**STATE OF HAWAI'I**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**OFFICE OF CONSERVATION AND COASTAL LANDS**
**Honolulu, Hawai'i**

File No: HA-3869
180-Day Exp. Date: February 20, 2021

December 11, 2020

**Board of Land and**
**Natural Resources**
**State of Hawai'i**
**Honolulu, Hawai'i**

| | |
|---|---|
| **REGARDING:** | Conservation District Use Application (CDUA) HA-3869 for an Access Road within the Kipahoehoe Natural Area Reserve |
| **APPLICANT/ LANDOWNER:** | State of Hawai'i<br>Department of Land and Natural Resources<br>Division of Forestry and Wildlife<br>Natural Area Reserves System |
| **APPROVING AGENCY:** | State of Hawai'i<br>Department of Land and Natural Resources<br>Office of Conservation and Coastal Lands |
| **LOCATION:** | Kipahoehoe, South Kona, Hawai'i |
| **TAX MAP KEYS (TMKs):** | (3) 8-8-001:005 |
| **AREA OF PARCEL:** | 3,777.14 acres |
| **USE:** | Road -construct 2,985 feet on barren lava; total disturbed area will be 1.18 acres and will include a small landing area |
| **SUBZONE:** | Protective |

**DESCRIPTION OF AREA/CURRENT USE**

The proposed project is in the Kipahoehoe Natural Area Reserve (NAR) which is 5,583 acres and extends from sea-level to a 5,600-foot elevation. The NAR is a wedge-shaped parcel that corresponds to the traditional 'ahupua'a of Kipahoehoe. Highway 11 runs through the NAR and divides it into mauka and makai parcels; the project area is located on the mauka parcel and is

between Highway mile markers 90 and 91 (**see Exhibit 1**). The parcel is located in the Protective Subzone of the State Land Use Conservation District.

The NAR is on the southwest slopes of Mauna Loa. Lava flows from Mauna Loa have continually inundated the area for the past 100,000 years. The area's surface geology consists almost entirely of very permeable ʻaʻa lava with little soil and is very well drained. Rainfall in the mauka NAR area averages 60 to 100 inches a year. Ground water is replenished by the infiltration of rainfall that percolates through the root zone and ends up in a fresh-salt water basal lens that is increasingly brackish water as it flows to the sea. Because of the high permeability of the lava, precipitation on the project site currently percolates to the underlying groundwater, and direct runoff to the ocean rarely occurs.

Most of the NAR is vegetated by different aged stands of ohiʻa (*metrosideros polymorpha*) forest on a substrate of young (< 2,000 years) ʻaʻa lava flows. A significant area was covered by the historic 1919 and 1950 flows and both areas are in the early stages of forest development. The soil of the project area is ʻaʻa lava (rLV). The project area has no soil covering and has very limited vegetation; it is mostly hard clinkery sharp pieces of lava piled in tumbled heaps. The topography of the project area is gentle sloping terrain without any major drainage issues.

The project area is within the Mauka aquifer system which is part of the Southwest Mauna Loa Sector Area (ASEA). The Mauka aquifer system has a sustainable yield of approximately 42 million gallons per day.

Hazards

The proposed project will be mauka of Highway 11 at approximately1,600 feet elevation and will not be affected by tsunami inundation. The surface geology of the area consists almost entirely of very permeable ʻaʻa lava with little soil and is very well drained. This parcel is Zone D per the Flood Hazard Assessment Report (**see Exhibit 2**). Zone D is defined as an unstudied area where floods are undetermined, but flooding is possible. The proposed road will not be paved and therefore will remain permeable.

The southwest slopes of Mauna Loa are susceptible to lava flows. The volcanic hazard mapping produced by the U.S. Geological Survey appears to place the property in Lava Hazard Zone 2 on a scale of ascending risk from 9 (low) to 1 (high). Fifteen to twenty-five percent of zone 2 has been covered by lava since 1800, and 25 to 75 percent has been covered within the past 750 years. Relative hazard within zone 2 decreases gradually as one moves away from zone 1. Lava flows from Mauna Loa have continually inundated the area for the past 100,000 years and since 1832 the volcano has erupted 40 times.

Flora and Fauna

There is little vegetation in the area proposed for the road because it is sited on a recent lava flow. Several rare and endangered plant species have been observed in the vicinity of the project area, but no rare species are known to be in the project area. Most of the rare and endangered species are located within the forested kipuka. Several kipuka of older substrate occur in the 3,600-foot elevation of the NAR; they contain deeper soil and well-developed koa (*Acacia koa*) dominated forests with other native plants. The project is not located within the forested kipuka.

The project is not anticipated to negatively impact native birds because land disturbance will occur primarily in sparsely vegetated lava areas. In the forested kipuka nearby, ʻElepaio (*Chasiempis sandwicensis*), ʻamakihi (*Hemignathus virens*), ʻapapane (*Himatione sanguinea*) and ʻiʻiwi

(*Vestiara coccinea*) are common. ‘I‘o (*Buteo solitarus*) are frequently seen in the area, and nests have been observed in snag trees. The endangered ‘akepa (*Loxops coccineus*) and Hawaii creeper (*Oreomystis mana*) are known from similar habitat in the vicinity. Kīpāhoehoe is considered to be critical habitat for the ‘alala or Hawaiian crow (*Corvus hawaiiensis*). The last observation of a wild crow in the area was in the early 1980’s. The ‘opeapea, or Hawaiian bat (*Lasiurus cinereus semotus*), is common in the vicinity of Highway 11 and undoubtedly uses trees within the NAR as roosting sites.

Little is known regarding invertebrates in Kīpāhoehoe. However, since the affected area is recent lava flow, the effect on native invertebrates is anticipated to be minimal. Feral pigs are common throughout the NAR, especially in kipuka with well-developed soils. At higher elevations, feral goats are common and small herds periodically move through the area. Feral, mouflon, and hybrid sheep are also present, but not in as large numbers as goats. Feral dogs and cats, rats, mice, and mongoose are also found in the NAR.

*Historic/Cultural*

A Kipahoehoe Cultural Study was completed in 2002. This Study analyzed ethnography, oral history interviews, and historical cultural source materials of Kipahoehoe and its environs. The Study found that, “Archaeological studies in Kipahoehoe and neighboring lands of Kapali/ua are very limited. Among the earliest compilations of historical references to sites and limited field work date from 1908 to 1930.” No archaeological sites have been observed in the project site area; pre-contact Hawaiian use of upland forests such as those in Kipahoehoe was likely limited to activities such as gathering plant materials and bird-catching.

The 2,985 feet long proposed road will be sited on the 1926 lava flow from Mauna Loa; therefore, the likelihood that historic sites will be affected is minimized. No archaeological sites have been observed in the areas where the proposed activity would take place. The Division of Forestry and Wildlife (DOFAW) requested consultation with SHPD on 1/9/2020 for the proposed road and was assigned log number 2020.00050. In response, the SHPD requested a field inspection of the project area to determine the presence or absence of historic properties within the project area. The field inspection did not identify any evidence of traditional Hawaiian historic properties within the project area. Based on the information provided, the SHPD concurred with the DOFAW’s project effect determination of “No historic properties affected” (**see Exhibit 3**). Pursuant to HAR §13-275-7(e), when the SHPD agrees that the action will not affect any significant historic properties, this is the SHPD’s written concurrence and historic preservation review ends. The historic preservation review process is ended.

## PROPOSED USE

The proposed project is to construct 2,985 feet of unpaved road on the southwest slopes of the Kipahoehoe NAR that is mauka of Highway 11. The road will be installed between the 90- and 91-mile markers along Highway 11. Construction will be on a recent lava flow and will require compaction of lava and sparse vegetative clearing. Lava compaction and vegetation clearing will be done via a bulldozer with a 16-foot wide blade. Additionally, a 60-foot by 60-foot area for parking, storage, and a helicopter landing will be cleared and leveled; this area will not be visible from the highway. The proposed land use will disturb 1.18 acres in a linear corridor of a cleared 4WD road and a small landing area.

The intent of this project is to benefit native species in the project area by providing management access on State lands. The proposed road will connect Highway 11 to an existing 4WD road that roughly follows the southern boundary of the NAR. The only existing vehicular access to the NAR is from an alternate route from the south which takes longer and requires permission from adjacent private landowners (**see Exhibit 4**). The applicant states that staff will carefully survey the project area to prevent destruction of rare species. The proposed project action will enable the natural resource crews to implement the Kipahoehoe Natural Area Reserve management plan which requires improved access for wildfire fighting, invasive species removal, and outplanting of native plants. This new access will be regulated by the DOFAW through the issuance of access keys and permits, if researchers or other permittees require access.

OTHER ALTERNATIVES CONSIDERED:

Alternative 1: No Action. Without the road, there would be significantly higher costs to the management of the Reserve. Staff and contractors may need to rely more heavily on helicopters, increasing use of fuel and greenhouse gas emissions, noise disturbance, and further exposing staff to safety risks of aviation. Staff would not be able to quickly access this area to respond to wildfires, which are a priority threat to the forests of South Kona.

Alternative 2: Proceed with the project. This would have multiple benefits for natural resource management of the Reserve. In addition to saving time for routing natural resource management such as invasive species control and tree planting, this road will reduce the amount of time needed to respond to emergencies like wildfires in this area. This road would significantly decrease staff time and cost to access this area, therefore increasing capacity for natural resource management crews to dedicate to protecting this area.

## SUMMARY OF COMMENTS

The Office of Conservation and Coastal Lands referred the application to the following agencies and organizations for review and comment:

State Agencies:
DLNR, Division of Conservation and Resource Enforcement
DLNR, Division of Forestry and Wildlife
DLNR, Hawai‘i District Land Office
DLNR, Na Ala Hele
Office of Hawaiian Affairs

County Agencies:
County of Hawai‘i, Department of Planning
County of Hawai‘i, Fire Department

Federal Agencies:
U.S. Fish and Wildlife

In addition, this application was also sent to the nearest public library, the Kealakekua Public Library, to make this information readily available to those who may wish to review it. The application was advertised in the Office of Environmental Quality Control’s September 23, 2020,

edition of *The Environmental Notice*. A public hearing notice was advertised in the State and local newspaper on September 24, 2020, and the public hearing was conducted via Zoom October 15, 2020; no members of the public attended the public hearing.

Comments were received by the following agencies and individuals and summarized by Staff as follows:

THE STATE

DEPARTMENT OF LAND AND NATURAL RESOURCES

*Division of Conservation and Resource Enforcement:*
*Comments:* No Response.

*Engineering Division:*
*Comments:* No Response.

*Division of Forestry and Wildlife:*
*Comments:* No Response.

*Hawai‘i District Land Office:*
*Comments:* No Response.

*Nā Ala Hele:*
*Comments:* No Comments.

*Office of Hawaiian Affairs:*
*Comments:* No Comments

COUNTY OF HAWAI‘I

COUNTY OF HAWAI‘I PLANNING DEPARTMENT

*Comments:* No Comments.

COUNTY OF HAWAI‘I FIRE DEPARTMENT

*Comments:* No Comments.

FEDERAL

U.S. FISH AND WILDLIFE SERVICES

*Comments:* **see Exhibit 5**

COMMENTS FROM THE PUBLIC

*Comments:* No Comments.

**ANALYSIS**

Following review and acceptance for processing the Applicant was notified by correspondence dated August 24, 2020 that:

1. The proposed use is an identified land use in the Protective subzone of the Conservation District, pursuant to the Hawai'i Administrative Rules (HAR), §13-5-22 P-13 **LAND AND RESOURCE MANAGEMENT** (D-2) Road construction and major erosion control projects;

2. Pursuant to HAR §13-5-40 HEARINGS (a) Public hearings shall be held: (3) on applications requiring a board permit in the protective subzone;

3. In conformance with Chapter 343, Hawaii Revised Statutes (HRS), as amended, and Chapter 11-200.1, HAR, a finding of no significant impact to the environment (FONSI) is anticipated by DLNR DOFAW for the proposed project; and

4. The subject area is not located in the Special Management Area (SMA).

The Final EA/Finding of No Significant Impact (FONSI) was issued by the DLNR Chairperson and published in the June 23, 2020 edition of the Office of Environmental Quality Control's *The Environmental Notice.*

**CONSERVATION CRITERIA**

The following discussion evaluates the merits of the proposed land use by applying the criteria established in §13-5-30, HAR.

1) *The proposed use is consistent with the purpose of the Conservation District.*

The objective of the Conservation District is to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. The DOFAW states that this project will allow managers to continue to conserve, protect and preserve the important natural resources of Kipahoehoe. It will provide direct vehicular access to the Reserve so that managers can conduct natural resource protection efficiently and be able to quickly respond to fires.

2) *The proposed land use is consistent with the objectives of the Subzone of the land on which the use will occur.*

The land falls in the Protective Subzone. The objective of this subzone is to protect valuable natural and cultural resources in designated areas such as restricted watersheds, marine, plant, and wildlife sanctuaries, significant historic, archaeological, geological, and

volcanological features and sites, and other designated unique areas. A road will allow workers easier access to the reserve and to more efficiently protect the natural resources, such as plants and wildlife, found therein.

3) *The proposed land use complies with the provisions and guidelines contained in Chapter 205A, HRS entitled "Coastal Zone Management", where applicable.*

The objectives, policies, and guidelines of the Coastal Zone Management (CZM) program contained in Chapter 205A, Hawai‘i Revised Statutes (HRS), are focused on the preservation, protection, and where possible, the restoration of the natural resources of the coastal zone in Hawai‘i. The proposed land use is outside the Special Management Area (SMA) and is thus not subject to County SMA rules. Additionally, no runoff into streams or oceans is anticipated from this project due to the highly porous nature of the lava terrain and lack of streams.

4) *The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.*

The proposed land use will disturb 1.18 acres in a linear corridor of a cleared 4WD road and small landing area. Though road construction would cause some limited short-term damage, the applicant states that the benefits would far out- weigh the temporary disturbance occurring during the construction phase. The management plan, as outlined in the 2002 Kipahoehoe Natural Area Reserve Management Plan Environmental Assessment, specified that measures would be taken to prevent wildlife and habitat disturbance, such as scheduling clearing of roadways to avoid the breeding and pupping season of bats and not clearing any trees with bats found roosting in them. Precautions will be taken, as needed, to implement this project in an environmentally sensitive area.

As stated earlier, the major impacts from this project are vegetation related. Damage to living native plants will be restricted to within the road/clearing corridors and will be minimized due to their being sited on predominantly unvegetated areas. No legally protected plant species have been observed near the proposed road, but an additional reconnaissance of all corridors will be made before work begins. Significant plants will be marked with flagging, and/or alignments will be shifted to avoid damage.

5) *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

This new road will connect to the already existing Highway that bisects the Kipahoehoe NAR. Additionally, the road will be built on newer lava flows that do not have much vegetation. The road will connect to an existing 4WD road that roughly follows the southern boundary of the NAR, allowing the connection of the existing road and the highway through State land, and opening up DLNR management access for the entire NAR.

6) *The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable.*

This road will allow crews easier access to help maintain the natural beauty of the reserve. This management includes invasive species removal, outplanting, and wildfire fighting.

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

No subdivision of land is proposed for this project.

8) *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

Staff believes the proposed land use will not be materially detrimental to the public health, safety, and welfare as mitigated. The DOFAW has identified Best Management Practices (BMPs) for project construction. The project will follow a Stormwater Pollution Prevention Plan. No localized drainage patterns will be altered. This project will take place outside of bat pupping season and is projected to have no impact on the species. Additional reconnaissance of all corridors will be made before work begins. Significant plants will be marked with flagging and/or alignments will be shifted to avoid damage. The lava will be grubbed and compacted through use of a bulldozer with a blade of 16 feet wide. This compaction and grubbing will create no sediment particles. Additionally, the lava surface is very porous with all water being absorbed quickly. There are no drainage waters in the vicinity of the project. Weed and rapid ʻōhiʻa death introduction will be minimized by ensuring that all heavy equipment, tools, boots, etc. have been cleaned before entering the project area. The long-term management plan for the Reserve includes regular monitoring and control of newly introduced species of non-native plants along fence lines and access roads.

Constructing a new access road will be an open invitation for the public to visit the upper Reserve. Even though a locked gate will be placed on the road, it will not exclude pedestrian traffic. The South Kona region lacks hiking opportunities, and this new access will allow the community to visit and learn about the unique native koa and ʻōhiʻa forests.

CULTURAL IMPACT ANALYSIS:

*Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised.*

Pre-contact Hawaiian use of upland forests such as those in Kīpāhoehoe was likely limited to activities such as gathering plant materials and bird-catching. As previously mentioned, a cultural study of the Reserve and surrounding lands was prepared in 2002. Although dated, the study analyzed cultural and ethnographic data and conducted oral interviews, as well as referenced

historical cultural source materials. So there has been a fair bit of research conducted on traditional Native Hawaiian practices.

*Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.*

During the EA consultation process, the SHPD indicated they did not believe any of the proposed management activities, including the construction and repair of access and boundary roads as well as installation of fences, will have an effect on historic sites. And that if any sites or artifacts are discovered all work will stop and the proper authorities will be notified.

*What feasible action, if any, could be taken by the Board of Land and Natural Resources in regard to your application to reasonably protect Native Hawaii rights?*

During the processing of this application, no comments were received from native practitioners or the Office of Hawaiian Affairs. It should be noted that OCCL held a public hearing on this application. No one attended the hearing. Nevertheless, staff believe that to the extent to which traditional and customary native Hawaiian rights are exercised, the proposed action does not appear to affect traditional Hawaiian rights. Thus, it is believed that no action is necessary to protect these rights.

The project is anticipated to benefit the natural resources of Kipahoehoe and its plants and animals which we see as enhancing traditional cultural practices. While some may not always desire more access to these areas, the project will facilitate the Department's ability to better manage the natural and cultural resources of Kipahoehoe and will facilitate proper access for all, including native Hawaiian practitioners.

## DISCUSSION

The proposed project is to construct a 2,985-foot unpaved road to improve access to the Kipahoehoe NAR on the southwest slopes of Hawaii Island. The proposed road will be installed mauka of Highway 11 and between the 90- and 91-mile markers; it will connect Highway 11 to an existing 4WD road that roughly follows the southern boundary of the NAR. The road will be constructed on recent lava flow; lava compaction and vegetation clearing will be done via a bulldozer with a 16-foot wide blade. The surrounding area is relatively open lava fields and beyond those lava flows are forest. Additionally, a 60-foot by 60-foot area for parking, storage, and a helicopter landing will be cleared and leveled; this area will not be visible from the highway. The proposed land use will disturb 1.18 acres in a linear corridor of a cleared 4WD road and a small landing area. The intent of this project is to benefit native species in the project area by providing management access on State lands.

Crews will keep land disturbance to a minimum. No legally protected plant species have been observed near the proposed road, but an additional reconnaissance of all corridors will be made before work begins. Significant rare plants will be marked with flagging, and alignments will be

shifted to avoid damage. The proposed bulldozing of the road will occur outside of bat pupping season (April to June) to avoid damaging roosting trees, however it is unlikely that bats are roosting in trees along the road corridor as vegetation is very sparse.

Based on the information provided, staff believes that the project will have negligible adverse environmental or ecological effects provided that best management practices and mitigation measures as described in the application and environmental assessment and as required by rule or laws are fully implemented.

## RECOMMENDATION

Based on the preceding analysis, staff recommends that the Board of Land and Natural Resources APPROVE Conservation District Use Application HA-3869 for an Access Road located at Kipahoehoe, South Kona, Hawai‘i, TMK (3) 8-8-001:005 subject to the following conditions:

1. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;

2. The permittee shall comply with all applicable Department of Health administrative rules;

3. Unless otherwise authorized, any work or construction to be done on the land shall be initiated within one year of the approval of such use, in accordance with construction plans that have been signed by the chairperson, and shall be completed within three years of the approval of such use;

4. All representations relative to mitigation set forth in the accepted application and environmental assessment or impact statement for the proposed use are incorporated as conditions of the permit;

5. The permittee shall plan to minimize the amount of dust generating materials and activities. Material transfer points and on-site vehicular traffic routes shall be centralized. Dusty equipment shall be located in areas of least impact. Dust control measures shall be provided during weekends, after hours and prior to daily start-up of project activities. Dust from debris being hauled away from the project site shall be controlled;

6. The permittee shall notify the Office of Conservation and Coastal Lands (OCCL) in writing prior to the initiation and upon completion of the project;

7. Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact SHPD (808-692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary;

8. The permittee shall utilize Best Management Practices for the proposed project;

9. The permittee understands and agrees that the permit does not convey any vested right(s) or exclusive privilege;

10. In issuing the permit, the department and board have relied on the information and data that the permittee has provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data prove to be false, incomplete, or inaccurate, this permit may be modified, suspended, or revoked, in whole or in part, and the department may, in addition, institute appropriate legal proceedings;

11. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;

12. Obstruction of public roads, trails, and pathways shall be avoided or minimized. If obstruction is unavoidable, the permittee shall provide alternative roads, trails, or pathways acceptable to the department;

13. During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities;

14. The permittee shall obtain a county building or grading permit or both for the use prior to final construction plan approval by the department;

15. Artificial light from exterior lighting fixtures, including but not limited to floodlights, uplights, or spotlights used for decorative or aesthetic purposes, shall be prohibited if the light directly illuminates or is directed to project across property boundaries toward the shoreline and ocean waters, except as may be permitted pursuant to section 205A-71, HRS. All exterior lighting shall be shielded to protect the night sky;

16. Significant rare plants will be marked with flagging, and road alignments will be shifted to avoid damage;

17. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawai‘i, and by Hawai‘i statutory and case law;

18. Trees taller than 15 feet shall not be removed or trimmed during the Hawai‘i Hoary bat birthing and pup rearing season from June 1st to September 15th;

19. If ‘ōhi‘a are found on the property during implementation of the proposed project, Rapid ‘Ōhi‘a Protocol shall be observed. There shall be no transport of ‘ōhi‘a to and from the property as well as no soil transport from the property;

20. Other terms and conditions as may be prescribed by the Chairperson; and

21. Failure to comply with any of these conditions shall render this Conservation District Use Permit void under Chapter 13-5, as determined by the chairperson or board.

Respectfully submitted,

Rachel Beasley, Staff Planner
Office of Conservation and Coastal Lands

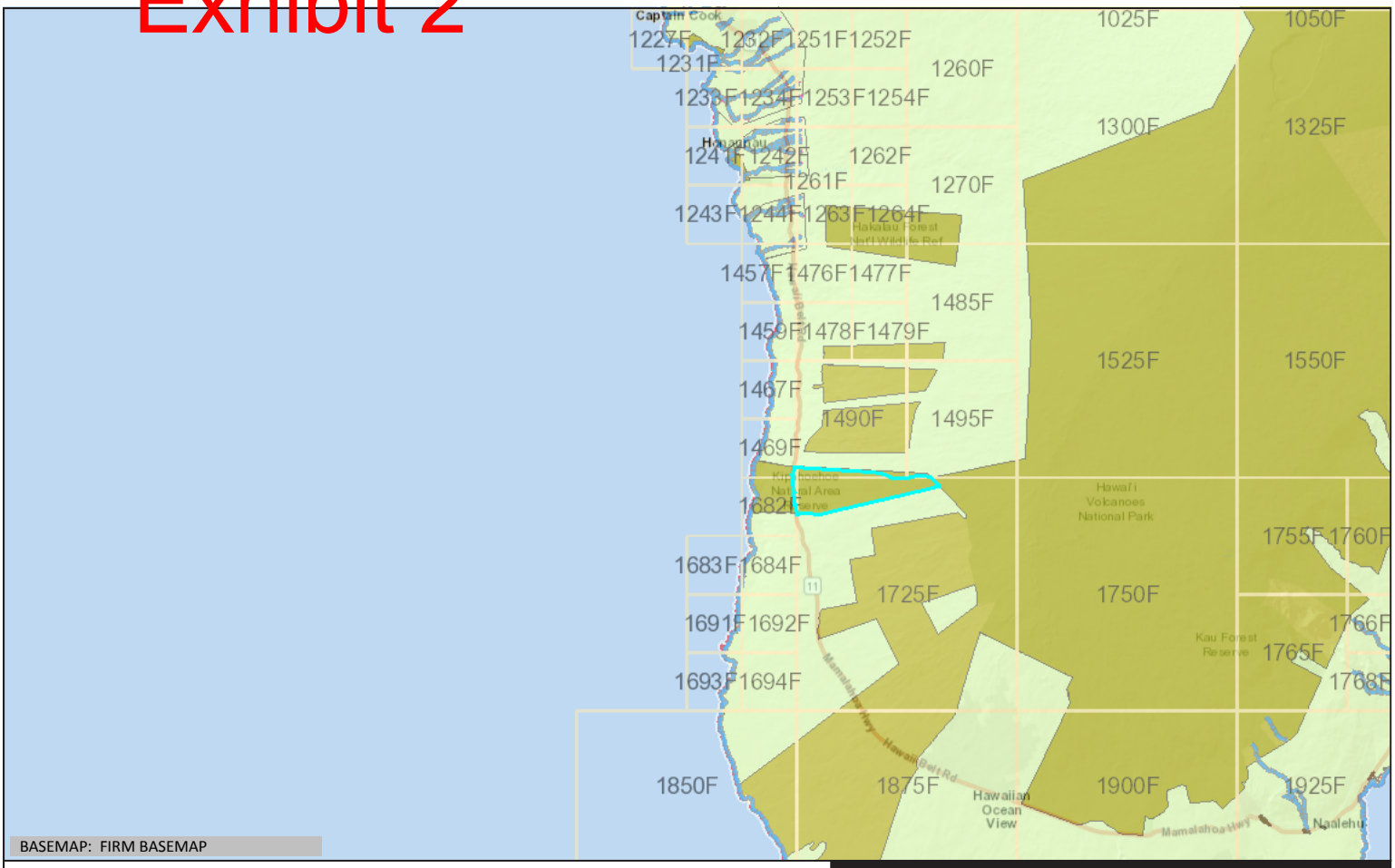
Approved for submittal:

SUZANNE D. CASE., Chairperson
Board of Land and Natural Resources

# Exhibit 1


Figure 1. Location of the Kīpāhoehoe Natural Area Reserve

# Exhibit 2




# Flood Hazard Assessment Report

www.hawaiinfip.org

## Property Information

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|---|---|
| COUNTY: | HAWAII |
| TMK NO: | (3) 8-8-001:005 |
| WATERSHED: | KIILAE |
| PARCEL ADDRESS: | ADDRESS NOT DETERMINED<br>CAPTAIN COOK, HI 96704 |

## Notes:

## Flood Hazard Information

| | |
|---|---|
| FIRM INDEX DATE: | SEPTEMBER 29, 2017 |
| LETTER OF MAP CHANGE(S): | NONE |
| FEMA FIRM PANEL - EFFECTIVE DATE: | 1551661469F - SEPTEMBER 29, 2017<br>1551661490F - SEPTEMBER 29, 2017<br>1551661495F - SEPTEMBER 29, 2017<br>1551661682F - SEPTEMBER 29, 2017<br>1551661725F - SEPTEMBER 29, 2017 |

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 4 8 mi

*Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.*

*If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.*

**FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND**
**(***Note: legend does not correspond with NFHL)*

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD** - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

| | |
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| | **Zone A**: No BFE determined. |
| | **Zone AE**: BFE determined. |
| | **Zone AH**: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined. |
| | **Zone AO**: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. |
| | **Zone V**: Coastal flood zone with velocity hazard (wave action); no BFE determined. |
| | **Zone VE**: Coastal flood zone with velocity hazard (wave action); BFE determined. |
| | **Zone AEF**: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE. |

**NON-SPECIAL FLOOD HAZARD AREA -** An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

| | |
|---|---|
| | **Zone XS (X shaded)**: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. |
| | **Zone X**: Areas determined to be outside the 0.2% annual chance floodplain. |

**OTHER FLOOD AREAS**

| | |
|---|---|
| | **Zone D**: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities. |

Exhibit 3



# STATE OF HAWAII
## DEPARTMENT OF LAND AND NATURAL RESOURCES

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

September 22, 2020

IN REPLY REFER TO:
Log No. 2020.01832
Doc. No. 2009SN06
Archaeology

Ms. Emma Yuen, Native Ecosystems Program Manager
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street
Honolulu, HI 96813
Email: emma.yuen@hawaii.gov

Dear Ms. Yuen:

SUBJECT: **Chapter 6E-8 Historic Preservation Review – Revised Review**
**Request for Concurrence with "No Historic Properties Affected"**
**Proposed Fencing Project at the Kīpāhoehoe National Area Reserve**
**Archaeological Field Inspection Report**
**Kīpāhoehoe Ahupua'a, South Kona District, Island of Hawai'i**
**TMK: (3) 8-8-001:005**

This letter provides the State Historic Preservation Division's (SHPD's) revised review of the subject application and a request from the Department of Land and Natural Resource's Division of Forestry and Wildlife (DOFAW) for SHPD's concurrence with a determination of "No historic properties affected." SHPD received the current submittal on August 10, 2020 which included a request for concurrence, a copy of SHPD's recent review letter, and a field inspection report titled, *Field Inspection Report for the Proposed Fencing Project at the Kīpāhoehoe Natural Area Reserve, Kīpāhoehoe Ahupua'a, South Kona District, Hawai'i Island, TMKs: [3] 8-8 001:005 (por.)* (Folk 2020).

**Project Description**
DOFAW proposes to construct a road and conduct grubbing along the southern fence line of Kīpahoehoe Natural Area Reserve (NAR) on the southwest slopes of Hawai'i Island. Kīpāhoehoe NAR is currently bordered by the Hawaii Belt Road on the west and natural barriers to the east. There is fencing to the north and the south. The entire NAR is 5,583 acres from roughly 2 miles of shoreline up to the Hawaii Volcanoes National Park boundary at 5,600 ft elevation. The area is managed by DOFAW's Native Ecosystem Protection and Management Program (NEPM) and its Natural Area Reserve (NAR) designation demonstrates its high priority for protection within DOFAW. An Environmental Assessment (EA) was published for Kīpāhoehoe Natural Area Reserve in 2002 for management activities including fencing and removal of nonnative plants and animals from the area. The project was designated to improve and protect the habitat for native flora and fauna as well as improve and maintain the quality of the South Kona Watershed. The current project will construct 2,985 ft of road and grub a total of 4.5 acres.

**Findings**
Our records indicate that no archaeological inventory survey (AIS) has been conducted for the proposed project area. They also indicate that very few archaeological investigations have been conducted in the general vicinity of the current project area. In a letter dated April 16, 2020 (Log No. 2020.00050, Doc. No. 2004SN08), SHPD requested a field inspection of the project area to determine the presence or absence of historic properties within the project area.

Exhibit 3



The field inspection report (Folk 2020) indicates that a pedestrian survey was conducted along either side of the roadway and proposed fence line corridors. The access corridor and portions of the fence line are located on the 1919 ʻAlika lava flow. Visibility along the ʻAlika lava flow was good to excellent. Portions of the proposed fence line to the south is within a heavily forested ʻōhiʻa forest. Visibility was poor to good. The field inspection did not identify any evidence of traditional Hawaiian historic properties within the project area. The report indicates that based on geology and known history of land use that any concentrated agricultural activity associated with the Kona Field System in the Kīpāhoehoe area were likely further downslope. Pre-Contact and early post-Contact traditional activities associated with the forest elevations would have left little to no evidence on the landscape.

**Determination**
Based on the information provided, **SHPD concurs** with the DOFAW's project effect determination of "No historic properties affected" for the current project. Pursuant to HAR §13-275-7(e), when the SHPD agrees that the action will not affect any significant historic properties, this is the SHPD's written concurrence and historic preservation review ends. The historic preservation review process is ended.

**SHPD hereby notifies the DOFAW** that the project initiation process may continue.

The document titled, *Field Inspection Report for the Proposed Fencing Project at the Kīpāhoehoe Natural Area Reserve, Kīpāhoehoe Ahupuaʻa, South Kona District, Hawaiʻi Island, TMKs: [3] 8-8 001:005 (por.)* (Folk 2020) serves to facilitate project planning and supports the historic preservation review process. Please send two hard copies of the document clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version of the report to the Kapolei SHPD office, attention SHPD Library. Additionally, please send a digital copy of the report to lehua.k.soares@hawaii.gov.

In the unlikely event that subsurface historic resources, including human skeletal remains, structural remains, cultural deposits, artifacts, sand deposits, or sink holes are identified during the demolition and/or construction work, cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division, at (808) 933-7651.

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

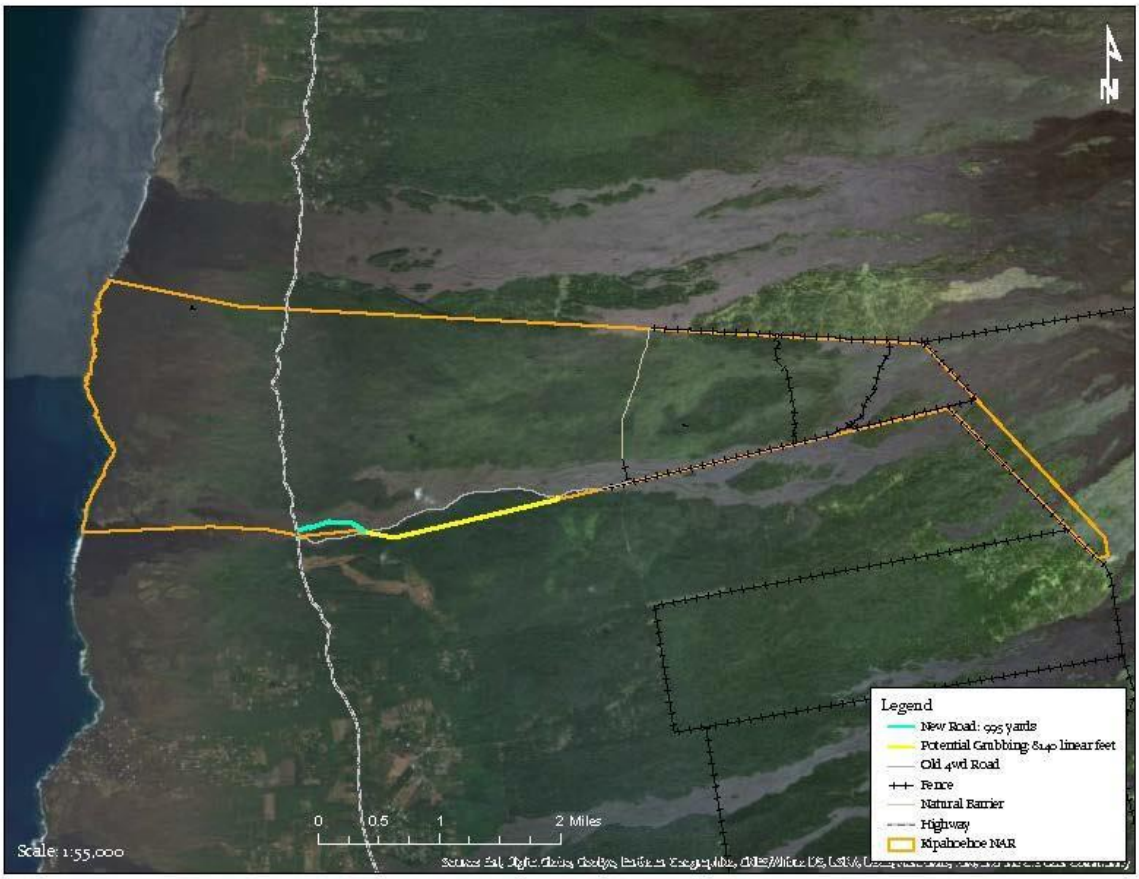
Aloha,
*Alan Downer*

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

cc. William Folk, CSH, WFolk@culturalsurveys.com

# Exhibit 4

Road Location




Proposed road is aqua colored line
Existing road that the proposed road will connect to is yellow

EXHIBIT 5

# United States Department of the Interior

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

In Reply Refer to:
01EPIF00-2021-TA-0013

October 13, 2020

Mr. Samuel J. Lemmo
Administrator
Hawaii Department of Land and Natural Resources
Office of Conservation and Coastal Lands
Post Office Box 621
Honolulu, Hawaii 96809

Subject: Technical Assistance for the Conservation District Use Application for the Kipahoehoe Natural Area Reserve Road Project in South Kona, Island and County of Hawaii

Dear Mr. Samuel J. Lemmo:

The U.S. Fish and Wildlife Service (Service) received your correspondence on September 23, 2020, requesting comments for the Conservation District Use Application (CDUA), HA-3869 for the Kipahoehoe Natural Area Reserve (NAR) Road Project at Tax Map Key: (3) 8-8-001:005 in South Kona. The Service offers the following comments to assist you in your planning process so that impacts to trust resources can be avoided through site preparation, construction, and operation. Our comments are provided under the authorities of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C 1531 *et seq.*).

**Project Description**

The proposed road construction will occur along the southern boundary of the Kipahoehoe NAR on the southwest slopes of Hawaii Island; the project is located in the protective subzone of the Conservation Use District. The proposed road will be built on barren lava flow with little vegetation. The project also includes a 60 feet by 60 feet (3,600 square feet (sq ft)) area of barren laval that will be leveled with a bulldozer for a helicopter landing zone (900 sq ft), a temporary storage area (400 sq ft), and a staff parking lot (2,300 sq ft). The proposed road and associated activities will not be paved.

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Project, there are six listed species in the immediate vicinity of the project area: the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the threatened Hawaiian goose *(Branta (Nesochen) sandvicensis)*, the

threatened Iiwi (*Drepanis coccinea*), and three endangered plant species: *Cyanea stictophylla*, *Cyanea hamatiflora* subsp. *carlsonii*, and *Phyllostegia floribunda*. Additionally, the endangered Hawaiian petrel (*Pterodroma sandwichensis*), band-rumped storm-petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*) may transit the project area flying to upland breeding colonies. The Hawaiian hawk (*Buteo solitarius*), a species listed as endangered under State of Hawaii law HRS-195D, also occurs in the project area.

To avoid and minimize potential project impacts to listed species, the following measures are recommended:

**Hawaiian hawk**

The Hawaiian hawk was recently federally delisted, but remains a listed species under Hawaii State law. The Hawaiian hawk is known to occur across a broad range of forest habitats throughout the Island of Hawaii. Loud, irregular and unpredictable activities, such as using heavy equipment or building a structure, near an endangered Hawaiian hawk nest may cause nest failure. Harassment of Hawaiian hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators.

To avoid and minimize impacts to Hawaiian hawks we recommend you incorporate the following applicable measures into your project description:

- If work must be conducted during the March 1 through September 30, the Hawaiian hawk breeding season, have a biologist familiar with the species conduct a nest search of the project footprint and surrounding areas immediately prior to the start of construction activities.
    - Pre-disturbance surveys for Hawaiian hawks are only valid for 14 days. If disturbance for the specific location does not occur within 14 days of the survey, conduct another survey.
- Clearing of vegetation or construction activities should not occur within 1,600 feet of any active Hawaiian hawk nest during the breeding season until the young have fledged.
- Regardless of the time of year, avoid trimming or cutting trees containing a hawk nest, as nests may be re-used during consecutive breeding seasons.

**Hawaiian hoary bat**

The Hawaiian hoary bat roosts in woody vegetation across all islands and will leave their young unattended in trees and shrubs when they forage. If trees or shrubs 15 feet or taller are cleared during the pupping season, June 1 through September 15, there is a risk that young bats could inadvertently be harmed or killed, since they are too young to fly or move away from disturbance. Hawaiian hoary bats forage for insects from as low as 3 feet to higher than 500 feet above the ground and can become entangled in barbed wire used for fencing.

To avoid and minimize impacts to the endangered Hawaiian hoary bat we recommend you incorporate the following applicable measures into your project description:

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

**Iiwi**

Hawaiian forest birds' current ranges are predominately restricted to montane forests above 3,500 feet in elevation due to habitat loss and threats at lower elevations. Hawaiian forest bird habitat has been lost due to development, agriculture, grazing, wildfire, and spread of invasive habitat-altering species. Forest birds are also affected by mosquito-borne diseases. Mosquitoes are not native to Hawaii; their occurrence increases in areas where ungulate presence results in small pools of standing water. Actions such as road construction and development increase human access and result in increased wildfire and invasive species threats. Grazing results in reductions in woody vegetation and increased grass cover, which reduces forest habitat quality and results in increased wildfire risk on the landscape.

Avoid conducting activities within forest bird habitat that:

- Promote the spread or survival of invasive species.
- Increase mosquito populations or stagnant water habitat.
- Increase wildfire threat to montane forest habitats.
- Remove tree cover during the peak breeding season between January 1 and June 30.

**Hawaiian goose**

Nene are found on the islands of Hawaii, Maui, Molokai, and Kauai. They are observed in a variety of habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. Threats to the species include introduced mammalian and avian predators, wind facilities, and vehicle strikes.

To avoid and minimize potential project impacts to nene we recommend you incorporate the following measures into your project description:

- Do not approach, feed, or disturb nene.
- If nene are observed loafing or foraging within the project area during the breeding season (September through April), have a biologist familiar with nene nesting behavior survey for nests in and around the project area prior to the resumption of any work. Repeat surveys after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest).
- Cease all work immediately and contact the Service for further guidance if a nest is discovered within a radius of 150 feet of proposed project, or a previously undiscovered nest is found within the 150-foot radius after work begins.
- In areas where nene are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.

**Hawaiian petrel, Newell's shearwater, and band-rumped storm petrel**

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.

To avoid and minimize potential project impacts to seabirds we recommend you incorporate the following measures into your project description:

- Fully shield all outdoor lights so the bulb 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.

***Cyanea stictophylla*, *Cyanea hamatiflora* subsp. *carlsonii*, *Phyllostegia floribunda***

Project activities may affect listed plant species by causing physical damage to plant parts (roots, stems, flowers, fruits, seeds, etc.) as well as impacts to other life requisite features of their habitat which may result in reduction of germination, growth and/or reproduction. Cutting and removal of vegetation surrounding listed plants has the potential to alter microsite conditions (e.g., light, moisture, temperature), damaging or destroying the listed plants and also increasing the risk of invasion by nonnative plants which can result in higher incidence or intensity of fire. Activities such as grazing, use of construction equipment and vehicles, and increased human traffic (i.e. trails, visitation, monitoring), can cause ground disturbance, erosion, and/or soil compaction which decrease absorption of water and nutrients and damage plant root systems and may result in reduced growth and/or mortality of listed plants. Soil disturbance or removal has the potential to negatively impact the soil seed bank of listed plant species if such species are present or historically occurred in the project area.

In order to avoid or minimize potential adverse effects to listed plants that may occur on the proposed project site, we recommend minimizing disturbance outside of existing developed or otherwise modified areas. When disturbance outside existing developed or modified sites is proposed, conduct a botanical survey for listed plant species within the project action area, defined as the area where direct and indirect effects are likely to occur. Surveys should be conducted by a knowledgeable botanist with documented experience in identifying native Hawaiian and Pacific Islands plants, including listed plant species. Botanical surveys should optimally be conducted during the wettest part of the year (typically October to April) when plants and identifying features are more likely to be visible, especially in drier areas. If surveys are conducted outside of the wet season, the Service may assume plant presence.

The boundary of the area occupied by listed plants should be marked with flagging by the surveyor. To avoid or minimize potential adverse effects to listed plants, we recommend

adherence to buffer distances for the activities in the **Table below**. Where disturbed areas do not need to be maintained as an open area, restore disturbed areas using native plants as appropriate for the location.

If listed plants occur in a project area, the avoidance buffers are recommended to reduce direct and indirect impacts to listed plants from project activities. However, where project activities will occur within the recommended buffer distances, additional consultation is required. The impacts to the plants of concern within the buffer area may be reduced by placing temporary fencing or other barriers at the boundary of the disturbance, as far from the affected plants as practicable.

The above guidelines apply to areas outside of designated critical habitat. If project activities occur within designated critical habitat unit boundaries, additional consultation is required.

Table 1. Recommended buffer distances to minimize and avoid potential adverse impacts to listed plants from activities listed below.

| **Action** | | **Buffer Distance (feet (meters)) - Keep Project Activity This Far Away from Listed Plant** | |
|---|---|---|---|
| | | **Grasses/Herbs/Shrubs and Terrestrial Orchids** | **Trees and Arboreal Orchids** |
| **Walking, hiking, surveys** | | 3 ft (1 m) | 3 ft (1 m) |
| **Cutting and Removing Vegetation By Hand or Hand Tools (e.g., weeding)** | | 3 ft (1 m) | 3 ft (1 m) |
| **Mechanical Removal of Individual Plants or Woody Vegetation (e.g., chainsaw, weed eater)** | | 3 ft up to height of removed vegetation (whichever greater) | 3 ft up to height of removed vegetation (whichever greater) |
| **Removal of Vegetation with Heavy Equipment (e.g., bulldozer, tractor, "bush hog")** | | 2x width equipment + height of vegetation | 820 ft (250 m) |
| **Ground/Soil Disturbance (Heavy Equipment)** | | 328 ft (100 m) | 820 ft (250 m) |
| **Surface Hardening/Soil compaction** | **Trails (e.g., human, ungulates)** | 20 ft (6 m) | 2x crown diameter |
| | **Roads/Utility Corridors, Buildings/Structures** | 328 ft (100 m) | 820 ft (250 m) |

**Definitions** (Wagner *et al*. 1999)

**Crown**: The leafy top of a tree.
**Herb**: A plant, either annual, biennial, or perennial, with the non-woody stems dying back to the ground at the end of the growing season.

**Shrub**: A perennial woody plant with usually several to numerous primary stems arising from or relatively near the ground.
**Tree**: A woody perennial that usually has a single trunk

**Biosecurity and Invasive Species**

We are attaching our list of Biosecurity Protocols to prevent the introduction and spread of harmful invasive species on the island of Hawaii. We encourage you to incorporate the relevant measures into your project description and all contracts for the construction/maintenance of the project.

If this potential project should receive federal funding, federal permits, or any federal authorization, it will require a Section 7 consultation with the Service. The Service only conducts Section 7 consultations with the federal action agency or their designated representative.

Thank you for participating with us in the protection of our endangered species. The Service commends the Natural Area Reserve for your continued proactive approach and commitment to the conservation and stewardship of these lands and our trust resources. If you have any further questions or concerns regarding this consultation, please contact Eldridge Naboa, Fish and Wildlife Biologist, 808-933-6964, e-mail: eldridge_naboa@fws.gov. When referring to this project, please include this reference numbers: ***01EPIF00-2021-TA-0013***.

Sincerely,

MICHELLE BOGARDUS

Digitally signed by MICHELLE BOGARDUS
Date: 2020.10.13 17:46:19 -10'00'

Michelle Bogardus
Island Team Manager
Maui Nui and Hawaii Island

Attachments:
Biosecurity Protocols – Hawaii Island

## BIOSECURTY PROTOCOL – HAWAII ISLAND (JULY 2018)

The following biosecurity protocol (based on National Park Service, State of Hawaii, U.S. Fish and Wildlife, U.S. Geological Survey, and the DOI Office of Native Hawaiian Relations guidance) should be followed when operating on Hawaii Island to prevent the introduction of harmful invasive species including frogs, ants, weeds, and fungi into local natural areas (e.g., Hawaii Volcanoes National Park, Hakalau Forest National Wildlife Refuge, State of Hawaii "Natural Areas") and areas with native habitat (habitat that is primarily composed of native vegetation), other islands in Hawaiian archipelago, or the U.S. mainland. The protocol also includes suggestions for keeping field staff safe from certain invasive species.

**1. All work vehicles, machinery, and equipment should be cleaned, inspected by its user, and found free of mud, dirt, debris and invasive species prior to entry into the natural areas or native habitat.**

a. Vehicles, machinery, and equipment must be thoroughly pressure washed in a designated cleaning area 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 hitchhikers).

b. The interior and exterior of vehicles, machinery, and equipment must be free of rubbish and food. The interiors of vehicles and the cabs of machinery must be vacuumed clean. Floor mats shall be sanitized with a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution.

c. Any machinery, vehicles, equipment, or other supplies found to be infested with ants (or other invasive species) must not enter natural areas or native habitat. Treatment is the responsibility of the equipment or vehicle owner and operator.

**2. Little Fire Ants – All work vehicles, machinery, and equipment should be inspected for invasive ants prior to entering the natural areas or native habitat.**

a. A visual inspection for little fire ants should be conducted prior to entry into natural areas or native habitat.

b. Hygiene is paramount but even the cleanest vehicle can pick up a little fire ant. Place MaxForce Complete Brand Granular Insect Bait (1.0% Hydramethylnon; http://littlefireants.com/Maxforce%20Complete.pdf) into refillable tamper resistant bait stations. An example of a commercially available refillable tamper resistant bait station is the Ant Café Pro (https://www.antcafe.com/). Place a bait station (or stations) in vehicle. Note 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 to the station.

c. Any machinery, vehicles, equipment, or other supplies found to be infested with ants (or other invasive species) must not enter natural areas or native habitat until it is sanitized and re-tested following a resting period. Infested vehicles must be sanitized following recommendations by the Hawaii 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.

d. Gravel, building materials, or other equipment such as portable buildings should be baited using MaxForce Complete Brand Granular Insect Bait (1.0% Hydramethylnon; http://littlefireants.com/Maxforce%20Complete.pdf) or AmdroPro (0.73% Hydramethylnon; http://littlefireants.com/Amdro%20Pro.pdf) following label guidance.

e. Storage areas that hold field tools, especially tents, tarps, and clothing should be baited using MaxForce Complete Brand Granular Insect Bait (1.0% Hydramethylnon; http://littlefireants.com/Maxforce%20Complete.pdf) or AmdroPro (0.73% Hydramethylnon; http://littlefireants.com/Amdro%20Pro.pdf) following label guidance.

**3. Base yards and staging areas inside and outside areas must be kept free of invasive species.**
a. Base yards and staging areas should be inspected at least weekly for invasive species and any found invasive removed immediately. Pay particular attention to where vehicles are parked overnight, keeping areas within 10-meters of vehicles free of debris. Parking on pavement and not under trees, while not always practical is best.

b. Project vehicles or equipment stored outside of a base yard or staging area, such as a private residence, should be kept in a pest free area.

**4. All cutting tools must be sanitized to prevent the Rapid Ohia Death (ROD) fungus.**
a. Avoid wounding ohia trees and roots with mowers, chainsaws, weed eaters, and other tools. Cut only the minimum amount of trees and branches as approved for the project.

b. All cutting tools, including machetes, chainsaws, and loppers must be sanitized to remove visible dirt and other contaminants prior to entry into natural areas or areas with native habitat, and when moving to a new project area within the native habitat area. Tools may be sanitized using a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution. One minute after sanitizing, you may apply an oil based lubricant to chainsaw chains or other metallic parts to prevent corrosion.

c. Only dedicated tools and chainsaws should be used to sample known or suspected ROD infected trees.

d. Vehicles, machinery, and equipment must be cleaned as described in (1) above.

**5. Imported firewood, logs, and ohia parts:**
a. Ohia firewood, ohia logs, and ohia parts should not be transported.

**6. For individuals working in the field:**
a. **Before going into the field**, visually inspect and clean your 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 should be sanitized using a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution.

b. **Immediately before leaving the field,** visually inspect and clean your clothes, boots, pack, radio harness, tools, and other personnel gear and equipment, for seeds, soil, plant parts, insects, and other debris. Soles of shoes should be sanitized using a solution of >70% isopropyl alcohol or a freshly mixed 10% bleach solution.

c. **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 cause inch long welts that are itchy and painful, and can last for weeks. Treat stings as you would other insect stings. In some persons stings can produce life threatening reactions. Stocking antihistamine in the first aid kit is a reasonable precaution.

d. **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 1-6 weeks after exposure. The disease is not spread person to person. Anyone who handles snails or slugs should wear gloves and/or wash hands. Eating unwashed produce is discouraged.

**References Cited**

USFWS. 2010. Endangered and threatened wildlife and plants; determination of endangered status for 48 species on Kauai and designation of critical habitat. Federal Register 75: 18960–19165.

. 2012. Endangered and threatened wildlife and plants; endangered status for 23 species on Oahu and designation of critical habitat for 124 species; final rule. Federal Register 77: 57648–57862.

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Wagner, W.L., Sohmer, S., and D.R. Herbst. 1999. Manual of the flowering plants of Hawaii, revised edition. Honolulu, Hawaii. University of Hawaii and Bishop Museum Press. 1,919 pp.