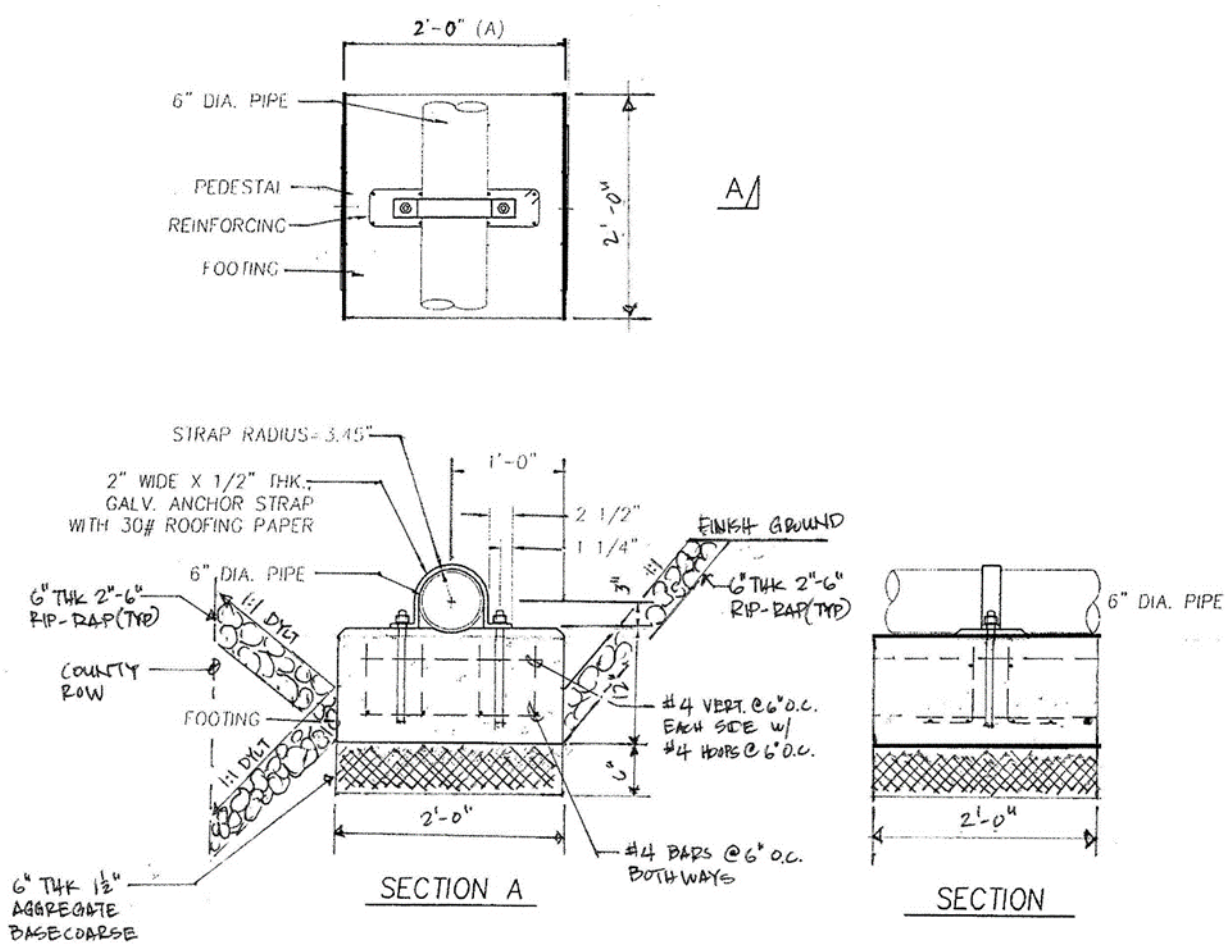


Figure 4. Typical Section for Water Line Installation in V-Shaped Riprap Trench

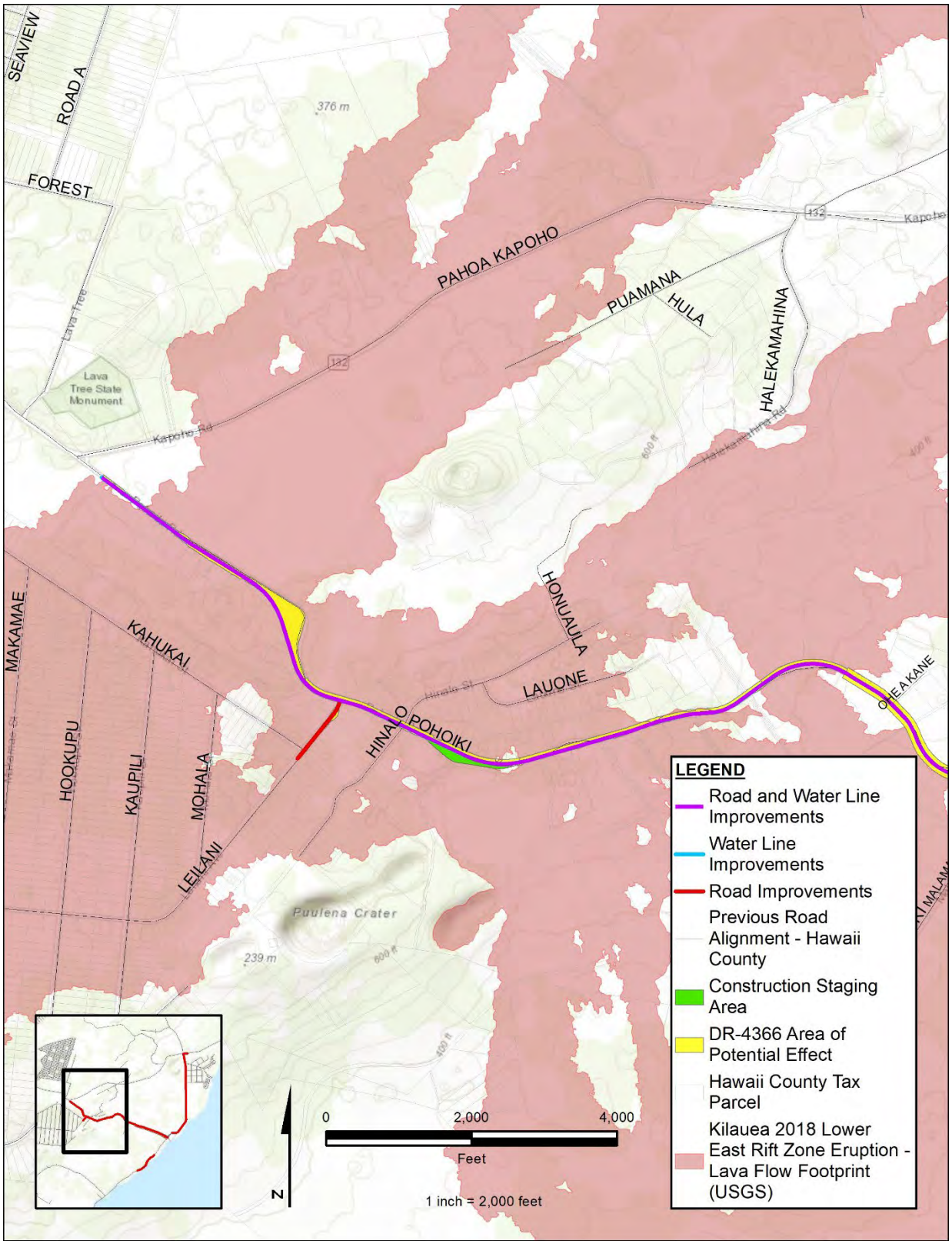


Figure 5. Shows project area along Upper Pohoiki Road

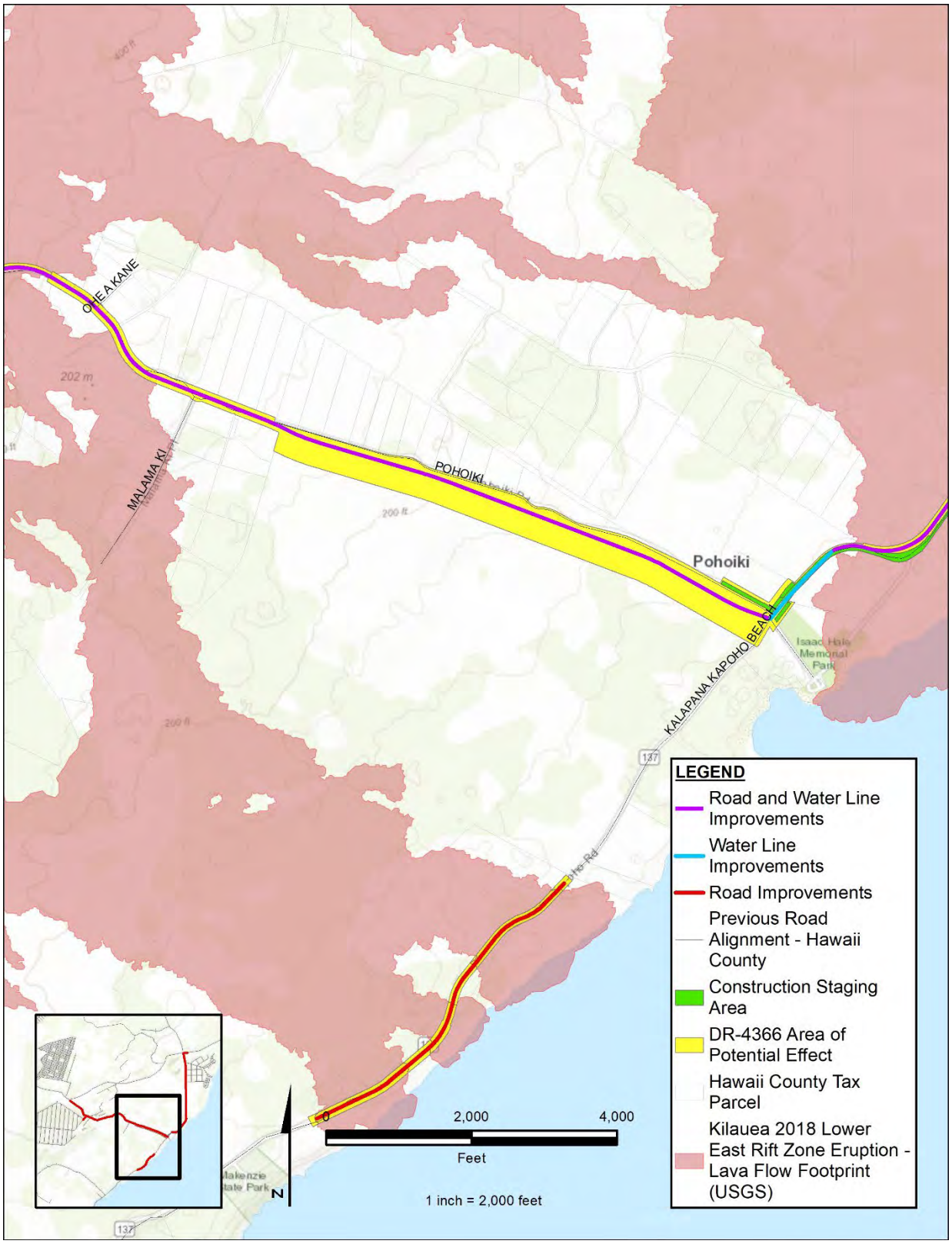


Figure 6. Map showing proposed road improvements and new alignment compared to old alignment for Lower Pohoiki Road

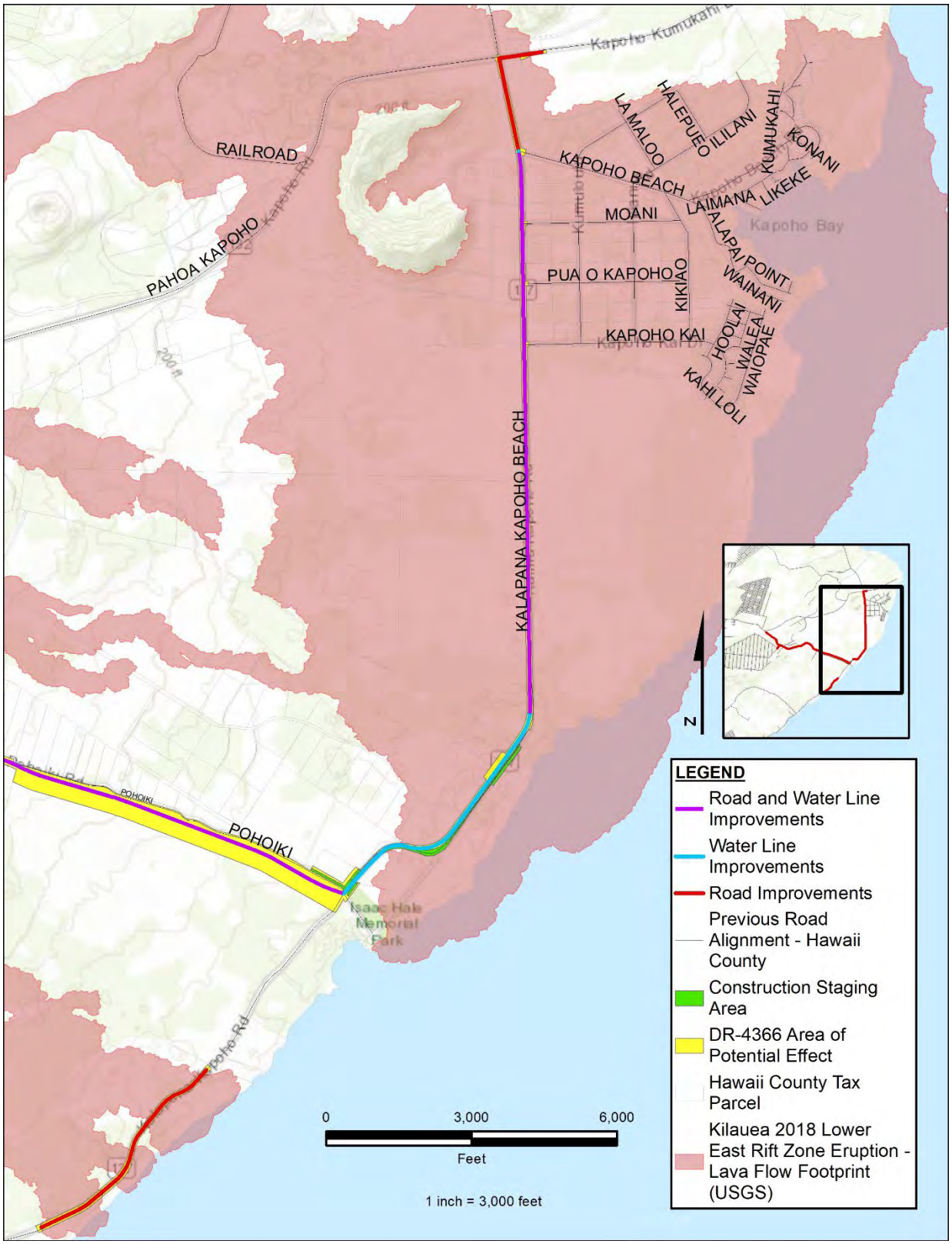


Figure 7. Map showing proposed road location of Highway 137a and stub-out roads

Figure 8. Map showing proposed road improvements for Highway 137 B.

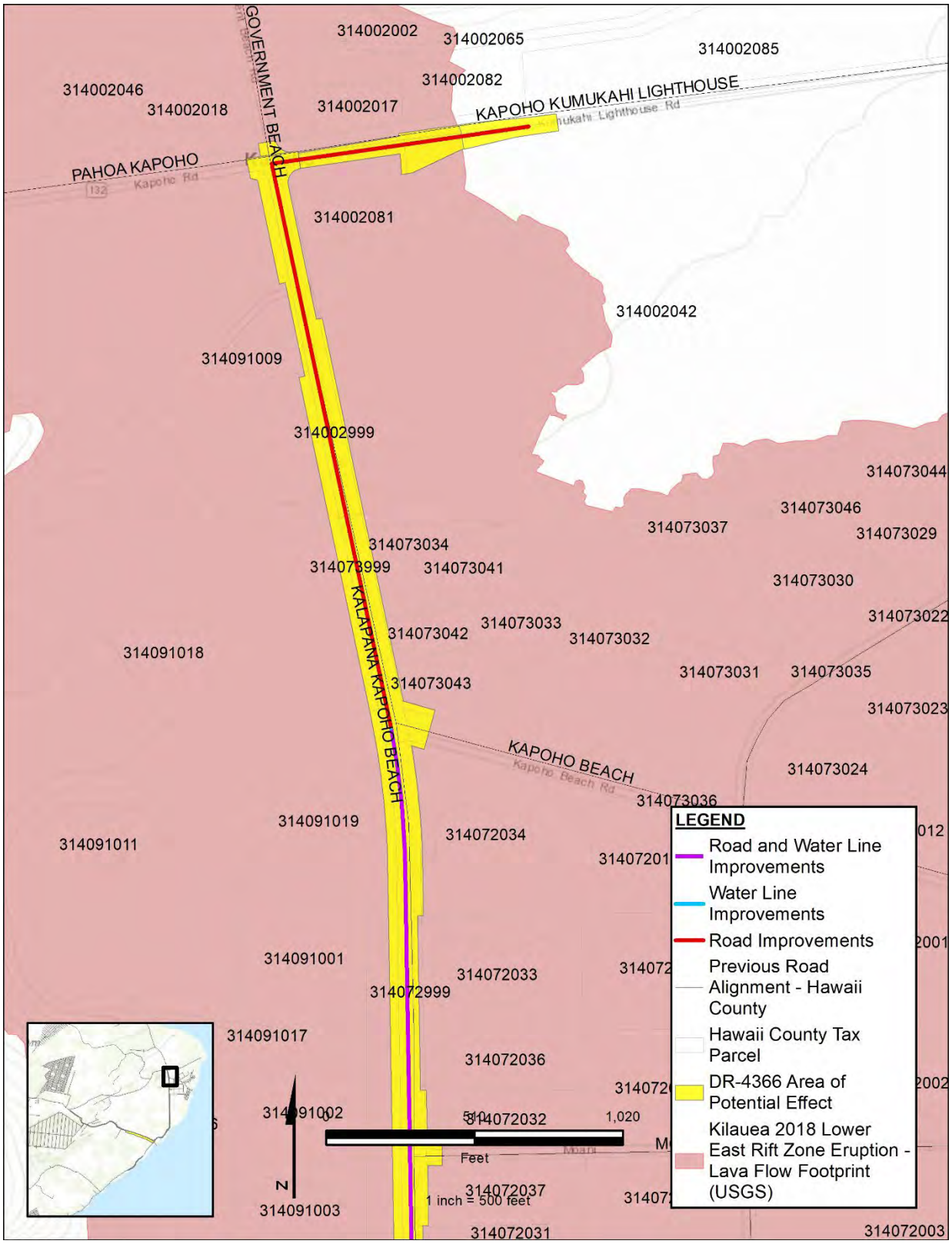


Figure 9. Location of proposed road alignment for Kumukahi/Lighthouse Road

Table 1: Resources Identified in the Direct APE

ID #	SIHP #50-10-46-	Site Name	Project Component	Site Description	Comments
2019RE02193	02503	Agricultural Complex	Survey Area #2	Site consists of several walls, 2 enclosures, numerous depressions, and mounds.	Inundated with lava.
2019RE02196	02506	Enclosure	Survey Area #2	Site consists of an open-ended enclosure (1.5m high) surrounding a small lava tube.	Inundated with lava.
2019RE02198	21352	Water Hole	Survey Area #2	Modified sink that was probably used continuously through the precontact and historic eras as a watering hole. Consists of a natural sink in bedrock that has been modified with a faced, stacked basalt wall around the rim of the opening.	Inundated with lava.
2019RE02200	02512	Enclosure	Survey Area #1	A small, lightly constructed enclosure with rough paving and crude entrance. Most likely of recent origin and utilization.	Not inundated with lava.
2019RE06447	02502	Puʻalaʻa Village	Survey Area #2	Part of site complex 46-4294; site encompasses 40 acres; features include 20 houses; garden pits; interconnecting paths; heiau. Visited by the missionaries Ellis, Thurston, and Bishop in 1823.	Inundated with lava.
2019RE06452	02513	Enclosure	Survey Area #1	A large, unusually shaped enclosure encompassing 5,500 sq m. The walls are constructed mainly of small pahoehoe slabs. Appears to be of recent origin.	Not inundated with lava.
2019RE06479	04294	Pūʻalaʻa Village Makai	Survey Area #2	Complex of features including walls, 0.5-0.65m wide x 1m; 35 enclosures; 97 stone mounds (10 paved); platforms (3 stepped); modified lava tubes; paved areas; 13 pits; possible burials & misc. features.	Inundated with lava.
2019RE07459	12153	Burial	Survey Area #2	Identified by ACH 1991; reidentified by PHRI 1994; site consists of platform, 3.8 x 2.08 x 0.7m.	Inundated with lava.
2019RE02748	02529	MacKenzie Petroglyphs	Survey Area #3	Site consists of petroglyph field containing about 90 figures, reversed letters, letters, circles, lines, and dots on smooth pahoehoe lava next to a precipice which falls 10 meters to the sea.	Approximately the northern 2/3 of the site is inundated with lava.

ID #	SIHP #50-10-46-	Site Name	Project Component	Site Description	Comments
2019RE06455	02521	Enclosure	Survey Area #3	Site consists of enclosure with walls 10m long x 1m high; located makai of Highway 137; appears to be of recent origin.	Partially inundated with lava; dense vegetation.
2019RE06456	02522	Enclosure/ Wall Complex	Survey Area #3	Site consists of a complex of enclosures and walls; overall site area18,500m sq; walls average 1m high x 0.6m wide; appears to be of recent construction.	Partially inundated with lava; dense vegetation.
2019RE06457	02524	L-shapes/ Walls/Mounds	Survey Area #3	Site consists of 2 L-shaped structures; several walls; and numerous mounds; no site or feature dimensions given.	Inundated with lava.
2019RE06461	02528	Petroglyphs	Survey Area #3	Site consists of cluster of petroglyphs depicting 16 letters; 8 of the letters appear in 4 groups of 2 each & possibly represent initials; the rest appear to be more elaborate and older.	Inundated with lava.
2019RE06481	04300	Unknown	Survey Area #3	Unknown information for this site that was labeled as site 4300 in a 1965 USGS map for Kapoho quad. No report or reference to this site number was found.	Mostly inundated with lava; dense vegetation covers area of site not inundated with lava.

Table 2: Resources Identified in the Indirect APE

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
06442	04250	King's Pillars	1-4-002: 092, Kula	Hudson (1932). Rock cairns commemorating chiefs visit to Kumukahi.	1.25 mi NE	Y*
06551	19032	Large Platform	1-4-002: 048, Kula	Hudson (1932). Recorded as destroyed.	1.45 mi NE	Y*
07444	04251	Kumukahi Grave Sites	1-4-002:092, Kula	Puoa-type grave sites (2) not destroyed by 1960 lava flow.	1.5 mi NE	Y*
07447	21794	Stone Burial Crypts	1-4-002:092, Kula	Site in the kipuka of 1960 lava flow. Numerous platform crypts built on an earlier aʻa flow; varying in height from 8-10cm to 1.5m	1.27 mi NE	N
07445	21792	Stone Burial Crypts	1-4-002:052 :092, Kula	Site in the kipuka of 1960 lava flow. Numerous platform crypts built on an earlier aʻa flow; varying in height from 8-10cm to 1.5m.	1.10 mi NE	N
07446	21793	Stone Burial Crypts	1-4-002:052, Kula	Site in the kipuka of 1960 lava flow. Numerous platform crypts built on an earlier aʻa flow; varying in height from 8-10cm to 1.5m.	1.0 mi NE	N
06532	19843	Puʻu Kukaʻe Mounds	1-4-002:002, Kula	Site area 25 x 15m at the base of Puʻu Kukaʻe, consists of 4 features: Fe.1, alignment, 7m long x 2m wide; Fe.2, mound, 4 x 2.5 x 0.6m; Fe.3, mound, 3 x 3 x 0.8m; Fe.4, alignment, 12m long.	0.25 mi N	N
06445	02500	Kukiʻi Heiau	1-4-002:002, Kula	Platform site is at the summit of Kukii Hill. Originally recorded by Stokes (1906), as a paved platform. Rerecorded by Hudson (1932), paving no longer evident. Platform measures 37 x 21m. The site is associated with the legend of Umi.	0.25 mi N	N
07474	19844	Kukiʻi Cyst	1-4-002:002, Kula	Burial Site. Originally described by Hudson 1932; consists of slab-lined cyst & pavement, 3 x 2m; overall site area 20 x 20m. At the crest of Puʻu Kukaʻe.	0.25 mi N	N
02194	02504	Platform	1-4-093:045, Ahalanui, Laepaoʻo	Site part of 50-10-46-2505; consists of platform, 10 x 7 x 0.4-1.5m; 2 adjoining enclosures (4m di x 0.5m high & 2.5 x 2.5 x 0.2m) on top of platform.	530 ft SE	Y
02195	02505	Enclosures, Walls, Mound, Platform	1-4-093:046, Ahalanui, Laepaoʻo	Site includes 50-10-46-2504; consists of 4 enclosures, several walls, a mound, and platform, 4.5 x 3.2 x 0.95.	323 ft SE	Y

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
02197	02507	Agricultural, Habitation Complex	1-3-008:016, 999, Ahalanui, Laepao'o	Site consists of enclosures and ag features; walls range from 0.8-1.1m high, appears to be recent. Remnants of an historic permanent habitation site complex.	790 ft SE	N
06446	2501	Kapoho Petroglyphs	1-4-091:018, Kapoho	Site consists of petroglyphs on rock slabs that form the southern exterior of Kapoho Crater, variety of forms. Several excellent depictions of men with upraised arms grasping canoe paddles or war clubs among triangular-bodied figures.	790 ft W	Y
06449	2509	Enclosure	1-3-008:016, Ahalanui, Laepaoʻo	Site consists of irregularly shaped enclosure, near Isaac Hale Park.	405 ft SE	N
06478	7492	Unknown	1-4-091:009, Kapoho	Unknown information for this site that was labeled as site 7492 in a 1965 USGS map for Kapoho quad. No report or reference to this site number was found.	133 ft W	Y
06483	11565	Agricultural Habitation Complex	1-4-093:008, 007, Ahalanui, Laepaoʻo	Recorded by ACH 1991, as platform (Fe.B); PHRI rerecorded site to consist of 2 features: cave, 15 x 7 x 1.25m; terrace, 5 x 2.5 x 0.67m; overall site area, 24 x 14m	75 ft NW	Y
06484	11574	Habitation	1-4-093:007, Ahalanui, Laepaoʻo	Previously recorded by ACH 1991; later recorded by PHRI 1994, as cave, 12 x 4.5 x 0.86m, 3 walls (5.5m long, 4m long; 2m long) w/in 6m area on either side of entrance; overall site area 27.5 x 8m.	811 ft NW	Y
06485	11899	Habitation	1-4-093:008, Ahalanui, Laepaoʻo	Recorded by ACH 1991, as agricultural mound; determined by PHRI 1994 to be historic hearth, 2.3 x 2 x 0.4m.	310 ft NW	Y
06486	11926	Habitation Site	1-4-093:007, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by PHRI 1994 as cave, 21 x 20 x 0.74m; entrance, 1.2 x 0.8m; 20m NW of 46-11574.	867 ft NW	Y
06491	12127	Habitation Complex	1-4-093:002, Ahalanui, Laepaoʻo	Originally identified by ACH 1991; reidentified by PHRI 1994; site consists of 8 features: 5 mounds, 2 platforms, 1 enclosure; overall site area 64 x 39m.	805 ft NW	Y
06493	12129	Habitation Complex	1-4-093:006, Ahalanui, Laepaoʻo	Site identified by ACH 1991; reidentified by PHRI 1994. Site consists of 18 features: 5 platforms, 3 caves, 3 modified outcrops, 4 mounds, 1 enclosure, C-shape, 1 terrace.	1000 ft NW	Y

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
06496	12132	Habitation Complex	1-4-093:004, 005, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by 1994. Consists of 11 features: 3 caves, 1 mound, 1 modified outcrop, 2 enclosures, 2 platforms, 2 walls.	964 ft NW	Y
06497	12133	Habitation Complex	1-4-093:005, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by 1994. Consists of 11 features: 7 mounds, 2 modified outcrops, 1 enclosure, 1 platform; overall site area 45 x 38m.	0.22 mi NW	Y
06498	12135	Habitation Complex	1-4-093:005, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of 9 features: 1 mound, 2 walls, 3 platforms, 2 enclosures; overall site dimensions 80 x 45m. Located between sites 12143 and 12136.	0.28 mi NW	Y
06499	12136	Habitation Complex	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of 4 features: 1 C-shape, 1 enclosure, 1 platform; overall site area 50 x 20m.	0.39 mi NW	Y
06500	12137	Ag/Habitation Complex	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of 13 features: 7 mounds, 2 walls, 2 modified outcrops, 1 platform, 1 terrace; overall site area 85 x 60m.	0.39 mi NW	Y
06503	12140	Residential Complex	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991; 1994 reidentified by PHRI. Consists of 4 features: cave, 7.6 x 6.4 x 1.3m; platform, 7 x 5 x 1.1m; mound, 3.2 x 2 x 0.97; mound, 3 x 2 x 1m; overall site area 50 x 35m.	0.51 mi NW	Y
06504	12141	Residential Complex	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991; 1994 reidentified by PHRI. Consists of 8 features: 2 caves, 2 walls, 2 modified outcrop, 1 platform, 1 enclosure; overall site area 105 x 60m.	0.45 mi NW	Y
06505	12141	Agricultural Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991, 1994 reidentified by PHRI. Consists of 8 features: 2 caves, 2 walls, 2 modified outcrops, 1 platform, 1 enclosure; overall site area 105 x 60m.	0.45 mi NW	Y
06509	12160	Ag/Habitation Complex	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by PHRI 1994. Consists of 7 features: 4 mounds; 2 walls, 1 modified outcrop; overall site area 125 x 60m.	0.45 mi NW	Y

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
06511	12162	Trail	1-4-093:006, Ahalanui, Laepaoʻo	Site originally identified by ACH 1991; reidentified by PHRI 1994. Site consists of paved trail, 170 x 1.5m; trail terminates at mound, 2 x 1.5 x 0.4m; immediately northeast of site 46-12160.	0.30 mi NW	Y
06512	12185	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991; reidentified by PHRI 1994 & determined to be separate site. Consists of cave, 3.75 x 3.5 x 1.2m.	0.50 mi NW	Y
06513	12188	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified ACH 1991: A. wall; B. platform; C. cave. PHRI 1994, redefined: platform, 9 x 4 x 0.8; cave, 12.5 x 7.5 x 1.07m; overall area 23 x 16 x 12.5.	0.54 mi NW	Y
06514	12572	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation platform; reidentified by PHRI 1994 as platform, 5.9 x 5.6 x 0.00m.	0.21 mi NW	Y
06515	12668	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation cave; reidentified by PHRI 1994 as separate site. Consists of cave, 85 x 26 x 1.3m; about 75m southwest of site 46-16178.	0.34 mi NW	Y
06516	12699	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation cave; reidentified by PHRI 1994 as separate site. Consists of cave, 4.3 x 1.7m; about 25m east of 46-12141.	0.43 mi NW	Y
06517	12704	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation cave; reidentified by PHRI 1994 as consisting of cave, 18 x 10 x 1.5m; mound, 1.3 x 1.1 x 0.4m; overall site area 18 x 10 x 1.5m.	0.43 mi NW	Y
06518	12724	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation cave; reidentified by PHRI 1994 as consisting of cave, 10 x 5 x 1.1m; about 25m east of 46-12136.	1784 ft NW	Y
06519	12726	Habitation Site	1-4-093:006, Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation cave; reidentified by PHRI 1994 as consisting of cave, 15 x 9.4 x 0.55m; about 12m east of 46-12724.	1692 ft NW	Y
06520	12774	Habitation Site	1-4-093:006, 034; Ahalanui, Laepaoʻo	Identified by ACH 1991 as habitation platform; reidentified by PHRI 1994 as consisting of cave, 6.6 x 6.3 x 0.7m; about 50m south of 46-12140.	2700 ft NW	Y

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
06521	16178	Habitation Site	1-4-093:006, Ahalanui, Laepao'o	Identified by ACH 1991; reidentified by PHRI 1994 as consisting of cave, 14 x 3 x 0.4m; about 10m west of 46-12125.	1542 ft NW	Y
06522	19064	Boundary Wall	1-4-093:001, 002, 003, 004, 005, 006, 035; Ahalanui, Laepao'o, Pu'ala'a	Site consists of wall, 0.6m wide x 0.9-1.1m high; grant parcel wall of Grant 1015 shown on Loebenstein's 1895 map.	74 ft SW	Y
06523	03946	Heiau	1-4-002:004, Pu'ala'a	Heiau platform, 22 x 31m; opihi, cowry shells, fish vertebrae found; charcoal sample taken for future dating.	315 ft E	Y
06525	03948	Platform	1-4-002:004, Pu'ala'a	Platform, roughly square, 4.5m, and about 1.8m high. Well-made of large a'a chunks with smaller a'a paving on top. Possibly either a fishing shrine or observation place for spotting fish.	558 ft E	Y
06526	03949	Possible Heiau	1-4-002:004, Pu'ala'a	Platform. An elongated, stepped platform, approximately 2.5 x 15 x 5m, and 2m high. Possibly a religious structure.	312 ft E	Y
07455	12134	Burial		Site identified by ACH 1991; reidentified by PHRI 1994. Consists of cave, 85 x 60m; between 46-12136 and 46-12138.	2093 ft NW	Y
07456	12145	Burial	1-4-093:009, Ahalanui, Laepao'o	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of platform, 3.5 x 2.3 x 0.5m.	829 ft NW	Y
07457	12146	Burial	1-4-093:009, Ahalanui, Laepao'o	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of platform, 3 x 2.3 x 0.48m.	810 ft NW	Y
07458	12147	Burial	1-4-093:004, Ahalanui, Laepao'o	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of platform, 4 x 4 x 0.6m.	657 ft NW	Y
07460	12154	Burial	1-4-093:009, Ahalanui, Laepao'o	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of platform, 5 x 3.5 x 0.5-1.25m; part of site complex 50-10-46-12157.	607 ft NW	Y
07461	12156	Burial/ Habitation Complex	1-4-093:008, Ahalanui, Laepao'o	Identified by ACH 1991; reidentified by PHRI 1994. Site consists of cave, 6 x 4 x 1m (main chamber); overall site dimensions 19.5 x 8 x 1m.	394 ft NW	Y
07462	12124	Platform with Burial	1-4-093:004, Ahalanui, Laepao'o	Platform with burial	783 ft NW	Y

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
07463	12124	Platform with Burial Vault (historic)	1-4-093:004, Ahalanui, Laepao'o	Platform with Burial Vault (historic)	591 ft NW	Y
07464	12124	Possible burial	1-4-093:004, Ahalanui, Laepao'o	Possible burial	593 ft NW	Y
07465	12126	Platform with Burial Vault (historic)	1-4-093:001, Ahalanui, Laepao'o	Platform with Burial Vault (historic)	200 ft NW	Y
07466	12126	Possible burial	1-4-093:001, Ahalanui, Laepao'o	Possible burial	76 ft NW	Y
07467	12126	Possible burial	1-4-093:001, Ahalanui, Laepao'o	Possible burial	3 ft NW	Y
07468	12130	Platform with Burial	1-4-093:001, Ahalanui, Laepao'o	Platform with burial	850 ft W	Y
07469	12128	Platform with Burial Vault (historic)	1-4-093:001, Ahalanui, Laepao'o	Platform with Burial Vault (historic)	1000 ft W	Y
07470	12125	Platform with Burial Vault (historic)	1-4-093:006, Ahalanui, Laepao'o	Platform with Burial Vault (historic)	1536 ft W	Y
07471	12138	Possible burial	1-4-093:006, Ahalanui, Laepao'o	Possible burial	2810 ft W	Y
07472	12140	Platform with Burial	1-4-093:006, Ahalanui, Laepao'o	Platform with Burial	3166 ft W	Y
07473	02503	Cave Burial	1-4-002:015, Pu'ala'a	This is a cave shelter, crescent-shaped in plan, in the same cliff face as 50-Ha-A10-11, about 200 meters further E.	603 ft W	Y
06458	2525	Petroglyphs	1-3-008:001, Kaukulau, Ki (b)	Site consists of a series of petroglyphs; 35 dots; circles; lines; & probable letters.	272 ft SE	Y
06459	2526	Lava Tube	1-3-008:018, Kaukulau, Ki (b)	Site consists of lava tube with 2 chambers separated by a wall. No site or feature dimensions. Possible refuge cave during a time of war.	525 ft WNW	N
06460	2527	Petroglyphs	1-3-008:001, Kaukulau, Ki (b)	Site consists of 12 petroglyphs depicting figures, concentric circles, lines, and dots.	173 ft E	Y
06462	2530	King's Highway (King's Trail)	1-3-007:026, Malama 1	Site consists of a curb-lined trail that parallels the ocean; no dimensions given.	850 ft NE	N

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
07450	2523	Burial Platform	1-3-008:018, Kaukulau, Ki (b)	Site consists of 3 platforms; a large rectangular main platform, 11 x 7 x 0.6-71.5m, depression, 3 x 2 x 0.5m deep; and 2 peripheral platforms, 1 paved. May have been a ceremonial structure that was converted into a burial platform.	330 ft NW	Y
02199	02510	Pohoiki Warm Spring	1-3-008:097, Pohoiki	Site consists of spring located behind pebble beach at Pohoiki Bay; forms pool, 8 x 6m.	513 ft SE	N
02201	02515	Enclosure, Platform, Well	1-3-008:034, 097, 013, Pohoiki	Site consists of complex, 50 x 25m; comprised of enclosure, stone-lined well, wall, and platform.	125 ft S	N
02202	02516	Possible Agricultural Complex	1-3-008:097, 015, Keahialaka	Site consists of a massive complex of walls, enclosures, mounds; overall site area, 100 x 50m.	1577 ft SW	N
02203	02517	Mahinaʻakaʻaka Heiau aka Mahinakaka	1-3-008:015, Keahialaka	Site consists of a large, stepped platform, 40 x 24 x 2.5m; originally surface was paved, but was reported as disturbed by Hudson (1932).	2141 ft SW	N
02205	30129	Concrete Cistern	1-3-008:034, Pohoiki	Circular concrete cistern, 12.8m in diameter x 1.5m deep, consists of vertical concrete walls with a thin layer of plaster. Two metal pipes extend into the east side of the cistern. Historic glass bottles collected near the base.	57 ft SE	N
02206	30130	Rectangular-shaped Pit	1-3-008:034, Pohoiki	Rectangular-shaped pit, 1.4m long x 1.1m wide, constructed of stacked small and medium cobbles. NW edge is collapsed. Function unknown, possibly related to the mill structure nearby.	76 ft SSE	N
02207	30131	Enclosure	1-3-008:034, Pohoiki	Enclosure that contains a series of constructed mauka/makai raised rows. Wall is 1.3m tall, 0.8m wide. In good condition.	51 ft SE	N
02208	30132	Concrete Slab	1-3-008:034, Pohoiki	Rectangular-shaped concrete foundation, 8.6m long x 4.3m wide, formed from concrete poured in place.	345 ft SE	N
02209	30133	Concrete Structure	1-3-008:034, Pohoiki	Two remnant concrete structures possibly used as a pig pen and related infrastructure. Both features were once roofed with a gutter system that fed the subterranean concrete cistern that forms the south portion of feature A.	397 ft SE	N

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
02210	30134	Concrete Structure	1-3-008:034, Pohoiki	Freestanding concrete oven and smokestack, older than the sites nearby, in poor condition.	371 ft SE	N
02211	30135	Concrete Cistern	1-3-008:034, Pohoiki	Square-shaped concrete cistern constructed of poured concrete formed with 2in x 18in boards. Constructed for water storage purposes, possibly related to the Rycroft's old mill.	523 ft SE	N
02212	30136	Enclosed Complex	1-3-008:034, Pohoiki	Walled enclosure and a former privy hole. Old maps show this is where Rycroft's house was located.	841 ft SE	N
02213	30137	Rycroftʻs Road	1-3-008:034, 014, 086, Pohoiki	Portion of an old mauka/makai road that once extended from Pohoiki Bay to the uplands of the ahupuaʻa. Built between 1881-1885 by Robert Rycroft. No physical remnants of the road were observed. Site was plotted based on old maps.	511 ft SE	N
02214	30138	Wall	1-3-008:034, 086, Pohoiki	Mauka/makai wall segments (12m and 17m long). Possibly served as boundary markers for Rycroftʻs residence.	537 ft SE	N
02215	30139	L-shaped Alignment	1-3-008:034, Pohoiki	L-shaped alignment, 1.9 x 1.5m, constructed of loosely piled medium and large ʻaʻā cobbles.	238 ft SSE	N
02216	30140	Core-filled Wall	1-3-008:013, 097, Pohoiki	Core-filled wall segment, 8.8m long x 0.67m wide x 0.74m tall, situated just mauka of the Pohoiki coastal trail (site 2530).	570 ft SSE	N
02217	30141	Landscape Complex	1-3-008:097, 999, Pohoiki	Two cobble alignments and an enclosure (145m long x 30m wide), possibly served as curbing for the road leading into the property and a planting area to keep pigs out (or as a possible pen).	300 ft SE	N
02218	30142	Agricultural Complex	1-3-008:097, 999, Pohoiki	Complex of agricultural features: 15 linear cobble piles, nine mounds, and one modified depression. Possible byproducts of planting area preparation.	655 ft SW	N
02219	30143	Enclosure	1-3-008:097, Kapoho	Large irregular-shaped enclosure, 55m long x 45m wide, with an associated wall segment 3m from its NE corner that extends NE for 9.7m along a meandering path. A possible modern camping area.	522 ft SW	N

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
02220	30144	Cobblestone Trail	1-3-008:097, Kapoho	Steppingstone trail remnant just west of site 30143. A possible branch of the trail that heads NE.	861 ft SW	N
02221	30145	Wall	1-3-008:097, Pohoiki	Core-filled wall segment 10m long x 0.6m wide and 0.7m tall. Possible historic agricultural function.	970 ft SW	N
02222	30146	Wall	1-3-008:097, Pohoiki	Fairly straight wall running in a north direction for 19.7 meters. 75cm wide x 80cm tall on average. Possible function as an arbitrary boundary as there is land clearing on one side and the wall runs straight over natural undulations.	1284 ft SW	N
02223	30147	Pond	1-3-008:015, Keahialaka	Brackish water pond in a bedrock depression within a grove of coconut trees. Oval shaped, 7.6m long x 5m wide x 0.3m deep. Pond is spring-fed and water levels vary with the tide. Many ʻōpauʻula observed within the pond.	1858 ft SW	N
02224	30148	Habitation Complex	1-3-008:097, 015, Keahialaka	Complex consisting of a platform, an enclosure, and a wall segment possibly used as habitation in the precontact period. Site has been damaged by coastal swells.	1760 ft SW	N
02225	30149	Agriculture Complex	1-3-008:097, 015, Kapoho	Mound complex and modified outcrop that becomes a shallow pond during high tide.	1608 ft SW	N
02226	30150	ʻAʻā Planting Area	1-3-008:097, 015, Pohoiki, Keahialaka	Large area (11.5 acres) a possible precontact informal agricultural site. Recording split the site into 4 functional areas (A-D).	790 ft SW	N
06448	2508	Enclosure	1-3-008:016, Kapoho, Ahalanui, Laepaoʻo	Site consists of enclosure, each wall measures 11 x 1 x 1m.	950 ft SE	N
06453	02514	Platform	1-3-008:085, Pohoiki	Site consists of a low circular platform, built against outcrop. A small platform crudely constructed of this rough lava. Possible function as a burial platform. No indications of human occupation or related sites.	366 ft SW	N
07852	07386	Pohoiki Mill Ruins	1-3-008:034, Pohoiki	Concrete mill/factory built by Rycroft consisting of a pig pen, the carpenters' shop (now Hale residence). The Pohoiki courthouse and jail were once on the property but are now destroyed.	78 ft SW	N

Resource ID# 2019RE-	SIHP # 50-10-46-	Site Name	TMK/ Ahupuaʻa	Site Description	Distance from APE+	Under lava (Y/N)*
07853	02511	Old Coffee Mill	1-3-008:034, Pohoiki	Two-story concrete building constructed by Robert Rycroft in the 1890s as a multipurpose industrial mill building.	78 ft SW	N

+Approximate distances derived from HICRIS; *1960 Lava flow

U.S. Department of Homeland Security
Region 9
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

FEMA

IN REPLY REFER TO:
DH-PA-4366 PW 00055-00053 December 15, 2022

Dr. Alan S. Downer, Ph.D.
Administrator
State Historic Preservation Division
Kakuhikewa Building
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai‘i 96707
Via: HICRIS

Dr. Sylvia M. Hussey, Ph.D.
Chief Executive Officer
Office of Hawaiian Affairs
560 N. Nimitz Hwy., Suite 200
Honolulu, HI 96817
Via: OHACompliance@oha.org

ATTN: Susan Lebo, SHPD, and Kai Markell, OHA

Re: **FEMA-4366-DR-HI-00055-00053 (46851) (45259)**
Pohoiki Road and Highway 137 Road Repair and Water Line Installation
Approximate lat/long: 19.460527, -154.843710, Island of Hawai‘i

FEMA Public Assistance Program Submission – Standard Project Review for Nonemergency Undertakings (15-day Review)
Reconnaissance Survey Report: Field Inspection of Lands and Previously Identified Sites within the Project Corridor, Pohoiki Road and Highway 137 Road Repair and Water Line Installation, DR-4366-HI PW-55 PW-53
Subrecipients: County of Hawai‘i Department of Public Works and Department of Water Supply

Dear Dr. Downer and Dr. Hussey:

The U.S. Department of Homeland Security’s Federal Emergency Management Agency (FEMA) proposes to provide a Federal grant, through the Hawai‘i Emergency Management Agency (Recipient), to the County of Hawai‘i Department of Public Works (DPW) and the County of Hawai‘i Department of Water Supply (DWS) (Subrecipients), authorized under the Robert T. Stafford Disaster Relief And Emergency Assistance Act, P.L. 93-288, as amended, in response to major Disaster Declaration, FEMA-DR-4366-HI, dated May 11, 2018 regarding the Kilauea Volcanic Eruption and Earthquakes. During the incident period of May 3 through August 17, 2018, volcanic and seismic activity stemming from the Kilauea volcanic eruption resulted in lava inundation in the in the Puna

District, rendering sections of roads inaccessible. DPW has requested funding to realign and reconstruct approximately 9.1 miles of County roads to bring them back to their pre-disaster function. DWS has requested funding to install water lines along approximately 7.8 miles of the same County roads. The two projects are collectively referred to as the Undertaking. The assistance would be provided through FEMA's Public Assistance Program.

FEMA is reviewing the Undertaking pursuant to the 2016 Programmatic Agreement among FEMA, the Hawai'i State Historic Preservation Officer (SHPO), the Hawai'i Emergency Management Agency (Hawai'i Department of Defense), and the State Office of Hawaiian Affairs (OHA) (Agreement). In reviewing the Undertaking, FEMA has made a ***No Historic Properties Affected*** determination and requests your review and concurrence per Stipulations II.C.4.d and II.C.5.a.1 of the Agreement.

Undertaking

DPW proposes to realign and reconstruct approximately 9.1 miles of county roads that were inundated with lava from the 2018 Kilauea volcano eruption in the easternmost portion of the island of Hawai'i (Puna District) to bring them back to their pre-disaster function, and DWS proposes to install approximately 7.8 miles of waterlines (Undertaking). The Undertaking would entail realignment and reconstruction of roads and installation water lines along Pohoiki Road and Highway 137 (Kalapana-Kapoho Beach Road, from the intersection with Pohoiki Road to the intersection with Highway 132). The Undertaking encompasses portions of the following roads: Leilani Avenue, Kapoho Beach Road, Moani Street, Pua O Kapoho Street, Kapoho Kai Drive, Kumukahi-Lighthouse Road, and Highway 137 near MacKenzie State Recreation Area.

Along road sections covered by hardened lava from the 2018 eruption, the road would be constructed on top of the hardened lava and would change elevation to follow the new natural grade. The hardened lava would be graded as needed outside of the roadway to maintain a 1:1 slope adjacent to the road and to provide safe conditions for drivers. Along sections where there is no hardened lava inundation, the road would be widened to meet current design standards. The road widening would be outside of the original footprint in some areas. The widest disturbance of hardened lava would be approximately 70 feet on either side of the road to create a roadway shoulder with appropriate slopes; along most of the alignment, the width of hardened lava disturbance would be less than 20 feet. Along the eastern portion of Pohoiki Road, approximately 7,000 feet of road would be realigned along the edge of an existing agricultural field. This realignment would minimize impacts on the exceptional mango trees that form a canopy over the existing Pohoiki Road in this area.

Water lines would be installed along the northern side of Pohoiki Road from just east of the intersection of Pohoiki Road and Highway 132 to the intersection of Pohoiki Road and Highway 137. The water line would then cross Highway 137 and run along the eastern side of Highway 137 to Kapoho Beach Road. Along most of the alignment, water lines would be installed under the unpaved shoulder of the road, just outside the travel lane. There would be a minimum of 2 feet of cover over the pipe. The total depth of excavation would be approximately 3 feet. In road sections where the remnant heat of the hardened lava is too high to install water lines underground (such as along Upper Pohoiki Road near the fissures, from approximate stations 45+00 to 65+00), the water line would be

installed in a V-shaped riprap trench, which would extend the project footprint 16 feet north. The V-shaped riprap trench would allow heat to continue to dissipate from the hardened lava while allowing the water line to be installed and operated.

DPW and DWS propose to stage equipment within the existing road footprint and on eight construction staging areas within parcels owned by the County near the project area. Some excavation may be needed to level the hardened lava from the 2018 eruption on the parcels to accommodate staging, storage, and stockpiling activities. Excavation would be no more than 5 feet deep and would not extend into previously undisturbed ground under the hardened lava from the 2018 eruption.

To implement the road realignments, the County would purchase portions of 55 private properties adjacent to the existing road footprint; portions of 26 private properties would be purchased along Pohoiki Road and Leilani Avenue, and portions of 29 private properties would be purchased along Highway 137. No structures would be acquired.

Area of Potential Effects

In accordance with Stipulation II.C.2 of the Agreement, FEMA determined in coordination with SHPD that the direct Area of Potential Effect (APE) for the Undertaking is limited to the areas within which construction and ground-disturbing activity would be confined to excavation on the hardened lava (22,400 linear feet) and excavation of the road section not covered by hardened lava (12,400 linear feet). The APE encompasses four sections of roadwork (Kumukahi/Lighthouse Road, Highway 137a and 137b, and Lower Pohoiki Road) and the staging areas.

The vertical APE for archaeological resources is limited to excavations into the hardened lava from the 2018 eruption along 22,400 linear feet of the road corridor and 12,400 linear feet excavation to repave the road not covered by hardened lava. The ground-disturbing construction activity on the hardened lava (22,400 linear feet) would not extend below the hardened lava from the 2018 eruption. The ground-disturbing activity on the road not covered by hardened lava (12,400 linear feet) would be in previously disturbed soil. An indirect APE of 0.5-mile radius from the Undertaking was considered to determine the potential for indirect effects (e.g., visual).

Identification and Evaluation of Historic Properties

In accordance with Stipulation II.C.3 of the Agreement, FEMA conducted a records search of the area affected within the APE and a surrounding 0.5-mile buffer through the State Historic Preservation Division's Hawai‘i Cultural Resource Information System (HICRIS) and the National Park Service's online National Register of Historic Places and National Historic Landmarks database. FEMA also reviewed files at the SHPD library (March 24, 2022), the Bishop Museum (submitted August 22, 2022, and received on August 23, 2022), and the Hamilton Library (March 4, 7, and 24, 2022). Other relevant databases were also researched including the Papakilo Database (OHA 2022), Ulukai Database 2022 (https://ulukau.org), Hawai‘i State Historic Bridge Inventory and Evaluation (2014), and Hawai‘i State Archives Electronic Database (2022) (https://digitalcollections.hawaii.gov).

The records search results indicated that within the direct APE, 16 previous cultural resource studies have been conducted and 14 cultural resources have been previously recorded. Within the indirect APE, there are 98 recorded cultural resources. Of the 14 cultural resources in the direct APE, two cultural resources were unaffected by lava, eight cultural resources are completely inundated with lava, and four cultural resources are partially inundated. Of the 98 cultural resources in the indirect APE, 58 cultural resources are completely inundated with lava, and 40 cultural resources were unaffected.

FEMA archaeological consultants conducted an archaeological reconnaissance survey from June 6 to July 8, 2022, in the four areas not inundated with hardened lava within the direct APE. Areas covered by hardened lava were not surveyed because the proposed excavations for roads and waterlines would not extend into the original ground surface, and there is no potential for extant cultural resources existing within the hardened lava. The survey did not extend into the indirect APE because these areas had been previously surveyed and any indirect effects of the Undertaking on known archaeological or historic sites in these areas could be assessed without additional survey.

As a result of the investigation, three new cultural resources were identified and recorded during the field site survey: SIHP 50-10-46-31353 (an historic railroad alignment and segment of the Hawai‘i Consolidated Railroad), SIHP site 50-10-46-31354 (Historic Wall/Enclosure), and SIHP site 50-10-46-31355 (Terrace-Mound Complex, three features: two precontact mounds, and one precontact linear terrace rock wall).

The survey reidentified three of the previously recorded sites within the direct APE that were not covered in hardened lava; sites SIHP 50-10-46-0512 and 50-10-46-0513 (Bevacqua and Dye 1972), and site SIHP 50-10-46-30583 (ASM 2016). One previously recorded site, SIHP 50-10-46-30583, was found and temporarily recorded as TS-4366-003 since it was not known as a previously recorded resource. SIHP 50-10-46-30583 was not listed in the Phase I Inventory review in HICRIS. As a result, this site was rerecorded; however, the SIHP Site No. 50-10-46-30583 is retained as the permanent resource number. Sites SIHP 50-10-46-0512 and 50-10-46-0513 were also relocated and updated.

The four previously recorded sites within the direct APE that were partially inundated with hardened lava (SIHP sites 50-10-46-02521, 50-10-46-02522, 50-10-46-02529, and 50-10-46-04300) could not be relocated during the survey.

The following sites were evaluated under National Register of Historic Places (NRHP) criteria A, B, C, and D; and HRHP Criterion E. SIHP sites 50-10-46-31353, 50-10-46-31354, 50-10-46-31355, 50-10-46-0512, 50-10-46-0513, and 50-10-46-30583 are all recommended eligible for the NRHP, and are considered significant under Criterion D for the information they have yielded and can continue to yield with respect to land use activities and patterns, as well as how the study area landscape evolved from precontact to historic times.

SIHP site 50-10-46-31353is considered additionally significant under Criterion A because the resource was constructed during an important time in establishing commercial activities via the railroad in the late nineteenth and early twentieth century. SIHP site 50-10-46-31353is also recommended eligible under Criterion B because of its association with the important figure in history, Benjamin Dillingham, to spearhead those marketing efforts.

SIHP site 50-10-46-31354is considered additionally significant under Criterion B because it is directly associated with Robert Rycroft, a locally significant historic figure.

SIHP site 50-10-46-31355is considered additionally significant under HRHP Criterion E because the site also has the potential to yield precontact era burials.

Native Hawaiian Organizations

In accordance with Stipulation I.C.1 of the Agreement, and based on recommendations from OHA, FEMA transmitted correspondence describing the Undertaking to Native Hawaiian Organizations (NHOs) and interested parties on September 2, 2022. NHOs and individuals contacted include Jordan V. Calpito of the County of Hawai‘i Burial Council; Palikapu Dedman, Interested Party; Sylvia M. Hussey, Ka Pouhana, Chief Executive Officer of the Office of Hawaiian Affairs; Keone Kalawe, Interested Party; Keikialoha Kekipi, Interested Party; Kai Markell, Ka Pou Kāko‘o, Manager, Kia‘i Kānāwai, Compliance Enforcement of the Office of Hawaiian Affairs; Susan Osborne, Interested Party; Miliani Trask of the No Koa Ikaika KaLahui Hawai‘i; Hannah H. Veloria, Interested Party; and Berkeley Yoshida, Pelekikiena of the Hawaiian Civic Club Ka‘u. The correspondence also requested information about areas/sites of concern that may be affected by the Undertaking and if recipients knew of any other interested parties who might have concerns about the Undertaking.

Palikapu Dedman and Keikialoha Kekipi, both Interested Parties, responded to FEMA’s letter. Mr. Dedman requested any identified burials be left in place, and the water lines be placed at an appropriate distance from any archaeological discoveries. He also noted that FEMA should follow Section 106 and consider the native perspective. Mr. Kekipi requested that archaeological sites be retained in place. He also expressed concern regarding the opening of Kumukahi-Lighthouse Road and requested it not be reopened until the Burial Treatment and Preservation Plan, being negotiated by third parties and outside of FEMA’s Section 106 consultation, is in place. The concern derived from the fact that in the year 2000 tourists had desecrated one of the burials and removed the *iwi* (bones) and that if the road was reopened this could happen again. The concern was also expressed by Mr. Kekipi and Mr. Keone Kalawe during a site visit with FEMA and a County of Hawai‘i DPW representative on August 25, 2022.

In consideration of the lineal descendants’ concerns, FEMA expanded the indirect APE to extend to area that contains the burials, namely from the edge of the designated indirect APE to the end of Kumukahi-Lighthouse Road near the coast, to determine if the Undertaking had any potential to affect the burials. HICRIS indicates that there are four known burials within this area (sites: SIHP Site -04251: Stone Burial Crypts; SIHP Site -21794: Stone Burial Crypts; SIHP Site -21792: Stone Burial Crypts; SIHP SIte 21793: Burial Crypts). The burials are approximately 1.5 miles from the Undertaking project area. For this Undertaking only, per II.C.3.c of the Agreement, FEMA is treating the burials discussed above as historic properties eligible for the National Register in order to make an indirect effects determination.

Finding of Effect

Per Stipulation II.C.4.d of the Agreement, FEMA has made a finding of ***No Historic Properties Affected*** because the project activities would avoid the historic properties within the direct APE, and

the project would not have any visual, auditory, atmospheric, or hydrological effect on historic properties within the indirect APE either due the fact that they are covered in lava, vegetation obscures them, or their distance from the Undertaking, 1.5 miles in the case of the Kumukahi-Lighthouse Road burials. See the attached archaeological survey report entitled, *Reconnaissance Survey Report: Field Inspection of Lands and Previously Identified Sites within the Project Corridor Pohoiki Road and Highway 137 Road Repair and Water Line Installation County of Hawai'i, Hawai'i DR-4366-HI PW-55 and PW-53.*

Subsurface archaeological features or deposits associated with the newly recorded and previously recorded historic properties, or other cultural resources presently unknown due to impenetrable dense vegetation, may be present within the project APE. FEMA proposes that an archaeological monitoring program for those areas with dense vegetation (the agricultural field), be developed to avoid potential adverse impacts on cultural resources.

Implementation of a cultural resources monitoring program discovery plan during project activities will be developed prior to the commencement of project activities. FEMA will condition the project to include a requirement that project construction be monitored by an archaeologist who meets the Secretary of the Interior Qualifications, and that if any burials (*iwi kupuna*) or historic properties are inadvertently discovered that work will stop in the immediate area and the SHPD, OHA, Native Hawaiian Organizations, and Native Hawaiian lineal descendants and the appropriate Hawaiian Burial Council will be contacted for consultation, as necessary. With the implementation of the mitigation monitoring program, no impacts on cultural resources would occur.

FEMA, therefore, requests that the SHPD and OHA review and concur with this **No Historic Properties Affected** finding.

Conclusion

Per Stipulations I.E.2.b and II.C.4.d of the Agreement, the SHPD and OHA have a 15-calendar day period for review of FEMA's finding and supporting documentation. Unless the SHPD or OHA objects within this period, FEMA may conclude the Section 106 review of the Undertaking, and FEMA may fund the Undertaking. In the interest of time, we request a response at your earliest opportunity. Should you have any questions or comments, please do not hesitate to contact David Herdrich, FEMA Environmental Protection Specialist and Archaeologist at FEMA's Pacific Area Office in Honolulu at david.herdrich@fema.dhs.gov or 808-228-2064, or contact me directly at kenneth.sessa@fema.dhs.gov or 816-283-7960.

Sincerely,

KENNETH G SESSA

Digitally signed by KENNETH G SESSA
Date: 2022.12.15 13:37:37 -05'00'

Kenneth Sessa
Acting Regional Environmental Officer
FEMA Region 9

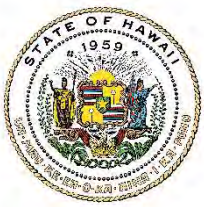
Enclosures:

Reconnaissance Survey Report: Field Inspection of Lands and Previously Identified Sites within the Project Corridor, Pohoiki Road and Highway 137 Road Repair and Water Line Installation, DR-4366-HI PW-55 PW-53

Cc: Palikapu Dedman
Keikialoha Kekipi

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

January 12, 2023

IN REPLY REFER TO:
Project No. 2021PR00548
Doc. No. 2301SN03
Archeology

David Herdrich, Environmental Protection Specialist
Federal Emergency Management Agency
Pacific Area Office
546 Bonney Loop, Bldg. 520
Honolulu, HI 96858
David.Herdrich@fema.dhs.gov

Mr. Herdrich:

SUBJECT: **National Historic Preservation Act (NHPA) Section 106 Review – Request for Concurrence with Effect Determination**
FEMA Reference No. DH-PA-4366 PW 00055-00053
Pohoiki Road and Highway 137 Road Repair and Water Line Installation
Kula, Kapoho, Pū'āla'a, Ahalanui, Laepao'o, Pohoiki, Keahialaka, Kaukulauki, and Malama 1 Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-3 and 1-4 (various plats and parcels)

The State Historic Preservation Division (SHPD) received a letter dated December 15, 2022, from the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) indicating that FEMA proposes a Federal grant through the Hawai'i Emergency Management Agency (HEMA) to the County of Hawai'i Department of Public Works (DPW) and the County of Hawai'i Department of Water Supply (DWS) as authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288 as amended, in response to major Disaster Declaration, FEMA-DR-4366-HI, dated May 11, 2018 regarding the Kilauea Volcanic Eruption and Earthquakes. In accordance with 36 CFR 800.2(a)(4), the FEMA has made a final determination of *no historic properties affected* for the Pohoiki Road and Highway 137 Road Repair and Water Line Installation project. The FEMA letter summarizes the NHPA Section 106 findings from a report titled: *Reconnaissance Survey Report: Field Inspection of Lands and Previously Identified Sites within the Project Corridor Pohoiki Road and Highway 137 Road Repair and Water Line Installation County of Hawai'i, Hawai'i* (Drennan and Sherman, December 2022), and consultation with Native Hawaiian Organizations (NHO), the SHPD, the County of Hawai'i, and other interested parties.

The project has been determined to be a federal undertaking as defined in 36 CFR 800.16(y) and is subject to compliance with Section 106 of the NHPA. The County of Hawai'i DPW's project is also subject to Hawaii Revised Statutes (HRS) §6E-8 historic preservation review.

The FEMA proposed project, in cooperation with the County of Hawa'i DPW, will involve reconstruction of approximately 9.1 miles of County roads that were inundated with lava from the 2018 Kīlauea volcano eruption (DR-4366-HI). DWS proposes to concurrently install new water lines along approximately 7.8 miles of the same County roads. FEMA conducted an archaeological reconnaissance survey in four areas not inundated with lava in the direct area of potential effects (APE) and considered the indirect effects of the APE as requested by SHPD.

The Drennan and Sherman (2022) reconnaissance survey was conducted to comply with the NHPA Section 106 identification, documentation, and assessment requirements and consisted of a literature search that identified 12 cultural resource studies and 14 previously recorded resources within the direct APE. A total of 98 resources were identified in the indirect APE. The report indicates that of the 14 previously identified resources within the direct APE, 2 cultural resources are not inundated with lava, 8 cultural resources are completely inundated with lava, and 4 cultural resources are partially inundated with lava. The report also indicates that of the 98 previously identified resources in the indirect APE, 58 have been completely inundated with lava and 40 have not been impacted by lava.

The reconnaissance survey documented three previously identified sites (State Inventory of Historic Places (SIHP) 50-10-46-0512 and 50-10-46-0513 (Bevacqua and Dye 1972), and SIHP 50-10-46-30583 (ASM 2016). These were relocated and updated in the survey documentation. Four (4) previously recorded sites (SIHP 50-10-46-02521, SIHP 50-10-46-02522, SIHP 50-10-46-02529, and SIHP 50-10-46-04300) within the direct APE that have been partially inundated were not located during the survey. The survey identified three newly identified sites within the direct APE, they consist of SIHP 50-10-46-31353 (an historic railroad alignment and segment of the Hawaii Consolidated Railway), SIHP 50-10-46-31354 (Historic Wall/Enclosure), and SIHP 50-10-46-31355 (Terrace-Mound Complex, including two pre-contact mounds, and one pre-contact linear terrace rock wall).

Based on consultation with Native Hawaiian lineal descendants and the SHPD, the indirect APE was expanded to include the area located at the end of Kumukahi/Lighthouse Road. An additional four (4) sites were considered, four of which are stone burial crypts (SIHP 50-10-46-04251, SIHP 50-10-46-21794, SIHP 50-10-46-21792, and SIHP 50-10-46-21793). None of the cultural resources within the Direct or Indirect APE are listed on the National Register of Historic Places (NRHP). One historic property is listed on the Hawai‘i Register of Historic Places (SIHP 50-10-46-02529, MacKenzie Petroglyphs).

The report indicates that SIHP 50-10-46-31353 is considered eligible under Criterion A because the linear resource was constructed during an important time in the development of commercial activities via the railroad in the late nineteenth/early twentieth century and under Criterion B as it was founded in association with an important figure in history, Benjamin Dillingham. SIHP 50-10-46-31354 is considered eligible under Criterion B because it is directly associated with Robert Rycroft, a locally significant historic figure. SIHP 50-10-46-31356 is considered additionally significant under HRHP Criterion e as the site also has the potential to yield Precontact era burials.

Based on the findings in the Drennan and Sherman (2020) reconnaissance survey, and per Stipulation II.C.4.b of the 2016 Programmatic Agreement among the SHPO, OHA, and the State of Hawai‘i Department of Defense, the FEMA has made a determination of *no historic properties affected* because the proposed project is designed to avoid effects to the identified historic properties within the direct APE. It has also been determined that the resources within the indirect APE would not be impacted in anyway based on their locations and again based on the findings in the reconnaissance survey and per Stipulation II.C.4.b, FEMA has also made a determination of *no historic properties affected* for the resources located within the indirect and expanded indirect APE.

The **SHPO concurs** with the FEMA determination of *no historic properties affected* pursuant to 36 CFR 800.4(d)(1).

Based on the potential for unidentified historic properties to be discovered in areas of dense vegetation within the APE, FEMA proposes archaeological monitoring to be conducted for the project to identify any archaeological historic properties or burials present and, if identified, to determine potential impacts to them, and to ensure that appropriate mitigation is implemented.

SHPD concurs with FEMA's proposal that archaeological monitoring be conducted. SHPD requests an archaeological monitoring plan (AMP) meeting the requirements of HAR §13-279-4 be submitted for SHPD review and acceptance prior to the start of construction activities. Please submit the AMP, the associated submittal review fee, and a copy of this letter to HICRIS Project 2021PR00548 using the Project Supplement option.

The **SHPO looks forward** to the FEMA and the County of Hawai‘i DPW initiating the HRS 6E historic preservation review for the subject project.

Although a reconnaissance level survey does not fulfill the requirements of an archaeological inventory survey as specified in HAR §13-276-5, it serves to facilitate project planning and supports the historic preservation review process. Please submit two hard copies of the reconnaissance survey report (Drennan and Sherman, December 2022),

clearly labeled FINAL, along with a text-searchable PDF copy of the report and a copy of this letter to the SHPD Kapolei office, Attn. Library. Please also submit one hard copy of the reconnaissance survey report (Drennan and Sherman, December 2022), clearly labeled FINAL and a copy of this letter to the SHPD Hilo office, Attn. Sean Naleimaile. Finally, please submit a text-searchable PDF copy of the report to HICRIS Project 2021PR00548 using the Project Supplement option, and a PDF copy of the report to lehua.k.soares@hawaii.gov.

The FEMA and the the County of Hawai‘i DPW are the offices of record for this undertaking. Please maintain a copy of this letter with your environmental review record for this undertaking.

Please contact Sean Naleimaile at (808) 933-7651 or at sean.p.naleimaile@hawaii.gov for any questions or concerns regarding this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

Cc: Lauren Unger, lauren.unger@fema.dhas.gov
Claudia Lea, claudia.lea@associates.fema.dhs.gov
Christina Beaty, christina.beaty@associates.fema.dhs.gov
Trisha Drennan, trisha.drennan@associates.fema.dhs.gov
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Zendo Kern, zendo.kern@hawaiicounty.gov
Rachelle Ley, rachelle.ley@hawaiicounty.gov
Douglas Le, douglas.le@hawaiicounty.gov

Appendix E: Public Notices

FEMA

DR-4366-HI Public Notice 002

English

Notice Date	September 7, 2022

INITIAL PUBLIC NOTICE

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) is proposing to fund two projects for the County of Hawai'i Department of Public Works (DPW) and the County of Hawai'i Department of Water Supply (DWS) in Hawai'i County, Hawai'i, to repair roads and install water lines along Pohoiki Road, Leilani Road, Highway 137 (Projects) and Kumukahi Lighthouse Road. The proposed action would repair damage from the 2018 Kīlauea volcano eruption in the southeastern portion of the island in the Puna district to bring the roads back to their pre-disaster function. Funding would be provided through the Public Assistance (PA) Program as authorized under Section 428 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

FEMA intends to prepare an Environmental Assessment (EA) for the Projects in compliance with the National Environmental Policy Act (NEPA); Executive Order (EO) 11988, Floodplain Management; EO 11990, Wetlands Protection; and EO 12898, Environmental Justice. FEMA hereby also provides interested parties with a notice of its intent to carry out an action affecting a floodplain or wetland.

The County of Hawai'i has applied for PA funds for the Projects. The purpose of the Projects is to recover from damage to the transportation network and water utilities

caused by the volcanic eruption and resulting overland lava flows in the Puna district of the Island of Hawai‘i. The Projects consist of the following: 1) realign and repave approximately 9.2 miles of roads to bring them back to their pre disaster function; and 2) install new and replacement water lines along approximately 7.9 miles of roads.

Portions of the project area are in the 100-year floodplain as depicted on the FEMA Flood Insurance Rate Map (FIRM) Numbers 1551661204F, 1551661212F, 1551661213F, and 1551661435F, effective date September 29, 2017. The FIRMs show that portions of the project area along Highway 137 lie within Zone AE, an area that has a 1-percent probability of flooding every year and where predicted floodwater elevations have been established. A portion of the project area along Pohoiki Road lies within Zone D, an area of undetermined flood hazard.

Initial comments concerning the Projects, potential alternatives, and preliminary identification of environmental issues will be accepted from the affected public; local, state, and federal agencies; Native Hawaiian Organizations; and other interested parties to assist FEMA with identifying the scope of the EA and inform decision-making. Comments should be made in writing and sent to the FEMA contact listed below. Comments must be received by October 7, 2022, to be considered.

Additional information about the Projects, including maps showing the project components and potential impacts on floodplains, may be obtained by contacting FEMA or the County. Once complete, the draft EA will be made available for public review and comment.

FEMA Contact:

Ken Sessa, FEMA Region 9 Environmental Officer (Acting)

1111 Broadway, Suite 1200, Oakland, CA 94607-4052

fema-rix-ehp-document@fema.dhs.gov

County of Hawai‘i Contact:

Steve Pause, Acting Director, Department of Public Works, County of Hawai‘i

101 Pauahi Street, Suite 7, Hilo, HI 96720

Steve.Pause@hawaiicounty.gov, (808) 961-8321

Last updated October 13, 2022

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FEMA

DR-4366-HI Public Notice 003

English

Notice Date	October 12, 2022

INITIAL PUBLIC NOTICE

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) is proposing to fund two projects for the County of Hawai'i Department of Public Works (DPW) and the County of Hawai'i Department of Water Supply (DWS) in Hawai'i County, Hawai'i, to repair roads and install water lines along Pohoiki Road, Leilani Road, Highway 137 (Projects) and Kumukahi Lighthouse Road. The proposed action would repair damage from the 2018 Kīlauea volcano eruption in the southeastern portion of the island in the Puna district to bring the roads back to their pre-disaster function. Funding would be provided through the Public Assistance (PA) Program as authorized under Section 428 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

FEMA intends to prepare an Environmental Assessment (EA) for the Projects in compliance with the National Environmental Policy Act (NEPA); Executive Order (EO) 11988, Floodplain Management; EO 11990, Wetlands Protection; and EO 12898, Environmental Justice. FEMA hereby also provides interested parties with a notice of its intent to carry out an action affecting a floodplain or wetland.

The County of Hawai'i has applied for PA funds for the Projects. The purpose of the Projects is to recover from damage to the transportation network and water utilities

caused by the volcanic eruption and resulting overland lava flows in the Puna district of the Island of Hawai'i. The Projects consist of the following: 1) realign and reconstruct approximately 9.1 miles of roads to bring them back to their pre-disaster function; and 2) install new and replacement water lines along approximately 7.8 miles of roads.

Portions of the project area are in the 100-year floodplain as depicted on the FEMA Flood Insurance Rate Map (FIRM) Numbers 1551661204F, 1551661212F, 1551661213F, and 1551661435F, effective date September 29, 2017. The FIRMs show that portions of the project area along Highway 137 lie within Zone AE, an area that has a 1-percent probability of flooding every year and where predicted floodwater elevations have been established. A portion of the project area along Pohoiki Road lies within Zone D, an area of undetermined flood hazard.

Initial comments concerning the Projects, potential alternatives, and preliminary identification of environmental issues will be accepted from the affected public; local, state, and federal agencies; Native Hawaiian Organizations; and other interested parties to assist FEMA with identifying the scope of the EA and inform decision-making. Comments should be made in writing and sent to the FEMA contact listed below. Comments must be received by November 11, 2022 to be considered.

Additional information about the Projects, including maps showing the project components and potential impacts on floodplains, may be obtained by contacting FEMA or the County. Once complete, the draft EA will be made available for public review and comment.

FEMA Contact:

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1111 Broadway, Suite 1200, Oakland, CA 94607-4052

fema-rix-ehp-documents@fema.dhs.gov

County of Hawai'i Contact:

Steve Pause, Acting Director, Department of Public Works, County of Hawai'i

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