HONOAPIʻILANI HIGHWAY IMPROVEMENTS PROJECT,
WEST MAUI: UKUMEHAME TO LAUNIUPOKO

Appendix 3.9 – Water Resources, Wetlands, and Floodplains - Supplemental Information

November 2025

Prepared for

Honoapiʻilani Highway Improvements

Prepared by

wsp

November 2025

Contents

HT Harvey & Associates
Preliminary Identification of Waters of the United States - Technical Report

November 2025





H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellence

Honoapiilani Highway Improvement Project
Preliminary Identification of Waters of the United States
Technical Report

Project # 4692-02

Prepared for:

WSP USA
1001 Bishop Street, Suite 2400
Honolulu, HI 96813

Prepared by:

H. T. Harvey & Associates

December 2023

Executive Summary

During 23 visits from January-September 2023, H. T. Harvey & Associates wetland ecologists performed a delineation of wetlands and other waters in support of the Honoapiilani Highway Improvement Project located in West Maui. The Project Area overlaps three watersheds in West Maui: Ukumehame, Olowalu, and Launiupoko. Approximately 902 acres within the Project's study area, which was defined to encompass the project's temporary and permanent impact areas, were surveyed for jurisdictional waters (wetlands and other waters) that may be subject to regulation under Section 404 of the Clean Water Act administered by the U.S. Army Corps of Engineers. This area (902 acres) included a 300 feet swath centered around each of the four proposed Build Alternatives and an additional 37 acres outside of these Build Alternatives. Because the study spanned from January to September, it allowed for observations and consideration of both wet and dry seasons when sampling. The results are based on the observation of conditions present across these multiple surveys. In total, 9.130 acres of jurisdictional wetlands and other waters were mapped in the wetland delineation study area. When estimated separately for each Build Alternative this includes: 0.228 and 1.337 acres of jurisdictional wetlands and other waters respectively in Build Alternative 1; 4.365 and 2.255 acres of jurisdictional wetlands and other waters respectively in Build Alternative 2; 4.365 and 2.280 acres of jurisdictional wetlands and other waters in Build Alternative 3; and zero jurisdictional wetlands and 1.777 acres of jurisdictional other waters in Build Alternative 4. Additionally, 16.709 acres of potentially isolated non-jurisdictional wetlands and other waters were identified within the study area If determined to be waters of the U.S., these features would be regulated under Section 401 of the Clean Water Act.

Habitat Type	Area (acres)	Notes
Total Jurisdictional Wetlands	***4.593***	
Wetland 1	*4.131*	*Surface connection to the Pacific Ocean via Ditch 7 and the Hanaula Gulch culvert under the existing highway*
Wetland 3	*0.228*	*Surface connected to the Pacific Ocean via the Hanaula Gulch*
Wetland 4	*0.234*	*Surface connected to the Pacific Ocean via the Hanaula Gulch*
Total Potentially Isolated Non-Jurisdictional Wetlands	***16.672***	
Wetland 2	*0.442*	*No surface connection to the ocean*
Wetland 5	*0.910*	*Wetlands 5 and 6 are connected in the area in between the Build Alternatives. Wetland 6 is separated from Wetland 4 via a built-up dirt road and fence. No surface connection to the ocean*
Wetland 6	*0.949*	*Wetlands 5 and 6 are connected in the area in between the Build Alternatives. Wetland 6 is separated from Wetland 4 via a built-up dirt road and fence. No surface connection to the ocean*

Habitat Type	Area (acres)	Notes
Wetland 7	*0.811*	*No surface connection to ocean*
Wetland 8	*4.792*	*No surface connection to ocean*
Wetland 9	*0.153*	*No surface connection to ocean*
Wetland 10	*8.575*	*No surface connection to ocean*
Wetland 11	*0.040*	*No surface connection to ocean*
Total Jurisdictional Other Waters	***4.537***	
Manawaipueo Gulch	*0.140*	*Connection to Pacific Ocean via culvert under the existing highway*
Papalaua Gulch	*1.670*	*Connection to Pacific Ocean via culvert under the existing highway*
Hanaula Gulch	*0.160*	*Connection to Pacific Ocean via culvert under the existing highway*
Ditch 1	*0.041*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 2	*0.040*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 3	*0.037*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 4	*0.049*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 5	*0.018*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 6	*0.186*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 7	*0.226*	*Connection to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 8	*0.380*	*Vicinity of Pohaku Aeko Street. Connection to Pacific Ocean via culvert under the existing highway*
Ukumehame Stream	*0.330*	*Connection to Pacific Ocean via culvert under the existing highway*
Ditch 9	*0.370*	*Vicinity of Ehehene Street. Connection to Pacific Ocean via culvert under the existing highway*
Mopua Stream	*0.200*	*Connection to Pacific Ocean via culvert under the existing highway*
Olowalu Stream	*0.260*	*Connection to Pacific Ocean via culvert under the existing highway*
Lihau Stream	*0.160*	*Connection to Pacific Ocean via culvert under the existing highway*
Awalua Stream	*0.150*	*Connection to Pacific Ocean via culvert under the existing highway*
Ka Puali Stream	*0.120*	*Connection to Pacific Ocean via culvert under the existing highway*

Habitat Type	Area (acres)	Notes
Total Potentially Isolated Non-Jurisdictional Other Waters	**0.037**	
Ditch 10	*0.007*	*No surface connection to another ditch or stream or ocean.*
Ditch 11	*0.009*	*No surface connection to another ditch or stream or ocean.*
Ditch 12	*0.021*	*No surface connection to another ditch or stream or ocean.*
Total Potential Waters of the U.S.	**9.130**	
Total Potentially Isolated Non-Jurisdictional Waters of the U.S.	**16.709**	
Total Non-Jurisdictional Upland Areas	**876.161**	
Wetland Delineation Study Area Total	**902.000**	

Table of Contents

Tables

Figures

Appendices

List of Preparers

Kelly Hardwicke, Ph.D., Principal-in-Charge, Plant and Wetland Ecologist

Shahin Ansari, Ph.D., Project Manager, Senior Plant and Wetland Ecologist

Terrell Erickson, M.S., Senior Associate, Wetland Ecologist

Sadie Trush, Ph. D. GIS Specialist

Section 1.0 Project Introduction and Purpose

1.1 Project Description

The Federal Highway Administration (FHWA), in cooperation with the State of Hawaii Department of Transportation (HDOT), is planning the Honoapiilani Highway Improvements Project. The proposed project is in West Maui, in the areas served by the existing Honoapiilani Highway between milepost 11 and milepost 17 (Figure 1). Honoapiilani Highway, which is part of Maui's Belt Road system, is a two-lane principal arterial highway that provides the sole access between communities along the west coast of Maui and the rest of the island. The proposed southeastern terminus at milepost 11 is in Ukumehame, in the vicinity of Papalaua Wayside Park, and the northwestern terminus of the project is at milepost 17 in Launiupoko, where Honoapiilani Highway currently intersects the southern terminus of the Lahaina Bypass. This approximately six-mile-long and 3/4-mile-wide Project Area is composed predominantly of a coastal plain that includes the ahupuaa of Ukumehame, Olowalu, and Launiupoko. Offshore, the Olowalu reef area, which extends from Ukumehame to Launiupoko, hosts about 1,000 acres of some of the healthiest and oldest living corals within the main Hawaiian Islands. The proposed project does not include work on the existing highway except where the new project joins the existing highway at the northern and southern connection points and potentially at connector roads to ensure continued access to residences, businesses, and public beaches. Additionally, there is no in-stream work planned for this project.

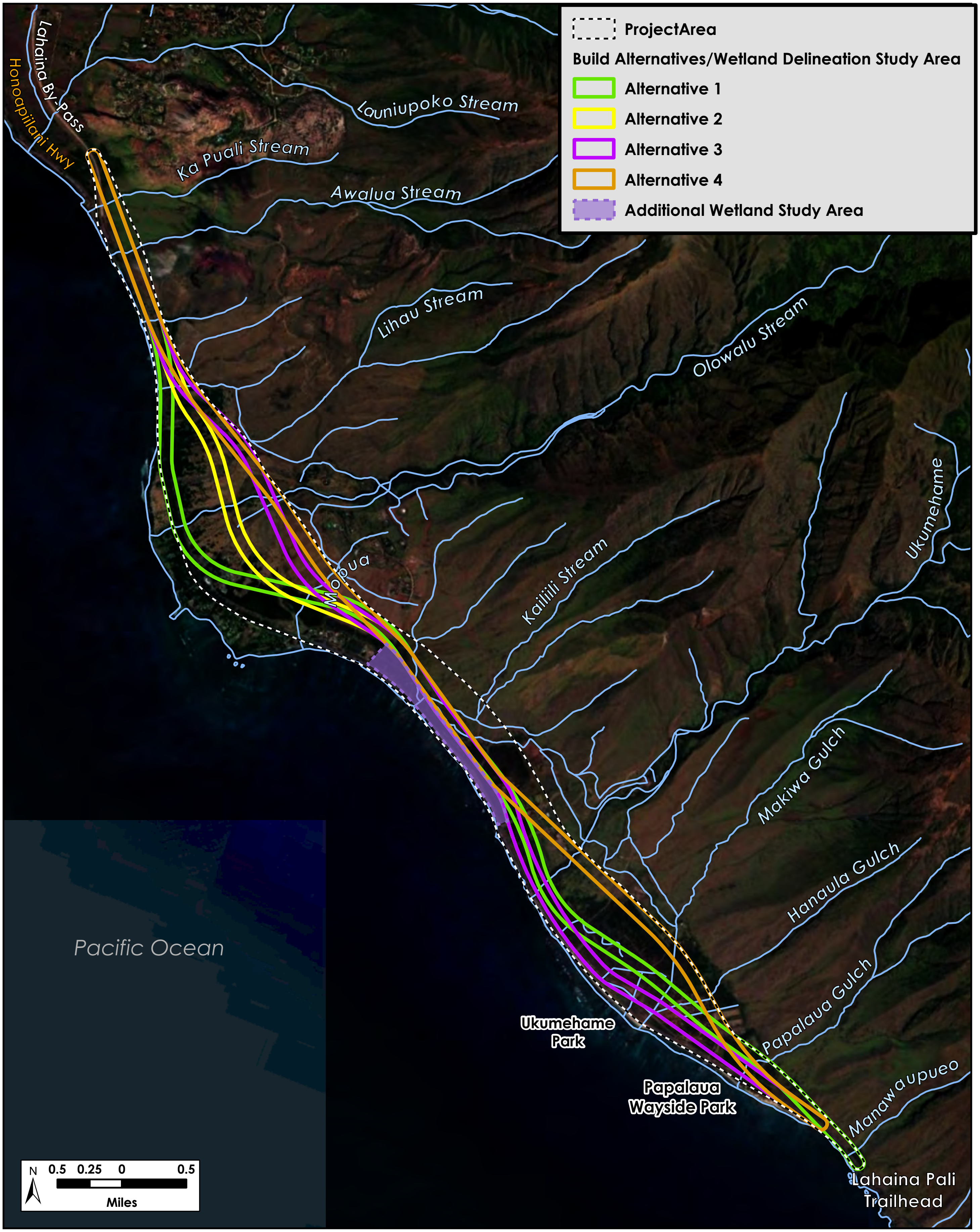
1.1.1 Project Alternatives

A Preferred Alternative has not yet been identified. Four draft "Build Alternatives" have been identified (Figure 2) and are being evaluated in the Draft Environmental Impact Statement currently underway. Each alternative involves the construction of a new highway, which is mainly along a new alignment, further inland from the ocean. Build Alternative 1 has been adapted from the County of Maui's Pali to Puamana Parkway 2005 coastal or makai concept. This alignment has been "modified" to apply American Association of State Highway and Transportation Officials (AASHTO) design standards, bypass erosion areas, and avoid cultural resources. This alternative is just mauka (mountain side or inland) of most inundation areas in Launiupoko and Olowalu, and maximizes use of the existing right-of-way. Build Alternative 2 has been adapted from the County of Maui's Pali to Puamana Parkway 2005 "middle" concept. The alignment was "modified" to apply AASHTO standards, bypass erosional areas, and avoid cultural resources. Build Alternative 3 has been adapted from the County of Maui's Pali to Puamana Parkway 2005 mauka concept. The alignment was "modified" to apply AASHTO standards, bypass erosional areas, and avoid cultural resources. Build Alternative 4 was also adapted from the County of Maui's Pali to Puamana Parkway 2005 mauka concept. The alignment has been "corrected" to apply AASHTO standards, bypass erosional areas, and avoid cultural resources. The route through Olowalu town, which distinguishes this alignment, is based on landowner input provided in 2007. This alignment meets the 55 miles per hour (mph) design speed (with speed signs to be posted at 45 mph), while minimizing curves. The alignments converge at several points and there are two distinct areas where the alignments all differ from one

N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Project Vicinity
Honoapiilani Highway (4692)
September 2023



H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 2. Wetland Delineation Study Area
Honoapiilani Highway (4692)
September 2023

another: one in Olowalu and the other in Ukumehame. The preferred alternative may be selected from two proposed alternatives, one in each of the two differing areas.

None of the Build Alternatives discussed below involves work in the ocean. Additionally, there is no in-stream work planned for this Project. The bridges over the streams will be built outside of the ordinary high water mark (OHWM). All Project alternatives will incorporate Best Management Practices as prescribed by FHWA, U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration, and other agencies participating in the review and approval of the proposed Project. It is also noted that no night work is anticipated during construction, and construction duration is anticipated to be no longer than two years. However, should night work be required, additional coordination will be conducted with USFWS and the Hawaii Department of Land and Natural Resources (DLNR) to agree upon any other appropriate conservation measures.

1.2 Survey Scope and Purpose

The U.S. Army Corps of Engineers (USACE) regulates placement of dredged and/or fill material within wetlands (a type of special aquatic site) and other "waters of the United States" (WoUS) under provisions of Section 404 of the Clean Water Act (CWA, formerly Federal Water Pollution Control Act) and Section 10 of the Rivers and Harbors Act of 1899. Under Section 404 of the CWA, dredged and fill material may not be discharged into WoUS (including wetlands) without a permit. Project activities described above in Section 1.1 may result in the discharge of materials in WoUS that might occur in the Project Area. The purpose of this study was to identify the extent and distribution of potential Section 404 waters including any associated wetlands (special aquatic sites) that might be impacted by proposed Project activities within the Project's wetland delineation study area. This wetland delineation study area was composed of a 300-foot wide swath centered on each proposed Build Alternative, extending the entire project length, plus an additional approximately 37 acres outside and west of the overlapping Build Alternatives between Olowalu and Ukumehame (Figure 2). H. T. Harvey & Associates examined the study area for features that may meet the physical criteria and regulatory definition of Section 404 wetlands and other waters.

1.3 Site Description

The Project Area generally consists of undeveloped land, historic agricultural uses, open space, rural residential, and state conservation land uses. The town of Lahaina is about 4 miles north of the northern end of the Project Area. Toward Lahaina to the north and west of the Project Area, the land use is more residential along and mauka (inland) of Lahaina Bypass. To the south and east, no developed land uses are along Honoapiilani Highway until the central Maui community of Maalaea. The Project Area is rural in character and contains mostly open lands along with historic settlements in Olowalu and newer low-density residential development inland of the existing highway corridor at the base of the mountains. Olowalu and Ukumehame areas were heavily influenced by the development of large-scale plantation agriculture that dramatically changed and still influences much of the existing landscape in the Project Area. Mauka (inland) of the Project Area there are limited residential uses, cultural sites, and reserve areas, and sparse residential uses. Elevation within the study area ranges from a couple feet above sea level to about 50 feet above mean sea level (Figure 3). In the mountains, land use is predominantly undeveloped open space as part of the West Maui Nature Reserve and the recently approved DLNR Wildlife Reserve.

The entire study area is situated at the foot of the west Maui Mountain and overlaps three watersheds: Ukumehame, Olowalu, and Launiupoko. Ukumehame is the perennial stream that intersects the Project Area and drains this 4.3 square mile (sq mile) watershed. Similarly, Olowalu is a perennial stream that intersects all four Build Alternatives in the Olowalu peninsula and drains a 4.8 sq mile area. The study area partially overlaps the Launiupoko watershed and the main perennial Launiupoko stream, which drains a 3.4 sq mile area outside of the study area. The ocean-side or western-most Build Alternatives are situated in the west Maui coastal floodplain; one of the primary reasons to address existing coastal erosion and flooding, as well as future coastal erosion and flooding caused by anticipated sea level rise.

The climate at the Project Area is typical of leeward West Maui – warm subtropical with average temperatures (°F) over a given year ranging from the low 60s to upper 80s. Situated on the leeward lowlands of West Maui, the entire Project Area is very dry and according to Giambelluca et al. (2013), receiving mean annual rainfall levels of approximately 30 inches with most of the annual precipitation occurring during the winter months from November through March and the least amount of precipitation during the summer. Typically, the predominant trade winds blow from east to west; this pattern changes during the winter months when meteorological conditions shift in response to approaching North Pacific cold fronts, causing winds to become more westerly ("kona winds") and delivering increased precipitation to leeward areas. Severe storms have historically been infrequent in this region of Maui.

Eleven soil units are mapped by the Natural Resources Conservation Service (NRCS) within the study area (Figure 4). Table 1 summarizes the associated texture, drainage classification, landform setting, and hydric soil status (NRCS 2023a) for these soil types found within the study area.

Table 1. Soil Type, Texture, Drainage Classification, and Hydric Status for the Soil Types Occurring in the Honoapiilani Wetland Study Area

Soil Symbol	Soil Name	Soil Texture	Drainage Classification	Landform	Hydric Status
EaA	Ewa Silty Clay Loam	Silty clay loam	Well drained	Alluvial fans, stream terraces, mountain slopes	No
JaC	Juacas Sand	Sand	Excessively drained	Beaches	No
KMW	Kealia Silty Loam	Silt loam, loam	Poorly drained	Tidal flats, salt marshes	Yes
PpA	Pulehu Clay Loam	Silt loam, silty clay loam	Well drained	Alluvial fans	No

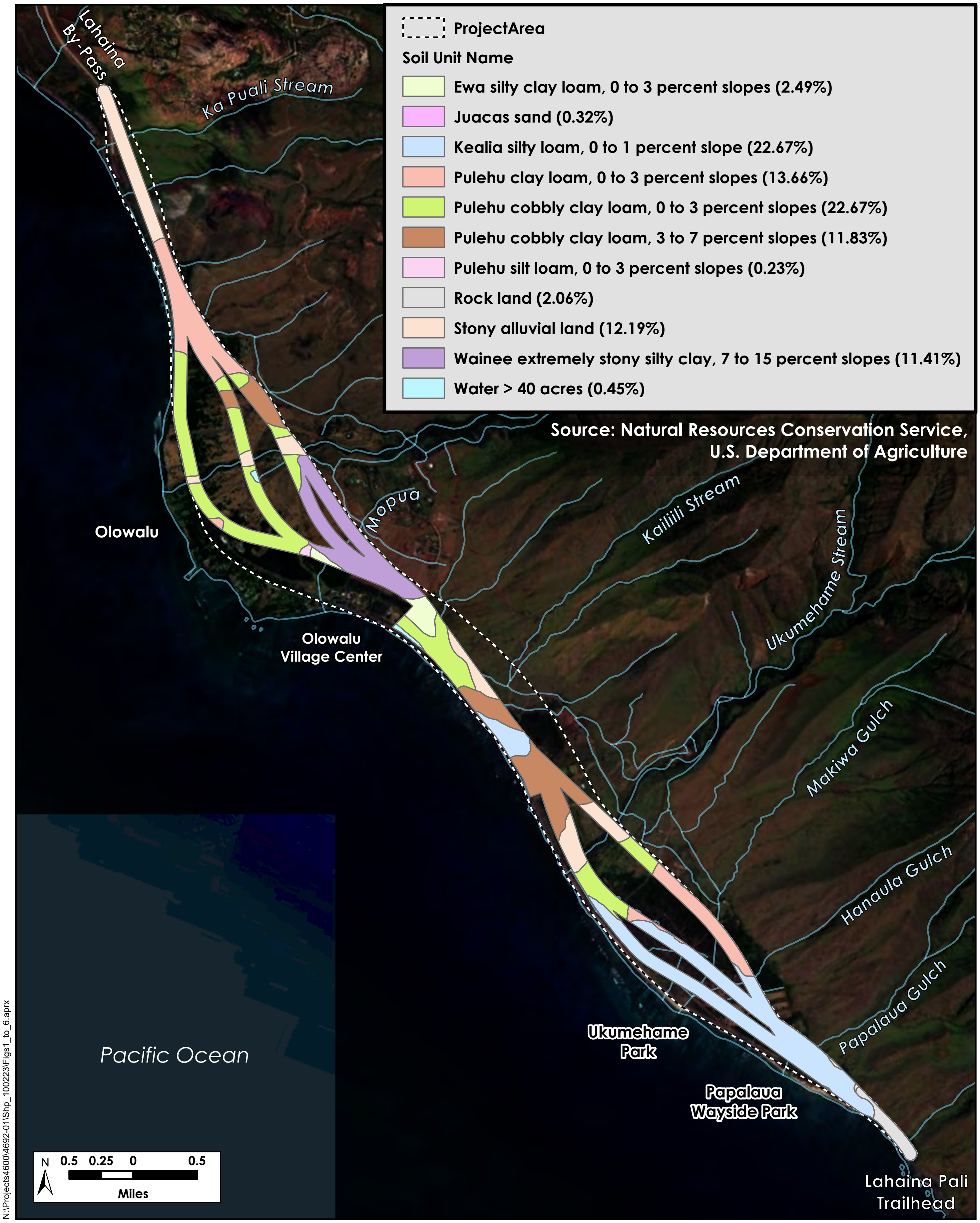
Soil Symbol	Soil Name	Soil Texture	Drainage Classification	Landform	Hydric Status
PtA (0-3% slopes)	Pulehu Cobbly Clay Loam	Cobbly clay PtBloam, slitly clay laom	Well drained	Alluvial fans	No
PtB (3-7% slopes)	Pulehu Cobbly Clay Loam	Cobbly clay PtBloam, slitly clay laom	Well drained	Alluvial fans	No
PpA	Pulehu Silt Loam	Silt loam, silty clay loam	Well drained	Alluvial fans	No
rRK	Rock Land	Silty clay loam, silty clay, bedrock	Well drained	Lava flows	No
rSM	Stony Alluvial Land	Extremely stony clay loam, boulder silty clay loam	Well drained	Alluvial fans	No
WyC	Wainee Extremely Stony Silty Clay	Extremely stony silty clay loam	Well drained	Slopes, alluvial fans	No
W	Water	n/a	n/a	n/a	n/a

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) map of the Project Area is depicted in Figure 5 (NWI 2023). The NWI identifies 20 aquatic features within the Project Area which fall into the following three classifications:

- Sixteen streams and tributaries intersect the study area and are mapped as Riverine, Intermittent, Streambed, Temporarily Flooded.
- Three features—two in the Olowalu peninsula and the HDOT sedimentation basin in Ukumehame are mapped as Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded.
- One feature at the northern end of the Project Area at the Lahaina Bypass end is mapped as Palustrine, Emergent, Persistent, Seasonally Flooded.

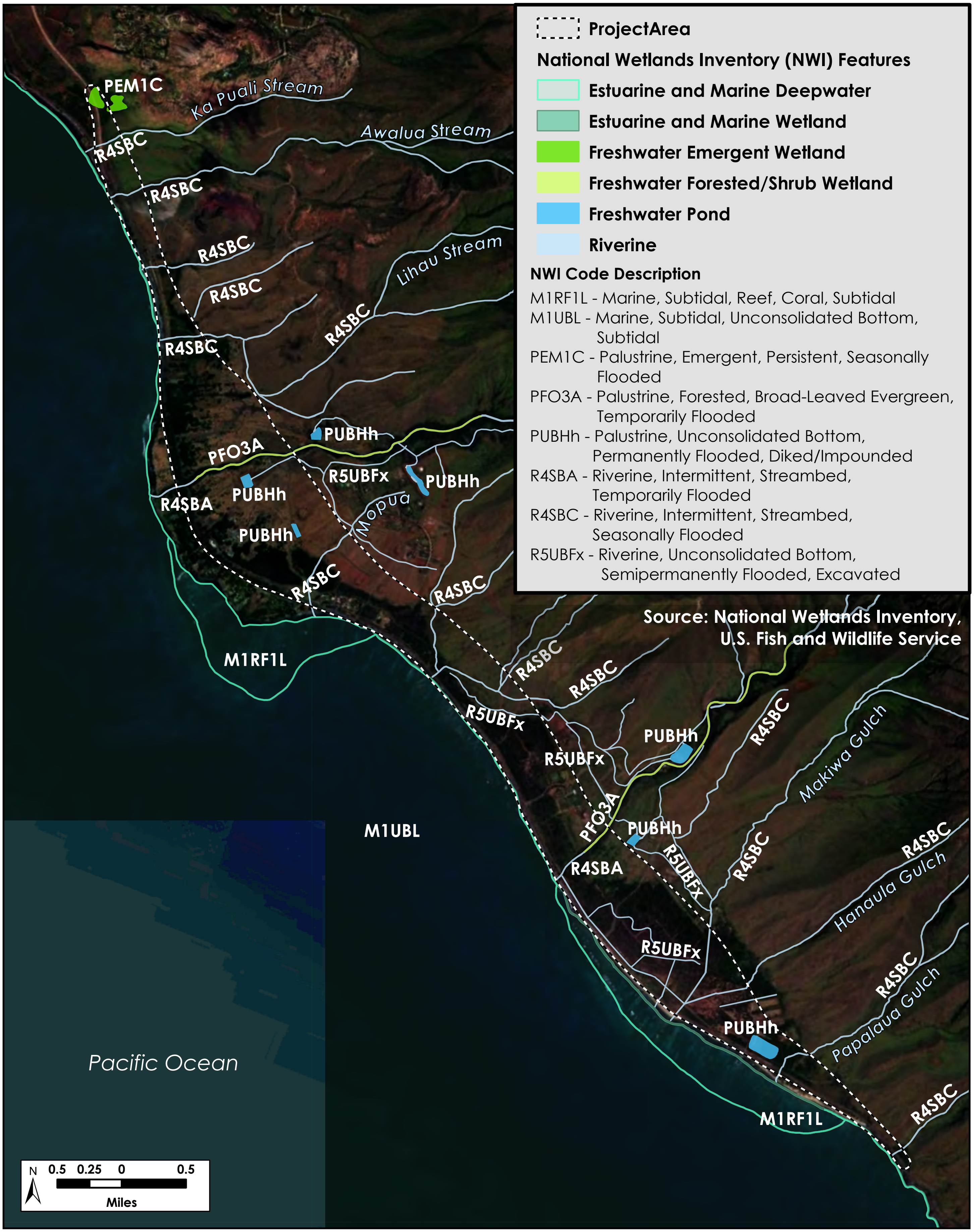
H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 3. Topographic Map
Honoapiilani Highway (4692)
September 2023



H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 4. Soils Map
Honoapiilani Highway (4692)
September 2023



N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 5. National Wetlands Inventory Map
Honoapiilani Highway (4692)
September 2023

Section 2.0 Survey Methods

Before the survey was conducted, H. T. Harvey & Associates reviewed topographic maps and current and historical aerial photos of the Project Area. These sources included the U.S. Geological Survey topographic map, NWI, Google Earth software (Google Inc. 2023), NRCS Soil Survey (NRCS 2023a, b), Hawaii Watershed Atlas (Parham et al. 2008), and State of Hawaii Geographic Information System (GIS) data for streams (Office of Planning 2017). With background information gleaned from these sources, H. T. Harvey & Associates' certified wetland ecologists, Shahin Ansari and Terrell Erickson, performed a technical determination and delineation of Section 404 wetland and other waters in the study area between January and September 2023.

The technical determination was performed in accordance with the *U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual* (Corps Manual) (Environmental Laboratory 1987). In addition, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Region (Version 2.0)* (Regional Supplement) (USACE 2012) was followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. H. T. Harvey & Associates wetland ecologists performed preliminary mapping of the extent and distribution of wetlands and other WoUS that may be subject to regulation under Section 404 of the CWA. The following sections present descriptions of the methods used to identify Section 404 jurisdictional waters (wetlands and other waters).

2.1 Identification of Jurisdictional Waters

The "Routine Determination Method, On-Site Inspection Necessary (Section D)" outlined in the Corps Manual (Environmental Laboratory 1987), and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Hawaii and Pacific Islands Region (USACE 2012) were used to examine the vegetation, soils, and hydrology on site. This three-parameter approach to identifying wetlands is based on the presence of a prevalence or dominance of hydrophytic vegetation, hydric soils, and wetland hydrology.

In addition to applying these survey methods, we compiled this report in accordance with guidance provided in *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* (USACE 2016). This document lists the information that must be submitted as part of a request for a jurisdictional determination, including:

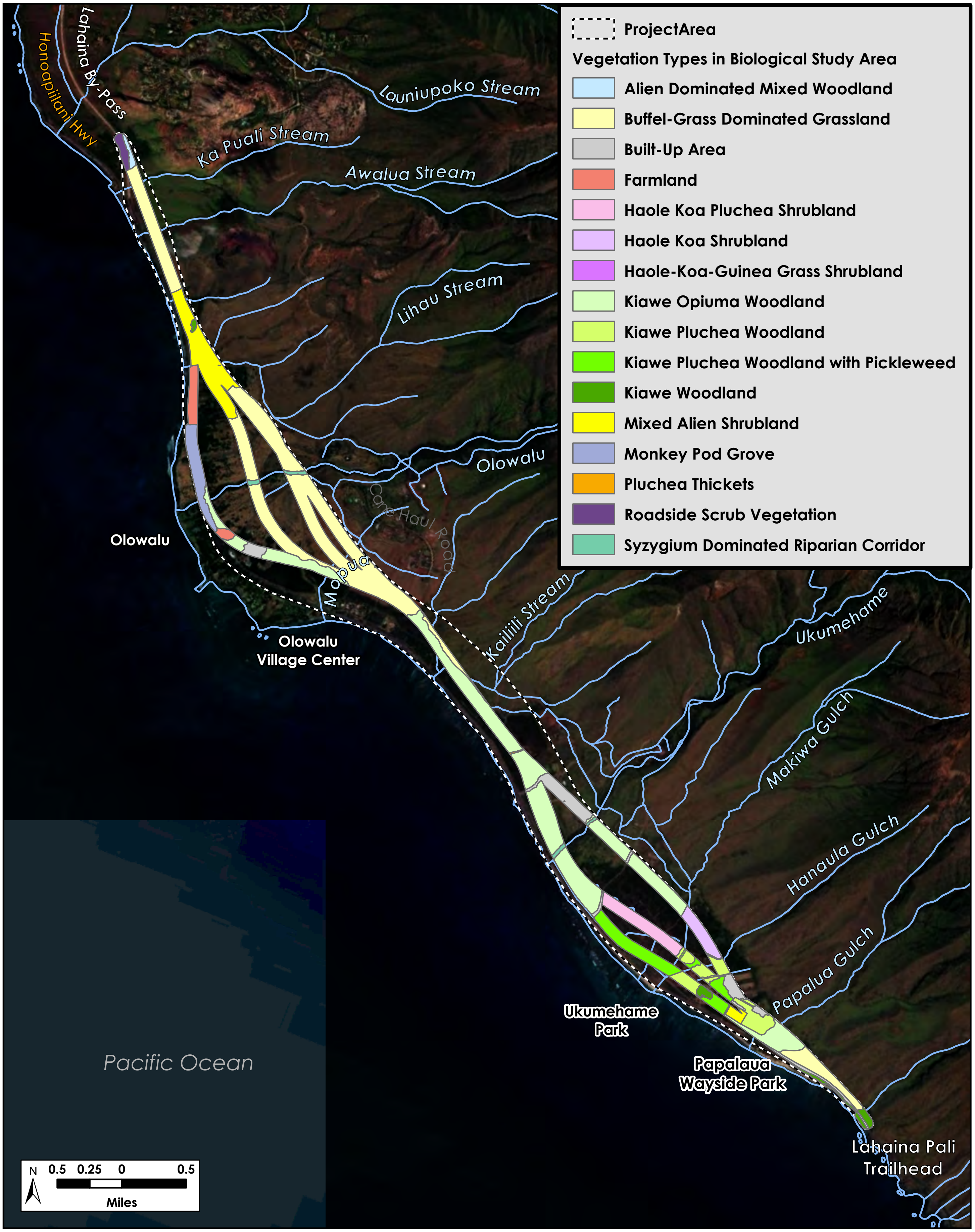
- Vicinity map (Figure 1)
- Project Area and wetland study area map (Figure 2)
- U.S. Geological Survey topographic map (Figure 3)
- NRCS Soils map (Figure 4)
- NWI map (Figure 5)

- Habitat map (Figure 6)
- Preliminary identification of waters maps (Figures 7, 8, 9, and 10)
- Plant species observed (Appendix A)
- Current Soil Survey Report (Appendix B)
- Wetland delineation data forms and photo documentation (Appendix C)
- Photo point locations (same as sample point locations, and numbered according to sample points on Figures 7, 8, and 9; additional photo points only on Figure 7). Photo points correspond to photos in Appendix C.
- OHWM delineation data forms and photo documentation (Appendix D)
- Written rationale for sample point choice (Section 3.3.1 Rational for Sample Points and OHWM datasheets that include rationale for OHWM transects)

During the survey, the study area was examined for topographic features, drainages, alterations to site hydrology or vegetation, and recent significant disturbance. A determination was then made as to whether normal environmental conditions were present at the time of the field survey. In the field, the techniques used to identify wetlands included digging of soil pits in the study area (also see "Hydric Soils" under Section 2.1.1), observing the vegetation growing near the soil sample points, and characterizing the current surface and subsurface hydrologic features present near the sample points through both observation of indicators and direct observation of hydrology. Features meeting wetland vegetation, soil, and hydrology criteria were then mapped in the field using a sub-meter Global Positioning System (GPS) unit.

2.1.1 Regulatory Regime

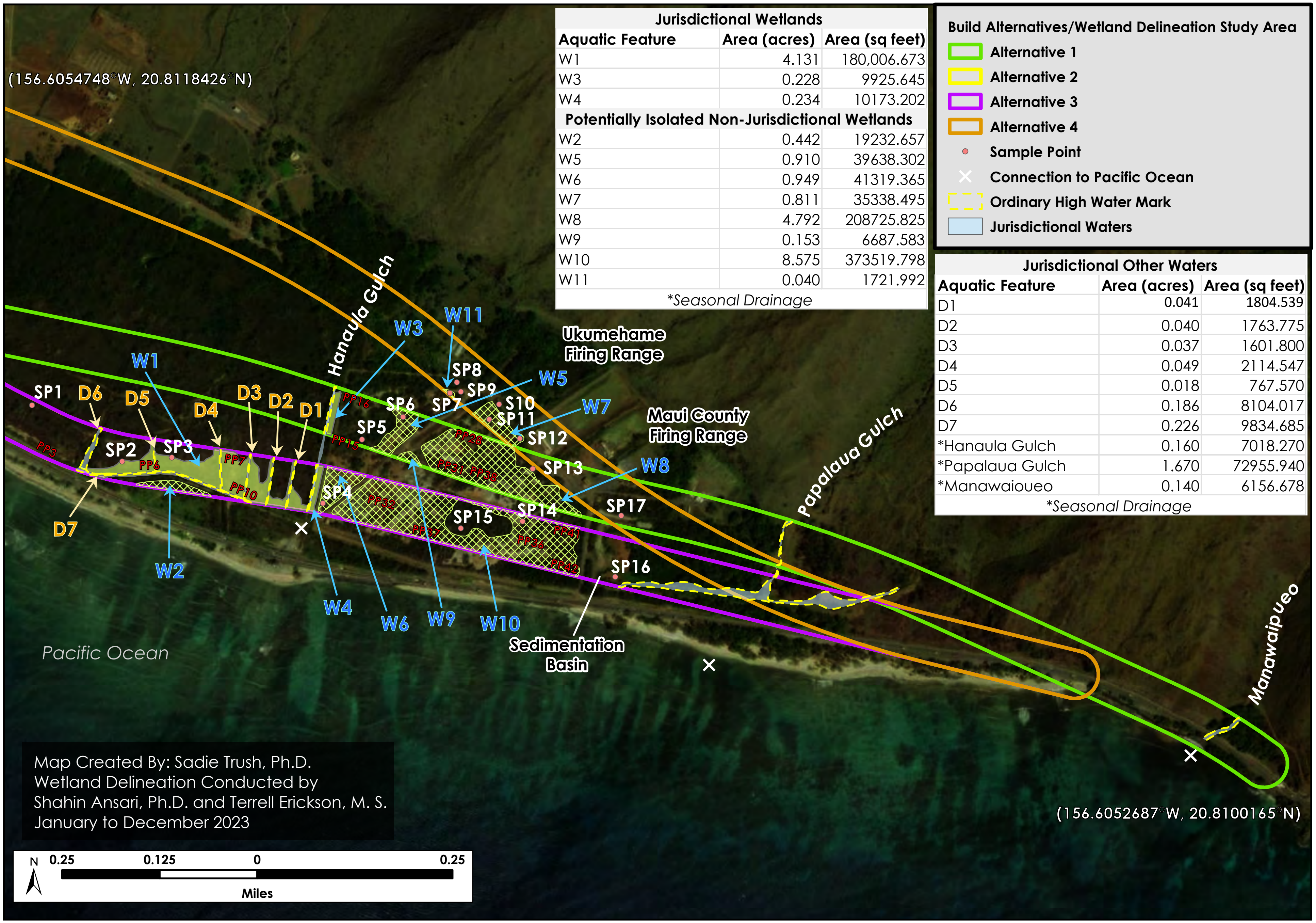
On December 30, 2022, the U.S. Environmental Protection Agency and Department of the Army (the agencies) announced a final "Revised Definition of 'Waters of the United States'" rule founded upon the pre-2015 definition of "waters of the United States." This rule was formally adopted in January 2023. To determine jurisdiction for tributaries, adjacent wetlands, and additional waters, the January 2023 rule relies on the longstanding approach of applying two standards. Certain types of waters are jurisdictional under the final rule if they meet either the relatively permanent standard or significant nexus standard. This report has been prepared consistent with the January 2023 rule but does not attempt to formally determine jurisdictional WoUS status in light of the May 25, 2023, Supreme Court decision in *Sackett v. Environmental Protection Agency* due to the lack of detailed guidance on that implementation at the time of the drafting. However, substantial consideration has been made in this report to describe surface connection of various features to the Pacific Ocean, to support the USACE determinations on which features constitute regulated WoUS under the current regulatory regime.



D:\Projects4600\4692-01\SadieMaps\HonoHabitat\HonoHabitat.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 6. Habitat/Vegetation Types
Honoapiilani Highway (4692)
September 2023



Jurisdictional Wetlands

Aquatic Feature	Area (acres)	Area (sq feet)
W1	4.131	180,006.673
W3	0.228	9925.645
W4	0.234	10173.202
Potentially Isolated Non-Jurisdictional Wetlands		
W2	0.442	19232.657
W5	0.910	39638.302
W6	0.949	41319.365
W7	0.811	35338.495
W8	4.792	208725.825
W9	0.153	6687.583
W10	8.575	373519.798
W11	0.040	1721.992

**Seasonal Drainage*

Jurisdictional Other Waters

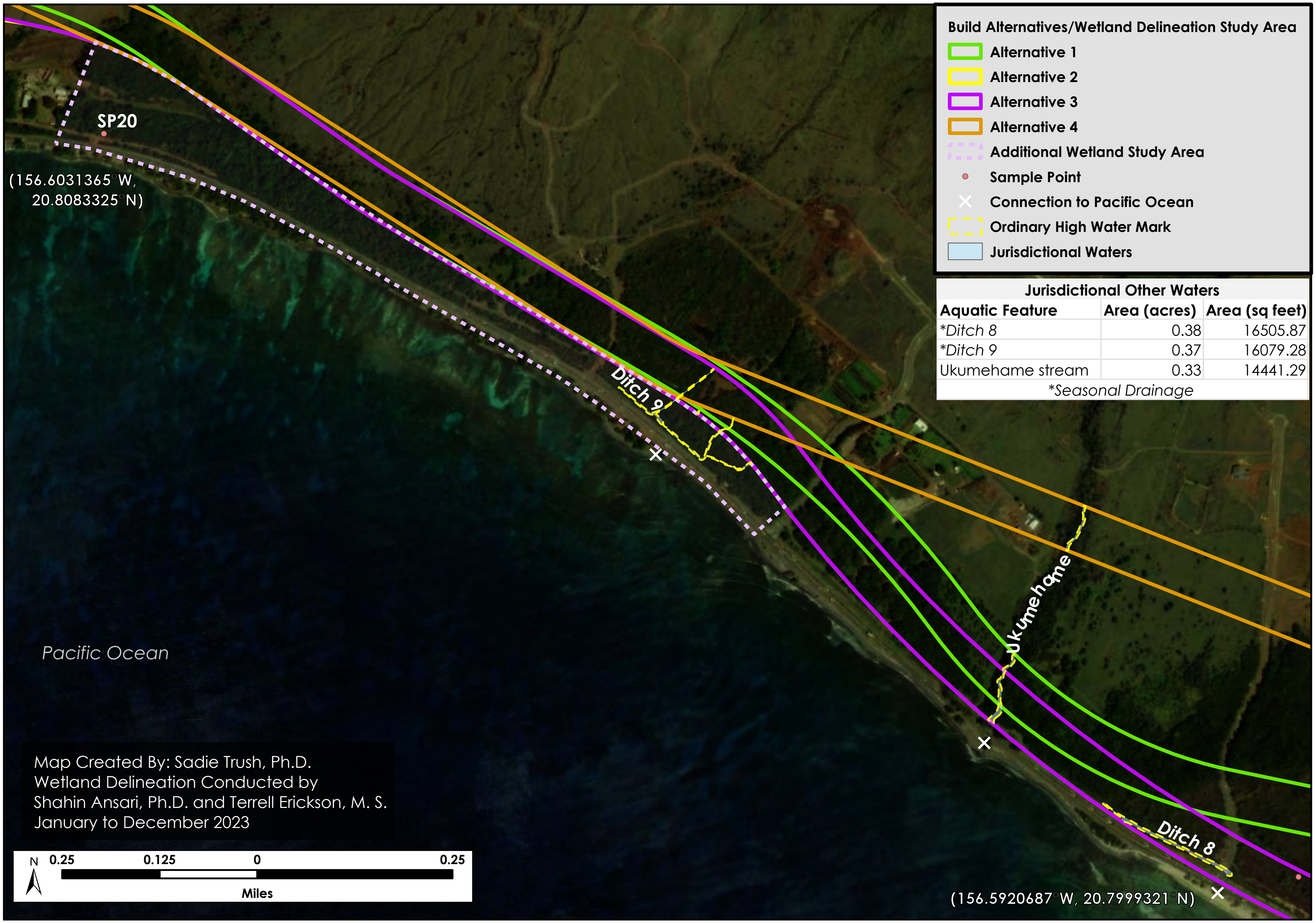
Aquatic Feature	Area (acres)	Area (sq feet)
D1	0.041	1804.539
D2	0.040	1763.775
D3	0.037	1601.800
D4	0.049	2114.547
D5	0.018	767.570
D6	0.186	8104.017
D7	0.226	9834.685
*Hanaula Gulch	0.160	7018.270
*Papalaua Gulch	1.670	72955.940
*Manawaioueo	0.140	6156.678

**Seasonal Drainage*

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 7. Preliminary Identification of Jurisdictional Wetlands, Potentially Isolated Non-Jurisdictional Wetlands, and Jurisdictional Other Waters in the Palalaua and Ukumehame Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



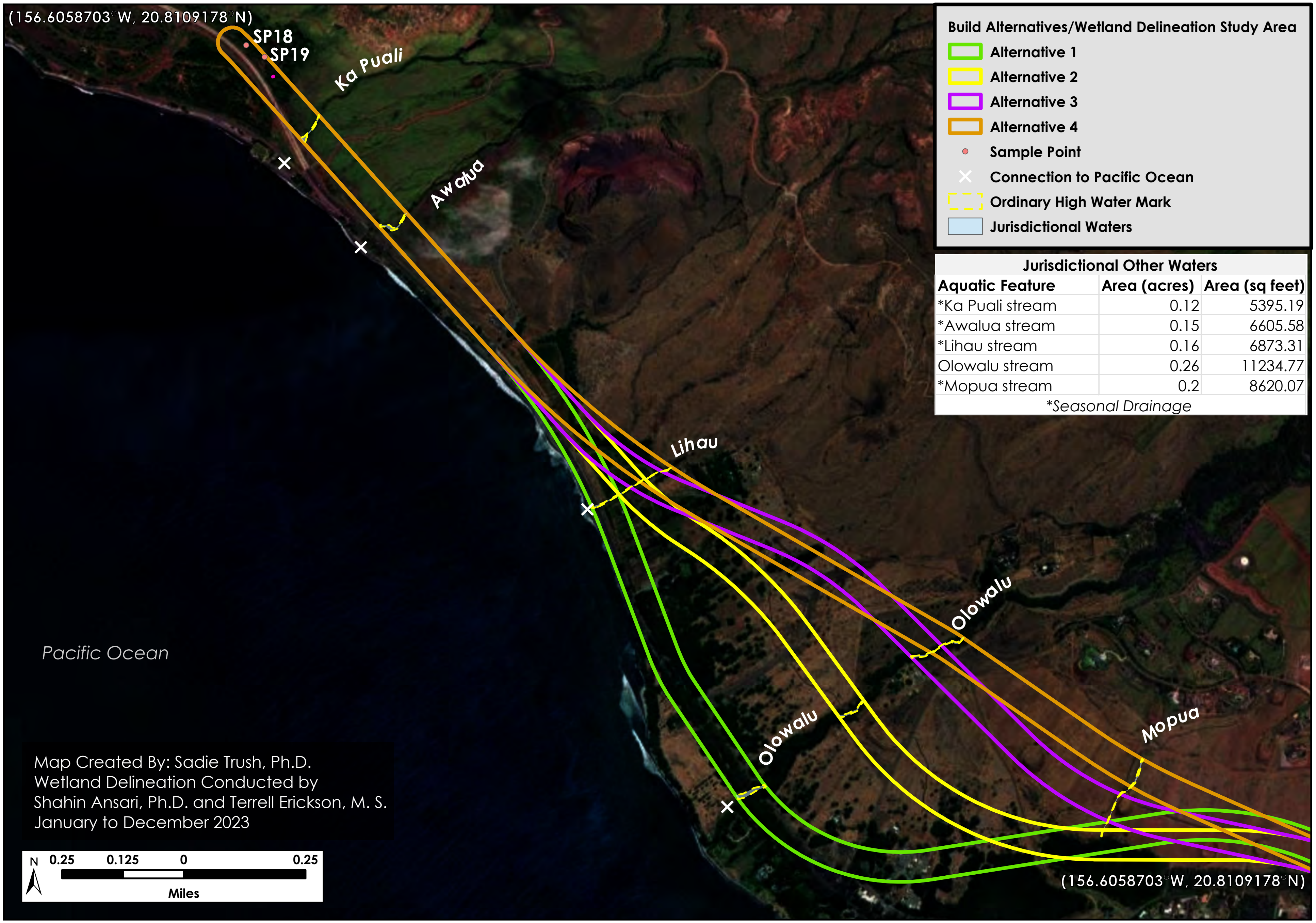
Jurisdictional Other Waters		
Aquatic Feature	**Area (acres)**	**Area (sq feet)**
**Ditch 8*	0.38	16505.87
**Ditch 9*	0.37	16079.28
Ukumehame stream	0.33	14441.29
**Seasonal Drainage*		

N:\Projects4600\4692-01\Shp_100223\Figs7_to_9.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 8. Preliminary Identification of Jurisdictional Other Waters in the Ukumehame Portion of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023

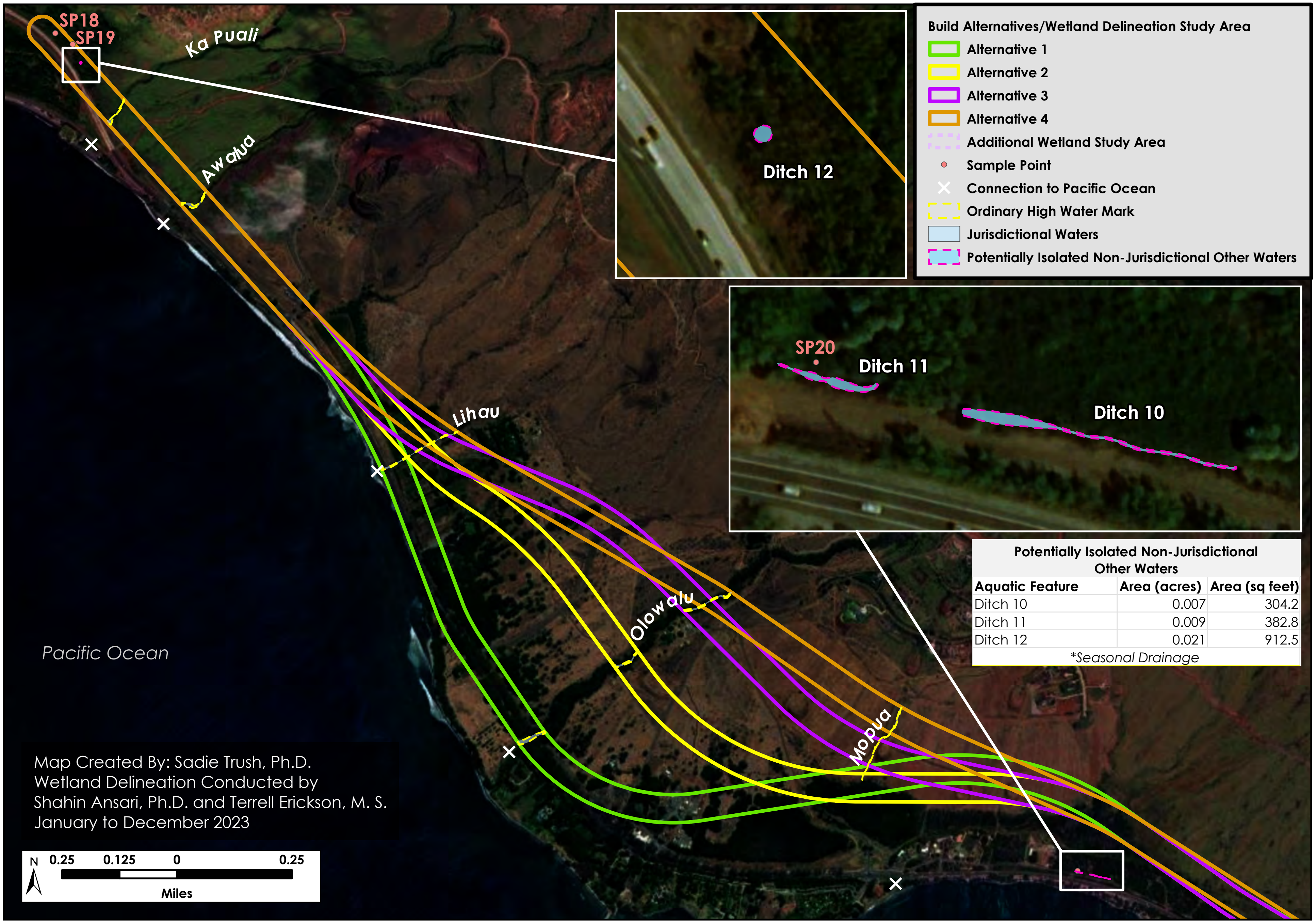


Jurisdictional Other Waters		
Aquatic Feature	Area (acres)	Area (sq feet)
*Ka Puali stream	0.12	5395.19
*Awalua stream	0.15	6605.58
*Lihau stream	0.16	6873.31
Olowalu stream	0.26	11234.77
*Mopua stream	0.2	8620.07
*Seasonal Drainage		

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 9. Preliminary Identification of Jurisdictional Other Waters in the Olowalu and Launiupoko Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



Potentially Isolated Non-Jurisdictional Other Waters

Aquatic Feature	Area (acres)	Area (sq feet)
Ditch 10	0.007	304.2
Ditch 11	0.009	382.8
Ditch 12	0.021	912.5
Seasonal Drainage		

N:\Projects4600\4692-01\Shp_100223\Figs7_to_9.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 10. Preliminary Identification of Jurisdictional and Potentially Isolated Non-Jurisdictional Other Waters in the Olowalu and Launiupoko Areas of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023

The agencies' definition of "waters of the United States" does not affect the longstanding activity-based permitting exemptions provided to the agricultural community by the CWA. Additionally, the final rule codifies eight exclusions from the definition of "waters of the United States" in the regulatory text to provide clarity, consistency, and certainty to a broad range of stakeholders. The exclusions are:

- Prior converted cropland, adopting the U.S. Department of Agriculture's definition and generally excluding wetlands that were converted to cropland prior to December 23, 1985.
- Waste treatment systems, including treatment ponds or lagoons that are designed to meet the requirements of the CWA.
- Ditches (including roadside ditches), excavated wholly in and draining only dry land, and that do not carry a relatively permanent flow of water.
- Artificially irrigated areas that would revert to dry land if the irrigation ceased.
- Artificial lakes or ponds, created by excavating or diking dry land that are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.
- Artificial reflecting pools or swimming pools, and other small ornamental bodies of water created by excavating or diking dry land.
- Waterfilled depressions, created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction operation is abandoned and the resulting body of water meets the definition of "waters of the United States."
- Swales and erosional features (e.g., gullies, small washes), that are characterized by low volume, infrequent, or short duration flow.

2.1.2 Identification of Section 404 Jurisdictional Wetlands (Special Aquatic Sites)

Where wetland field characteristics were present, the biologists examined vegetation, soils, and hydrology using the Routine Determination Method outlined in the Corps Manual (Environmental Laboratory 1987) and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Hawaii and Pacific Region Supplement (USACE 2012).

2.1.2.1 Hydrophytic Vegetation

Plants that can grow in soils that are saturated or inundated for long periods of time, which contain little or no oxygen when wetted, are considered adapted to those soils and are called hydrophytic. There are different levels of adaptation, as summarized in Table 2. Some plants can only grow in soils saturated with water (and depleted of oxygen), some are mostly found in this condition, and some are found equally in wet soils and in dry soils. Plants observed at each of the sample sites were identified to species, where possible, using the *Manual of Flowering Plants of Hawaii Revised Edition* (Wagner et al. 1999) and the *Hawaiian Vascular Plants Checklist February 2019 Update* (Imada 2019). The wetland indicator status of each species was obtained from the Hawaii and

Pacific Islands Regional Wetland Plant List (Lichvar et al. 2020). Wetland indicator species are designated according to their frequency of occurrence in wetlands. For instance, a species with a presumed frequency of occurrence of 67 to 99% in wetlands is designated a facultative wetland indicator species. The wetland indicator groups, indicator symbol, and the frequencies of occurrence of species within wetlands, provided as a percentage, are shown in Table 2.

Table 2. Wetland Indicator Status Categories for Vascular Plants

Indicator Category	Symbol	Frequency (%) of Occurrence in Wetlands[1]
Obligate	OBL	>99 (Almost always is a hydrophyte, rarely in uplands)
Facultative wetland	FACW	67 – 99 (Usually a hydrophyte but occasionally found in uplands)
Facultative	FAC	34 – 66 (Commonly occurs as either a hydrophyte or non-hydrophyte)
Facultative upland	FACU	1 – 33 (Occasionally is a hydrophyte, but usually occurs in uplands)
Upland	UPL	<1% (Rarely is a hydrophyte, almost always in uplands)
Not Listed	NI	Considered to be an upland species

[1] Based on information contained in the Corps Manual (Environmental Laboratory 1987). Plant species that are not listed in the Hawaii and Pacific Islands Regional Wetland Plant List (Lichvar et al. 2020) are considered Upland species in Appendix A – Plants Observed in the Project Area.

Obligate and facultative wetland indicator species are hydrophytes that occur "in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present" (Environmental Laboratory 1987). Facultative indicator species may be considered wetland indicators when found growing in hydric soils that experience periodic saturation. Plant species that are not on the regional list of wetland indicator species are considered upland species. A complete list of the vascular plants observed within the study area, including their current indicator statuses, has been provided in Appendix A.

2.1.2.2 Hydric Soils

Given that the Project Area contained soils with low to high levels of lead contamination, only visual/color indicators for hydric soils were examined with limited assessment of soil texture. The National Technical Committee for Hydric Soils defines a hydric soil as one formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper 12 inches of soil (NRCS 2018). Hydric soils include soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. In general, evidence of a hydric soil includes characteristics such as reducing soil conditions, soils with bright mottles and/or low matrix chroma, and soils listed as hydric by the U.S. Department of Agriculture on the National Hydric Soils List (NRCS 2023b). Reducing soil conditions can also include circumstances where there is evidence of frequent ponding for long or very long duration. A long duration is defined as a period of inundation for a single event that ranges from 7 days to a month, and very long is greater than one month (Environmental Laboratory 1987).

Munsell Soil Notations (Munsell 2021) were recorded for the soil matrix of each soil sample. The Munsell color system is based on three color dimensions: hue, value, and chroma. A brief description of each component of the system is described below, in the order they are used in describing soil color (i.e., hue/value/chroma):

1. **Hue—**The Munsell Soil Color Chart is divided into five principal hues: yellow (Y), green (G), purple (P), blue (B), and red (R), along with intermediate hues such as yellow-red (YR) and green-yellow (GY). Examples of commonly encountered hue numbers include 2.5YR, 10YR, and 5Y.
2. **Value—**Refers to lightness, ranging from white to grey to black. Common numerical values for value in the Munsell Soil Color Chart range from 2 for saturated soils to 8 for faded or light colors. Hydric soils often show low-value colors when soils have accumulated sufficient organic material to indicate development under wetland conditions but can show high-value colors when iron depletion has occurred, removing color value from the soil matrix. Value numbers are commonly reported as 8/, 2.5/, and 6/.
3. **Chroma—**Describes the purity of the color, from "true" or "pure" colors to "pastel" or "washed out" colors. Chromas commonly range from 1 to 8, but can be higher for gleys. Soil matrix chroma values that are 1 or less, or 2 or less when mottling is present, are typical of soils that have developed under anaerobic conditions. Chroma numbers are listed, for example, as /1, /5, and /8.

The NRCS Web Soil Survey (NRCS 2023a) was consulted to determine which soil types have been mapped in the study area (Table 1, Figure 4). Detailed descriptions of these soil types are provided in Appendix B.

2.1.2.3 Hydrology

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Wetland hydrology indicators provide evidence that the site has a continuing wetland hydrologic regime. Primary indicators might include visual observation of surface water (A1), high water table (A2), water marks (B1), and hydrogen sulfide odor (C1). Secondary indicators might include a passing score for the FAC-neutral test (D5), stunted or stressed plants (D1) and saturation visible on aerial imagery (C9). Each of the sample points was examined for positive field indicators (primary and secondary) of wetland hydrology, following the guidance provided in the Regional Supplement.

Appendix C contains the wetland delineation datasheets used to document the three-parameter approach described above as well as the associated photos.

2.1.3 Identification of Other Waters

Surveys were also conducted within the Project Area for "other waters", which includes lakes, streams, slough channels, seasonal ponds, tributary waters, non-wetland linear drainages, and salt ponds. Such areas are identified by the (seasonal or perennial) presence of standing or running water and generally lack hydrophytic vegetation. In non-tidal waters, the USACE Section 404 jurisdiction extends to the OHWM which is defined in 33 CFR Part 328.3 as "*the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation or the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area*." "Other waters" extend to the OHWM on opposing channel banks in non-tidal drainage channels. In tidal waters, Section 404 jurisdiction extends to the landward extent of wetland vegetation of the high tide line (HTL). This can either be identified in the field from direct observations of the HTL via highest extent of wrack, or highest extent of shelving along undeveloped soil banks. Outside of direct observation HTL can be estimated using tidal gauge and elevation data. In tidal waters, Section 10 waters include open water, mud flats, and adjacent special aquatic sites up to the limit of the mean high water (MHW) line in areas currently exposed to fully tidal or muted-tidal action.

In concert with USACE's efforts to revise the wetland delineation manuals and make them more specific to different geographic regions of the United States, as described above, efforts have been initiated by USACE to develop an OHWM delineation manual. In particular, two relatively recent publications have attempted to further refine the definition of OHWM:

- Regulatory Guidance Letter No. 05-05 (USACE 2005) deals specifically with the topic of OHWM identification, and lists the following physical characteristics that should be considered when making an OHWM determination: (1) natural line impressed on the bank; (2) shelving; (3) changes in the character of the soil; (4) destruction of terrestrial vegetation; (5) wracking; (6) vegetation matted down, bent, or absent; (7) sediment sorting; (8) leaf litter disturbed or washed away; (9) scour; (10) deposition; (11) multiple observed flow events; (12) bed and banks; (13) water staining; and (14) and change in plant community.
- National OHWM Field Delineation Manual for Rivers and Streams: Interim Version (David et al. 2022), provides consistent science-based method for delineating OHWM in streams. This manual provides guidance to observe, evaluate, and select appropriate field indicators to identify the OHWM elevation that can be applied to any type of stream system. It also introduces a (new) two-page data sheet to record these observations.

For all the aquatic features-streams, tributaries, and ditches, we investigated the stream bed and banks and the surrounding area and gathered various geomorphic, vegetation, sediment, and ancillary indicators from both banks per USACE (2005) guidance and the interim National OHWM Manual (David et al. 2022) to delineate jurisdictional waters. To better characterize the streams and help with delineating the OHWM level, we established four OHWM transects perpendicular to the stream bed at representative different locations along the stretch of the channel in the Project Area. Appendix D contains the OHWM data forms for transects including representative pictures taken at these transects. We placed flags at the OHWM indicators on the left and right banks of each transect. GPS data was collected in the field using a Trimble GeoXT™ GPS unit capable of submeter accuracy. We also took a set of photographs (left bank and right bank; viewing downstream) of the observed OHWM indicators on each transect (Appendix D). After the survey, the GPS data was processed using ARC GIS to map the extent of Section 404 other waters.

Section 3.0 Survey Results and Discussion

As illustrated in Figure 6, fifteen habitat or vegetation types were identified within the study area. Twenty sample points (SPs) and 25 OHWM transects were examined to identify potentially jurisdictional features (Figures 7, 8, 9, and 10) (Appendices C and D). About 4.6 acres of jurisdictional wetlands, 16.7 acres of potentially isolated non-jurisdictional wetlands, 4.5 acres of jurisdictional other waters, and 0.04 acres of potentially isolated non-jurisdictional other waters were identified in the study area (Tables 3 and 4). The results of the delineation are described below.

Table 3. Summary of Jurisdictional Wetlands and Other Waters, and Potentially Isolated Non-Jurisdictional Wetlands and Waters Delineated Within the Honoapiilani Project's Wetland Delineation Study Area

Habitat Type	Area (acres)	Notes
Total Jurisdictional Wetlands	***4.593***	
Wetland 1	*4.131*	*Surface connection to the Pacific Ocean via Ditch 7 and the Hanaula Gulch culvert under the existing highway*
Wetland 3	*0.228*	*Surface connected to the Pacific Ocean via the Hanaula Gulch*
Wetland 4	*0.234*	*Surface connected to the Pacific Ocean via the Hanaula Gulch*
Total Potentially Isolated Non-Jurisdictional Wetlands	***16.672***	
Wetland 2	*0.442*	*No surface connection to the ocean*
Wetland 5	*0.910*	*Wetlands 5 and 6 are connected in the area in between the Build Alternatives. Wetland 6 is separated from Wetland 4 via a built-up dirt road and fence. No surface connection to the ocean*
Wetland 6	*0.949*	*Wetlands 5 and 6 are connected in the area in between the Build Alternatives. Wetland 6 is separated from Wetland 4 via a built-up dirt road and fence. No surface connection to the ocean*
Wetland 7	*0.811*	*No surface connection to ocean*
Wetland 8	*4.792*	*No surface connection to ocean*
Wetland 9	*0.153*	*No surface connection to ocean*
Wetland 10	*8.575*	*No surface connection to ocean*
Wetland 11	*0.040*	*No surface connection to ocean*
Total Jurisdictional Other Waters	***4.537***	
Manawaipueo Gulch	*0.140*	*Connection to Pacific Ocean via culvert under the existing highway*

Habitat Type	Area (acres)	Notes
Papalaua Gulch	*1.670*	*Connection to Pacific Ocean via culvert under the existing highway*
Hanaula Gulch	*0.160*	*Connection to Pacific Ocean via culvert under the existing highway*
Ditch 1	*0.041*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 2	*0.040*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 3	*0.037*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 4	*0.049*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 5	*0.018*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 6	*0.186*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 7	*0.226*	*Connection to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 8	*0.380*	*Vicinity of Pohaku Aeko Street. Connection to Pacific Ocean via culvert under the existing highway*
Ukumehame Stream	*0.330*	*Connection to Pacific Ocean via culvert under the existing highway*
Ditch 9	*0.370*	*Vicinity of Ehehene Street. Connection to Pacific Ocean via culvert under the existing highway*
Mopua Stream	*0.200*	*Connection to Pacific Ocean via culvert under the existing highway*
Olowalu Stream	*0.260*	*Connection to Pacific Ocean via culvert under the existing highway*
Lihau Stream	*0.160*	*Connection to Pacific Ocean via culvert under the existing highway*
Awalua Stream	*0.150*	*Connection to Pacific Ocean via culvert under the existing highway*
Ka Puali Stream	*0.120*	*Connection to Pacific Ocean via culvert under the existing highway*
Total Potentially Isolated Non-Jurisdictional Other Waters	**0.037**	
Ditch 10	*0.007*	*No surface connection to another ditch or stream or ocean.*
Ditch 11	*0.009*	*No surface connection to another ditch or stream or ocean.*
Ditch 12	*0.021*	*No surface connection to another ditch or stream or ocean.*
Total Potential Waters of the U.S.	**9.130**	

Habitat Type	Area (acres)	Notes
Total Potentially Isolated Non-Jurisdictional Waters of the U.S.	**16.709**	
Total Non-Jurisdictional Upland Areas	**876.161**	
Wetland Delineation Study Area Total	**902.000**	

Table 4. Summary of Jurisdictional Wetlands and Waters, and Potentially Isolated Non-Jurisdictional Wetlands and Waters Delineated Within Each of the Four Build Alternatives in the Honoapiilani Project's Wetland Delineation Study Area

Habitat Type	Area (acres)
Jurisdictional Wetlands	
Build Alternative 1	*0.228*
Build Alternative 2	*4.365*
Build Alternative 3	*4.365*
Build Alternative 4	*0*
Potentially Isolated Non-Jurisdictional Wetlands	
Build Alternative 1	*5.855*
Build Alternative 2	*9.965*
Build Alternative 3	*9.965*
Build Alternative 4	*0.851*
Jurisdictional Other Waters	
Build Alternative 1	*1.337*
Build Alternative 2	*2.255*
Build Alternative 3	*2.280*
Build Alternative 4	*1.777*
Potentially Isolated Non-Jurisdictional Other Waters	
Build Alternative 1	*0.007*
Build Alternative 2	*1.049*
Build Alternative 3	*1.049*
Build Alternative 4	*0.050*

Information assembled during this investigation and pertinent to the identification of jurisdictional Section 404 waters is further discussed below and presented in the five appendices of this report.

- Appendix A—Plants Observed in the study area

- Appendix B—Custom Soil Report for the study area
- Appendix C—USACE wetland delineation data forms with photo documentation
- Appendix D— USACE OHWM delineation data forms with photo documentation

The sections below describe the site conditions observed during this delineation survey, along with pertinent background information, assumptions, and rationale.

3.1 Assumption and Background Information

The preliminary delineation assumes that relatively normal circumstances prevailed at the time of this study from January to September 2023, and results are based upon the conditions present at the time of the survey. The survey was performed using the "Routine Method of Determination" using three parameters, as outlined in the Regional Supplement for wetlands and the method described to identify OHWM level for streams in the National Manual. The study overlapped the winter rainy season as well as the hot summer months and therefore allowed for observations during both the wet and dry season. Rainfall data from the rain gauge at the National Weather Service (NWS) Location ID: Maalaea Bay [P36] which is about three miles to the south of the study area indicates in 2022 this area experienced drier than normal conditions. In 2022, the year-to-date (YTD) rainfall (5.52 inches) was 42% of the average (13.22 inches) for this annual duration (NWS 2023). However, during the study period from January to August 2023 this area received near average rainfall with the YTD rainfall for the duration of the study from January to September 2023, being 8.46 inches; about 110% of the average (7.99 inches) for this period (NWS 2023). The stream flows in general had ordinary low flow conditions at the time of the survey. Specific observed flow condition for each water feature is included in the OHWM datasheets included in Appendix D and discussed below in Section 3.4 Identification of Other Waters. The study area did not experience any recent extreme flood or drought events.

3.2 Site Conditions and Observations

The study area is a stretch of about six miles from the Lahaina Bypass in the north to the Pali, near the Lahaina Pali Trailhead in the south. The main access to the locations within the study area is from the existing Honoapiilani Highway. The southern one-third portion of the study area, from the Pali to Pohaku Aeko Street in Ukumehame, is largely undeveloped land other than for some infrastructure associated with the County of Maui firing range and the State Department of Defense's Ukumehame Firing Range. Several different types of vegetation or habitat types occur here: Kiawe Woodland, Kiawe-Opiuma Woodland, Kiawe-Pluchea Woodland, Kiawe-Pluchea Woodland with Pickleweed, Haole Koa Shrubland, Haole Koa-Pluchea Shrubland. and Buffel Grass Dominated Grassland (Figure 6). The dominant canopy species in the woodland habitat types were kiawe (*Prosopis pallida*) and opiuma (*Pithecellobium dulce*); while *Pluchea* species and haole koa (*Leucaena leucocephala*) were the most dominant shrubs. The ground cover was mostly composed of a mix of several alien grasses and herbaceous weeds although the native ilima (*Sida fallax*) and uhaloa (*Waltheria indica*) were also common in this southern portion of the study area. Most of the study area here is next to the Pacific Ocean, separated only by the existing Highway, and it receives considerable salt spray. Four streams/gulches --

Manawaipueo, Papalaua, Hanaula, and Makiwa -- drain the watershed here and form a coastal flood plain in the western most portion of the study area against the existing Honoapiilani Highway. A sedimentation basin built by HDOT in 1972 is situated in Ukumehame just south of the firing ranges. This was built specially to funnel the sediment-heavy waters from the streams in Papalaua Gulch before they enter the Pacific Ocean.

In the central portion of the study area, from Pohaku Aeko Street in Ukumehame to the southern end of the Olowalu peninsula, the Build Alternatives overlap for the most part and run parallel to the existing Honoapiilani Highway. This stretch of the study area is also undeveloped land and is composed of two main habitat or vegetation types: Kiawe-Opiuma Woodland and Buffel Grass Dominated Grassland (Figure 6). Kiawe and opiuma were the dominant tree species with buffel grass (*Cenchrus ciliaris*) dominating the grassland habitats. Although there is no major development here, this stretch of the study area was highly disturbed with several homeless encampments and the area being used as a dumpsite for scrap cars. In addition, there is ongoing construction of new residential lots near the eastern portion of the study area. Ukumehame is a major perennial stream that intersects this portion of the study area. There are also several tributaries of Kailiili Stream that appear to intersect the study area here (NWI 2023), but no indicators of these aquatic features were found during the investigations of this study (Figures 2 and 8, Table 3, Section 3.5 Areas Not Meeting the Regulatory Definition of WoUS).

The northern one third of the study area runs from the Olowalu Peninsula in the south to the Lahaina Bypass at the north end (Figure 2). This stretch overlaps some small-scale businesses and residences in the Olowalu Village Center, farmland, Olowalu cultural areas, and the Olowalu Residential Recycling and Refuse Center. Compared to the northern and southern portions of the study area, the Build Alternatives in this central Olowalu Peninsula for the most part are more inland from the Pacific Ocean. In the northern part of the study area here toward the Lahaina Bypass, the Build Alternatives overlap again and pass through undeveloped areas near the Pacific Ocean. The vegetation in the western portion of the Olowalu peninsula is composed of mostly large monkey pod (*Samanea saman*) as avenue trees along the existing highway, kiawe, and opiuma, while the inner/eastern portion is dominated by a monotonous expanse of Buffel Grass Dominated Grassland (Figure 6). Cultivated farmlands with vegetable crops and ornamental species were seen cultivated here mostly in the vicinity of Olowalu Village Center. Vegetation toward the Lahaina Bypass end is composed of either Mix Shrubland or Buffel-Grass Dominated Grassland over undeveloped lands. Olowalu is the main perennial stream that bisects the Olowalu peninsula. Four additional streams/gulches -- Mopua, Lihau, Awalua, and Ka Puali -- also intersect this northern one-third portion of the study area (Figure 9).

The study spanned both the wet (January to March) and dry seasons (April to September) and therefore surveys considered the overall and annual hydrology in the study area. In addition, before starting the delineation investigations, we visited the study area on December 20 and 21, 2022 after the area received heavy rainfall, to better understand the hydrology in the study area and document surface flow in some nonperennial streams that intersect the study area. During these visits, vast areas in the vicinity of Ukumehame and the Maui County Firing ranges ponded water. Nonperennial streams in the study area were flowing and carried "brown water" with heavy sediment loads. The banks of the many streams and tributaries were heavily vegetated as well.

Detailed findings of the delineation study are discussed below in Sections 3.3 Identification of Potential Section 404 Wetlands and Section 3.4 Identification of Section 404 waters. Appendices C and D contain the wetland and OHWM datasheets and the associated photographic documentation.

3.3 Identification of Potential Section 404 Wetlands

Areas that were wetlands were dominated by hydrophytes, possessed hydric soil characters, and demonstrated evidence of wetland hydrology. All wetlands are situated in a floodplain that experience seasonal flooding during the winter/rainy season. Out of the eleven wetland areas (Figure 7, W1 to W11) mapped in the study area, Wetlands 1, 3, and 4 have a direct surface connection to the Pacific Ocean via the Hanaula Gulch culvert and are identified here as jurisdictional wetlands. Wetland 2, and Wetlands 5 to 11 do not have an obvious surface connection to the ocean and are identified here as potentially isolated non-jurisdictional wetlands.Approximately 4.6 acres of potential USACE jurisdictional wetlands and 16.7 acres of potentially isolated non-jurisdictional wetlands were identified within the study area (Figure 7 and Table 3). These wetlands were only found in this southern portion of the study area in the Ukumehame region. The largest area of wetlands are in the overlapping Build Alternatives 2 and 3, followed by Build Alternative 1, and the most inland Build Alternative 4 had no wetlands. In general, the wetland areas are situated around the Ukumehame and County Firing Ranges and the interconnected ditch system associated with the Hanaula Gulch (Figure 7). Details of the vegetation, soil, and hydrology characteristics that define the mapped wetlands are discussed below.

3.3.1 Vegetation

Pickleweed (*Batis maritima*) (OBL) was the dominant obligate plant species found in the mapped wetlands in the study area. Sample points SP2, SP4, and SP12 are representative of these wetland habitat types where the ground cover is mostly dominated by pickleweed (Appendix C). The canopy species in these wetland habitats were FACU kiawe trees that for the most part appeared to be under stress based on having no leaves and were either dead or dying. These pickleweed-dominated wetlands were largely associated with the Hanaula Gulch and associated ditches (also see Section 3.3.3. Hydrology) that are remnant from the sugarcane plantation time on Maui and still received water from streams in the west Maui mountains. This vegetation/habitat “signature”—semi-open, dominated with pickleweed in the understory, with stressed almost dead of dying kiawe trees -- was used to delineate the wetlands in the northern half of Build Alternatives 1 and 2 overlapping the Ukumehame Firing Range and areas around the ditches to the north of the Ukumehame Firing Range. A shift from this wetland “signature” to one with a mix of *Pluchea* spp. (FAC) and buffel grass (FACU) with live (not stressed) kiawe and haole koa trees, for the most part, marked the boundary between wetland and upland habitats. It should be noted that large areas to the north of the ditches (represented by SP1) contained stands of dead haole koa trees with mostly *Pluchea* spp. in the understory. This area did not meet the three parameter wetland criteria (Appendix A. Photos 1-2). In fact, pockets of dead haole koa (UPL) trees were also found in other upland areas, but the cause of these localized dead stands was not obvious in the field.

Many areas with very little vegetation also met the three parameter wetland criteria. These areas usually had a prominent salt crust and/or showed evidence of recent ponding with prominent soil cracks, and the soil surface showing red or black deposits/coloration. The few scattering of plants in such areas were mostly prostrate herbs of saltbush (*Atriplex semibaccata*) (FAC) and scattering of grasses such as finger grass (*Chloris* spp.) (FACU). Vegetation at SP3 (Appendix C, Photos 8-10), SP6, (Appendix C, Photos 17-18), and SP7 (Appendix C, Photos 19-20) are representative of such wetland habitats, mostly in Ukumehame Firing Range and areas between here and the access road to the Maui County Firing range.

The third vegetation community that met the three parameter wetland criteria was generally dominated by a mix of facultative *Pluchea* spp. and saltbush, along with FACU species of finger grass. There was also a mix scattered live and dead kiawe trees (FACU) that formed an open canopy. These areas were generally also showed prominent signs of hydrology such as salt crust and soil surface cracks. SP11 (Appendix C, Photos 29-32), SP14 (Appendix C, Photos 34-38), and the areas around the upland "island" (represented by SP 15) contained this wetland habitat type (Figure 7).

Kiawe (FACU), opiuma (FAC), haole koa (UPL), and buffel grass (FACU) were some of the most abundant species in the vast majority of the uplands in the study area. Some upland habitats were also dominated by facultative *Pluchea* spp. (e.g., SP1 and SP8) but did not have either the hydrology or the hydric soil conditions to meet the criteria of a three-parameter wetland.

3.3.2 Soils

Hydric soil indicators observed in several soil pits include distinct redoximorphic concentrations throughout most of the soil profile which had a dark surface layer with soil colors commonly in the range of 5YR3/2 and 7.5YR 2.5/3. The redox concentrations were soft masses with distinct to prominent contrast with the soil surface and colors in the range of 2.5YR4/6 and 5YR4/6 and concentrations ranging from 2 to 20 percent. This corresponds to the F6 – *Redox dark surface,* hydric soil indicator. Dark soil surfaces in some sample pits also tested positive for the effervesce test with 3% hydrogen peroxide (e.g., SP6). The soil types identified in the sampled pits were silty clay, silty loam, and silty clay loams. The soils in the delineated wetlands are mapped as Kealia Silty Loam, 0 to 1 percent slopes and are listed on the National Hydric Soils List as hydric soils (NRCS 2023b). Kealia Silty Loams are common in tidal flat and salt marshes on Maui, are prone to frequent ponding, and are strongly saline.

3.3.3 Hydrology

As described above in Section 3.2, in December 2022, extensive flooding was observed at various locations in the southern portion of the study area overlapping Ukumehame region, particularly overlapping the Build Alternatives 1 and 2. In general, surface water from streams in West Maui mountains is the primary source of hydrology supporting the wetlands in the study area (also see Section 3.4 Identification of Section 404 Other Waters). The surface water that enters the coastal plain, backs up against natural features such as the beach berm or developed infrastructure such as roads creating flooded conditions for varied periods of times during the wet rainy season and following heavy rains. The wetland is also heavily influenced by salt water from the neighboring Pacific Ocean.

Several primary and secondary hydrology indicators were observed during the study period. As expected, sampling locations in January, at the peak of the wet season, showed more evidence of the primary indicator of surface water and saturation than locations that were sampled between March and September 2023, nonetheless, Drainage Patterns (B10) were obvious during these latter drier months. Water Marks (B1), Saturation (A3), Algal Mat or Crust (B4), and Oxidized Rhizospheres on Living Roots (C3) were the primary hydrology indicators observed at the sampled locations in the study area. Surface Water Cracks (B6) was the most prominent secondary hydrology indicator as the system had recently drained and/or dried after ponding. Salt Deposits (C5) was also a common secondary hydrology indicator. Deposition of salt from saline ocean spray as well as through the capillary action of saline ground water had resulted in salt deposits across large unvegetated areas. Sparsely Vegetated Concave Surface (B6) and stunted or stressed plants (D1) were other secondary hydrology indicators at the sampled locations. Lack of hydrology indicator was the main parameter distinguishing wetland from upland areas.

3.3.4 Rationale for Sample Point Choice

Twenty sample points were selected to document conditions in representative jurisdictional and non-jurisdictional areas (Figure 7). Rationale and findings for wetland sample point (Appendix C: SP 1-20) locations are summarized in Table 5. Location of sample points are depicted in Figures 7 and 8. Photos associated with sample points have the same rationale and depiction as sample points and are included in Table 5.

Table 5. Summary of Sample Point (SP) Locations and Results

Name	Sampling Rationale	Hydrophytic Vegetation	Hydric Soil?	Wetland Hydrology?	Overall Wetland Assessment
SP1 (Photos 1-2)	Placed to investigate the prevalence of facultative *Pluchea* spp.	No	No	No	This area does meet the three parameter wetland criteria.
SP2 (Photos 4 -5)	Placed to investigate area dominated by obligate pickleweed species.	Yes	Yes	Yes	This area (Wetland 1) meets three parameter wetland criteria.
SP3 (Photo 8-9)	Placed to investigate area with salt crust and with very little vegetation. Lack of vegetation appears to be due to seasonal ponding.	-	Yes	Yes	This area (Wetland 1) is a two-parameter wetland.
SP4 (Photos 11-12)	Placed to investigate if wetland conditions continue in (fenced in) Ukumehame firing range adjacent to wetland but south of the ditch.	Yes	Yes	Yes	This area (Wetland 6) meets three parameter wetland criteria.

Name	Sampling Rationale	Hydrophytic Vegetation	Hydric Soil?	Wetland Hydrology?	Overall Wetland Assessment
SP5 (Photos 13-14)	Placed to investigate a large swath of elevated area in the northeastern part of Ukumehame Firing Range with predominantly buffel grass in understory.	No	No	No	This area does not meet the three parameter wetland criteria.
SP6 (Photos 17-18)	Placed to investigate large, sparsely vegetated area with moist platy soils and surface soil cracks.	Yes	Yes	Yes	This area (Wetland 5 meets the three parameter wetland criteria.
SP7 (Photos 19-20)	Placed to investigate large sparsely vegetated area with platy moist soil with dark black and bright red deposits/coloration on surface.	Yes	Yes	Yes	This area (Wetland 11) meets the three parameter wetland criteria.
SP8 (Photos 21-22)	Placed on slightly higher ground adjacent to wetland to investigate thicket of facultative *Pluchea* species under kiawe canopy.	No	No	No	This area does not meet the three parameter wetland criteria.
SP9 (Photos 24-25)	Placed to investigate the unvegetated firebreak dirt road that runs between upland and wetland area.	No	No	No	This area does not meet the three parameter wetland criteria.
SP10 (Photos 26-27)	Placed to investigate the built-up (~ 6 feet) berm (#1 from east) artificially created in the Ukumehame Firing Range. Soils hydric from historic conditions before being placed as a berm.	No	Yes	No	This area does not meet the three parameter wetland criteria.
Sp11 (Photos 29-30)	Placed to investigate the low-lying areas between the built-up berms 1 and 2 at the that had predominantly saltbush in understory and surrounded by unvegetated areas with surface crack soils and salt crust.	Yes	Yes	Yes	This area (Wetland 7) meets three parameter wetland criteria.
SP12	Placed in pickleweed thicket `between firing range berm and the County firing range parking lot.	Yes	Yes	Yes	This area (Wetland 7) meets three parameter wetland criteria.
SP13 (Photo 33)	Placed on edge between County parking lot to the east and wetland to the west to investigate the edge of wetland. Soil disturbance from construction might have led to artificial piling of hydric soils here.	No	Yes	No	This area does not meet the three-parameter wetland criteria.

Name	Sampling Rationale	Hydrophytic Vegetation	Hydric Soil?	Wetland Hydrology?	Overall Wetland Assessment
SP14 (Photo 34-35)	Placed to investigate typical representative habitat seen in the general area south of Ukumehame Firing Range: Areas with salt crust on soil and patches of FACU kiawe trees with predominantly facultative *Pluchea* sp. and saltbush in the understory.	Yes	Yes	Yes	This area (Wetland 10) meets three parameter wetland criteria.
SP15 (Photos 39-40)	Placed to investigate a large "island" area within the wetland that appeared to be slightly (~ on feet) higher with thickets of buffel grass in understory and did not show signs of being flooded.	No	No	No	This area did not meet the three parameter wetland criteria.
SP16 (Photo 43)	Placed to investigate the HDOT artificially created sedimentation basin	No	No	Yes	This area does not meet the three parameter wetland criteria.
SP17 (Photo 44)	Placed to investigate a patch of pickleweed east of the spillway bordering eastern side of the sedimentation basin	No	No	No	This area does not meet the three parameter wetland criteria.
SP18 (Photos 45-46)	Placed to investigate NWI feature of PEM1C	No	No	No	This area does not meet the three parameter wetland criteria.
SP19 (Photos 47-48)	Placed to investigate the eastern edge of the NWI feature	No	No	No	This area does not meet the three parameter wetland criteria.
SP20 (Photos 49-50)	Placed to investigate area next to an isolated ditch.	No	No	No	This area does not meet the three parameter wetland criteria.

3.3.5 Photo Points for Section 404 Wetland

Photo point labels and rationales for photo documentation outside of the sample point locations (Table 5) are presented in Table 6. Photos are depicted on figures 7 and 8 and included in Appendix C.

Table 6. Coordinates and Rationale for Photo Points (PP)

Label (As on Figure 7, 8 and 9)	Depiction
PP3	Between SP1 and the existing highway. View to south. Taken to document observed upland conditions like SP1 area.

Label (As on Figure 7, 8 and 9)	Depiction
PP6	Between SP2 and SP3 to show area that was included wetland due to habitat conditions similar to that at SP2
PP7	Shows transition between wetland habitats dominated with pickleweed and dead kiawe and upland habitats with live kiawe and no pickleweed.
PP10	Area south of SP3 to show habitat included as wetlands based on observed similarity with habitat conditions observe at SP3
PP15	View to east toward an area identified as upland based on habitat type, slope, and hydrology conditions observed at SP5.
PP16	Area northeast of SP5 excluded as upland based on similarities in habitat type, slope, and hydrology with SP5.
PP23	The eastern portion of Ukumehame Firing Range on slightly higher ground and identified as upland based on being dominated with upland haole koa species.
PP28	View to south, photo of second berm (from east) excluded as upland based on similarities in habitat type, slope, and hydrology conditions observed at the investigated SP10 location.
PP31	View to west at the low-lying area between berms 2 and 3. Included as wetland based on similarities in habitat type, slope, and hydrology observed at SP11.
PP32	View to west at the low-lying area west of berm 3. Included as wetland due to similarities in habitat type, slope, and hydrology observed at SP11.
PP36	Representative wetland habitat to west of the upland area identified by SP15. View to South.
PP37	Representative wetland habitat to north of the upland area identified by SP15. View to North.
PP38	Representative wetland habitat to east of the upland area identified by SP15. View to East.
PP41	The area northeast of road leading to County firing range and dominated with obligate pickleweed. Included as wetland habitat based on similarities in habitat type with SP12.
PP42	The area northwest of road leading to County firing range and dominated with obligate pickleweed. Included as wetland habitat based on similarities in habitat type with SP12.

3.4 Identification of Section 404 Other Waters

Approximately 5.54 acres of potential other WoUS were identified in the wetland delineation study area. Appendix D contains the OHWM datasheets that describe site conditions at the time of delineation, observed OHWM indicators, rationale for placement of the data gathering transects, and associated photos for the aquatic features mapped during this study. Described below are additional background and relevant details for these mapped and potentially jurisdictional waters.

3.4.1 Manawaipueo Stream

Manawaipueo Stream is a seasonal drainage. On December 20, 2022, and on January 3, January 2023, there was standing water in the gulch overlapping the study area (Appendix D, Figures 51; DLNR 2022). Later, on March

21, construction crew were seen using excavators to clear the culvert. This made it evident that the standing water in the gulch over December and January was due to the water being backed up against the blocked and sedimented-in culvert. Also, for this reason, no OHWM indicators were seen at the lowermost 10 to 15 feet of the stream where sediment excavation was in progress. Other than for this disturbance, clear indicators were seen to map the OHWM level of the stream. There is an old (historic?) and broken concrete bridge at the upper (eastern) part of the gulch (Appendix D, Figure 52). At the time of survey, on March 21, 2023, the soil was saturated, mucky, and slippery with small puddles of water limited to the rocky stream bed in the upper/eastern end. Sediment staining on rocks and concrete at the OHWM level together with shelving of debris above the OHWM here were used to map the OHWM elevation here (Appendix D, Figures 51-54). In the lower stretch of the stream the presence of mud cracks were also used to identify the OHWM level.

3.4.2 Papalaua Gulch

The HDOT's sedimentation basin is situated at the base of the Papalaua Gulch. It was constructed in 1971 to mitigate sediment heavy flows from two unnamed seasonal drainages entering the ocean (Figure 7). These two seasonal drainages provide intermittent and large flows to the sedimentation basin following heavy rains. The first is a narrow (3 to 5 feet wide) nonperennial stream that enters the basin at the southern boundary, turns along the southwestern corner, and flows parallel to the western berm of the basin for about 600 feet; after which the flow fans out into an alluvial flood plain. In the narrow stretch of this stream, before it forms the alluvial fan, heavily sedimented and unvegetated bed to vegetated banks marked the OHWM level here (Appendix D, Photo 55). The second wider stream (10 to 20 feet) enters the sedimentation basin from the southeast, about 800 feet west of the first stream (Figure 7). Transition from unvegetated beds with boulders to vegetated banks with sediment were the clear indicators of OHWM level at this stream (Appendix D, Photo 59). This second stream also fans out into an alluvial plain and the water from both streams is funneled north along a 20 to 60 feet wide unvegetated to partially vegetated flood plain leading into the main central portion of the sediment basin (Appendix D, Photos 55 to 60). There are two large culverts built into the sediment basin that carry the waters from the basin into the Pacific Ocean under the existing Honoapiilani Highway.

3.4.3 Hanaula Gulch and Associated Ditches 1 to 7

Immediately to the north of the Ukumehame Firing Range, there are a series of ditches (Figure 7, Ditches 1 to 7), remnant from when these lands were under sugar plantation, that are interconnected (Figure 7, Appendix D, Photos 61-64). Hanaula Gulch supports the hydrology of this ditch system and the associated wetlands described above in Section 3.3. Hanaula is a seasonal drainage (DLNR 2022) and during the winter rains or following a heavy rain event, this 20-feet wide gulch with high banks, that runs parallel to the northern fence line of the Ukumehame Firing Range (Appendix D, Photo 62) carries water through a culvert under the existing Honoapiilani Road into the Pacific Ocean (Figure 7). At the western end, this ditch is connected to another ditch (D7) via a three-feet plastic culvert and stretches for about 0.25 miles in a north-south direction (perpendicular to the stream flow) (Appendix D, Photo 63). Six additional ditches run parallel to each other and are connected to this long ditch (D7) that runs in the north-south direction. Ditches 1 to 5 were relatively narrow, about six feet across. At the time of the survey there was little to no water in these ditches, but the beds were saturated. The bed and banks of all the ditches were heavily vegetated with obligate pickleweed. Break in slope, observed above the OHWM level was the main feature to identify these otherwise heavily vegetated ditches. Some ditches that recently conveyed water had a clear line of dead vegetation in the center of the bed, while others had prominent surface soil cracks. Together these were used as OHWM indicators for the ditches. The northern most ditch mapped in this area was the widest, at about 35 feet. Although there was no culvert at this ditch it is connected to the ocean via the 0.25-mile long ditch (running in the north-south direction), which in turn connects to the east-west running Hanaula Gulch (next to the firing range fence) that flows into the Pacific Ocean (Figure 7).

3.4.4 Ditch 8 – Vicinity of Pohaku Aeko Street

One linear ditch, about 700 feet in length was mapped at the intersection of Pohaku Aeko Street and the existing Honoapiilani highway (Figure 7). This feature has concrete culverts and is fenced in on either side of Pohaku Aeko Street (Appendix D, Photos 65-68). The ditch starts at about 50 feet to the south of this Street, and at the time of survey had open standing water in it that appeared to be deep. The concrete edge and the edge of facultative *Pluchea* spp. defined the OHWM level of this feature. The ditch runs under the Street for about 60 feet, daylights, and continues to run northward parallel to the existing Highway for about 680 feet before it abruptly dries and ends. This long stretch of the ditch had water in it that was barely visible because it was so heavily vegetated. The central channel of the ditch was blanketed with obligate pickleweed, and the banks were covered with facultative *Pluchea* shrubs (Appendix D, Photo 67-68). The change in vegetation type was used as the strongest indicator to identify the OHWM level of this aquatic feature. There was no apparent connection of this ditch to the ocean at Pohaku Aeko Street however, the ditch continues underground and daylights at the Ukumehame Stream Bridge. There was evidence of fill in the vicinity of where the ditch abruptly ends.

3.4.5 Ukumehame Stream

Ukumehame is a perennial stream. Ukumehame Stream Bridge on the existing Honoapiilani Highway crosses the stream at the lowermost reach right before it enters the Pacific Ocean. There is also a concrete stream ford at the lower end, east of the bridge. The lower part of the stream overlapping Build Alternatives 1-3 were surveyed on March 23, 2023, and the uppermost reach of the stream in the study area overlapping Build Alternative 4 was surveyed on September 26, 2023. On both the survey dates, ordinary low flow conditions were observed and several OHWM indicators were clearly visible at, below, and above the OHWM elevation. These included sorting of sediment from boulders to fine sediment and exposed roots below the OHWM elevation; wracking of debris above, and scour mark on concrete at the OHWM elevation (Appendix D, Photos 69-73). The average width of the channel between the mapped OHWM levels are 14.25 feet, 20 feet, and 39.75 feet at the upper, middle, and the lower reaches respectively.

3.4.6 Ditch 9-Vicinity of Ehehene Street

There were a few interconnected ditches in the "additional wetland delineation study area" between the existing Honoapiilani Highway and the study area where all the Build Alternative overlap (Figure 8). There is a ditch about 682-foot long that runs parallel to the existing Honoapiilani Highway. It starts about 600 feet north of

Ehehene Street and abruptly terminates about 200 feet south of dirt road leading inland from the Highway (Figure 8). Dense impenetrable thickets of haole koa and *Pluchea* shrubs made it difficult to access and investigate this ditch. The water appeared to be low and stagnant, and patches of floating duckweed (*Lemna* sp.) were seen at multiple locations in the ditch (Appendix D, Photos 74-77). Two other ditches, running in the east-west direction and about 400 feet apart feed into this north-south running ditch. Dense vegetation and deep water in these ditches also made it difficult to access and investigate the banks. These aquatic features, however, were relatively clear on the aerial imagery and combination of imagery and field observations were used to map them. There were also a couple of smaller ditches just east of the southern east-west running ditch that appeared to be isolated in the field but could be connected to the main ditch based on aerial imagery. There is also a large water pump, remnant from the sugar cane plantation time where the northern of the two east-west running ditch meets the north-south running ditch. Opposite this feature, on the other side of the Highway is a culvert and the ditches drain from under the Highway via this culvert into the Pacific Ocean.

3.4.7 Mopua Stream

Mopua is a seasonal drainage (DLNR 2022) that intersects all four Build Alternatives in the southern part of the Olowalu Peninsula. At the time of the OHWM study, the stream was dry and did not appear to have channeled surface flows in the recent past. The stream bed for the most part was very shallow (<1 foot), the bed and banks were dominated with dead buffel grass, and overall, there were very weak OHWM indicators (Appendix D, Figures 78-81). Sediment sorting from boulders to smaller rocks and finer sediment was a key indicator in many places. Undercut bank and matted vegetation in few places also helped identify the OHWM level on this stream (Appendix D, Photos 79-81). These OHWM indicators became weaker, and the stream channel could no longer be identified after a stretch of about 890 feet.

Mopua Stream passes through undeveloped private lots with several stone and gravel foundation pads for building and irrigated areas with ornamental and native outplantings. Even though the stream in the study area was dry there was evidence that it flows underground. At multiple places near the course of the stream there were small water pumps, including a water pressure gauge at the easternmost end of the channel in the study area with water being pumped for irrigation. Furthermore, in its lower most reach (outside of the study area) the stream daylights and flows under existing Highway through a concrete culvert, into a ditch that runs parallel to the Highway, and then flows into the Pacific Ocean.

3.4.8 Olowalu Stream

Olowalu is a perennial stream (DLNR 2022) that bisects the Olowalu Peninsula in the study area through undeveloped lands. There was a recent fire in this area that made identification of the OHWM level challenging due to confounding effects of wind and soil erosion as well as the deposition and shifting of debris caused by fires. The stream had normal low flows at the time of the survey which allowed for identifying several below-OHWM-level indicators such as cut in bank and accumulation of debris in between the exposed roots caused by water (Appendix D, 82-87). The stream had runs, riffles, and pools and sharp bends in the middle portion of the stream reach in the study area. The westernmost stretch below the Olowalu Stream Bridge did not burn and was densely vegetated. Sediment marks on concrete and debris accumulation under the bridge helped identify the OHWM level here. Olowalu Stream flows to the Pacific Ocean.

3.4.9 Lihau Stream

Lihau is a seasonal drainage (DLNR 2022) that flows through the northern end of the Olowalu Peninsula and overlaps with all four Build Alternatives. There is a farm at the eastern end of the stream that had irrigation lines leading into and out of the stream. Water was observed in the stream during a reconnaissance visit to the site in March 2023. Given the moist stream bed the stream channel was obvious with green/live vegetation which predominantly composed of haole koa and castor bean shrubs. The stream bed and bank were dry when surveyed in September 2023. (Appendix D, Photos 88-91). OHWM indicators were weak and break in slope, washed away and matted down debris, were some of the few indicators used to identify the OHWM level in this stream. Lihau stream has a clear surface connection to the Pacific Ocean; it flows below the existing Honoapiilani Highway through a concrete culvert, before reaching the ocean.

3.4.10 Awalua Stream

Awalua is a seasonal drainage (DLNR 2022) in the Launiupoko Watershed. At the time of the survey in September 2023, the bed and banks were dry. The stream flows through undeveloped buffel grass grassland in a deep (~20 feet) and wide (~40 feet) gulch with heavily eroded banks that made it challenging in places to determine the OHWM elevation (Appendix D, Photos 92-95). There is a spillway that runs in the north-south direction to divert flows into the grassland to the south. The edge of the spillway together with the undercut banks (from stream flow) were used to distinguish between OHWM and erosional features at the lower/western end of the stream. At the upper eastern end of the stream, the transition from vegetated bed to unvegetated bank slopes with undercut banks marked the OHWM level. Awalua flows through a large concrete culvert under the existing Honoapiilani Highway before entering the Pacific Ocean.

3.4.11 Ka Puali Stream

Ka Puali is the northernmost seasonal drainage (DLNR 2022) in the study area which also overlaps all four Build Alternatives. At the time of the survey in March 2023, small puddles of water were seen in the densely vegetated bed and banks of the stream (Appendix D, Photos 96-99). The density of grasses and shrubs made it challenging to determine the OHWM level in the stream. The moist stream bed supported more shrubs and trees than the banks and this change in vegetation together with the break in slope, and imbedded rocks in the lower banks helped determine the OHWM level for this stream (Appendix D. Photos 96-99). Ka Puali Stream flows through a concrete culvert under the existing Honoapiilani Highway before entering the Pacific Ocean.

3.4.12 Ditches 10, 11, and 12

There were three isolated aquatic features that are identified as potentially isolated non-jurisdictional other waters (Figure 10). These include two ditches (D11 and D12) in the "additional wetland delineation study area" toward the northern end where all the Build Alternative overlap between Ukumehame and the Olowalu peninsula (Figure 10). Both ditches had standing water and no hydrophytic vegetation. They did not appear to have a surface water connection to any other ditch, stream, or culvert. It is possible that they have an underground connection with the mapped Ditch 9 (Figure 8). Both these ditches were next to an inner road that runs parallel to the existing highway and next to a private residential/agricultural parcel. There were no associated wetlands with these features (Figure 9, SP 20). The third isolated aquatic feature identified as was a sunken hole (lava tube?) about 20 feet in diameter and 20 feet deep. Stagnant water was observed at a depth of about 20 feet, however, there was no obvious connection to any water source. This feature was surrounded by thickets of haole koa (UPL) and kiawe (FACU) shrubs and trees with no signs of hydrology and therefore was identified as potentially isolated non-jurisdictional other water.

3.5 Areas Not Meeting the Regulatory Definition of WoUS

The remainder of the study area does not meet the regulatory definition of Section 404 wetlands or other waters. Wetlands were mapped in two out of the observed fifteen vegetation types: Kiawe Pluchea Woodland and Kiawe Pluchea Woodland with Pickleweed. Non-jurisdictional uplands include the remaining thirteen vegetation types observed in the study area. While facultative *Pluchea* species dominated many of the upland habitats; areas mapped as wetlands differed in that they were associated with perennial or nonperennial streams and ditches, had prominent hydrology indicators, were co-dominated by obligate pickleweed and vast areas of salt crusted unvegetated areas occurred in these habitats, and had clear hydric soil indicators as well.

Section 4.0 Conclusion

In conclusion, H. T. Harvey & Associates' delineation of Section 404 WoUS in the Project's study area is based upon our best professional judgement. Federal jurisdiction is solely dependent on the determination and confirmation by USACE. Acceptance may require a site visit by a USACE representative to confirm the delineation data points gathered in the surveyed area. This delineation is not official until HDOT receives a Jurisdictional Determination letter from USACE.

The County of Maui (the County) has a new law, Ordinance 5421, to protect and restore wetlands in the County (County of Maui 2023a). Wetlands that meet any two parameters used to identify Section 404 jurisdictional WoUS, are protected under this ordinance. As such, wetlands and waters delineated in this study are likely to meet the County's Ordinance 5421 criteria. The County is in the process of mapping wetlands on Maui to create a Wetlands Overlay Map (Count of Maui 2023b). Implementation of Ordinance 5421 is expected to start after completion of this Wetlands Overlay Map. H. T. Harvey & Associates recommends that HDOT consult with the County of Maui Planning Department to discuss potential impacts to wetlands that meet the criteria under Ordinance 5421.

Section 5.0 References

County of Maui. 2023a. Ordinance NO. 5421. <https://www.mauicounty.gov/DocumentCenter/View/137562/Ord-5421>. Accessed October.

County of Maui. 2023b. Wetlands Restoration and Protection Project. <https://www.mauicounty.gov/2724/Wetlands-Restoration-and-Protection-Proj>. Accessed October 24.

David, G. C. L., K. M. Fritz, T.-L. Nadeau, B. J. Topping, A. O. Allen, P. H. Trier, S. L. Kichefski, et al. 2022. National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams: Interim Version (ERDC/CRREL TR-22-26). U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

[DLNR] Department of Land and Natural Resources. 2022. Hawaii Streams. Hawaii Statewide GIS Program. <https://geoportal.hawaii.gov/datasets/56046b3578064d989ffa485e4ed3dc46/explore?location=20.818798%2C-156.591537%2C14.56>. Accessed August 25, 2023.

Environmental Laboratory. 1987. U.S. Corps of Engineers Wetlands Delineation Manual. Department of the Army.

Giambelluca, T. W., Q. Chen, A. G. Frazier, J. P. Price, Y.-L. Chen, P.-S. Chu, J. K. Eischeid, and D. M. Delparte. 2013. Online rainfall atlas of Hawaii. Bulletin of the American Meteorological Society 94:313–316.

Google Inc. 2023. Google Earth Pro (Version 7.1.5.1557) [Software]. <http://earth.google.com>. Accessed March 10.

Imada, I. T. 2019. Hawaiian Naturalized Vascular Plants Checklist. Bishop Museum Technical Report 69. <http://hbs.bishopmuseum.org/publications/pdf/tr69.pdf>. Accessed November 2021.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2020. Hawaii 2020 Regional Plant List. The National Wetland Plant List: 2016 Wetland Ratings. Phytoneuron 2016-30:1–17. Prepared for the U.S. Army Corps of Engineers.

Munsell. 2021. Soil Color Charts, Munsell Color X-rite. Grand Rapids, Michigan.

[NRCS] Natural Resources Conservation Service. 2018. Field Indicators of Hydric Soils in the U.S.: A Guide for Identifying and Delineating Hydric Soils (Version 8.2). U.S. Department of Agriculture. Prepared with the National Technical Committee for Hydric Soils.

[NRCS] Natural Resources Conservation Service. 2023a. Web Soil Survey. U.S. Department of Agriculture. <http://websoilsurvey.nrcs.usda.gov>. Accessed March 10.

[NRCS] Natural Resources Conservation Service. 2023b. National Hydric Soils List. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>. Accessed March 10.

[NWI] National Wetlands Inventory. 2023. Wetlands Mapper. U.S. Fish and Wildlife Service. <http://www.fws.gov/wetlands/Wetlands-Mapper.html>. Accessed March 10.

[NWS] National Weather Service. 2023. Precipitation Summaries. National Oceanic and Atmospheric Administration. <https://www.weather.gov/hfo/hydro_summary>. Accessed May 25.

Office of Planning. 2017. Hawaii Statewide GIS Program. Streams (Perennial and Non-Perennial) of the State of Hawaii. <http://geoportal.hawaii.gov/datasets/56046b3578064d989ffa485e4ed3dc46_1>. Accessed March 10.

Parham, J. E., G. R. Higashi, E. K. Lapp, D. G. K. Kuamoo, R. T. Nishimoto, S. Hau, J. M. Fitzsimons, et al. 2008. Atlas of Hawaiian Watersheds and Their Aquatic Resources. A Joint Project between the Hawaii Division of Aquatic Resources and Bishop Museum. <http://hawaiiwatershedatlas.com/watersheds/oahu/36006.pdf>.

[USACE] U.S. Army Corps of Engineers. 2005. Regulatory Guidance Letter. No. 05-05. December 7.

[USACE] U.S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Islands Region (Version 2.0). Wetlands Regulatory Assistance Program.

[USACE] U.S. Army Corps of Engineers. 2016. Updated Map and Drawing Standards for the South Pacific Division Regulatory Program.

Wagner, W. L., D. R. Herbst, and S. H. Sohmer. 1999. Manual of the Flowering Plants of Hawaii. Two volumes. Revised edition. University of Hawaii Press and Bishop Museum Press, Honolulu.

Appendix A. Plants Observed in the Wetland Delineation Study Area

Plant Species Observed in the Honoapiʿilani Highway Improvement Wetland Study Area

Family	Scientific Name	Common Name	Status[1]	Relative Abundance[2]	Wetland Indicator Status[3]
Malvaceae	*Abutilon incanum* (Link) Sweet	Hoary abutilon	Alien	Uncommon	UPL
Malvaceae	*Abutilon grandifolium* (Willd.) Sweet	Hairy abutilon	Native	Rare	UPL
Poaceae	*Cenchrus ciliaris* L.	Buffel grass	Alien	Abundant	FACU
Fabaceae	*Prosopis pallida* (Humb. & Bonpl. Ex Willd.)	Kiawe	Alien	Abundant	FACU
Fabaceae	*Leucaena leucocephala* (Lam.) de Wit	Haole koa	Alien	Abundant	UPL
Malvaceae	*Sida fallax*	ilima	Native	Uncommon	UPL
Santalaceae	*Santalum ellipticum*	Sandalwood	Native	Rare	UPL
Sapindaceae	*Dodonaea viscosa*	aalii	Native	Rare	FACU
Areceaea	*Washingtonia robusta* H. Wendl.	Mexican fan palm	Alien	Uncommon	FAC
Fabaceae	*Pithecellobium dulce*(Roxb.) Benth.	Opiuma	Alien	Abundant	FAC
Asteraceae	*Pluchea indica* (L.) Less.	Indian fleabane	Alien	Abundant	FAC
Asteraceae	*Pluchea x fosbergii* Cooperr. & Galang	Marsh fleabane	Alien	Abundant	[4]FAC
Poaceae	*Megathyrsus maximus*	Guinea grass	Alien	Abundant	FAC
Asteraceae	*Xanthium strumarium*	cocklebur	Alien	Common	FACU
Bataceae	*Batis maritima*	Pickleweed	Alien	Abundant	OBL
Aizoaceae	*Sesuvium portulacastrum*	Akuiluli	Native	Common	FAC
Amaranthaceae	*Chenopodium murale*	Nettleleaf goosefoot	Alien	Uncommon	FACU
Fabaceae	*Chamaecrista nictitans*	Partridge pea	Alien	Uncommon	FACU
Nyctaginaceae	*Boerhavia sp.*	Alena	Alien	Uncommon	FAC
Fabaceae	*Crotalaria pallida*	Smooth rattlepod	Alien	Uncommon	FAC
Poaceae	*Cenchrus echinatus*	Sandbur	Alien	Rare	FACU
Cyeraceae	*Cyperus rotundus*	Purple nutsedge	Alien	Uncommon	FACU
Asteraceae	*Bidens alba*	Florida beggartick	Alien	Uncommon	UPL

Family	Scientific Name	Common Name	Status[1]	Relative Abundance[2]	Wetland Indicator Status[3]
Fabaceae	*Desmanthus pernambucanus*	Slender mimosa	Alien	Uncommon	FACU
Portulacaceae	*Portulaca oleracea*	pigweed	Alien	Rare	FACU
Poaceae	*Eragrostis amabilis*	lovegrass	Alien	Common	FAC
Convolvulaceae	*Ipomoea triloba* L.	Little bell	Alien	Uncommon	FAC
Zygophyllaceae	*Tribulus terrestris* L.	Puncture vine	Alien	Uncommon	UPL
Poaceae	*Cynodon dactylon* (L.) Pers.	Bermuda grass	Alien	Common	FACU
Poaceae	*Digitaria abyssinica* (Hochst. Ex. A.Rich.) Stapf	Finger grass	Alien	Common	UPL
Malvaceae	*Waltheria indica* L.	Uhaloa	Native	Common	FACU
Euphorbiaceae	*Ricinus communis* L.	Castor bean	Alien	Common	FACU
Fabaceae	*Samanea saman* (Jacq.) Merr.	Monkey pod	Alien	Common	UPL
Fabaceae	*Macroptilium atropurpureum* (DC.) Urb.	Vining cow pea	Alien	Common	FAC
Musaceae	*Musa* sp.	Banana	Pol	Uncommon	FACU
Bromeliaceae	*Ananas comosus* L. Merr	Pineapple	Alien	Rare	UPL
Arecaceae	*Cocos nucifera* L.	Coconut	Pol	Uncommon	FACU
Moraceae	*Artocarpus altilis* (Parkinson ex Z) Fozberg	Breadfruit	Pol	Rare	UPL
Nyctaginaceae	*Bougainvillea spectabilis* Willd.	Bougainvillea	Alien	Uncommon	UPL
Anacardiaceae	*Mangifera indica* L.	Mango	Alien	Rare	FACU
Malvaceae	*Abutilon incanum* (Link) Sweet	Hoary abutilon	Alien	Uncommon	UPL
Cucurbitaceae	*Momordica charantia* L.	Bitter melon vine	Alien	Common	FAC
Convolvulaceae	*Merremia tuberosa* (L.) Rendle	Woodrose	Alien	Common	UPL
Euphorbiaceae	*Euphorbia hirta* L.	Hairy spurge	Alien	Uncommon	FACU
Asteraceae	*Tridax procumbens* L.	Coat buttons	Alien	Uncommon	FAC
Amaranthaceae	*Amaranthus viridis* L.	Slender amaranth	Alien	Common	FACU
Heliotropiaceae	*Heliotropium amplexicaule* Vahl	Heliotrope	Alien	Uncommon	UPL

Family	Scientific Name	Common Name	Status[1]	Relative Abundance[2]	Wetland Indicator Status[3]
Fabaceae	*Peltophorum pterocarpum* (DC.) K.Heyne	Copper pod	Alien	Rare	UPL
Malvaceae	*Sida rhombifolia* L.	Cuban jute	Alien	Rare	FACU
Goodeniaceae	*Scaevola taccada* (Gaertn.) Roxb.	Naupaka	Native	Rare	UPL
Lamiaceae	*Leonotis nepetifolia* (L.) R.Br.	Lion's ear	Alien	Uncommon	FACU
Poaceae	*Chloris gayana* Kunth	Rhodes grass	Alien	Abundant	FACU
Cucurbitaceae	*Cucumis dipsaceus* Ehrenb. Ex Spach	Wild cucumber	Alien	Uncommon	UPL
Passifloraceae	*Passiflora foetida* L.	Love in a mist	Alien	Uncommon	FACU
Myrtaceae	*Syzygium cumini* (L.) Skeels	Java plum	Alien	Common	FAC
Asteraceae	*Zinnia peruviana* (L.) L.	Zinnia	Alien	Rare	UPL
Malvaceae	*Thespesia populnea* (L.) Sol. Ex Corrêa	Milo	Native	Rare	FAC

[1] **Status Notes:** alien = introduced or alien (all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact [i.e., Cook's arrival in the islands in 1778]). Native = species that occur naturally in the Hawaiian Islands including indigenous species that have a wider distribution outside of Hawaii.

[2] **Qualitative Relative Abundance of Observed Species in Study Area:** A = abundant forming a major part of the vegetation in the Biological Study Area. C = common—widely scattered throughout the Biological Study Area or locally abundant in a portion of it. U = uncommon scattered sparsely throughout the Biological Study Area or occurring in a few small patches. R = rare—only a few isolated individuals in the Biological Study Area.

[3] **Wetland Indicator Status Source:** USACE 2023. Hawaii and Pacific Islands 2020 Regional Wetland Plant List. Available at: https://wetland-plants.sec.usace.army.mil/nwpl_static/v34/home/home.html

[4] Pluchea x fosbergii, not listed in the Lichvar et al, 2020 plant list is a hybrid of the two facultative *Pluchea inidica* and *Plucheal carolinensis* and is therefore treated here as a facultative species.

Appendix B. Natural Resources Conservation Service Custom Soil Report for the Project Area

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Island of Maui, Hawaii

October 3, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:54,000 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 500 1000 2000 3000

Feet: 0 2500 5000 10000 15000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 4N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Island of Maui, Hawaii
Survey Area Data: Version 21, Sep 8, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 29, 2017—Oct 11, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BS	Beaches	34.3	1.7%
EaA	Ewa silty clay loam, 0 to 3 percent slopes, MLRA 158	25.9	1.3%
JaC	Jaucas sand, 0 to 15 percent slopes, MLRA 163	23.3	1.1%
KMW	Kealia silt loam, frequent ponding, 0 to 1 percent slopes, MLRA 163	190.7	9.2%
PpA	Pulehu silt loam, 0 to 3 percent slopes	49.8	2.4%
PsA	Pulehu clay loam, 0 to 3 percent slopes , MLRA 163	203.0	9.8%
PtA	Pulehu cobbly clay loam, 0 to 3 percent slopes	294.4	14.2%
PtB	Pulehu cobbly clay loam, 3 to 7 percent slopes	137.3	6.6%
rCI	Cinder land	26.5	1.3%
rRK	Rock land	334.1	16.1%
rRO	Rock outcrop	2.1	0.1%
rRS	Rough broken and stony land	10.0	0.5%
rSM	Stony alluvial land	385.7	18.6%
W	Water > 40 acres	2.4	0.1%
WyC	Wainee extremely stony silty clay, 7 to 15 percent slopes, MLRA 158	226.6	10.9%
Totals for Area of Interest		**2,071.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Island of Maui, Hawaii

BS—Beaches

Map Unit Setting

National map unit symbol: hq7b
Elevation: 0 to 10 feet
Mean annual precipitation: 10 to 75 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landform: Beaches
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coral, sea shells, basalt and olivine

Typical profile

H1 - 0 to 6 inches: coarse sand
H2 - 6 to 60 inches: coarse sand

Properties and qualities

Slope: 1 to 5 percent
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 72 inches
Frequency of flooding: Frequent
Calcium carbonate, maximum content: 99 percent
Maximum salinity: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydric soil rating: No

EaA—Ewa silty clay loam, 0 to 3 percent slopes, MLRA 158

Map Unit Setting

National map unit symbol: 2yyrq
Elevation: 0 to 240 feet
Mean annual precipitation: 16 to 23 inches
Mean annual air temperature: 79 to 81 degrees F
Frost-free period: 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ewa and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ewa

Setting

Landform: Alluvial fans, stream terraces, mountain slopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Mountainbase, lower third of mountainflank, tread
Down-slope shape: Linear, convex
Across-slope shape: Concave, convex
Parent material: Alluvium derived from basalt

Typical profile

Ap1 - 0 to 13 inches: silty clay loam
Ap2 - 13 to 18 inches: silty clay loam
Bw1 - 18 to 45 inches: silty clay loam
Bw2 - 45 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R158XY002HI - Isohyperthermic Torric Naturalized Grassland
Hydric soil rating: No

JaC—Jaucas sand, 0 to 15 percent slopes, MLRA 163

Map Unit Setting

National map unit symbol: 2w02z
Elevation: 0 to 1,140 feet
Mean annual precipitation: 13 to 77 inches
Mean annual air temperature: 73 to 77 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Jaucas and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jaucas

Setting

Landform: Beaches
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Sand sized coral and sea shells sandy marine deposits derived from sedimentary rock

Typical profile

AC - 0 to 13 inches: sand
C1 - 13 to 22 inches: sand
C2 - 22 to 60 inches: sand

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 99 percent
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 7s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

KMW—Kealia silt loam, frequent ponding, 0 to 1 percent slopes, MLRA 163

Map Unit Setting

National map unit symbol: 2w035
Elevation: 0 to 260 feet
Mean annual precipitation: 10 to 41 inches
Mean annual air temperature: 73 to 77 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kealia and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kealia

Setting

Landform: Tidal flats, salt marshes
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Parent material: Alluvium over beach sand

Typical profile

Az - 0 to 3 inches: silt loam
Bz1 - 3 to 8 inches: loam
Bz2 - 8 to 19 inches: loam
Bz3 - 19 to 27 inches: loam
Czg - 27 to 35 inches: fine sandy loam
2Czg - 35 to 64 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 5.95 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Maximum salinity: Strongly saline (16.0 to 32.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Hydric soil rating: Yes

Minor Components

Kealia, deep water table

Percent of map unit: 10 percent
Landform: Tidal flats, salt marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Salt flats

Percent of map unit: 5 percent
Landform: Tidal marshes
Hydric soil rating: Yes

PpA—Pulehu silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hqbh
Elevation: 0 to 300 feet
Mean annual precipitation: 10 to 35 inches
Mean annual air temperature: 73 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pulehu and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pulehu

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

H1 - 0 to 21 inches: silt loam
H2 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R158XY002HI - Isohyperthermic Torric Naturalized Grassland
Hydric soil rating: No

PsA—Pulehu clay loam, 0 to 3 percent slopes , MLRA 163

Map Unit Setting

National map unit symbol: 2x1vv
Elevation: 0 to 300 feet
Mean annual precipitation: 10 to 50 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pulehu and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pulehu

Setting

Landform: Flood plains, stream terraces, alluvial fans
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, tread, rise
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from igneous rock

Typical profile

Ap - 0 to 21 inches: clay loam
2C1 - 21 to 33 inches: loam
3C2 - 33 to 37 inches: loamy sand
4C3 - 37 to 47 inches: fine sandy loam
5C4 - 47 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R158XY002HI - Isohyperthermic Torric Naturalized Grassland
Hydric soil rating: No

Minor Components

Mala

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Ewa

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Waialua

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, rise
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PtA—Pulehu cobbly clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hqbn
Elevation: 0 to 300 feet
Mean annual precipitation: 10 to 35 inches
Mean annual air temperature: 73 to 75 degrees F
Frost-free period: 365 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pulehu and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pulehu

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

H1 - 0 to 21 inches: cobbly clay loam
H2 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: R158XY002HI - Isohyperthermic Torric Naturalized Grassland
Hydric soil rating: No

PtB—Pulehu cobbly clay loam, 3 to 7 percent slopes

Map Unit Setting

National map unit symbol: hqbp
Elevation: 0 to 300 feet
Mean annual precipitation: 10 to 35 inches
Mean annual air temperature: 73 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pulehu and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pulehu

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

H1 - 0 to 21 inches: cobbly clay loam
H2 - 21 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: R158XY002HI - Isohyperthermic Torric Naturalized Grassland
Hydric soil rating: No

rCI—Cinder land

Map Unit Setting

National map unit symbol: hqck
Elevation: 8,000 to 10,000 feet
Mean annual precipitation: 20 to 100 inches
Mean annual air temperature: 43 to 73 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cinder land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cinder Land

Setting

Landform: Cinder cones
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex

Typical profile

H1 - 0 to 60 inches: paragravel

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

rRK—Rock land

Map Unit Setting

National map unit symbol: hqcq
Elevation: 0 to 6,000 feet
Mean annual precipitation: 15 to 60 inches
Mean annual air temperature: 57 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock land and similar soils: 55 percent
Rock outcrop: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Land

Setting

Landform: Pahoehoe lava flows
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope, riser, rise
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Basalt

Typical profile

H1 - 0 to 4 inches: silty clay loam
H2 - 4 to 8 inches: silty clay
H3 - 8 to 20 inches: bedrock

Properties and qualities

Slope: 0 to 70 percent
Depth to restrictive feature: 4 to 10 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: bedrock

Properties and qualities

Slope: 10 to 70 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

rRO—Rock outcrop

Map Unit Setting

National map unit symbol: hqcr
Elevation: 0 to 10,000 feet
Mean annual precipitation: 10 to 175 inches
Mean annual air temperature: 45 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: bedrock

Properties and qualities

Slope: 5 to 99 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Hydric soil rating: No

rRS—Rough broken and stony land

Map Unit Setting

National map unit symbol: hqct
Elevation: 0 to 4,000 feet
Mean annual precipitation: 20 to 200 inches
Mean annual air temperature: 61 to 73 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Rough broken and stony land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rough Broken And Stony Land

Setting

Landform: Gulches
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium & colluvium

Typical profile

H1 - 0 to 8 inches: very stony silty clay
H2 - 8 to 18 inches: silty clay
H3 - 18 to 60 inches: bedrock

Properties and qualities

Slope: 40 to 70 percent
Depth to restrictive feature: 12 to 55 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydric soil rating: No

rSM—Stony alluvial land

Map Unit Setting

National map unit symbol: hqcw
Elevation: 0 to 1,000 feet
Mean annual precipitation: 10 to 50 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Stony alluvial land and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stony Alluvial Land

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Rise
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: extremely stony clay loam
H2 - 10 to 60 inches: bouldery silty clay loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A/D
Hydric soil rating: No

W—Water > 40 acres

Map Unit Composition

Water > 40 acres: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WyC—Wainee extremely stony silty clay, 7 to 15 percent slopes, MLRA 158

Map Unit Setting

National map unit symbol: 2xn17
Elevation: 60 to 610 feet
Mean annual precipitation: 15 to 24 inches
Mean annual air temperature: 61 to 77 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Wainee, extremely stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wainee, Extremely Stony

Setting

Landform: Mountain slopes, alluvial fans
Landform position (two-dimensional): Footslope, shoulder
Landform position (three-dimensional): Mountainbase, side slope, rise
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from volcanic rock

Typical profile

Ap - 0 to 12 inches: extremely stony silty clay
Bw1 - 12 to 26 inches: very stony silty clay
Bw2 - 26 to 36 inches: extremely stony silty clay
CBk - 36 to 60 inches: extremely stony silty clay

Properties and qualities

Slope: 7 to 15 percent
Surface area covered with cobbles, stones or boulders: 8.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R158XY004HI - Rocky Isohyperthermic Torric Naturalized Grassland
Hydric soil rating: No

Minor Components

Wahikuli, very stony

Percent of map unit: 10 percent
Landform: Mountain slopes, alluvial fans
Landform position (two-dimensional): Footslope, shoulder
Landform position (three-dimensional): Mountainbase, side slope, rise
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix C. Wetland Determination Data Form – Hawaii and Pacific Islands Region and Photo Documentation

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 3/23/23 Time: 10:55 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP1

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): None

Lat: 156.582423°W Long: 20.797866°N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam, frequent ponding NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No X	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** X
Hydric Soil Present?	Yes ______	No X	
Wetland Hydrology Present?	Yes ______	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Leucaena leucocephala	50	Y	UPL
2. Prosopis pallida	5	N	UPL
3.			
4.			
5.			
	55 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1. Pluchea indica	70	Y	FAC
2.			
3.			
4.			
5.			
	70 = Total Cover		
Herb Stratum (Plot size: ______)			
1. Cenchrus ciliaris	25	Y	UPL
2. Atriplex semibaccata	5	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

Remarks:

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2								Coarse litter
2-12	5YR 3/3						Silty Loam	Some white sand, ~20%
12-15	5yr 2.5/2						Loam	No grittiness

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sand, rubble, cobbles on surface probably from previous disturbance.

Photo 1. At SP1 Facing South; Area Dominated with *Pluchea* spp. (FAC) and Buffel Grass (FACU)

Photo 2. At SP1 Facing West; Representative of Uplands in this Area

Photo 3. Area West of SP1 between Existing Highway and SP1; Representative of Upland Conditions Observed at SP1 with Mix of *Pluchea* spp. (FAC) and Buffel Grass (FACU) and Showing no Signs of Hydrology

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 3.24.23 Time: 11:17

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: ______ Sampling Point: SP2

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): ______

Lat: 156.578085°W Long: 20.798105°N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silty Loam NWI classification: Area includes "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes Y No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______	**Is the Sampled Area within a Wetland?** **Yes** X **No** ______
Hydric Soil Present?	Yes X	No ______	
Wetland Hydrology Present?	Yes X	No ______	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 sq feet)			
1. Pluchea indica	5%	Y	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: 15 sq feet)			
1. Batis maritima	90%	T	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	90% = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	7.5YR 3/4						Silty Clay	Mn mottles (Prominent)
7-16	2.5YR 6/2	98	7.5YR 4/6	2	C	Matrix/Interior	Sandy Clay Loam	Organic staining line. Jaucus sands?

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Muck Presence (A8)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Dark Surface (S7)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Stratified Layers (A5)
___ Sandy Mucky Mineral (S1)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________________

Depth (inches): ________________

Hydric Soil Present? **Yes** _X_ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
X Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Tilapia Nests (B17)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
X Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
X Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):

Water Table Present? Yes ___ No ___ Depth (inches):

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 4. At SP2 Facing East; Area Dominated by Obligate Pickleweed (*Batis maritima*) Species

Photo 5. Soil Pit at SP2 with Obligate Pickleweed (*Batis maritima*) Species

Photo 6. Representative Area between SP2 and SP3 Included in Wetland as Similar to SP2 in Observed Vegetation, Slope, and Hydrology Characteristics

Photo 7. Area South of SP3 Showing Transition (White Dash Line) between Wetland—Right Side with Pickleweed (*Batis maritima*) [OBL] and Dead Kiawe (*Prosopis pallida*) (FACU) Trees and Upland—Upper Left Side with Live Kiawe Trees and No Pickleweed in Understory

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 3.24.23 Time: 11:17

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: ______ Sampling Point: SP3

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): ______

Lat: 156.582016°W Long: 20.796921°N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silty Loam NWI classification: Area includes "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes Y No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ____	Is the Sampled Area within a Wetland?	Yes X No ____
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	90%		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks:

No vegetation. Salt crusted bare ground. Because SP3 is surrounded by obligate and salt tolerant Batis maritima species spreading toward SP3, it strongly suggests that this area would be eventually covered with this obligate species.

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-04								salt crust
0.04-8	5YR 3/2	90	7.5YR 4/6	10	C	Matrix/ Interior	Silty loam	Prominent
8-16	7.5YR 3/2	>95	7.5Yr 5/6	<5	C	Matrix/ Interior	Silty loam	Prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
  Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No**

Remarks:

Salt crust on bare ground; no vegetation. Bright orange mottles. Oxidized root channels.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):

Water Table Present? Yes ___ No ___ Depth (inches):

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches):

Wetland Hydrology Present? Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 8. At SP3 - Salt Crusted Bare Ground Devoid of Vegetation

Photo 9. At SP3 - Oxidized Root Channels Observed in Hydric Soils

Photo 10. Representative Area South of SP3 Showing Habitat Conditions Similar to that Observed at SP2 and Therefore Included as Wetland

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 1.5.23 Time: 2:30 pm

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP4

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): Coastal plain Local relief (concave, convex, none): none

Lat: 156.579819°W Long: 20.796367°N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silty Loam NWI classification: "Riverine" features border the area

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes Y No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______	**Is the Sampled Area within a Wetland?** **Yes** X **No** ______
Hydric Soil Present?	Yes X	No ______	
Wetland Hydrology Present?	Yes X	No ______	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 sq feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	10	Y	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Herb Stratum (Plot size: ______)			
1. Batis maritima	55	Y	OBL
2. Atriplex semibaccata	10	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	55	x 1 = 55
FACW species	0	x 2 = 0
FAC species	10	x 3 = 30
FACU species	10	x 4 = 40
UPL species		x 5 =
Column Totals:	75 (A)	125 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** Y **No** ______

Remarks:

Triangular area between firebreak dirt road and main access (dirt) road.

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	5YR 3/3						Silt loam	Salt crust present
1-16	7.5YR 2.5/2	90	5YR 4/6	10	C	Matrix/ Interior	Silty loam	(Fe mottles) Prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Salt crust on top. Fine roots top 5 inches.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):

Water Table Present? Yes ___ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Much evidence of ponding.

Photo 11. At SP4 - Wetland Habitat with Kiawe (*Prosopis pallida*) Overstory and Ground Vegetation Dominated with Obligate Pickleweed (*Batis maritima*)

Photo 12. At SP4 - Saturated Hydric Soil Conditions

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 1/7/23 Time: 2:50 pm

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP5

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): convex area

Lat: 156.577686°W Long: 20.797315°N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam, frequent ponding NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	20	Y	FACU
2.			
3.			
4.			
5.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ______)			
1. Cenchrus ciliaris	80	Y	FACU
2. Atriplex semibaccata	50	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	130 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:

SOIL

Sampling Point: SP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-0.4								Litter
0.4-6	5YR 3/4						Clay loam	Roots
6-12	5YR 3/4						Clay loam	Roots
12-16	5YR 3/3						Clay loam	Roots

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No X

Remarks:

Roots throughout profile.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This kiawe (Prosopis pallida) stand is slightly on higher elevation and did not show hydrology indicators in spite of being surrounded by areas that appeared to have recently ponded.

Photo 13.At SP5 - Slightly Elevated Area with Upland Habitat Conditions Similar to that at SP5. Live Kiawe (*Prosopis pallida*) with Predominantly Buffel Grass (*Cenchrus ciliaris*) in Understory

Photo 14. Southeast of SP5 - Habitat Conditions Representative of Similar Uplands Observed at SP5

Photo 15. Looking East at Large Kiawe (*Prosopis pallida*) Buffel Grass (*Cenchrus ciliaris*) Area (Red Oval) Excluded as Upland

Photo 16. Close Up of Upland Representative Area in the Northeastern Part of Ukumehame Firing Range and Excluded as Upland

WETLAND DETERMINATION DATA FORM – Hawai'i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 3.24.23 Time: 11:17

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: ______ Sampling Point: SP6

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.577376°W Long: 20.798293°N Datum: ______ Slope (%): 1-2%

Soil Map Unit Name: Kealia Silty Loam NWI classification: Area includes "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______	**Is the Sampled Area within a Wetland?** **Yes** X **No** ______
Hydric Soil Present?	Yes X	No ______	
Wetland Hydrology Present?	Yes X	No ______	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 sq feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	5	Y	FACU
2.			
3.			
4.			
5.			
= Total Cover	5		
Sapling/Shrub Stratum (Plot size: ______)			
1. Pluchea indica	5	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Atriplex semibaccata	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	10		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

Open area, mostly bare ground with fluffly cracked surface, appears to be recently ponded.

SOIL

Sampling Point: SP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	5YR 3/3	80	5G 2.5/1	20	C	Exterior	Silty Clay Loam	Prominent, large, platy
2-12	5YR 3/3	78	5YR 4/6 (Fe)	<2	C	Matrix/Interior	Silty loam	Distinct
			5GY 2.5/1	2-20	C	Matrix/ Interior	Silty loam	Prominent
12-16	5YR 3/3	50	5YR 4/6 (Fe)	25	C	Matrix/Interior	Silty loam	Distinct
			5GY 2.5/1	25	C	Matrix/Interior	Silty loam	Prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

X Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Muck Presence (A8)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Dark Surface (S7)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Stratified Layers (A5)
___ Sandy Mucky Mineral (S1) Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes X **No**

Remarks:

Crack, platy soil surface with dark/black patches on soil surface that appears to be dried mucky organic material. Prominent redox features of iron and manganese.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
X Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Tilapia Nests (B17)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

X Surface Soil Cracks (B6)
X Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
X Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):

Water Table Present? Yes ___ No ___ Depth (inches):

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches):

Wetland Hydrology Present? Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area recently flooded.

Photo 17. At SP6—View to East; Large Sparsely Vegetated Wetland with Prominent Surface soil Cracks

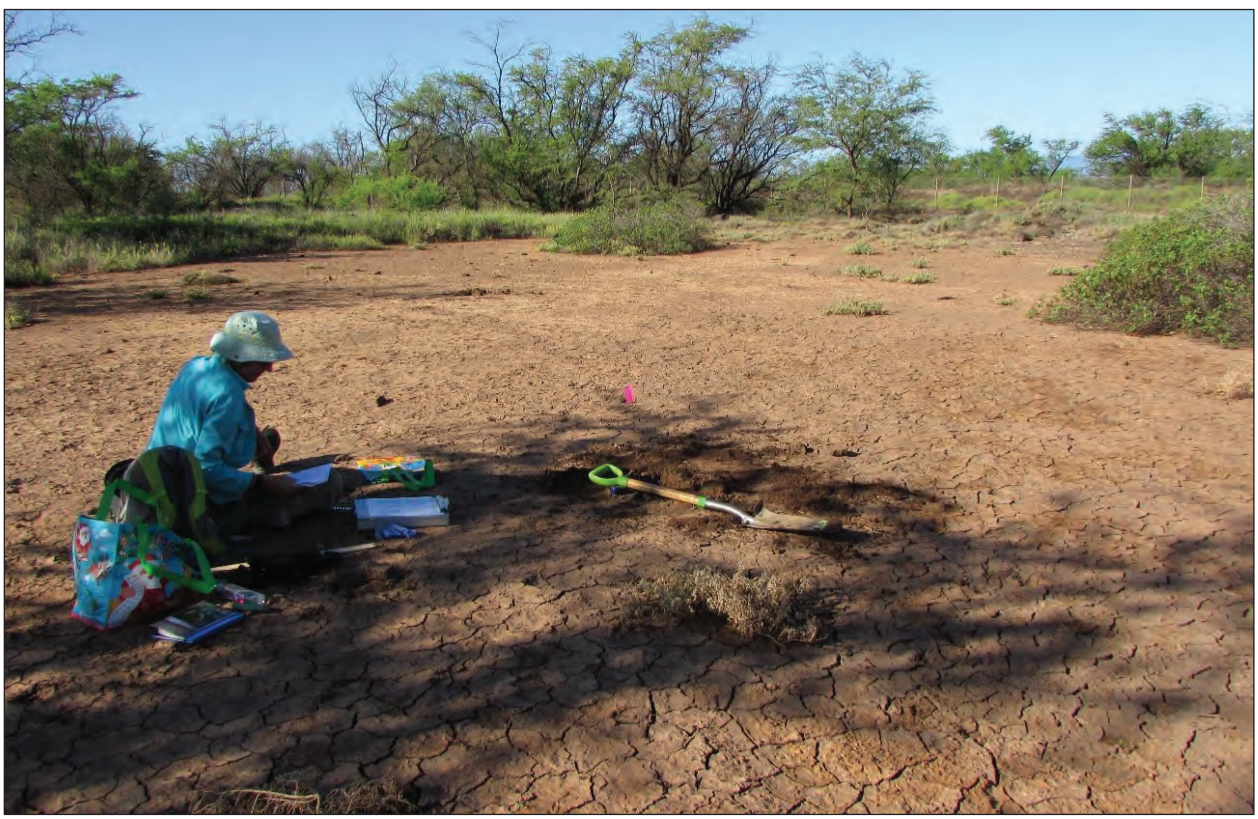


Photo 18. At SP6—View to North. Sparsely Vegetated Wetland Area (Foreground) with Buffel Grass Dominated Upland Area in the Background

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 1.7.23 Time: 1:50 pm

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: ______ Sampling Point: SP7

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.577336°W Long: 20.798374°N Datum: ______ Slope (%): 1-2%

Soil Map Unit Name: Kealia Silty Loam NWI classification: Area includes "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: 20 sq feet)			
1. Pluchea sp.	5	Y	FAC
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 20 sq feet)			
1. Atriplex semibaccata	20	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	___ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

Open area, mostly bare ground with platy damp red soils with bright red and black coloration on soil surface, appears to be recently ponded.

SOIL

Sampling Point: SP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-0.02			10YR 3/1	75		Exterior	Silty clay	Dark soil surface (Mn)
			5R 4/4	25		Exterior	Silty clay	Red soil surfave (Fe)
0.02-10	5YR 2.5/2	44	5R 4/6	10		Matrix/Interior	Silty clay	Prominent contrast
			5R 2.5/1	44		Matrix/Interior	Silty clay	Faint contrast
			10YR 3/1	<2		Matrix/Interior	Silty clay	Prominent contrast

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Muck Presence (A8)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Dark Surface (S7)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ Stratified Layers (A5)
- __ Sandy Mucky Mineral (S1)
- __ Red Parent Material (F21)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Crack, platy soil surface stained with dark, black (Mn) and red (Fe) patches on surface. Redox features of iron and manganese in matrix as well.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- __ Water-Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Tilapia Nests (B17)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- __ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Salt Deposits (C5)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):

Water Table Present? Yes ___ No ___ Depth (inches):

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area recently flooded.

Photo 19. At SP7 - Placed in Sparsely Vegetated Area to Investigate Platy Moist Soils that Had Both Bright Red and Black Soil Surface Colors

Photo 20. At SP7 - Soil Showed Redox Features of Iron and Manganese on Surface As Well As Mottles in the Matrix

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 1/5/23 Time: 9:30

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP8

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Convex

Lat: 156.579807W Long: 20.798389N Datum: ______ Slope (%): 2

Soil Map Unit Name: Kealia Silt Loam, frequent ponding NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	75	Y	FACU
2.			
3.			
4.			
5.			
	75 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1. Pluchea indica	80	Y	FAC
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: ______)			
1. Cenchrus ciliaris	10	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	___ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:

Thicket of P. pallida and P. indica. The thicket is on slightly (~one feet) higher elevation than the surrounded area that appeared to have recently ponded. No signs of ponding in this thicket.

SOIL

Sampling Point: SP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1								Organic litter
1-16	7.5YR 2.5/3						Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

Live roots in entire soil profile. Some pebbles present.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This area is on slightly (~one feet) higher elevation than the surrounded area that appeared to have recently ponded. No signs of ponding in this thicket.

Photo 21. At SP8 - Looking North into Thicket of *Pluchea* spp. with Kiawe (*Prosopis pallida*) As Canopy Species

Photo 22. Area around SP8 - Mapped as Uplands Based on Similar Habitat Conditions Observed at SP8

Photo 23. Upland Areas Identified Toward the Eastern End of Build Alternative 1 in Ukumehame Firing Range Based on Habitat, Slope, and Hydrology Similarities with SP8

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project City: Ukumehame Sampling Date: 1/5/23 Time: 9:30

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP9

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.57863W Long: 20.79791N Datum: ______ Slope (%): 2

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** X
Hydric Soil Present?	Yes ______	No X	
Wetland Hydrology Present?	Yes X	No ______	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 3 sq feet)			
1. Pluchea indica	10	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	10		
Herb Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

This sample point is on the dirt road (fire break) next to thicket of Pluchea indica.

SOIL

Sampling Point: SP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-1	5YR 2.5/2						Silty loam	
1-16	5YR 2.5/2						Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

Salt deposition on crack soil surface.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? **Yes** X **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This sample point is next to vegetation but on bare dirt road that is a fire break on the firing range.

Photo 24. SP 9 in Ukumehame Firing Range, on Firebreak Dirt Road Separating an Upland Area to the Left and Wetland Area to the Right

Photo 25. At SP9, Platy and Crack Surface Soils that were Not Hydric and Area Excluded as Wetland as It Did Not Meet the Three Parameter Wetland Criteria

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Ukumehame Firing Range City: Ukumehame Sampling Date: 9/27/23 Time: 11am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP10

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Convex

Lat: 156.57863W Long: 20.79791N Datum: ______ Slope (%): 30

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 200 sq feet)			
1. Prosopis pallida	15	Y	FACU
2.			
3.			
4.			
5.			
	15 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 200 sq feet)			
1. Atriplex semibaccata	60	Y	FAC
2. Cenchrus ciliaris	25	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:

This sample point is on the high berm built on the firing range. Read vegetation cover over entire rectangular berm.

SOIL

Sampling Point: SP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5YR 2.5/4							No litter
6-18	2.5YR 2.5/4	95	2.5YR 4/8	5	C	Matrix/Interior	Silty clay loam	Prominent (Fe)

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
  Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ___

Remarks:

No litter. Some bright red Fe concentrations lower in the matrix.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):

Water Table Present? Yes ___ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches):

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This sample point is on the built up berm in the firing range, approximately 6 feet higher than the surrounding area.

Photo 26. At SP10 - View to South, Artificially Built Up Berm in Ukumehame Firing Range

Photo 27. At SP10 - Close Up of Sample Pit with No Signs of Hydrology and FAC saltbush (*Atriplex semibaccata*) mixed with FACU Buffel Grass (*Cenchrus ciliaris*)

Photo 28. View to South, Photo of Second Berm (From East) that was Excluded as Upland Based on Similarities in Habitat, Slope, and Hydrology Observed at the SP10 Berm Site

WETLAND DETERMINATION DATA FORM – Hawai'i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Ukumehame Firing Range City: Ukumehame Sampling Date: 9/27/23 Time: 11:40 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP11

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.57735W Long: 20.79679 Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 sq feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	50	Y	FACU
2.			
3.			
4.			
5.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1. Pluchea sp.	25	Y	FAC
2.			
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 200 sq feet)			
1. Atriplex semibaccata	50	Y	FAC
2. Chloris radiata	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

This sample point is representative of the area between berms. Area was observed to have been flooded in January 2023.

SOIL

Sampling Point: SP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-0.5								Litter
0.5-18	7.5YR 2.5/1	80	2.5YR 4/8	20	C	Matrix/Interior	Silty loam	Prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Muck Presence (A8)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Dark Surface (S7)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Stratified Layers (A5)
___ Sandy Mucky Mineral (S1)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Some bright red Fe streaks and spots.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Tilapia Nests (B17)
___ Hydrogen Sulfide Odor (C1)
X Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

X Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
X Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
X Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):
Water Table Present? Yes ___ No X Depth (inches):
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This sample point is representative of area between the berms. Ponding was observed here in January 2023.

Photo 29. At SP11 - Between Berms 1 and 2; Kiawe (*Prosopis pallida*), with Predominanlty Facultative Saltbush (*Atriplex semibaccata*) in Understory

Photo 30. Around SP11 - View to East. Wetland Habitat with Surface Crack Soils and Salt Crust

Photo 31. View to West from Top of Berm 2 into the Low-Lying Area Between Berms 2 and 3; Area Included as Wetland Based on Similar Habitat, Slope, and Hydrology Observed at SP11 Between Berms 1 and 2


Photo 32. View to West from Top Berm 3 into the Low-Lying Area Between Berms 3 and the Western Fence of Ukumehame Firing Range; Area Included as Wetland Based on Similar Habitat, Slope, and Hydrology Conditions Observed at SP11

WETLAND DETERMINATION DATA FORM – Hawai'i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - East of County Firing Range City: Ukumehame Sampling Date: 5/1/23 Time: 10:30 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP12

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): ______

Lat: 156.57761W Long: 20.795880N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 sq feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	5	Y	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: 200 sq feet)			
1. Batis maritima	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	100	x 1 = 100
FACW species		x 2 =
FAC species		x 3 =
FACU species	5	x 4 = 20
UPL species		x 5 =
Column Totals:	105 (A)	120 (B)

Prevalence Index = B/A = 1.14

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

SOIL

Sampling Point: SP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2.5/2						Clay	Many fine roots
6-18	5YR 3/3	80-98	2.5YR 4/6	2-20			Clay	Prominent contrast

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No**

Remarks:

Black concentrations were charcoal and not Mn.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):
Water Table Present?	Yes ___	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):

Wetland Hydrology Present? Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

P. pallida trees appeared stunted and and almost dead in this B. maritima dominated patch. Area next to this patch is open parking for County firing range which showed signs of ponding.

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Ukumehame Firing Range City: Ukumehame Sampling Date: 9/26/23 Time: 4:20 pm

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP13

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Convex

Lat: 156.57735W Long: 20.79679 Datum: ______ Slope (%): 2%

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 sq feet))	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	20	Y	FACU
2.			
3.			
4.			
5.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1. Pluchea sp.	75	Y	FAC
2.			
3.			
4.			
5.			
	75 = Total Cover		
Herb Stratum (Plot size: 200 sq feet)			
1. Atriplex semibaccata	15	Y	FAC
2. Chloris radiata	10	Y	FACU
3. Cenchrus ciliaris	15	Y	UPL
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

This sample point is representative of the push piles between the parking area of the county firing range to the east and what appears to be wetland to the east.

SOIL

Sampling Point: SP13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5YR 2.5/3						Silty clay	
6-10	2.5YR 2.5/3	75	2.5YR 4/6	25	C	Matrix/Interior	Silty clay	Distinct
10-18	2.5YR 2.5/2	75	2.5YR 4/6	25	C		Silty clay	Distinct

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Area slightly elevated as on a push pile between parking lot and what appears to be a wetland.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):

Water Table Present? Yes ___ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches):

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Very faint and shallow surface cracks.


Photo 33. At SP13 – View to East; This Upland Area in the Disturbed Swath Next to the County Firing Range Parking Lot Defined the Edge of the Wetland to the West

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - West of County Firing Range City: Ukumehame Sampling Date: 9/26/23 Time: 4:20 pm

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP14

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.57738W Long: 20.79645N Datum: ______ Slope (%): 2%

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______	**Is the Sampled Area within a Wetland?** **Yes** X **No** ______
Hydric Soil Present?	Yes X	No ______	
Wetland Hydrology Present?	Yes X	No ______	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 sq feet))	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	50	Y	FACU
2.			
3.			
4.			
5.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 sq feet)			
1. Pluchea sp.	80	Y	FAC
2.			
3.			
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 10 sq feet)			
1. Atriplex semibaccata	40	Y	FAC
2. Chloris radiata	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	55	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

SOIL

Sampling Point: SP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 2.5/3						Silty Clay	many roots
5-14	7.5YR 2.5/3	95	2.5YR 4/6	5	C	Matrix/Interior	Silty Clay	Fe. Prominent contrast
14-16	7.5YR 2.5/3	90	10YR 2/1	5	C	Matrix/Interior	Silty Clay	Mn Distinct contrast
			2.5YR 4/6	5	C	Matrix/Interior		Fe Prominent contrast

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- X Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Muck Presence (A8)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Dark Surface (S7)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ Stratified Layers (A5)
- __ Sandy Mucky Mineral (S1)
- __ Red Parent Material (F21)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water-Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Tilapia Nests (B17)
- __ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- __ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- __ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Salt Deposits (C5)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):
Water Table Present?	Yes ___	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Oxidized root channels. Moist soil below 10 inches.

Photo 34. At SP14 - Wetland Area with Salt Crust and Dominated with Facultative Species of Pluchea sp. and Saltbush (Atriplex semibaccata) in Understory

Photo 35. Salt Crust on Soil in Unvegetated Area Next to SP14 (Seen Here in the Background)

Photo 36. View to South - Representative Wetland Habitat Mapped to South of the Upland Area (As Identified by SP15)

Photo 37. View to North - Representative Wetland Habitat Mapped to the West of Upland Area (as Identified by SP15)

Photo 38. View to East - Representative Wetland Habitat Mapped to the East of the Upland Area (as Identified by SP15)

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Ukumehame Firing Range City: Ukumehame Sampling Date: 9/26/23 Time: 4:20 pm

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP15

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Convex

Lat: 156.57608W Long: 20.79407N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 sq feet))	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	60	Y	FACU
2.			
3.			
4.			
5.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: 30 sq feet)			
1. Cenchrus ciliaris	100	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	___ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sample point is in a kiawe (P. pallida) thicket that is slightly (~on feet) higher in elevation. Does not appear to have ponded like the surrounding area.

SOIL

Sampling Point: SP15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-0.5								Organic grass litter
0.5-18	7.5YR 3/3							Many grass roots in top 6 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

Area slightly elevated about one feet and does not appear to have ponded like the surrounding area.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample point is in a kiawe (P. pallida) thicket that is slightly (~on feet) higher in elevation. Does not appear to have ponded like the surrounding area.

Photo 39. Border of Wetland (to the Left) and Upland Area to the Right as Identified by SP15

Photo 40. At SP15 - Upland Area Dominated FACU Kiawe (*Prosopis pallida*) and UPL Buffel Grass (*Cenchrus ciliaris*) in the Understory

Photo 41. Area Northeast of the Road Leading to the Maui County Firing Range; Included as Wetland Based on Similarity with Habitat Characteristics to SP2, SP4, and SP12

Photo 42. Area Northwest of Road Leading to the Maui County Firing Range; Included as Wetland as Similar in Habitat Characteristics to SP2, SP4, and SP12

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Sedimentation Basin City: Ukumehame Sampling Date: 5/14/23 Time: 9:40 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP16

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.57608W Long: 20.79387N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam NWI classification: PUBHh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No X	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** X
Hydric Soil Present?	Yes ______	No X	
Wetland Hydrology Present?	Yes X	No ______	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 sq feet))	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Sapling/Shrub Stratum (Plot size: 10 sq feet)			
1. Xanthium strumarium	80	Y	FACU
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: 10 sq feet)			
1. Cyanadon dactylon	5	Y	FACU
2. Chloris barbata	5	Y	FACU
3. Cenchrus ciliaris	5	Y	FACU
4.			
5.			
6.			
7.			
8.			
	15 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

Remarks:

Sample pit is in HDOT's sedimentation basin

SOIL

Sampling Point: SP16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-0.5			7.5YR 2/5/1				Silty Clay Loam	Evidence of Mn, top ponded surface
0.5-14	5YR 3/3						Silty clay loam	
14-16	5YR 3/3						Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

Sample point is is in artificially engineered sedimentation basin. Ponds every year in rainy/winter season or during periods of heavy rain. Some evidence of Mn on soil surface as dark

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sedimentation basin is fed by two streams that enter from the southern border.

Photo 43. The Sedimentation Basin where SP16 was Placed; Looking West

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Sedimentation Basin City: Ukumehame Sampling Date: 5/14/23 Time: 9:40 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP17

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): ______

Lat: 156.57609W Long: 20.79377N Datum: ______ Slope (%): ______

Soil Map Unit Name: Kealia Silt Loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 sq feet))	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis pallida	10	Y	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10 sq feet)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: 10 sq feet)			
1. Batis maritima	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	100	x 1 = 100
FACW species		x 2 =
FAC species		x 3 =
FACU species	10	x 4 = 40
UPL species		x 5 =
Column Totals:	110 (A)	140 (B)

Prevalence Index = B/A = 1.27

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

Sample pit is next (east) to HDOT's sedimentation basin in a patch dominated by B. maritima.

SOIL

Sampling Point: SP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-17	10YR 3/3						Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

Roots to 10 inches. Bits of sand and rock in ped.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:


Photo 44. SP17 Next to Road to the East of the Spill Way on the Eastern Side of the Sedimentation Basin

WETLAND DETERMINATION DATA FORM – Hawai'i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Lahaina Bypass End City: Launiapoko Sampling Date: 1/4/23 Time: 10:55 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP18

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ____

Landform (hillslope, coastal plain, etc.): ____ Local relief (concave, convex, none): Concave

Lat: 156.63060W Long: 20.83285N Datum: ____ Slope (%): 2%

Soil Map Unit Name: Kealia Silt Loam NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 15 sq feetsq feet)			
1. Prosopis pallida	5	Y	FACU
2.			
3.			
4.			
5.			
= Total Cover	5		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 15 sq feet)			
1. Cenchrus ciliaris	10	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	10		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

Compacted soils in relatively open ponded area.

SOIL

Sampling Point: SP-18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-0.05								Black algal layer
0.05-12	7.5YR 2.5/3						Silty clay loam	
12-14	7.5YR 2.5/2						Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ______ Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 45. SP19 Placed in the Low Point of the Area Identified as a National Wetland Inventory Feature (PEM1C) in the Northernmost Part of the Study Area

Photo 46. Lahaina Bypass End of Study Area – The General Vicinity of SP19 that Overlaps the National Wetland Inventory Feature

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Lahaina Bypass End City: Launiapoko Sampling Date: 1/4/23 Time: 10:55 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP19

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Concave

Lat: 156.63708W Long: 20.83545N Datum: ______ Slope (%): 2%

Soil Map Unit Name: Kealia Silt Loam NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______
Hydric Soil Present?	Yes ______	No X
Wetland Hydrology Present?	Yes X	No ______

Is the Sampled Area within a Wetland? **Yes** ______ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 sq feetsq feet)	Absolute % Cover	Dominant Species?	Indicator Status
1. Washingtonia robusta	10	Y	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1. Pluchea sp.	80	Y	FAC
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: 15 sq feet)			
1. Chloris radiata	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

SOIL

Sampling Point: SP-19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-0.5								organic/litter mat
0.5-8	10YR 2/1						Silty clay loam	
8-16	10YR 2/2						Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Some charcoal present.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):

Water Table Present? Yes ___ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches):

Wetland Hydrology Present? Yes X No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 47. SP19 Representative of National Wetland Inventory Feature (PEM1C) Seen Here Dominated by Facultative Species of Pluchea spp. and Mexican Fan Palms (*Washingtonia robusta);* Looking East

Photo 48. SP19 Soil Pit that Did Not Show Any Evidence of Hydric Soil Indicators

WETLAND DETERMINATION DATA FORM – Hawai‘i and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - Lahaina Bypass End City: Launiapoko Sampling Date: 9/27/23 Time: 11am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP20

Investigator(s): Shahin Ansari TMK/Parcel: ______

Landform (hillslope, coastal plain, etc.): ______ Local relief (concave, convex, none): Convex

Lat: 156.60846W Long: 20.80945N Datum: ______ Slope (%): 2%

Soil Map Unit Name: Kealia Silt Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ______	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** X
Hydric Soil Present?	Yes ______	No X	
Wetland Hydrology Present?	Yes ______	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 sq feetsq feet)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1. Pluchea sp.	80	Y	FAC
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: 15 sq feet)			
1. Chloris radiata			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	______ = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ______

Remarks:

Next to ditch to investigate if wetland.

SOIL

Sampling Point: SP-20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-0.5								organic/litter mat
0.5-17	5YR 2.5/2						Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

Root hairs in full profile.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches):

Water Table Present? Yes ______ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches):

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 49. Placed to Investigate Edge of the Ditch

Photo 50. Dominated by Facultative Pluchea sp. but Did Not Meet Three Parameter Wetland Criteria

Appendix D. USACE Ordinary High Water Mark Delineation Datasheets and Photo Documentation

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved - OMB No. 0710-0025 Expires: 01-31-2025

Project ID #: Honoapiilani Improvement	Site Name: Manawaipueo Gulch	Date and Time: March 20, 2022
Location (lat/long): 20.79218N, 156.56343W	Investigator(s): Shahin Ansari and Terrell Erickson	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- ☐ gage data
- ☐ LiDAR
- ☐ geologic maps
- ☐ climatic data
- ☒ satellite imagery
- ☐ land use maps
- ☒ aerial photos
- ☒ topographic maps
- ☐ Other: ____

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Manawaipueo gulch is in the Papalaua watershed in west Maui. The stream is ephemeral and known to only flow during high rain events. No recent drought or flood events were recorded around March 20, 2023 when the OHWM delineation was conducted. In January 2023, the gulch was observed to be flowing and holding water after heavy rains. No flows were observed at the time of the survey. This stream feature is located at the start of the Lahaina Pali Trailhead.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

There was construction crew excavating sediment from the lowermost end of the stream. The blockage of this culvert had caused the stream to back up and pond in Dec 2022-Jan 2023. The stream bed was saturated and slippery due to the heavy sediment deposits.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- ☒ **Break in slope:** a
  - ☐ *on the bank:*
  - ☒ *undercut bank:*
  - ☐ *valley bottom:*
  - ☐ Other: ____
- ☒ **Shelving:** a
  - ☒ *shelf at top of bank:* a
  - ☐ *natural levee:*
  - ☐ *man-made berms or levees:*
  - ☒ *other berms:* ____
- ☒ **Channel bar:** b
  - ☐ *shelving (berms) on bar:*
  - ☒ *unvegetated:* b
  - ☐ *vegetation transition (go to veg. indicators)*
  - ☒ *sediment transition (go to sed. indicators)* b
  - ☐ *upper limit of deposition on bar:*
- ☐ **Instream bedforms and other bedload transport evidence:**
  - ☐ *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - ☐ *bedforms (e.g., pools, riffles, steps, etc.):*
  - ☐ *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- ☐ **Secondary channels:**

Sediment indicators

- ☐ **Soil development:**
- ☐ **Changes in character of soil:**
- ☒ **Mudcracks:** b
- ☐ **Changes in particle-sized distribution:**
  - ☒ *transition from* boulder to fine sedi
  - ☐ *upper limit of sand-sized particles*
  - ☐ *silt deposits:*

Vegetation Indicators

- ☒ **Change in vegetation type and/or density:** x
  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs). **Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - ☒ *vegetation absent to:* graminoids
  - ☐ *moss to:*
  - ☐ *forbs to:*
  - ☐ *graminoids to:*
  - ☐ *woody shrubs to:*
  - ☐ *deciduous trees to:*
  - ☐ *coniferous trees to:*
- ☐ **Vegetation matted down and/or bent:**
- ☐ **Exposed roots below intact soil layer:**

Ancillary indicators

- ☒ **Wracking/presence of organic litter:** a
- ☐ **Presence of large wood:**
- ☐ **Leaf litter disturbed or washed away:**
- ☒ **Water staining:** x
- ☐ **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: Honoapiilani Improvement

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 was placed toward the upstream end just below the remnant broken concrete bridge. Sediment or water staining on the rocks along and matted down vegetation were used to mark the OHWM elevation followed by wracking on debris above the OHWM. The second transect was placed at the lower reach of the stream where indicators such as destruction of vegetation were used to identify the OHWM elevation.

Additional observations or notes

The banks were vegetated with predominantly kiawe (Prosopis pallida) trees and guinea grass (Megathyrsus maximus). The width of the stream channel at the upstream end was about 22 feet wide and about 47.5 feet wide at the downstream end.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
51-54	See attached Photos and description.

Photo 51. Ponded and Backed Up Stream on December 20, 2022 Following Heavy Rains

Photo 52. Remnant of an Old Concrete Bridge at the Upper (Eastern) End of the Stream in the Study Area. [Water and sediment staining used to identify the OHWM level here.]

Photo 53. Location of Transect 1; Sediment/Water Staining on the Rocks at the OHWM and Wracking of Debris Above the OHWM were Used to Mark the OHWM Level Here

Photo 54. Location of Transect 2; Placed Where Indicators Such as Vegetation Destruction were Selected to Mark the OHWM Level

U.S. Army Corps of Engineers (USACE)
INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved - OMB No. 0710-0025 Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Papalaua Gulch	Date and Time: 1/3 and 4/28, 2023
Location (lat/long): (20.79608N, 156.57601W)	Investigator(s): Shahin Ansari and Terrell Erickson	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [ ] aerial photos
- [x] topographic maps
- [ ] Other:

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Two unnamed streams in the Papalaua Gulch flow into the HDOT sedimentation basin. There were little to no flows in the Unnamed Streams of the Papalaua Gulch. No recent extreme floods or drought were recorded.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Two streams in the Papalua Gulch converge and flow into the sedimentation basin that was constructed in 1971 by HDOT to mitigate sediment heavy flows from reaching the Pacific Ocean.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [ ] *on the bank:*
  - [x] *undercut bank:* a
  - [x] *valley bottom:* x
  - [ ] Other:
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:*
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [x] **Secondary channels:** x

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [x] **Changes in particle-sized distribution:**
  - [x] *transition from* boulder to sediment
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x
  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [x] *vegetation absent to:* graminoids
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [x] **Exposed roots below intact soil layer:** b

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:
The entire system is situated in a flood plain.

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 was placed on the stream that enters from the south. Transition from absence of vegetation in the heavily sedimented bed to dense grasses on the bank was a major indicator of the OHWM level here. Transect 2 was placed on the stream that enters from the east. Break in bank, transition from absence of vegetation to grasses, and sediment sorting from boulders to sediment were clear indicators of the OHWM elevation for this stream. Transect 3 was placed in the alluvial fan leading to the sedimentation basin. Here too, heavily sedimented channel and transition from no vegetation to grasses was the main indicator defining the OHWM elevation.

Additional observations or notes

Buffel grass (Cenchrus ciliaris) dominated the banks of the southern stream. A mix of herbs and forbs dominated the banks of the second stream entering from the east. The floodplain along the berm of the sedimentation basin was dominated by kiawe (Prosopis pallida), thickets of haole koa (Leuceana leucocephala), Pluchea spp., and guinea grass (Megathyrsus maximus).

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not: ______

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
55 to 60	See attached photos and descriptions.

Figure 55. Papalaua Gulch – Location of Transect 1 on Southern Unnamed Stream; Stream Flow Here is in the East West Direction Before it Turns North Along the Raised Berm of the Sedimentation Basin

Figure 56. Papalaua Gulch Southern Unnamed Stream; Stream Flow Here is in the North South Direction Parallel to the Raised Berm of the Sedimentation Basin (Break in Bank was Much Above the OHWM Elevation as Indicated by Sediment Sorting)

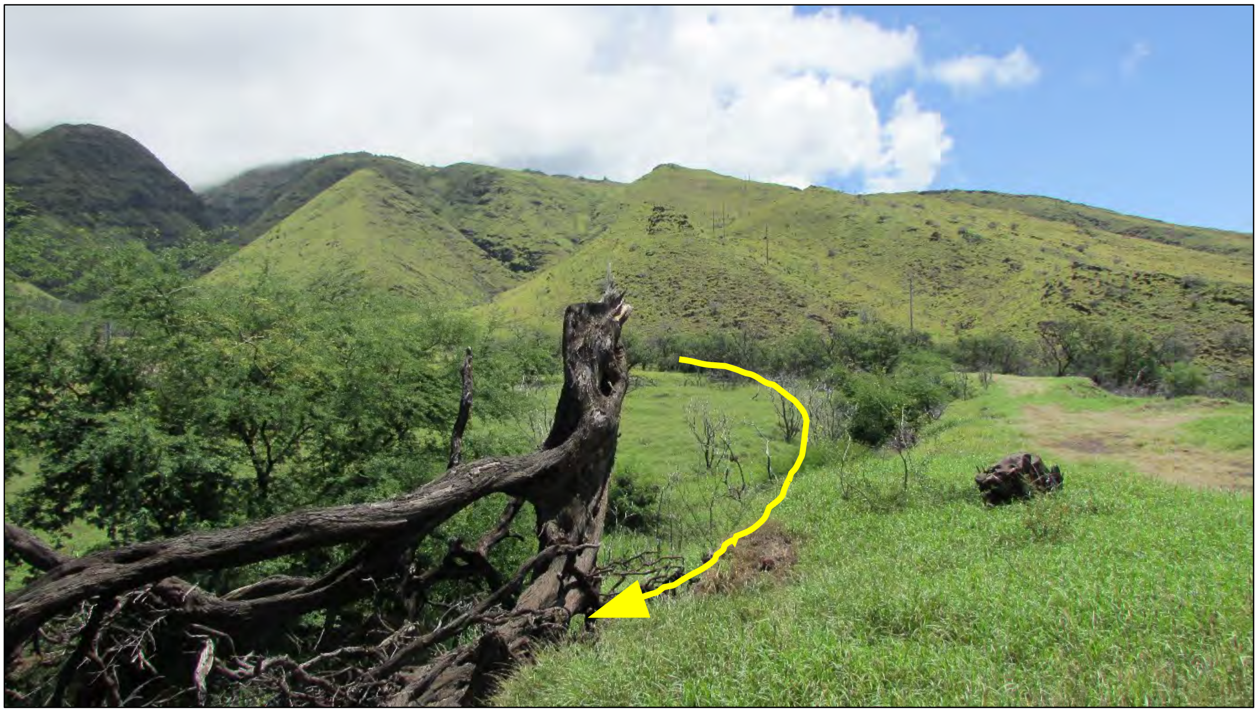


Figure 57. General Direction of Flow of the Papalaua Gulch Unnamed Southern Stream

Figure 58. Alluvial/Sediment Fan Created by the Papalaua Gulch Unnamed Southern Stream

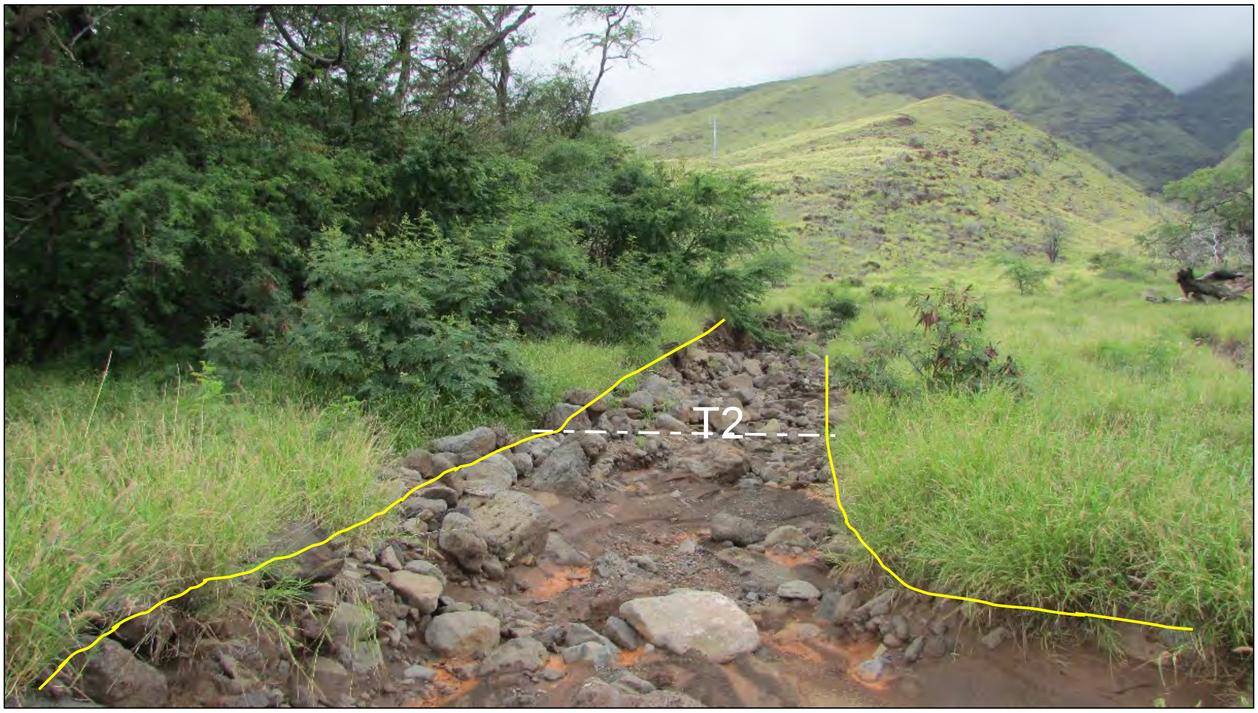


Figure 59. Papalaua Gulch – Location of Transect 2 on Unnamed Stream Entering from the East; Alluvial/Sediment Fan Created by the Papalaua Gulch Unnamed Southern Stream

Figure 60. Papalaua Gulch – Location of Transect 3; Unvegetated Alluvial Fan Leading to the Sediment Basin (Looking south, the Northward Flow Runs Parallel to the Western Berm of the Sedimentation Basin [not seen here])

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved - OMB No. 0710-0025 Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Hanaula Gulch & associated ditches	Date and Time: 3/21 to 3/23, 2023

Location (lat/long):	Investigator(s): Shahin Ansari and Terrell Erickson

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
The Hanaula Gulch/Stream is an intermittent stream. It is the main source of water to the ditch system next to the Ukumehame firing range. There was little to no water in the ditches which is expected at this time of the year for an intermittent stream system. There were no recent flood or drought events at the time of the survey.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

The ditches are remnant from the time when the land here was under sugarcane plantation. There is also an old abandoned road that runs parallel tothe

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [ ] *on the bank:*
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: ______
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ______
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [x] **Mudcracks:**
- [ ] **Changes in particle-sized distribution:**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*
- [ ] **Exposed roots below intact soil layer:**

Vegetation Indicators

- [ ] **Change in vegetation type and/or density:**
  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [ ] *vegetation absent to:*
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [ ] **Vegetation matted down and/or bent:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Dense growth of pickleweed in the ditches made it challenging to identify the OHWM level. Some ditches that recently carried water had a clean line of dead vegetation in the center of the bed. In some other ditches where the pickleweed was not very dense, prominent mud cracks were visible. These indicators were use to place the OHWM elevation at the ditches.

Additional observations or notes

All the ditches had a dense cover of obligate pickleweed (*Batis maritima*) species. The southernmost ditch that runs parallel to the Ukumehame Firing Range fenceline is connected to the Pacific Ocean via an underground culvert that runs below the existing Honoapiilani Highway.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
61 to 64	See attached photos and description.

Photo 61. Google Earth Imagery - Hanaula Gulch (Blue Arrow) and Associated Ditches. D1 to D7 (While Outline) [Landscape View of Hanaula Stream Flow into the Ditch (Blue Arrow) that Runs Parallel to the Northern Boundary of Ukumehame Firing Range]

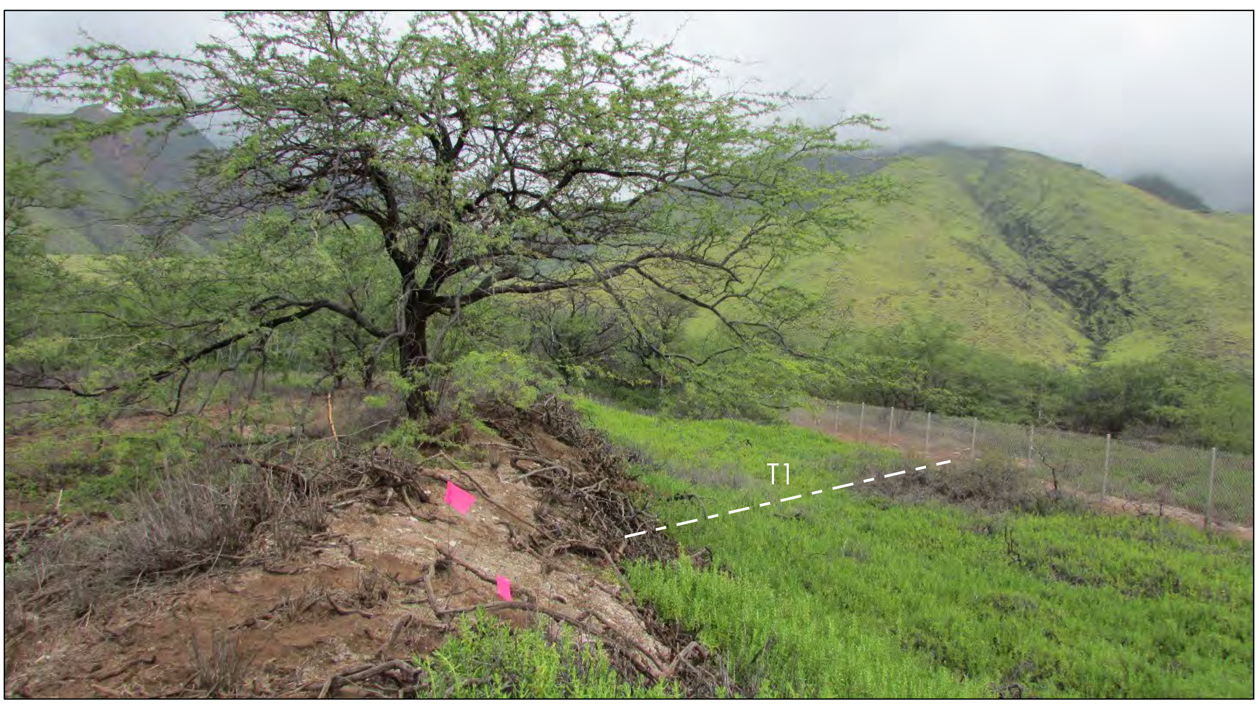


Photo 62. Hanaula Gulch and Ditch Next to Ukumehame Firing Range Fence in the Study Area. Location of Transect 1 to Identify the OHWM Line

Photo 63. Culvert Connecting the North-South Ditch 7 (White Arrow) to the Hanaula Gulch (Blue Arrow)

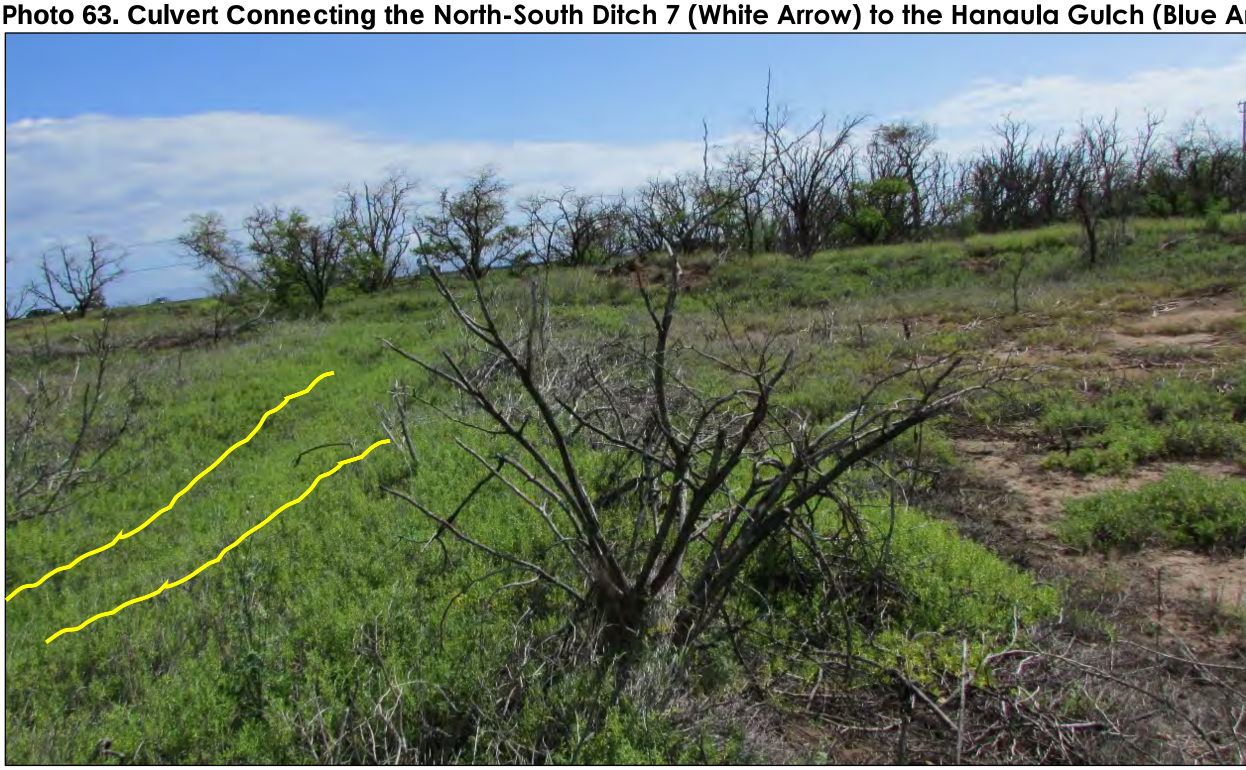


Photo 64. Dense Growth of Pickleweed Made it Challenging to Identify the OHWM Level. [Break in slope was a weak indicator of the OHWM in many places.]

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved -
OMB No. 0710-0025
Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

The public reporting burden for this collection of information, 0710-OHWM, is estimated to average 30 **minutes** per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

Project ID #: Honoapiilani Highway	Site Name: Ditch 1 (at Pohaku Aeko Street)	Date and Time: March 22, 2023
Location (lat/long): 20.79815N, 156.78156W	Investigator(s): Shahin Ansari and Terrell Erickson	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [ ] aerial photos
- [ ] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Ditch 1 is a culverted ditch that runs parallel to the existing Honoapiilani Highway. There was standing water in this feature. No recent extreme drought or flood events were recorded.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

The ditch was heavily vegetated which probably impacted flow.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [ ] **Break in slope:**
  - [ ] *on the bank:*
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: ______
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ______
- [x] **Channel bar:** x
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [x] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [ ] **Changes in particle-sized distribution:**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x
  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [ ] *vegetation absent to:*
  - [ ] *moss to:*
  - [x] *forbs to:* woody shrubs
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [ ] **Vegetation matted down and/or bent:**
- [ ] **Exposed roots below intact soil layer:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:
The bed of the ditch was covered with obligate picklweed and transitioned to thickets of woody Pluchea species on the ditch banks.

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☒ Yes ☐ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 was placed at the culvert to the south of Pohaku Aeko Street. The edge of the culvert and the edge of facultative Pluchea spp. thickets was used to delineated the OHWM at this feature. Transect 2 was placed on the longer stretch of the ditch north of Pohaku Aeko Street. The transition from obligate pickleweed plants that covered the standing water in the ditch to the woody Pluchea spp. on the bank indicated the OHWM elevation at this location.

Additional observations or notes

The heavily vegetated ditch was hard to access. Other than for change in vegetation, and a weak break in bank, very few OHWM indicators were seen here. A combination of aerial imagery and field observations were used to determine the OHWM elevation for this feature.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
65-68	See attached photos and descriptions.

Photo 65. Ditch 8 at Pohaku Aeko Street. [Ditches on Either Side of Pohaku Aeko Street Are Connected Via a Concrete Culvert. Also, the Ditch to the South [Right] of the Road Flows Under the Existing Highway into the Pacific Ocean.]

Photo 66. Fence Lining the Concrete Culvert at Pohaku Aeko Street – View to the South. [Location of Transect 1 Where the Edge of Culvert was Used to Identify the OHWM Elevation at this Aquatic Feature]

Photo 67. Fenced in Culvert and Ditch 8 at Pohaku Aeko Street – View to the North

Photo 68. Location of Transect 2; Placed Where Change in Vegetation from Obligate to Facultative was Used to Mark the OHWM Level

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved - OMB No. 0710-0025 Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Ukumehame Stream	Date and Time: 3/23/23 and 9/22/23

Location (lat/long):	Investigator(s): Shahin Ansari, Terrell Erickson

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [x] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: ____

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Ukumehame is a perennial stream. Stream channel in the study area largely runs through undeveloped lands. There were ordinary low flows in the stream at the time of the survey. No recent extreme flood or drought events have been recorded.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

There is a concrete ford, concrete bridge, and culvert at the lowermost (western) end of the stream reach. Other than this the stream has natural bed and banks.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [ ] *on the bank:*
  - [ ] *undercut bank:*
  - [x] *valley bottom:* b
  - [ ] Other: ____
- [x] **Shelving:** x
  - [x] *shelf at top of bank:* x
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ____
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [x] **Soil development:** b
- [ ] **Changes in character of soil:** b
- [ ] **Mudcracks:**
- [ ] **Changes in particle-sized distribution:**
  - [x] *transition from* boulder to sediment
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** b

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [x] *vegetation absent to:* absent
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [x] **Exposed roots below intact soil layer:** b

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [x] **Presence of large wood:** x
- [x] **Leaf litter disturbed or washed away:** b
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 is representative of the uppermost reach of the stream. OHWM level selected at elevation clearly showing the undercut banks with exposed roots and shelving on top of bank. Transect 2 is representative of the middle reach of the stream where sediment sorting from boulders to finer sediment and wracking were used to identify OHWM elevation. Transect 3 is representative of the lowermost reach of the stream where the width of the bridge and the water staining on the concrete were used to identify the OHWM elevation.

Additional observations or notes

The stream has riffles, runs, and pools. Boulders and cobbles present but there is not much embeddedness. Java plum (Syygium cumini) is the dominant tree species. Guinea grass (Megathyrsus maximus) is abundant in the ground cover.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	See attached for photos 51-55 and descriptions.

Photo 69. Location of Transect 1; In the Upper Reach of Ukumehame Stream Overlapping Build Alternative 4

Photo 70. OHWM Level Indicators at Transect 1; OHWM Level Selected at the Elevation of Undercut Bank, Exposed Roots Below this Level, and Shelving of Debris Above the Level

Photo 71. Location of Transect 2 in Middle Reach of Stream; Transect Placed Where Clear Lining on the Bank was Visible at the OHWM Level Along with Sediment Sorting from Boulders to Sediment

Photo 72. Sediment Sorting at Transect 2; Sorting of Sediment from Boulders to Finer Sediment Below the OHWM and Wracking at the OHWM were Main Indicators at this Transect

Photo 73. Location of Transect 3 at Lowermost Reach of Stream; Ukumehame Stream Bridge and the Concrete Ford at the Lowermost Reach (The Bridge Footing and Water Staining on the Concrete Defined the OHWM Level for this Lower Reach)

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved -

OMB No. 0710-0025

Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani	Site Name: Ditch 2-Vicinity of Ehehene Street	Date and Time: September 20, 2023
Location (lat/long): 20.80456N, 156.59900W	Investigator(s):	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Based on imagery over multiple years, it appears that Ditch 2 (system) is perennial and has a clear connection to the ocean. Normal low flows occurred at the time of the survey. No extreme recent flood or drought event occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Dense impenetrable thickets of vegetation surround the ditches that made it challenging to find OHWM indicators here.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [ ] **Break in slope:**
  - [ ] *on the bank:*
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: ______
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ______
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [ ] **Changes in particle-sized distribution:**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [x] *vegetation absent to:* woody shrubs
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [ ] **Exposed roots below intact soil layer:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: Honoapiilani

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect was placed at a location where OHWM indicator could be investigated from amongst the dense vegetation on the bank. Change in vegetation from either lack of it or from floating masses of duckweed to thickets of Pluchea shrubs along with break in slope were used to estimate the OHWM level.

Additional observations or notes

There is an old and large water pump, remnant of the sugar plantation time in the northern of the two east-west running ditches.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
74-77	See attached photos and descriptions.

Photo 74. Imagery the Ditch (System) 9 in the Vicinity of Ehehene Street; Yellow Arrows Showing Two East-West Running Ditches that Meet the North South Running Ditch and the Connection of the Northern Ditch with the Pacific Ocean

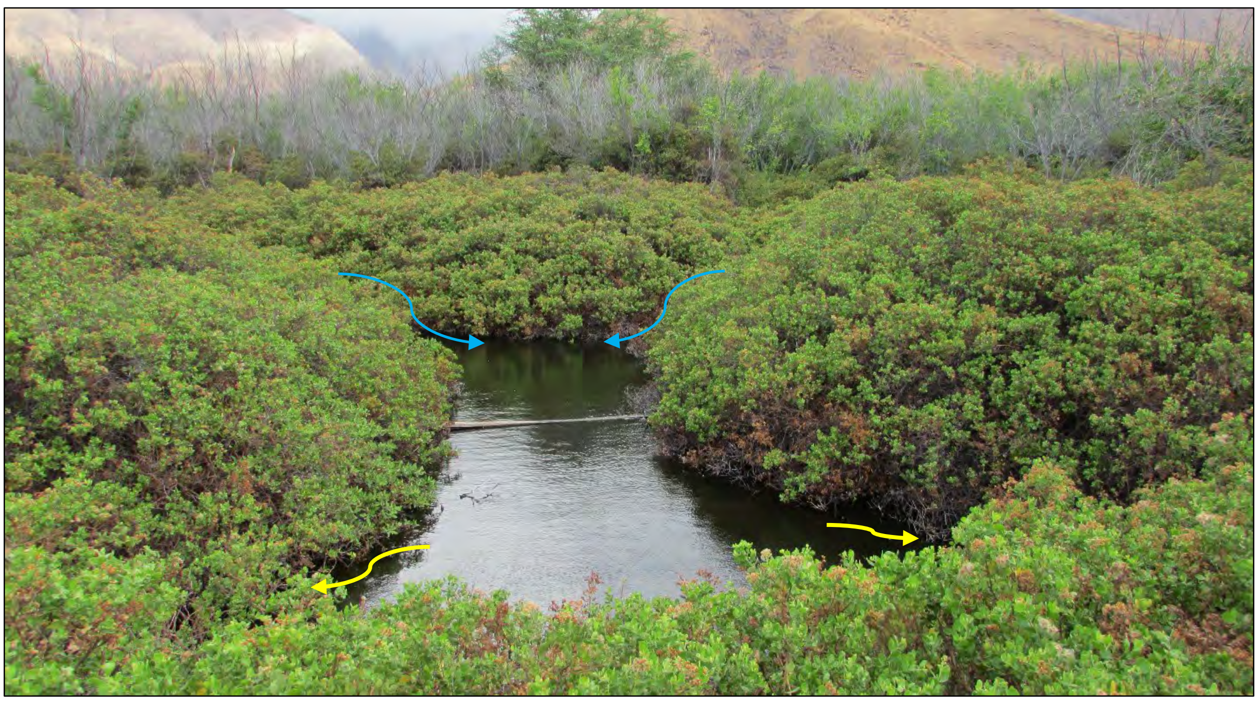


Photo 75. The Southern of the Two East-West Running Ditches in the Vicinity of Ehehene Street; Ditch is Surrounded by Thickets of Pluchea Shrubs (the Blue Arrows Indicate Smaller Ditches that Fed into this Main East-West Ditch, the Yellow Arrows Show the Connection to the North-South Ditch that Runs Parallel to the Existing Highway)

Photo 76. The Northern of the Two East-West Running Ditches in the Vicinity of Ehehene Street; Large Water Pump Remnant from the Sugar Plantation Time

Photo 77. North-South Running Ditch in the Vicinity of Ehehene Street; Location of Transect 1, OHWM was Mostly Indicated by the Break in Bank (Water in the Ditch, Seen Here, is Covered with Duckweek [Lemna sp.])

U.S. Army Corps of Engineers (USACE) **INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET** The proponent agency is Headquarters USACE CECW-CO-R.	***Form Approved -*** ***OMB No. 0710-0025*** ***Expires: 01-31-2025***

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani	Site Name: Mapua Stream	Date and Time: September 26, 2023
Location (lat/long): 20.81345N, 156.61381W	Investigator(s): Shahin Ansari and Sadie Trush	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: ____________

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Mopua stream passes through undeveloped residential lots in Olowalu Peninsula. The stream bed and banks were dry. No recent extreme flood or drought occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

The stream appears to be flowing undergrond in the stretch that was investigated. There are several water pump, a water meter, and irrigation pipes near the stream channel.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** x
  - [ ] *on the bank:*
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: ____________
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ____________
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [x] **Changes in particle-sized distribution:**
  - [x] *transition from* boulder to sediment
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [ ] **Change in vegetation type and/or density:**
  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [ ] *vegetation absent to:*
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** b
- [x] **Exposed roots below intact soil layer:** b

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:
The OHWM indicators become weaker and the dry stream abruptly ends after about 890 feet.

Project ID #: Honoapiilani

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 was placed where break in bank and sorting of sediment were the strongest indicators of the OHWM level.

Additional observations or notes

The stream flows under the existing Highway alignment via a black plastic pipe and into a ditch before it enters the ocean.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
79-81	See attached photos and descriptions.

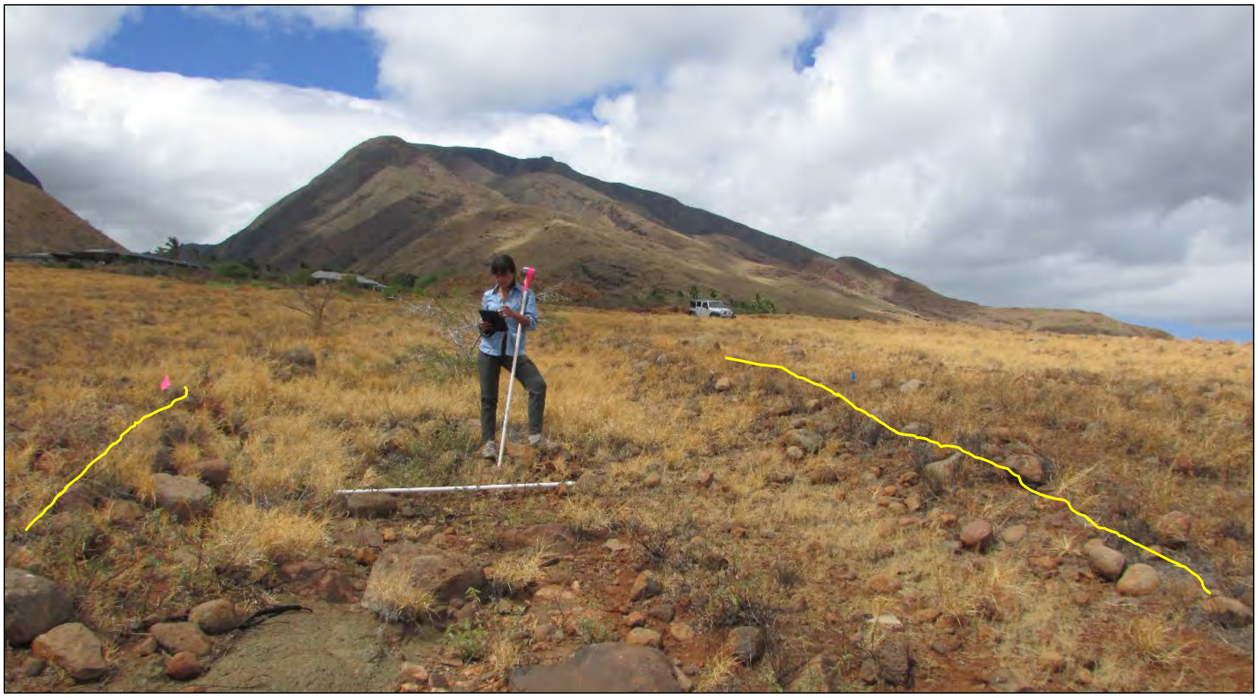


Photo 78. Mapua Stream – Shallow and Dry Stream Channel in September 2023; Break in Bank and Sediment Sorting from Boulders and Rocks to Sediment on Bank were Strong Indicators of OHWM in this System

Photo 79. Mapua Stream, Transect 1 Location; Somewhat Undercut Bank and Sorting of Sediment from Boulders to Finer Sediment

Photo 80. Culverts, Water Pumps, and Water Meter Suggest Mopua Stream Runs Undergound

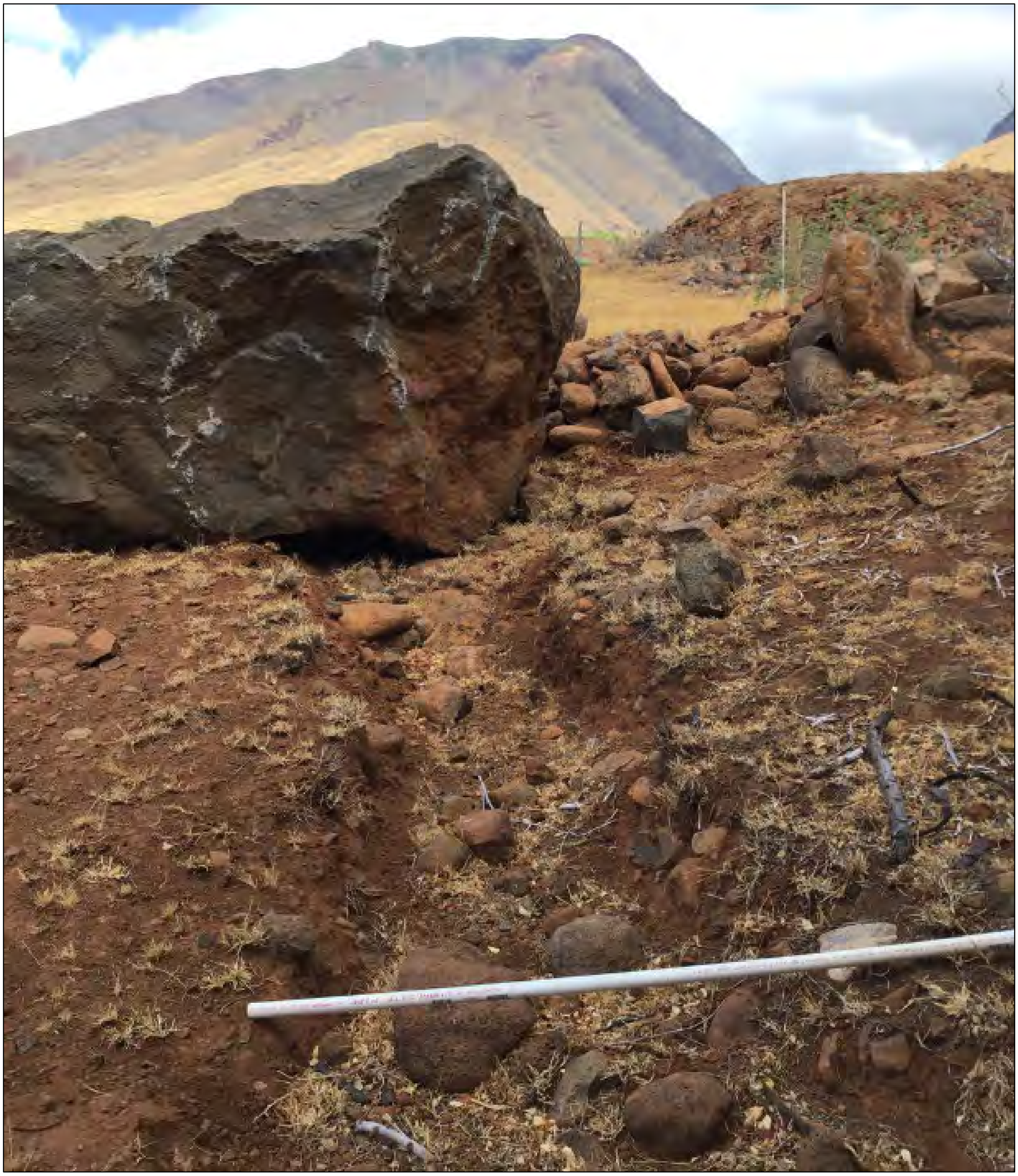


Photo 81. Portion of Mapua Stream Channel before it Abruptly Ends in the Study Area

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved - OMB No. 0710-0025 Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Olowalu Stream	Date and Time: July 18, 2023
Location (lat/long): 20.81360N, 156.62095W	Investigator(s): Shahin Ansari and Sadie Trush	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Olowalu is a perennial stream that bisects the Olowalu Peninsula. It runs through mostly undeveloped There were normal low flows in the stream at the time of the survey. No recent extreme drought or flood was recorded.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

This general area had recently burned and in many places identification of OHWM was confounded by wind and soil erosion and shifting of debris caused by fire.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [ ] *on the bank:*
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: ______
- [x] **Shelving:**
  - [x] *shelf at top of bank:* a
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ______
- [x] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:* b
  - [x] *vegetation transition (go to veg. indicators)* b
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [x] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [x] *bedforms (e.g., pools, riffles, steps, etc.):* b
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [ ] **Changes in particle-sized distribution:**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

- [x] *vegetation absent to:*
- [ ] *moss to:*
- [ ] *forbs to:*
- [ ] *graminoids to:*
- [ ] *woody shrubs to:*
- [ ] *deciduous trees to:*
- [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** b
- [x] **Exposed roots below intact soil layer:** b

Ancillary indicators

- [x] **Wracking/presence of organic litter:** a
- [x] **Presence of large wood:** a
- [x] **Leaf litter disturbed or washed away:** b
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Vegetation absent to evergreen trees of Java plum (Syzygium cumini)

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transects 1 representative of the upper reach of the stream in the study area and placed where undercut banks with exposed roots and wracking and shelving of debris caused by water were more evident as OHWM level indicator. Transects 2 representative of the middle reach of the stream in the study area and placed where the stream takes a sharp turn and where exposed roots were a stronger indicator of OHWM level compared to erosion caused by wind and soil. Transects 3 representative of the lower reach of the stream in the study area and placed neat the Olowalu Stream Bridge where sediment staining on the concrete and accumulation of debris under the bridge helped identify the OHWM in this area.

Additional observations or notes

Java plum (Syzygium cumini) was the most dominant tree species along the stream bank. Guinea grass dominated the banks in the lower reach of the stream.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
82-87	See attached photos and decriptions.

Photo 82. Location of Transect 1; Representative of the Portion of the Stream with Runs Overlapping the Innermost Build Alternative 4 (Burned Trees from the Fires in June-July 2023 Visible on the North (Left) Bank

Photo 83. Indicator of Accumulation of Large Debris at the OHWM Level in the Up Stream Section of the Study Area

Photo 84. Location of Transect 2 Representative of the Middle Reach of the Stream in the Study Area at Bend in Stream; Blue Arrow Indicates the Bend in Stream

Photo 85. OHWM Level in the Middle Reach of the Stream in Study Area Below the Soil Erosion Seen on Top of the Bank

Photo 86. Location of Transect 3 At the Olowalu Stream Bridge; Sediment Staining on the Concrete Bridge Contributed to Determining the OHWM Level in this Area

Photo 87. Undercut Banks with Exposed Roots Was Key in Separating Impacts from Confounding Soil and Wind Erosion Caused Due to Recent Fire

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved - OMB No. 0710-0025 Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Lihau Stream	Date and Time: September 22, 2023
Location (lat/long): 20.82433N, 156.62118W	Investigator(s): Shahin Ansari and Sadie Trush	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other:

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Lihau is an intermittent stream. The stream flows through undevelope agricultural land. No flows but puddles were seen in March 2023 and the stream bed was dry in September 2023. No recent extreme floods or droughts occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

There is a farm at the eastern end of the study area and irrigation pipes from the farm were seen leading into the stream.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:**
  - [x] *on the bank:* x
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other:
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:*
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [x] **Changes in particle-sized distribution:**
  - [x] *transition from* rocks to sediment
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:**
  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [x] *vegetation absent to:* graminoids
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** b
- [ ] **Exposed roots below intact soil layer:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:
Because of moist soil bed in the lower reach of the stream, presence of live green vegetation in the stream was helpful in defining the stream channel and the OHWM level here.

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1. was placed in the upper reach of he stream where cut in bank slope and destruction of vegetation below the OHWM level indicated the OHWM level. here. Transect 2 was placed in the lower reach of the stream. The bed was moist and the presence of green/live vegetation to dead grass on the bank helped identify the OHWM level in addition to the break in slope.

Additional observations or notes

The bed and banks were heavily vegetated with species such as haole koa (Leuceana leucocephala) and castor bean (Ricinus communis) shrubs and buffel grass (Cenchrus ciliaris) dominated the banks of he stream. Lihau Stream flows into the Pacific Ocean in the western most part of the study area.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
88-91	See attached photos and descriptions.

Photo 88. Location of Transect 1; Representative of the Uppermost Reach of the Stream in the Study Area (Break in Slope and Washed of Debris Were Used as Indicators of OHWM)

Photo 89. Break in Bank as OHWM Indicator in the Upper Reaches of LIhau Stream in Study Area

Photo 90. Location of Transect 2 at the Lower/Western Reach of LIhau Stream in the Study Area; Heavily Vegetated Moist Bed Compared to the Upper Drier Banks and Break in Bank Slope Used as OHWM Indicators

Photo 91. Lihau Stream Entering the Pacific Ocean in the Western Most Portion of the Study Area

U.S. Army Corps of Engineers (USACE)
INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved -
OMB No. 0710-0025
Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Awalua Stream	Date and Time: September 26, 2023
Location (lat/long): 20.82910N, 156.63419W	Investigator(s): Shahin Ansari and Sadie Trush	

Step 1 Site overview from remote and online resources
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other: ____________

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Awalua Stream is an intermittent stream that runs through undeveloped buffel grass grassland. The stream was dry at the time of the survey. No recent extreme flood or drought events occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

There is an inner road that runs parallel to the main Honapiilani Highway that has a culvert for the Awalua stream flow. Just east of the road there is also a spillway that allows for flows to spill in the north-south direction before entering this culvert.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [ ] *on the bank:*
  - [x] *undercut bank:* b
  - [x] *valley bottom:* x
  - [ ] Other: ____________
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ____________
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [ ] **Changes in particle-sized distribution:**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs)*. ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [ ] *vegetation absent to:*
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [x] *graminoids to:* absent
  - [ ] *woody shrubs to:*
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [ ] **Exposed roots below intact soil layer:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [ ] **Leaf litter disturbed or washed away:**
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 was placed near the spillway in the lower/western portion of the stream. Spillway elevation together with the change in vegetation indicated the OHWM level here. The second transect was placed upstream from here where undercut banks, change in vegetation, and deposition of woody debris helped determine the OHWM level here.

Additional observations or notes

Dead buffel grass dominated the bed and banks of Awalua Stream. This stream flows under the Honoapiilani Highway through concrete culvert before entering the Pacific Ocean.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
92-95	See attached photos and derscriptions.

Photo 92. Awalua Stream – East View

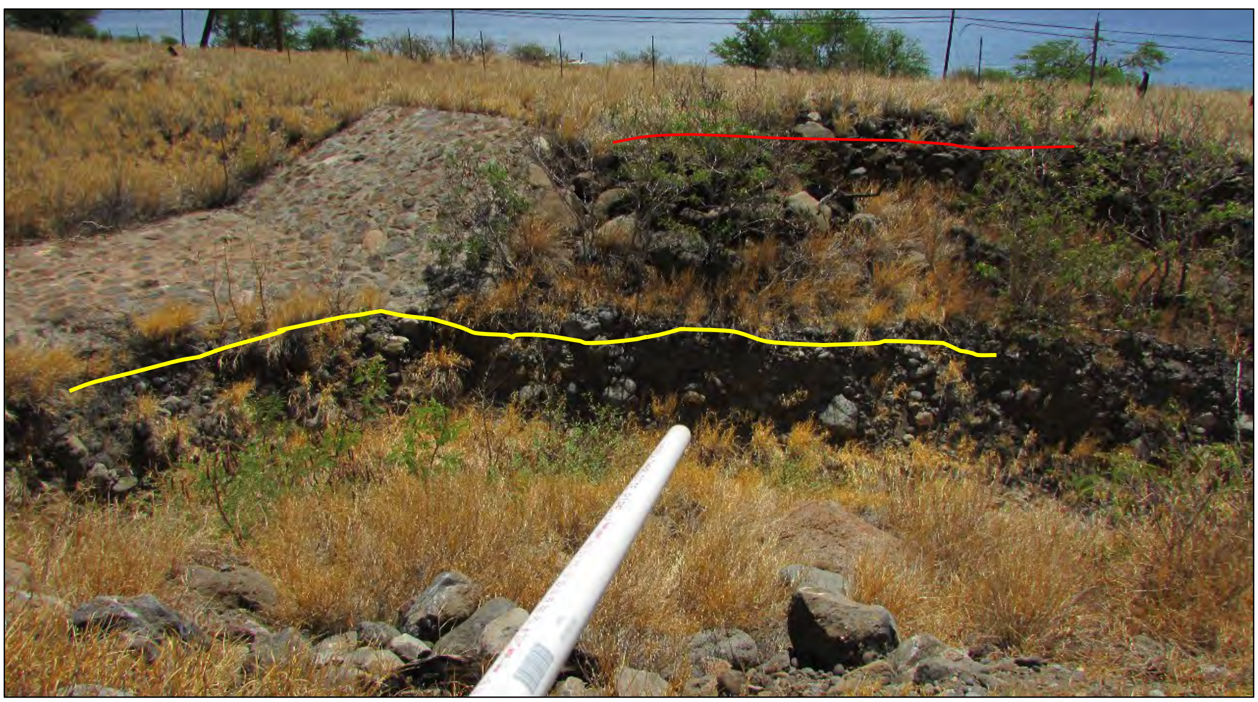


Photo 93. Awalua Stream Location of Transect 1 at Spillway; Spillway in Awalua Stream Allowing for High Flows to Spill Over in the North-South Direction Before Entering the Culvert and Ocean (this Structure Guided the Placement of OHWM Below the Eroded Bank Break Seen Above in Red Line)

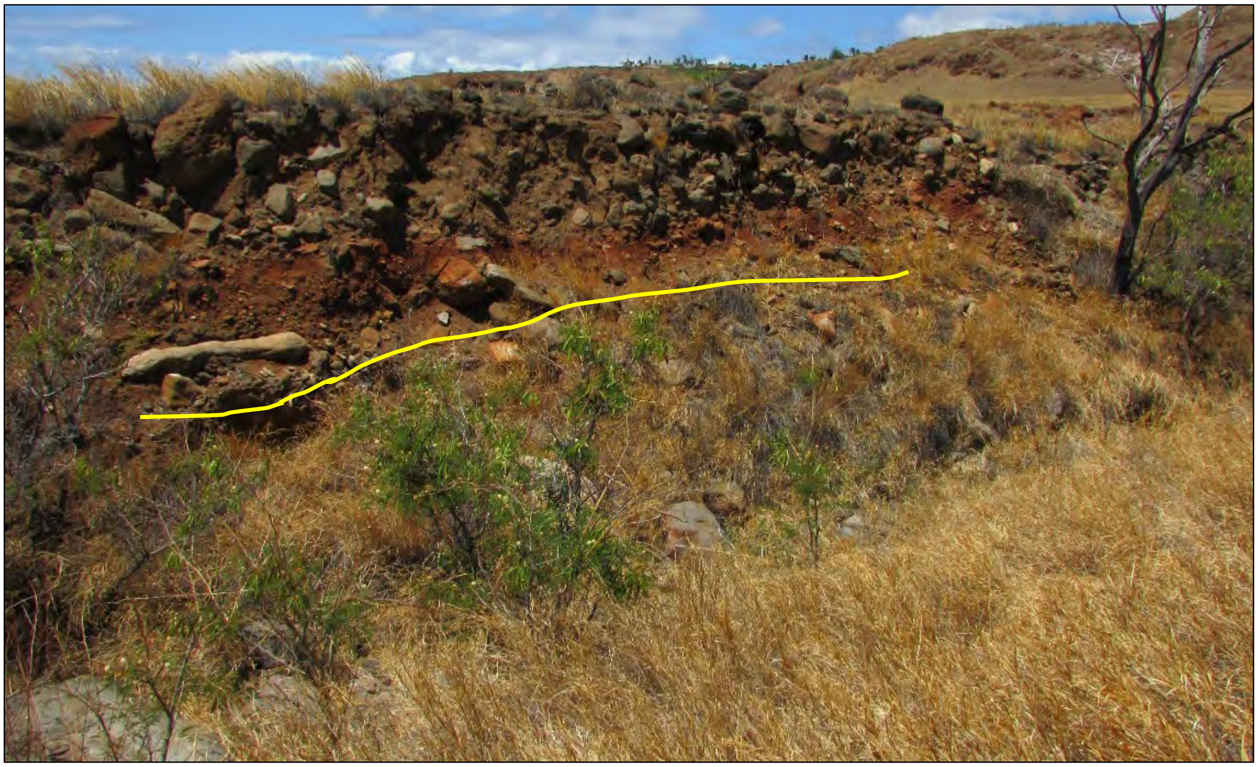


Photo 94. Awalua Stream Location of Transect 2 in the Upper/Eastern Reach of Stream in Study Area; the Dry Vegetation in the Bed was Indicative of Moisture Levels that Supported Plant Growth in the Bed and Helped Distinguish Between Erosional Features and OHWM Level

Photo 95. Awalua Stream Undercut Bank; Vegetation Line Together with Undercut Bank Allowed for Identifying OHWM Level Here

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved -

OMB No. 0710-0025

Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

Project ID #: Honoapiilani Highway	Site Name: Ka Puali Stream	Date and Time: March 25, 2023
Location (lat/long): 20.83233N, 156.63898W	Investigator(s): Shahin Ansari and Terrell Erickson	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [x] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other: ____

Describe land use and flow conditions from online resources.

Were there any recent extreme events (floods or drought)?

Ka Puali is an ephemeral stream that flows from the West Maui Mountains, through undeveloped grassland, and into the Pacific Ocean. No stream flow was seen at time of survey. No extreme flood or drought events occurred before survey.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

It was dry with no stream flow. The bed and banks were heavily vegetated making it challenging to identify OHWM features.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:**
  - [x] *on the bank:* b
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: ____
- [ ] **Shelving:**
  - [ ] *shelf at top of bank:*
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [ ] *other berms:* ____
- [ ] **Channel bar:**
  - [ ] *shelving (berms) on bar:*
  - [ ] *unvegetated:*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar:*
- [ ] **Instream bedforms and other bedload transport evidence:**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.):*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- [ ] **Secondary channels:**

Sediment indicators

- [ ] **Soil development:**
- [ ] **Changes in character of soil:**
- [ ] **Mudcracks:**
- [x] **Changes in particle-sized distribution:** b
  - [x] *transition from* rocks to sediment
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:**

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***
  - [ ] *vegetation absent to:*
  - [ ] *moss to:*
  - [ ] *forbs to:*
  - [ ] *graminoids to:*
  - [x] *woody shrubs to:* graminoids
  - [ ] *deciduous trees to:*
  - [ ] *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [ ] **Exposed roots below intact soil layer:**

Ancillary indicators

- [ ] **Wracking/presence of organic litter:**
- [ ] **Presence of large wood:**
- [x] **Leaf litter disturbed or washed away:** x
- [ ] **Water staining:**
- [ ] **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: Honoapiilani Highway

Step 4 Is additional information needed to support this determination? ☐ Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Transect 1 was placed at the lower or western end of the stream right before the concrete culvert. Embedded rocks on lower bank and presence of shrubs and trees here helped estimate the OHWM level in this heavily vegetated stream. Transect 2 was placed upstream where some matted down vegetation, break in slope, change in vegetation together helped identify the OHWM level.

Additional observations or notes

Kiawe (Prosopis pallida) and haole koa (Leuceana leucocephala) shrubs dominated the bed, while the banks were most composed of dense cover of buffel grass.

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes ☐ No If no, explain why not:

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
96-99	See attached photos and descriptions.

Photo 96. Ka Puali Stream – West View with Concrete Culvert; Location of Transect 1 (Heavily Vegetated Bed with Shrubs and Bank with Grasses)

Photo 97. Ka Puali Stream – Eas View; Heavily Vegetated Bed with Shrubs and Bank with Grasses

Photo 98. Ka Puali Stream Bed; Location of Transect 2 (Change in Vegetation from a Combination of Shrubs, Trees, and Grasses to Only Grasses on the Bank and Presence of Rocks and Boulders Helped Determine the OHWM for this Stream)

Photo 99. Ka Puali Stream Culvert

Memorandum

Project# 4692-02

August 13, 2024

To: **Genevieve Sullivan, Project Manager, Hawaii Department of Transportation**

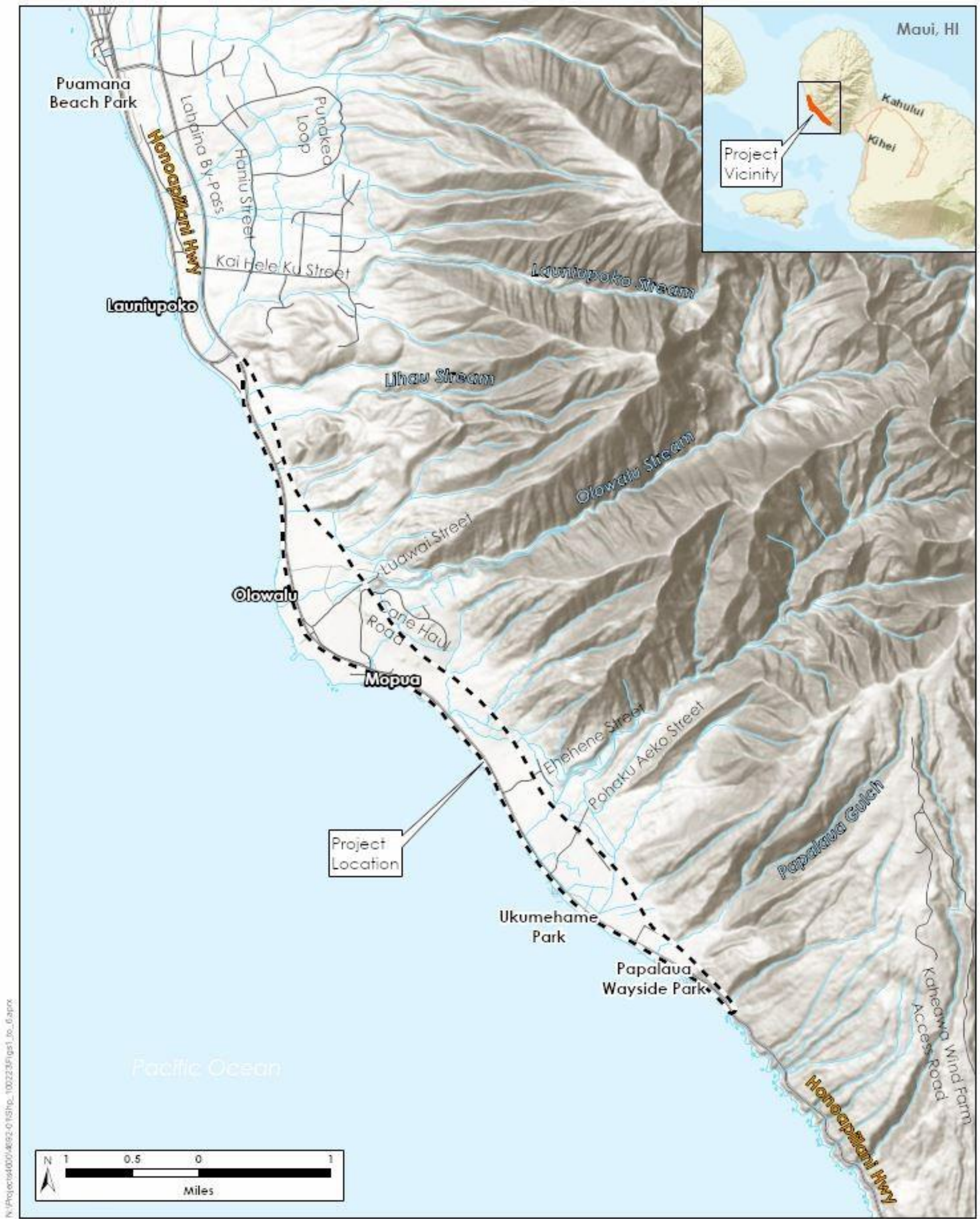
From: **Shahin Ansari, Senior Ecologist, H. T. Harvey & Associates**

CC: **Kelly Hardwicke, Principal in Charge, H. T. Harvey & Associates;**
James Sullivan, Associate Environmental Planner, WSP USA

Subject: **Honoapiilani Highway Improvement Project – Field Investigations About Surface Connections of Potentially Non-Jurisdictional and Jurisdictional Wetlands to Waters of the U. S.**

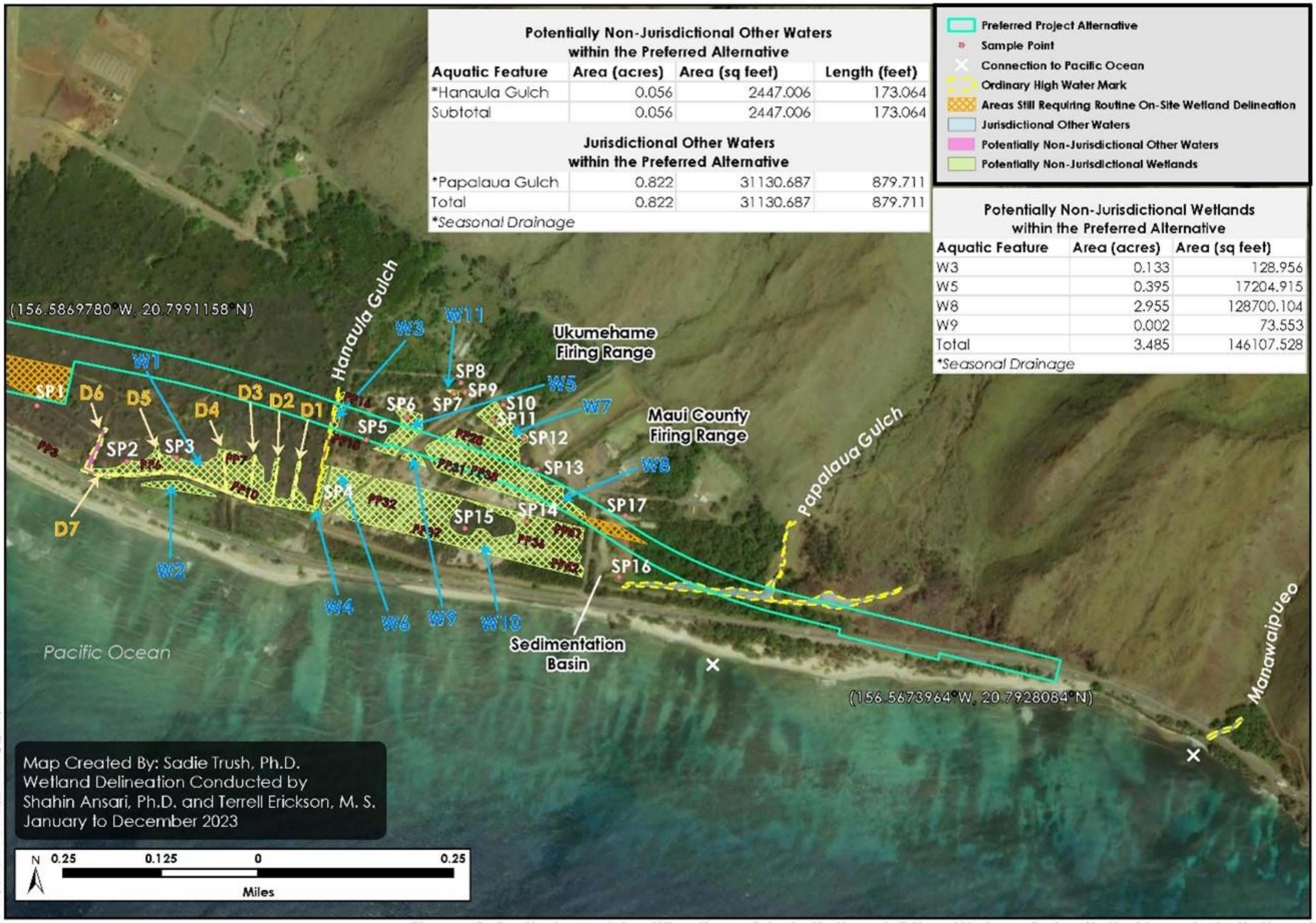
The Federal Highway Administration, in cooperation with the State of Hawaii Department of Transportation (HDOT), is planning the Honoapiilani Highway Improvements Project (the Project). The proposed Project comprises a 6-mile-long alignment in West Maui, in the areas served by the existing Honoapiilani Highway between milepost 11 and milepost 17 (Figure 1). H. T. Harvey & Associates conducted a wetland delineation for this Project during 2023, the findings of which were detailed in a technical report submitted to the U. S. Army Corps of Engineers (USACE) Honolulu District in December 2023. Upon review of this report, the USACE, in an email (POH-2022-00114) to the HDOT expressed that the Project's proposed potentially non-jurisdictional wetlands might be connected to the Pacific Ocean (ocean) via an underground culvert and requested further evidence clarifying surface connections of these wetlands to the ocean under the Clean Water Act conforming rule of September 2023. On May 2, 2024, members of the Project team [Ms. Genevieve Sullivan (HDOT Project Manager), Mr. Kevin Kasamoto (HDOT Hydraulics Design Engineer), Mr. Gerald Andrade (WSP USA, Project Engineer), Mr. Mathew Small (Project Engineer, WSP USA), and Dr. Shahin Ansari (Senior Ecologist, H. T. Harvey & Associates)] visited the Project site to investigate potential surface connection of the proposed jurisdictional and the potentially non-jurisdictional wetlands to the ocean. This memo details the findings of this field investigation.

Figure 1: Project Vicinity



The Project's proposed jurisdictional and potentially non-jurisdictional wetlands are illustrated in Figure 2. Field investigations on May 2, 2024, focused on nine different locations within five separate areas (Locations 1a, 1b, 2a, 2b, 3, 4a, 4b, 5a, and 5b) to determine if the Project wetlands (W1 through W11*) illustrated in this figure have "continuous surface connections" to the ocean under the conforming rule. It is our understanding that an active, working culvert can constitute a continuous surface connection, but that subsurface flows and seeps cannot. Detailed below are the findings from each of these nine locations and our assessment of the surface connectivity among these delineated wetlands and to the ocean. The location numbers, depicted in green, in Figures 3 and 4 correspond to the numbered locations in the discussion below.

Figure 2: Preliminary Identification of Jurisdictional Wetlands, Potentially Non-Jurisdictional Wetlands, and Jurisdictional Other Waters in the Papalaua and Ukumehame Portions of the Wetlands Delineation Study Area



H. T. HARVEY & ASSOCIATES
Ecological Consultants

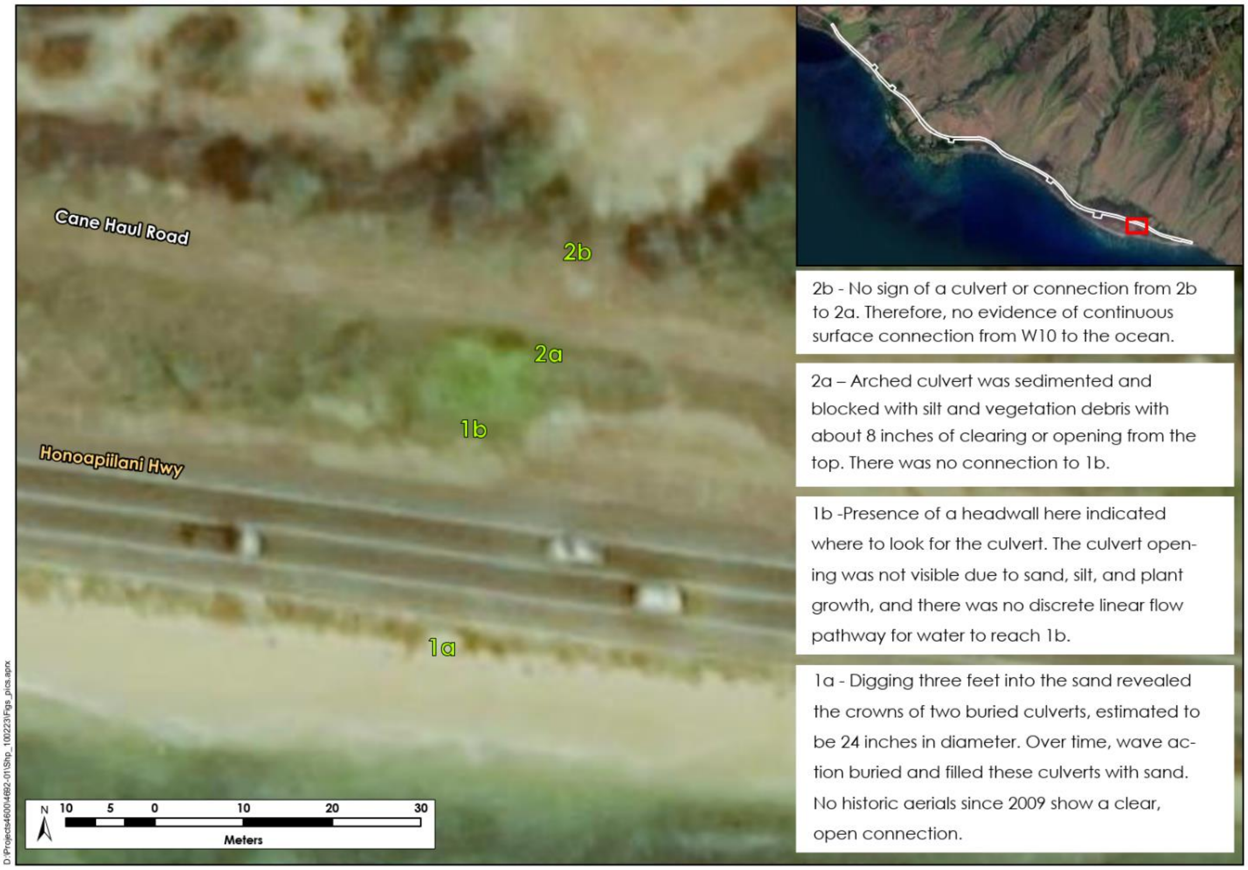
Figure 2. Preliminary Identification of Jurisdictional Other Waters, Potentially Non- Jurisdictional Wetlands, and Potentially Non-Jurisdictional Other Waters in the Palalaua and Ukumehame Portions of the Wetland Delineation Study Area

Figure 3: Aerial View of All Locations

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 3. Aerial View of All Locations Investigated on May 2, 2024
Honoapiilani Highway Improvement Project (4692-02)
Field Investigations About Surface Connections of Potentially Non-Jurisdictional and Potentially Jurisdictional Wetlands to Waters of the U.S.
May 2, 2024

Figure 4: Aerial View of Locations 1a, 1b, 2a, and 2b with Key Takeaways



H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 4. Aerial View of Locations 1a, 1b, 2a and 2b with Key Takeaways
Honoapiilani Highway Improvement Project (4692-02)
Field Investigations About Surface Connections of Potentially Non-Jurisdictional and Potentially Jurisdictional Wetlands to Waters of the U.S.
May 2, 2024

Location 1a

Location 1a is on the west side (ocean side) of the existing Honoapiilani Highway (Figure 3). Aerial imagery indicated the presence of a potential culvert at this location. In particular, the “C” shaped arrangement of rocks on the beach pointed to the exact location of a potential culvert (Figure 4). A culvert at this location could connect W10 to the ocean via the potential connection with Location 1b and a potential culvert between Locations 2a and 2b discussed below (Figure 2, Figure 4). At first, no culvert was obvious at this location in the field. However, digging in the sand to a depth of about three feet revealed the crowns of the end of two buried culverts. Based on the exposed top portion of these buried culverts, they are estimated to be 24 inches in diameter. No headwall to support the ends of the culverts was observed. Over time, wave action had caused these culverts to be completely buried and filled with sand. No historic aerials available for this location showed a clear and open culvert connection dating back to 2009 (Google Earth 2024[1]). There was no direct evidence observed of seep through the accumulated sand and silt in this blocked culvert from inland towards the ocean (also see notes on Location 1b). Although the culvert is entirely blocked by sand, the presence of water in a freshly dug pit on the beach indicated that, at least during high tides, there is some small amount of subsurface movement of water from the ocean towards the buried culvert and the land (Figure 5). However, this amount of flow is insufficient to conclude a functioning continuous surface connection via the culvert. While subsurface seep from inland rain and stormwater is not impossible, it is highly improbable that any consequential flow would traverse the roughly 60 feet through the existing sand block from Location 1b to Location 1a, which was buried approximately three feet deep during the May 2024 investigation, particularly given the regular wave action. Observations at Location 1a evidenced an insufficient flow to constitute a continuous surface connection to the Pacific Ocean.

Figure 5: Photos of Location 1a

Photo depicting the sand blocking the culvert at Location 1a.

Photo depicting water ponding on the ocean side of the culvert at the existing Honoapiilani Highway.

[1] Google. 2024. Google Maps. <http://maps.google.com>. Accessed June 10, 2024.

Location 1b

Location 1b corresponds with the east side (land side) of the same culvert 1 (discussed in 1a) and is located opposite of Location 1a on the land side of the existing Honoapiilani Highway (Figure 4). The presence of a headwall here indicated where exactly to look for the culvert. The culvert opening was not visible as the area downslope was saturated and densely covered with pickleweed (*Batis maritima*), a wetland plant species with an obligate indicator status (Figure 6). A shovel placed downward along the headwall revealed that the depth of the pickleweed vegetation was at least four to five feet indicating that the top of the culvert was below five feet. The wet shovel blade and saturated soils indicate that even if the culvert (the inside of which was not visible) is mostly blocked with sand and/or silt it allows for subsurface seepage of water landward as well as seaward. Historic aerials show no open culvert in this area, and the amount of vegetation cover and silt and sand blocking the culvert indicate that it has not been maintained/cleared of sediment for quite some time. The ground was progressively drier inland from Location 1b toward Location 2a (discussed below), and there was no discrete linear flow pathway (such as a ditch or swale) for water to reach Location 1b. These observations indicate that water could be ponding at Location 1b, but that it is unlikely that the surface water is flowing from Location 2a and W10. See discussion on Locations 2a and 2b for more details.

Figure 6: Photos of Location 1b

Dense growth of pickleweed (*Batis maritima*) located within saturated soils in front of the culvert blocked visibility.

Presence of a concrete culvert headwall on the land side of the existing Honoapiilani Highway. This culvert appears to be buried in historic imagery from 2009 and 2019 obtained from Google Maps.

Location 2a

Location 2a is on the ocean side of an inland and abandoned road, named Cane Haul Road, running somewhat parallel to the existing Honoapiilani Highway and providing access to the Ukumehame Firing Range (Figures 3 and 4). Location 2a is in line with Locations 1a and 1b. The culvert at this location could connect W10 to the ocean via Location 2b and culvert between Locations 1a and 1b (Figure 2, Figure 4), if all connections were open and functioning. From Location 1b, the pickleweed growth toward Location 2a was less dense but continuous up to the edge of Cane Haul Road. Also, unlike the wider surrounding area, pickleweed growth was mostly limited to the saturated soils between Locations 1b and 2a. Clearing vegetation around the ocean side edge of Cane Haul Road revealed the presence of an arched culvert (Figure 7) under this road. This culvert was sedimented and blocked with silt and vegetation debris with about 8 inches of clearing or opening from the top. A shovel placed in this opening was able to go all the way in, indicating that the culvert was partially open for at least five to six feet. Although, unlike at Location 1b, there was no sign of standing water or saturated soils at Location 2a (Figure 7). There was no evidence of flow from Location 2b and W10 reaching Location

2a and subsequently continuing into Location 1b and 1a. In summary, there was no observed surface connection to the Pacific Ocean from Location 2a via these culvert locations.

Figure 7: Photos of Location 2a

Green shovel depicted in the center of the photograph within the culvert. Ruler on the right indicated an 8 inch measurement

Location 2b

Location 2b corresponds with the land side of the same culvert 2 (discussed in 2a) and is located opposite of location 2a on the land side edge of the Cane Haul Road, in line with locations 2a, 1a, and 1b (Figures 3 and 4). Location 2b neighbors wetland W10 (Figure 2), one of the proposed "potentially non-jurisdictional" wetlands illustrated on Figure 2. There was no sign of a culvert visible at Location 2b. In fact, inland of Location 2b, towards W10, there is about five feet of sediment build-up against the edge of Cane Haul Road (Figure 8). Furthermore, unlike on the ocean side of Cane Haul Road, the vegetation at this location is mostly composed of dense growth of buffel grass (*Cenchrus ciliaris*) which has a facultative upland indicator status. Digging to a depth of approximately 2-3 feet did not reveal any signs of a culvert indicating that if a culvert is present, it is completely blocked and buried at this location (Figure 8). It appears that during heavy rains the silt and debris flowing in the east to west direction (toward the ocean) across the low-lying wetland W10 have piled up over time along the eastern (land side) edge of Cane Haul Road. Such debris and silt movement has completely blocked and buried any potential culvert opening that may be present and cuts off all surface connectivity between W10 with the ocean. It should be noted that Cane Haul Road, where Locations 2a and 2b are, is not under HDOT's jurisdiction. This road does not appear to be maintained by either the County of Maui or the State's Department of Defense. The County of Maui maintains a separate, paved, and direct road leading from

Honoapiilani Highway to the County's Ukumehame Firing Range. It is unclear when this Cane Haul Road was last serviced or maintained and for how long the culvert below this road has been blocked. Field observations indicated that there is no evidence of continuous surface connection from W10 to the ocean.

Figure 8: Photos of Location 2b

No sign of a culvert was visible on the land side of Cane Haul Road at Location 2b.

Figure 9: Aerial View of Locations 3, 4a, and 4b with Key Takeaways

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 9. Aerial View of Locations 3, 4a and 4b and Key Takeaways
Honoapiilani Highway Improvement Project (4692-02)
Field Investigations of Potentially Non-Jurisdictional and Potentially Jurisdictional Wetlands to Waters of the U.S.
May 2, 2024

Location 3

Location 3 was investigated for surface connections between delineated wetlands W3 on the north and W4 south side of Hanaula Gulch to delineated wetlands W5 and W6 located to the east (Figure 2, Figure 9). It should be noted that the field investigation on this day observed a completely silted in culvert from Hanaula Gulch to the ocean (see discussion on Location 4a below). As there were no signs of a culvert at Location 4a, both W3 and W4 are now considered potentially non-jurisdictional wetlands.

Hanaula Gulch varies in depth; it is shallower inland along wetland W3 and is deeper along W4, with the bottom at about 10 feet below grade in some places. As noted in the wetland delineation report, W4 is separated from W6 via a fenced-in dirt road that runs between wetlands W3 and W4 on the north and W6 to the south and demarcates a boundary between the two complexes (Figure 2, Figure 10 -Photo 10a). Observations made during the field visit did not note a discrete flow pathway between W4 and W6, though the uni-directional (southern) movement of water from W4 to W6 is possible during rare heavy rain and storm events as documented by community members during a heavy rain event in January 2023. Pictures taken by the Ukumehame Firing Range manager during the heavy rains of January 2023, show water breaching the fence and road (in the southern direction) and flowing across the upland area next to W5 (Figure 10- Photos 10b and 10c). Debris build up on the gulch (southern) side of the fence, and water marks from the fence toward W6 indicate that water can overtop the southern bank of the Gulch (towards W4) and flow through the fence, across the dirt road, and into W6 during storm events. An aerial image from January 2023 shows that there probably is a non-wetland surface connection without an ordinary high water mark among all delineated wetlands (W1 through W11) in the north-south direction during heavy rain events (Figure 10).

Figure 10: Photos of Location 3

Photo 10a. Depicting the wetlands on either side of Hanaula Gulch.

Photo 10b. The dirt road along the fenceline adjacent to Hanaula Gulch containing water marks, a hydrologic indicator that water is traveling from the Gulch to W6.

Photo 10c. Water breaching Hanaula Gulch and flowing (south) across uplands towards W6 during a storm event. Photos from January 2023, courtesy of Mike Ecsedy, Repairs & Maintenance Assistant, Ukumehame Firing Range

Location 4a

Location 4a is on the ocean side of the the Honoapiilani Highway (Figures 3 and 11) and was investigated to determine the condition of the opening of the Hanaula Gulch culvert on the ocean side of the Highway. The potential culvert at this location would connect W1, W3, and W4 to the ocean via the Hanaula Gulch (Figure 2). Despite digging at the land side of this ditch (behind the guard rail) to a depth of about three feet, there was no sign of a culvert opening. It appears that the Hanaula Gulch culvert is completely buried and sedimented with sand, silt and debris on the ocean side of the Honoapiilani Highway. Similar to the culvert discussed for Locations 1a and 1b above, no historic aerials show an open culvert in this location. At this location there is a linear depression that stretches from behind the Highway guard rail toward the beach. It is shallower at the two ends and deeper toward the center. It is heavily vegetated with a mix of weedy species, mostly buffel grass, toward the Highway (land side) end but otherwise surrounded and dominated by pickleweed thickets (a wetland plant species – see Figure 11) that is assumed to be supported via subsurface seepage that could occur during heavy rain events. The soil in the depression was dry with no saturation or signs of recent ponding.

Figure 11: Photos of Location 4a

Photos depicting that there is no sign of a culvert along the ocean side edge of Honoapiilani Highway in line with the Hanaula Gulch and Location 4b.

Location 4b

Location 4b corresponds with 4a; it is located opposite of Location 4a and is the land side opening of the same culvert discussed above in 4a. This location was investigated to confirm if Hanaula Gulch, as stated in the wetland delineation report, has a surface connection to the ocean on the land side of the existing Honoapiilani Highway. The culvert opening on the land side of the Highway appears to be open and somewhat functioning. The mouth of the culvert was not blocked. However, as it was investigated further, silt and sediment blocked the culvert completely towards the ocean side (where Location 4a is situated). The invert of this culvert is about 15 feet below grade of the Highway (Figure 12). With field observations indicating no functioning connection between Location 4a and 4b, there is no evidence of continuous surface connection from Hanaula Gulch to the ocean. Therefore, there is no continuous surface connection between wetlands W1, W3, and W4 to the ocean, as well as no continuous surface connection between Ditches 1-7 (D1-D-7) to the ocean (Figure 2). These features can all be considered potentially non-jurisdictional in light of the May 2nd field visit.

Figure 12: Photos of Location 4b

Land side of the culvert under the existing Honoapiilani Highway at Hanaula Gulch is open only at the mouth but progressively blocked under the highway and toward the ocean side end.

Figure 13: Aerial View of Locations 5a and 5b with Key Takeaways

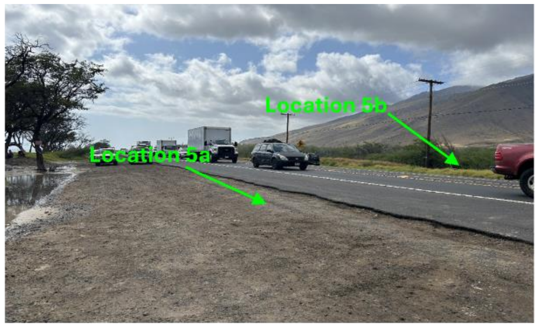
H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 13. Aerial View of Locations 5a and 5b.
Honoapiilani Highway Improvement Project (4692-02)
Field Investigations About Surface Connections of Potentially Isolated Non-Jurisdictional and Jurisdictional Wetlands to Waters of the U.S.
May 2, 2024

Location 5a

Location 5a is on the ocean side of the Honoapiilani Highway (Figures 3 and 13) located directly in-line with Location 5b (discussed below). The field visit confirmed the absence of a culvert at Location 5a (Figure 15). There is no evidence of flow from Ditch 6 towards the ocean.

Figure 14: Photos of Locations 5a, 5b, and Ditch 6



There is no culvert visible on the land side of the existing Honoapiilani Highway at Location 5b in line with Ditch 6.

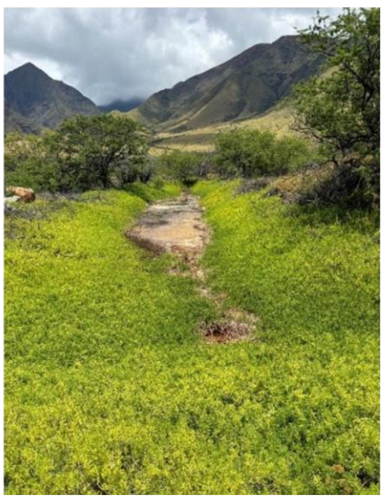


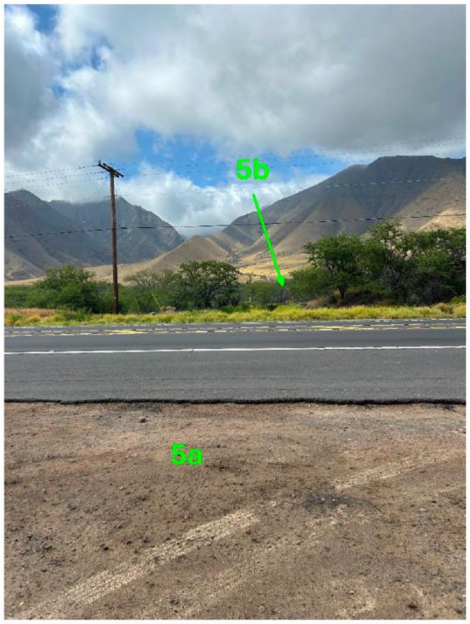
Photo depicting Ditch 6 at Location 5b, land side view.

Dense pickleweed with no obvious culvert blocked, at Location 5b, ocean side view.

Location 5b

Location 5b is located at Ditch 6 (D6, Figures 2 and 14), the northernmost end of the delineated wetlands W1 and W2. This location was investigated when field studies conducted earlier in the day indicated that the culvert connecting Hanaula Gulch to the ocean at Locations 4a and 4b was in fact blocked and no longer functional as an open culvert connection. D6 is perpendicular to and terminates at the Honoapiilani Highway. There is a steep drop from the land side edge of the roadway into this ditch, the bottom of which is about 5-8 feet below grade of the Honoapiilani Highway (Figure 14). There are dense thickets of pickleweed down this steep slope and on both banks of the ditch. Searching in the pickleweed thicket on the slope did not reveal any signs of a culvert at this location. Water from D6 runs parallel to the Highway via D7 through the various ditches (D1-D5) toward Hanaula Gulch and does not flow into the ocean at this location (Figure 2). Field observations confirmed that there is no functional surface connection between Location 5b and 5a (Figure 15). This finding reinforces the conclusion that there is no evidence of continuous surface connection from W1, W3, W4 to the ocean, and that these wetlands are therefore potentially non-jurisdictional.

Figure 15: Photo Evidence of No Culvert at Locations 5a and 5b



There is no culvert under the existing Honoapiilani Highway at the ocean side at this location

Conclusions

The site visit on May 2, 2024, revealed the following conclusions, as compared to the original delineation report:

- In an email on March 11, 2024, the USACE expressed concern that the Project's proposed potentially non-jurisdictional wetlands might be connected to the ocean via underground culverts at Locations 1 and 2. The site visit revealed that findings of original delineation report are still accurate to assume no continuous surface connection (There was no evidence of flow from Location 2b and W10 reaching Location 2a and subsequently continuing into Location 1b and 1a.). With field observations showing that the potential connections between Location 2b and 1a are either not functioning or nonexistent, and there is insufficient flow to conclude a functioning continuous surface connection at Location 1a, there is no evidence of continuous surface connection from W10 to the ocean. Therefore, W10 is still considered potentially non-jurisdictional wetlands.
- Location 4 was investigated to confirm that Hanaula Gulch, as stated in the wetland delineation report, has a continuous surface connection to the ocean via a culvert between 4a and 4b. However, this site visit revealed that the ocean side of this culvert (Location 4a) is completely blocked and does not allow for a continuous surface water connection from Hanaula Gulch, W1, W3, W4, and ditches D1-D7 to the ocean.

Therefore, Hanaula Gulch, W1, W3, W4, and D1-D7 are all now considered potentially non-jurisdictional features.

- The wetland delineation report submitted to the USACE in December 2023 for this Project (POH-2022-00114) concluded that wetlands W1, W3, and W4 are potentially jurisdictional wetlands. This conclusion was mostly based on the culvert opening at the mouth Hanaula Gulch (Location 4b). However, this site visit revealed that the ocean side of this culvert (4a) in fact is completely blocked and does not allow for surface water connections from the wetlands W1, W3, and W4 to the ocean. Therefore, W1, W3, and W4 are now considered potentially non-jurisdictional wetlands.
- The wetland delineation report submitted to the USACE in December 2023 for this Project (POH-2022-00114) concluded that the Hanaula Gulch and ditches D1, D2, D3, D4, D5, D6, and D7 are potentially jurisdictional Other Waters of the United States. This conclusion was mostly based on the culvert opening at the mouth Hanaula Gulch (Location 4b). However, this site visit revealed that the ocean side of this culvert (4a) in fact is completely blocked and does not allow for surface water connections from the wetlands to the ocean. Therefore, Hanaula Gulch and ditches D1, D2, D3, D4, D5, D6, and D7 are now considered potentially non-jurisdictional Other Waters of the United States.
- Only during high rainfall and rainstorm events do surface water flows in the north-south direction (parallel to the Honoapiilani Highway) connect the potentially non-jurisdictional mosaic of wetlands situated on the landside (east) of the Honoapiilani Highway. There is no evidence of continuous surface connection from these wetlands to the ocean.
- Because all the delineated wetlands (W1 to W11), under normal circumstances (i.e., outside of king tides and high rainfall events) are not connected via continuous surface flows, these features, under the existing Clean Water Act conforming rule adopted in September 2023, can be regarded as potentially non-jurisdictional wetlands.
- Given the results of the May 2, 2024, field visit, the Project is not anticipated to affect greater than 0.1 acre of Waters of the United States. A linear viaduct structure in Ukumehame will span over the Papaula Gulch, avoiding effect to the jurisdictional feature in that area. For this reason, the Project could pursue a Nationwide Permit, or series of Nationwide Permits, as previously discussed with Jason Brewer (USACE), on June 19, 2023.

HT Harvey & Associates
Results of the Wetland Delineation in the Project's 2025 Biological Study Area

H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellence

Memorandum

Project No. 4692-02

April 29, 2025

To: **James Sullivan, Environmental Planner, WSP USA**

From: **Shahin Ansari, Senior Ecologist, H. T. Harvey & Associates**

CC: **Kelly Hardwicke, Principal in Charge, H. T. Harvey & Associates**
Jamie Bents, Project Manager, WSP USA

Subject: **Honoapiilani Highway Improvements Project – Results of the Wetland Delineation in the Project's 2025 Biological Study Area**

Introduction

The Federal Highway Administration (FHWA), in cooperation with the State of Hawaii, Department of Transportation (HDOT), is proposing the Honoapiilani Highway Improvements Project (Project). This Project is situated in West Maui, Hawaii, in the area served by the existing Honoapiilani Highway between milepost 11 and milepost 17 and generally overlaps the ahupuaa of Ukumehame and Olowalu (Appendix A, Figure 1). Honoapiilani Highway is the primary transportation route for people and goods between West Maui and the rest of the island. Climate change and sea level rise are already contributing to damage along this coastal stretch of the Highway and the Highway has been repaired several times over the past decade due to coastal flooding. The purpose of the Project is to reduce the highway's exposure to sea level rise, where feasible, and provide a reliable transportation facility in West Maui that can serve the community with increased reliability and safety to withstand coastal hazards.

A draft environmental impact statement (DEIS) for the Project was published in December 2024 (USDOT, FHWA and HDOT 2024). In 2023, H. T. Harvey & Associates completed a comprehensive delineation of Section 404 waters in support of the environmental planning for the Project, the results of which are published in the DEIS (H. T. Harvey & Associates 2023). The 2023 Biological Study Area (BSA) encompassed an area of about 902 acres overlapping the four proposed Highway alignments that were evaluated for the DEIS (Appendis A, Figure 2). These alternatives were further refined as the DEIS was prepared, leading to the selection of a preferred alternative. While the vast majority of the BSA surveyed in 2023 overlaps the preferred alternative, there are a few scattered parcels along the current preferred alternative that were not part of the 2023 field studies. These unsurveyed parcels are illustrated in Appendix A, Figure 2 and collectively referred to here as the 2025 BSA. This memorandum describes the methods and results of the wetland delineation study conducted in the 2025 BSA.

Wetland Study Scope and Objective

The purpose of this study was to identify the extent and distribution of potential Section 404 waters of the U.S. including any associated wetlands (special aquatic sites) that might be impacted by proposed Project activities within the Project's 2025 BSA parcels. The geographic scope of this study was limited to the 13 disjointed parcels along the Project's preferred alignment that constitute the 2025 BSA. We examined each parcel for features that may meet the physical criteria and regulatory definition of Section 404 wetlands and other waters.

Methods

The field studies completed in 2023 documented the habitat types found in the BSA overlapping the four proposed alignments. The 2025 BSA parcels are next to the 2023 BSA and the habitats in the 13 parcels generally are a continuum of those already surveyed and therefore are expected to have similar characteristics. Prior to the survey, we reviewed the wetland technical report of findings completed for the 2023 surveys which provided a good indication of what we might expect in the 2025 BSA parcels. We also reviewed following information: topographic maps and current and historical aerial photos of the Project Area, U.S. Geological Survey topographic map, National Wetland Inventory map, Google Earth software (Google Inc. 2025), Natural Resource Conservation Services Soil Survey (NRCS 2025a, b), Hawaii Watershed Atlas (Parham et al. 2008), and State of Hawaii Geographic Information System (GIS) data for streams (Office of Planning 2017). With background information gleaned from these sources, H. T. Harvey & Associates' certified wetland ecologists Shahin Ansari and Racine Robinson performed a technical determination and delineation of Section 404 wetland and other waters in the 2025 BSA on March 19 and 25 and April 2 and 3, 2025.

The technical determination was performed in accordance with the *U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual* (Corps Manual) (Environmental Laboratory 1987). In addition, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Region (Version 2.0)* (Regional Supplement) (USACE 2012) was followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. We performed preliminary mapping of the extent and distribution of wetlands and other Waters of the U.S. (WoUS) that may be subject to regulation under Section 404 of the Clean Water Act (CWA). The "Routine Determination Method, On-Site Inspection Necessary (Section D)" outlined in the Corps Manual (Environmental Laboratory 1987), and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Hawaii and Pacific Islands Region (USACE 2012) were used to examine the vegetation, soils, and hydrology on site. This three-parameter approach to identifying wetlands is based on the presence of a prevalence or dominance of hydrophytic vegetation, hydric soils, and wetland hydrology.

During the survey, we examined the 2025 BSA for topographic features, drainages, alterations to site hydrology or vegetation, and recent significant disturbance. A determination was then made as to whether normal environmental conditions were present at the time of the field survey. In the field, the techniques used to identify wetlands included digging of soil pits in the study area, observing the vegetation growing near the soil sample points, and characterizing the current surface and subsurface hydrologic features present near the sample points through both observation of indicators and direct observation of hydrology. Features meeting wetland vegetation, soil, and hydrology criteria were then mapped in the field using a sub-meter Global Positioning System (GPS) unit.

Surveys were also conducted within the 2025 BSA for "other waters", which includes lakes, streams, slough channels, seasonal ponds, tributary waters, non-wetland linear drainages, and salt ponds. Such areas are identified by the (long-running seasonal or perennial) presence of standing or running water and generally lack hydrophytic vegetation. In non-tidal waters, the USACE Section 404 jurisdiction extends to the Ordinary High Water Mark (OHWM) which is defined in 33 CFR Part 328.3 as "*the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation or the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area*." "Other waters" extend to the OHWM on opposing channel banks in perennial or intermittent non-tidal drainage channels. For all the aquatic features-streams, tributaries, and ditches, we investigated the stream bed and banks and the surrounding area and gathered various geomorphic, vegetation, sediment, and ancillary indicators from both banks per USACE (2005) guidance and the interim National OHWM Manual (David et al. 2022) to delineate jurisdictional waters. We are also operating under the assumption that ephemeral streams are no longer considered waters of the U.S., despite the presence of OHWMs, due to not being considered "relatively permanent waters" under the current waters of the U.S. rule (2023).

In accordance with the September 2023 Conforming Rule defining waters of the U.S., wetlands and other waters were not considered likely to be jurisdictional Section 404 waters if they did not exhibit a clear *continuous surface connection* (EPA 2025) to navigable waters of the U.S. or their tributaries. Blocked and buried culverts located under the Highway prevent a continuous connection of several features located to the north and east of the Highway to the Pacific Ocean located to the south and west. Such wetlands and other waters were considered "isolated" in project maps.

GPS data was collected in the field using a Trimble GeoXT™ GPS unit capable of submeter accuracy. After the survey, the GPS data was processed using ARC GIS to map the extent of Section 404 other waters. We also took a set of photographs of observed wetland and OHWM features.

In addition to applying these survey methods, we compiled this report in accordance with guidance provided in *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* (USACE 2016). This memo lists the information that must be submitted as part of a request for a jurisdictional determination, including:

- Vicinity map (Appendix A, Figure 1)
- Project Area and wetland study area map (Appendix A, Figure 2)
- U.S. Geological Survey topographic map (Appendix A, Figure 3)
- NRCS Soils map (Appendix A, Figure 4)
- NWI map (Appendix A, Figure 5)
- Habitat map (Appendix A, Figure 6)
- Preliminary identification of waters maps (Appendix A, Figures 7, 8, 9, and 10)
- Wetland delineation data forms and photo documentation (Appendix B)
- OHWM delineation data forms and photo documentation (Appendix C)
- Written rationale for sample point choice is in the Results section Table 2 and rationale for OHWM transects is on the datasheets OHWM in Appendix C.
- The plant species observed in the 2025 BSA are the same as those observed and reported in the 2023 wetland delineation report (H. T. Harvey & Associates 2023) and are also discussed in the Results section below when describing the various features.

Regulatory Regime

This memo is prepared consistent with the March 12, 2025, the U.S. Environmental Protection Agency Department of the Army (the agencies) guidance to field staff on implementation of "continuous surface connection" (EPA 2025) and restricting jurisdiction to "relatively permanent waters" consistent with the U.S. Supreme Court's May 25, 2023, decision in the case of *Sackett v. Environmental Protection Agency* and the September 2023 Conforming Rule.

Results

As illustrated in Appendix A, Figure 6, six different habitat or vegetation types were identified within the 2025 BSA. Two points (SP21 and SP22) and seven OHWM transects were examined to identify potentially jurisdictional features (Appendix A, Figures 7 to 10). About 0.138 acres of isolated non-jurisdictional wetlands, 0.004 acres of jurisdictional waters, 0.109 acres of non-jurisdictional other waters were identified in the study area (Table 1). Results of the delineation are described below.

Table 1. Summary of Jurisdictional Wetlands and Waters, and Isolated Non-Jurisdictional Wetlands and Other Waters Delineated Within the Honoapiilani Project's 2025 Biological Study Area

Habitat Type	Area (acres)	Notes
Total Isolated Non-Jurisdictional Wetlands	***0.138***	
Wetland W12	*0.138*	*In parcel 1 in the Ukumehame region. It does not have a continuous surface connection to the ocean.*
Total Jurisdictional Waters	***0.004***	

Habitat Type	Area (acres)	Notes
Ditch D14	*0.004*	*Perennial waterbody (year-round flow) in parcel 6, in the Ukumehame region. Connected to Ditch 7 that was previously delineated as jurisdictional other water in the 2023 BSA. This feature has a continuous surface connection to the ocean via Ditch 7.*
Total Not Relatively Permanent Non-Jurisdictional Other Waters	***0.119***	
Culvert – Awalua Stream	*0.039*	*Awalua stream is not a relatively permanent stream in parcel 13, in the Launiupoko watershed. The concrete culvert carries Awalua Stream waters below an inner paved road and the Honoapiilani Highway and has a continuous surface connection to the ocean.*
Culvert Ka Puali Stream	*0.080*	*Ka Puali stream is not a relatively permanent stream in parcel 13, in the Launiupoko watershed. The culvert carries Ka Puali Stream waters under the existing Honoapiilani Highway and has a continuous surface connection to the ocean.*
Total Isolated Non-Jurisdictional Other Waters	***0.109***	
Ditch D13	*0.051*	*Not a relatively permanent waterbody in parcel 2. No continuous surface connection to the Pacific Ocean.*
Culvert Ehehene Street	*0.035*	*Not a relatively permanent water body in parcel 5, in the Ukumehame region. Runs parallel to the Pacific Ocean and the existing Honoapiilani Highway with no continuous surface connection to the ocean*
Ditch D15	*0.016*	*Not a relatively permanentl waterbody in parcel 7, in vicinity of Olowalu village. No continuous surface connection to the ocean.*
Culvert – Vicinity of Lahaina Bypass	*0.007*	*Not a relatively permanent waterbody in parcel 1. No continuous surface connection to the ocean.*
Total Section 404 Waters	**0.004**	
Total Non-Jurisdictional Waters	**0.366**	
Total Non-Jurisdictional Upland Areas	**30.96**	
Wetland Delineation Study Area Total	**31.33**	

Assumptions, Site Conditions, and Observations

The preliminary delineation assumes that relatively normal circumstances prevailed at the time (March-April 2025) of this study. The study area did not experience any recent extreme flood or drought events. The survey was performed using the "Routine Method of Determination" using three parameters, as outlined in the

Regional Supplement for wetlands and the method described to identify OHWM level for streams in the National Manual. The 13 parcels that make up the 2025 BSA encompass 31.3 acres and are scattered along the full length of the preferred alignment from HDOT's sedimentation basin in the south to the Lahaina Bypass in the north. The main access to each of the 13 parcels is from the existing Honoapiilani Highway. Five out of the 13 parcels in the BSA overlap an existing paved road—the County Road leading to the firing range in parcel 1, Pohaku Aeko Street in parcel 5, Ehehene Street in parcel 6, Luawai Street and an unnamed adjacent paved road in parcel 8, and the existing Honoapiilani Highway in parcel 13. The remaining parcels largely overlap undeveloped areas. Buffel Grass Grassland, Kiawe Opiuma Woodland, Pluchea Thickets, and Kiawe Pluchea Woodland with Pickleweed were the major habitat types observed across the 2025 BSA parcels. Kiawe (*Prosopis pallida*) and opiuma (*Pithecellobium dulce*) were the most abundant tree canopy species, and haole koa (*Leucaena leucocephala*), *Pluchea* spp. (*Pluchea indica* and *Pluchea x fosbergii*) were common shrubs. Overall buffel grass (*Cenchrus ciliaris*) was the most abundant understory species across 2025 BSA. Two ephemeral streams—Ka Puali and Awalua intersect the 2025 BSA in the northernmost parcel 13 (Appendix A, Figure 2). Specific findings of the delineation study are discussed below under *Identification of Potential Section 404 Wetlands* and *Identification of Section 404 Waters*. Appendices B contains wetland and OHWM datasheets and the associated photographic documentation.

Identification of Potential Section 404 Wetlands

Only the southernmost parcel in the Ukumehame region contained an area identified as wetland. It was dominated by hydrophytic vegetation, possessed hydric soil characters, and demonstrated evidence of wetland hydrology. This wetland identified as W12 is part of the larger Ukumehame wetlands delineated in 2023. W12 is a triangular shaped area that is situated between the Projects proposed alignments (Appendix B, Figure 7). It is continuous with wetlands W8 to the east and W10 to the west but was not mapped in the 2023 report as it fell outside of the 2023 BSA (Appendix B, Photo 1). Sample point SP12 taken in 2023 is representative of the W12 wetland habitat type where the ground cover is mostly dominated by obligate pickleweed (*Batis maritima*) species and the canopy species is FACU (facultative upland) kiawe trees, which mostly appeared to be under stress based on having no leaves and were either dead or dying. For these reasons, no sample point was taken at W12 during the 2025 study. Wetland delineation datasheet for SP12 completed in 2023 is included again for reference as part of Appendix B of this memo. Photos 2 and 3 in Appendix B show the similar habitat observed during this 2025 study.

Hydric soil indicator observed at SP12 in 2023 that is representative of wetland W12 had "Redox Depressions (F8)" with the redox features showing prominent contrast and the soil texture was clay. In general, the delineated wetland that W12 is part of has Kealia Silty Loam, 0 to 1 percent slopes and is listed on the National Hydric Soils List as hydric soils (NRCS 2025b). Kealia Silty Loams are common in tidal flat and salt marshes on Maui, are prone to frequent ponding, and are strongly saline.

Similar to the surrounding wetlands, W12 is situated in the Ukumehame floodplain that experiences seasonal flooding during the winter/rainy season. Secondary hydrology indicators of drainage patterns (B10) and stunted and stressed plants (D1) were observed in W12. In general, surface water from streams in West Maui mountains is the primary source of hydrology supporting the wetlands in the Project's BSA. The surface water that enters the coastal plain, backs up against natural features such as the beach berm or developed infrastructure such as the existing Honoapiilani Road at this site, creating flooded conditions for varied periods of times during the wet rainy season and following heavy rains. Hanaula Gulch, part of the West Maui mountains, is the closest surface water that supports the Ukumehame wetlands including W12. W12 is also heavily influenced by salt water from the neighboring Pacific Ocean which is about 570 feet to the west. Despite its proximity to the ocean, the May 2024 field investigations found that a culvert leading from the larger Ukumehame wetlands under an old cane haul road and then under the existing Honoapiilani Road to the Pacific Ocean was blocked and did not have a continuous surface connection to the ocean (H. T. Harvey & Associated 2024). Furthermore, the culvert connecting the Hanaula Gulch to the Pacific Ocean was also blocked and did not have a continuous surface connection to the ocean (H. T. Harvey & Associates 2024). These findings contributed to making a determination that W12 is an isolated non-jurisdictional wetland.

Rationale for Sample Point Choice—Two sample points were selected to document conditions in representative jurisdictional and non-jurisdictional areas (Appendix A, Figure 8). Rationale and findings for wetland sample points locations SP21 and SP22 are summarized in Table 2. Location of sample points are depicted in Appendix B, Figure 8. Photos associated with sample points are included along with the wetland datasheets in Appendix B with rationale in the photo captions.

Table 2. Summary of Sample Points Locations and Results for the 2025 Biological Study Area

Name	Sampling Rationale	Hydrophytic Vegetation?	Hydric Soils?	Wetland Hydrology?	Overall Wetland Assessment
SP21 (Photos 4-6)	Placed to investigate a 100 percent dense cover of facultative *Pluchea* spp. thickets next to a jurisdictional feature (D9, delineated in 2023) that had standing water in it. SP21 was placed in a slightly concave depression leading away from the east bank of the jurisdictional ditch.	Yes	No	Yes	This area does not meet the three parameter wetland criteria.
SP22 (Photos 7-9)	Placed to investigate a 100 percent dense cover of facultative *Pluchea* spp. shrubs next to a ditch that had standing water in it. SP22 was placed in a slightly concave depression leading away from the east bank of the jurisdictional ditch.	Yes	No	Yes	This area does not meet the three parameter wetland criteria.

Identification of Potential Section 404 Waters

A total of 0.004 acres of Section 404 other waters were mapped in the 2025 BSA. Appendix D contains the OHWM datasheets that describe site conditions at the time of delineation, observed OHWM indicators, rationale for placement of the data gathering transects, and associated photos for these aquatic features mapped during this study. Described below are additional background and relevant details for these mapped jurisdictional and non-jurisdictional features.

Ditch 13—Ditch 13 in parcel 2 is part of the agricultural ditch system in the Ukumehame flood plain (Appendix A, Figure 7) that is remnant from the sugarcane plantation time on Maui. It enters parcel 2 from the southwestern border, runs north for 106 feet and abruptly ends (Appendix C, Photos 10, 11, and 12). Ditch 13 does not have a continuous surface connection to the ocean. It appears to derive its hydrology from the Hanaula Gulch and its associated ditches (D1 to D7 delineated in 2023) which are about 400 feet to the south of Ditch 13 and which also do not have a continuous surface connection to the ocean. Ditch 13 had a clear bed and bank and break in slope, observed above the OHWM level as the main indicator for this feature. The ditch had recently conveyed water as the bed was saturated with some scattered facultative species such as *Atriplex semibaccata*. Dead and dying matted down vegetation was an indicator below the OHWM level in this feature. The ditch was deeper (about 5 feet) at the southern end where it enters parcel 2, gets shallower toward the north and appeared to be filled at the northern end where it abruptly ends.

Culvert – Ehehene Street—This is a concrete culvert situated in parcel 5 (Appendix A, Figures 2 and 8). It runs in the north south direction below Ehehene Street, right where the street connects with the existing Honoapiilani Highway (Appendix C, Photos 13, 14, and 15). The culvert is about 150 feet from the Pacific Ocean and runs parallel to the ocean and the existing Honoapiilani Highway. It does not have a continuous surface connection to the ocean and conveys water in the north south direction amongst the remnant agricultural ditch system east of the existing Highway. It appears to derive its hydrology via surface flows (during and after rains) from Ukumehame Stream about 0.3 miles to the south and perennial ditch system (D9 and D14) about 350 feet to the north. The culvert was dry at the time of the survey and heavily overgrown with mostly upland plant species such as haole koa and buffel grass. The top beam of the concrete and the wings of the culvert that lead down to the ditch were used to identify the OHWM level here. Observations made and photos taken during the 2023 wetland delineation survey when the vegetation around this culvert was mowed (H. T. Harvey & Associates 2023) were also used to guide the OHWM delineation for this feature.

Ditch 14—This feature is located in parcel 6 of the 2025 BSA (Appendix A, Figures 2 and 8). It enters the parcel at the northwestern corner, bends to the west and abruptly ends (Appendix C, Photos 16-19). The ditch was heavily overgrown with dense thickets of facultative *Pluchea* spp. shrubs that made access and observations of OHWM features challenging. At one corner standing water was seen with break in bank and water-stained leaves along the top of the bank as OHWM indicators. As seen on the aerial imagery and based on field observations, Ditch 14 is connected to Ditch 9 that was delineated during the 2023 wetland study and has a continuous surface connection to the Pacific Ocean (H. T. Harvey & Associates 2023). Ditches D7 and D14 have year-long flows and probably deriving from hydrology from Ukumehame Stream (Appendix C, Photos 16-19). The dense cover of vegetation perhaps also helps retain water year-round in the ditches outside of rain events.

Ditch 15—Ditch 15 is in the southwestern corner of parcel 7 in the vicinity of Olowalu village (Appendix A, Figures 2 and 8). It appears to be an isolated ditch remnant of the old sugarcane plantations here. Ditch 15 is in the vicinity of the isolated ditches D11 and D12 that were delineated in 2023 and may have an underground connection to these features. The ditch did not have a continuous surface connection to the ocean. Break in slope with clear bed and bank were the OHWM indicators used to delineate this ditch which was heavily overgrown with the facultative *Pluchea spp*. shrubs (Appendix C, Photos 20-22). The ditch was barely visible under the dense vegetation. Lack of rooted plants in the bed also was used as an indicator to identify the OHWM level in this shallow and hard to see ditch. The southern end of the ditch had some water but for the most part the bed was saturated with no standing water.

Culvert – Awalua Stream—The Awalua Stream Culvert is situated in the northernmost parcel 13 of the 2025 BSA on the east side of the existing Honoapiilani Highway (Appendix A, Figures 2 and 10). This culvert carries Awaula, an ephemeral stream, under an inner road that runs parallel to and on the east side of the existing Honoapiilani Highway (Appendix C, Photos 23 and 24). This is a large concrete culvert that is continuous with the Awalua Stream delineated during the 2023 wetland study. Awalua Stream and this culvert have a continuous surface connection to the ocean. The northern side of this culvert is a concrete wall while the southern side is a rockwall with both, concrete bed and rock bed, that runs between the inner road and the existing Honoapiilani Highway. These features were used to identify the OHWM level in the field. No signs of water were observed during the survey. The Vegetation surrounding this culvert is composed of mostly upland plant species of kiawe, buffle grass, uhaloa (*Waltheria indica*), haole koa.

Culvert – Ka Puali Stream—The Ka Puali Stream Culvert is in the northernmost parcel 13 of the 2025 BSA. This culvert carries Ka Puali, an ephemeral stream, under the existing Honoapiilani Highway and has a continuous surface connection to the ocean. The entire stretch of the culvert in parcel 13 is under the existing Highway, was not visible from above ground and was mapped based on aerial imagery (Appendix A, Figure 10).

Culvert – Vicinity of Lahaina Bypass—This feature is in parcel 13 in the northernmost section of the BSA in the vicinity of the Lahaina Bypass (Appendix A, Figures 2 and 10). The beam of the concrete culvert and the wings of the culvert were used to identify the OHWM level at this feature. Large rocks were placed in the spillway and the culvert opening under the Highway did not appear to be blocked (Appendix C, Photo 25). But dense vegetation of mostly upland plant species such as kiawe, buffel grass, and ilima (*Sida fallax*) surrounded the culvert and the rocks. No continuous surface connection to the ocean was found. Ditch 12, a perennial but isolated (no continuous surface connection to the ocean) feature delineated in 2023 and situated on the opposite and east side of the existing Honoapiilani Highway, possibly has an underground hydrological connection to this culvert.

Areas Not Meeting the Regulatory Definition of WoUS

The remainder of the 2025 BSA does not meet the regulatory definition of Section 404 wetlands or other waters. Wetland W12 was mapped in the Kiawe Pluchea Woodland with Pickleweed, and non-jurisdictional uplands occur in the remaining five habitat types observed in the BSA. The most abundant ground cover in upland habitats across the 2025 BSA was buffel grass. The most common canopy tree species include kiawe [UPL (Upland)] and opiuma [FAC (facultative)]; and the most common shrub species include haole koa [UPL] and *Pluchea* spp. [FAC (facultative)]. While upland species such as kiawe were found in wetlands, they often appeared to be stressed with little to no leaves on branches. While facultative *Pluchea* species dominated many of the upland habitats; the areas mapped as wetland differed in that it was associated with ephemeral or perennial water bodies, had prominent hydrology indicators, were co-dominated by obligate pickleweed and had clear hydric soil indicators as well.

Conclusion

In conclusion, H. T. Harvey & Associates' delineation of Section 404 WoUS in the Project's 2025 BSA is based upon our best professional judgement. Federal jurisdiction is solely dependent on the determination and confirmation by USACE. Acceptance may require a site visit by a USACE representative to confirm the delineation data points gathered in the surveyed area. This delineation is not official until HDOT and FHWA receive a Jurisdictional Determination letter from USACE.

References

David, G. C. L., K. M. Fritz, T.-L. Nadeau, B. J. Topping, A. O. Allen, P. H. Trier, S. L. Kichefski, et al. 2022. National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams: Interim Version (ERDC/CRREL TR-22-26). U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Environmental Laboratory. 1987. U.S. Corps of Engineers Wetlands Delineation Manual. Department of the Army.

Google Inc. 2025. Google Earth Pro (Version 7.1.5.1557) [Software]. <http://earth.google.com>. Accessed March 10.

[EPA] Environmental Protection Agency. 2025. Memorandum to the Field Between the U.S. Department of Army, U. S. Army Corps of Engineers and the U.S. Environmental Protection Agency Concerning the Proper Implementation of "Continuous Surface Connection" Under the Definition of "Waters of the United States" Under the Clean Water Act. March 12, 2025. <https://www.epa.gov/system/files/documents/2025-03/2025cscguidance.pdf > Accessed April 5.

H. T. Harvey & Associates. 2023. Honoapiilani Highway Improvements Project Preliminary Identification of Waters of the United States Technical Report. Prepared for WSP USA. *In* Appendix 3.9 – Water Resources, Wetlands, and Floodplains – Supplemental Information *of* Draft Environmental Impact Statement. <https://www.honoapiilanihwyimprovements.com/pdfs/deis/app_03_09.pdf>.

H. T. Harvey & Associates. 2024. Memorandum: Honoapiilani Highway Improvements Project – Field Investigations About Surface Connections of Potentially Non-Jurisdictional and Jurisdictional Wetlands to Waters of the U.S. Prepared for WSP USA. *In* Appendix 3.9 – Water Resources, Wetlands, and Floodplains – Supplemental Information *of* Draft Environmental Impact Statement. <https://www.honoapiilanihwyimprovements.com/pdfs/deis/app_03_09.pdf>.

[NRCS] Natural Resources Conservation Service. 2025a. Web Soil Survey. U.S. Department of Agriculture. <http://websoilsurvey.nrcs.usda.gov>. Accessed March 10.

[NRCS] Natural Resources Conservation Service. 2025b. National Hydric Soils List. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>. Accessed March 10.

Office of Planning. 2017. Hawaii Statewide GIS Program. Streams (Perennial and Non-Perennial) of the State of Hawaii. <http://geoportal.hawaii.gov/datasets/56046b3578064d989ffa485e4ed3dc46_1>. Accessed March 10.

Parham, J. E., G. R. Higashi, E. K. Lapp, D. G. K. Kuamoo, R. T. Nishimoto, S. Hau, J. M. Fitzsimons, et al. 2008. Atlas of Hawaiian Watersheds and Their Aquatic Resources. A Joint Project between the Hawaii Division of Aquatic Resources and Bishop Museum. <http://hawaiiwatershedatlas.com/watersheds/oahu/36006.pdf>.

[USACE] U.S. Army Corps of Engineers. 2005. Regulatory Guidance Letter. No. 05-05. December 7.

[USACE] U.S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaii and Pacific Islands Region (Version 2.0). Wetlands Regulatory Assistance Program.

[USACE] U.S. Army Corps of Engineers. 2016. Updated Map and Drawing Standards for the South Pacific Division Regulatory Program.

[USDOT] U.S. Department of Transportation, [FHWA] Federal Highways, and [HDOT] Hawaii Department of Transportation. 2024. Draft Environmental Impact Statement. Honoapiilani Highway Improvements Project, West Maui: Ukumehame to Launiupoko Draft Environmental Impact Statement. <https://www.honoapiilanihwyimprovements.com/info-plus-docs/>.

Attachments

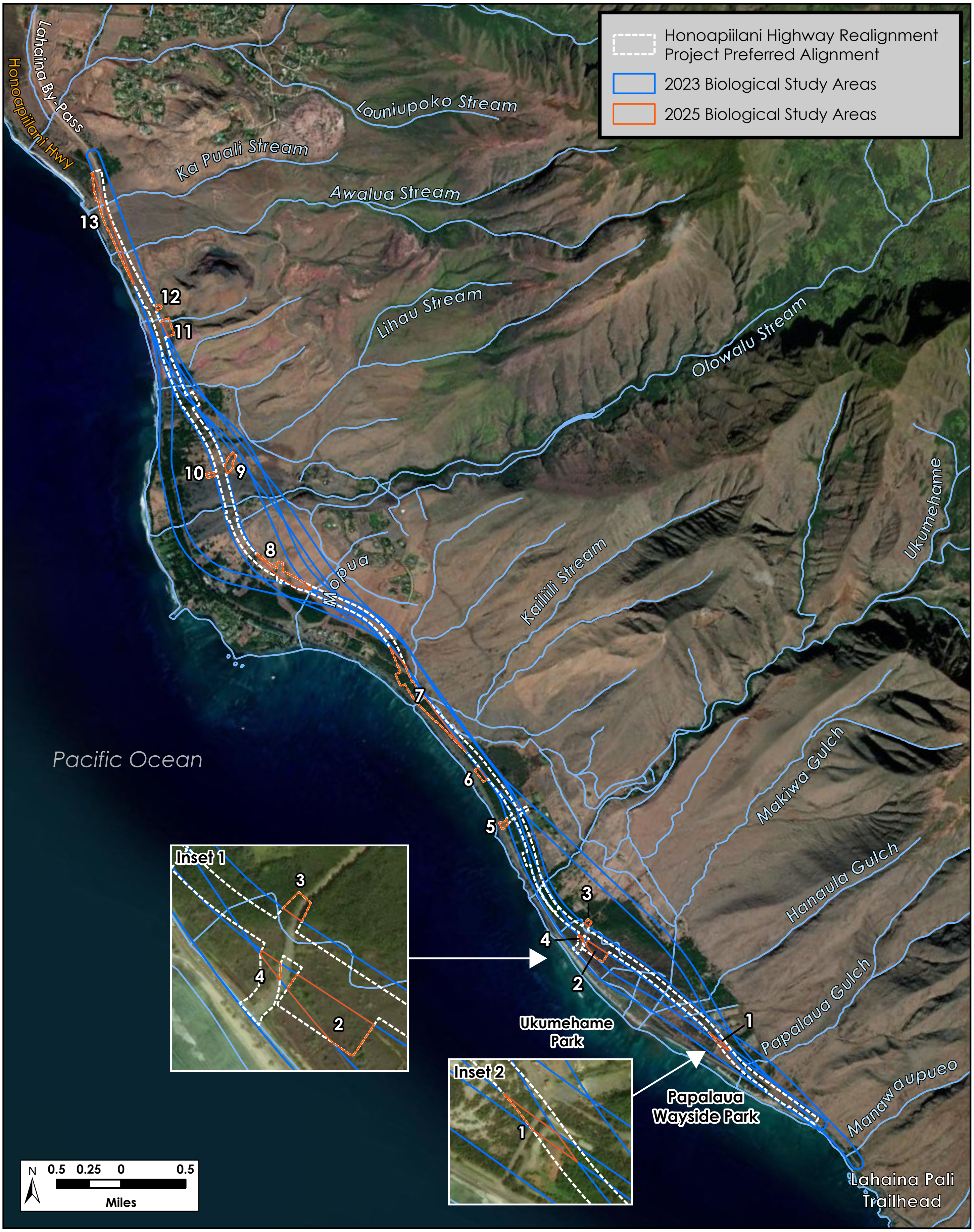
Appendix A – Wetland Delineation Figures 2025 Biological Study Area
Appendix B – Wetland Delineation Datasheets with Photos
Appendix C – Ordinary High Water Mark Delineation Datasheets with Photos

Appendix A. Wetland Delineation Figures 2025 Biological Study Area

N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

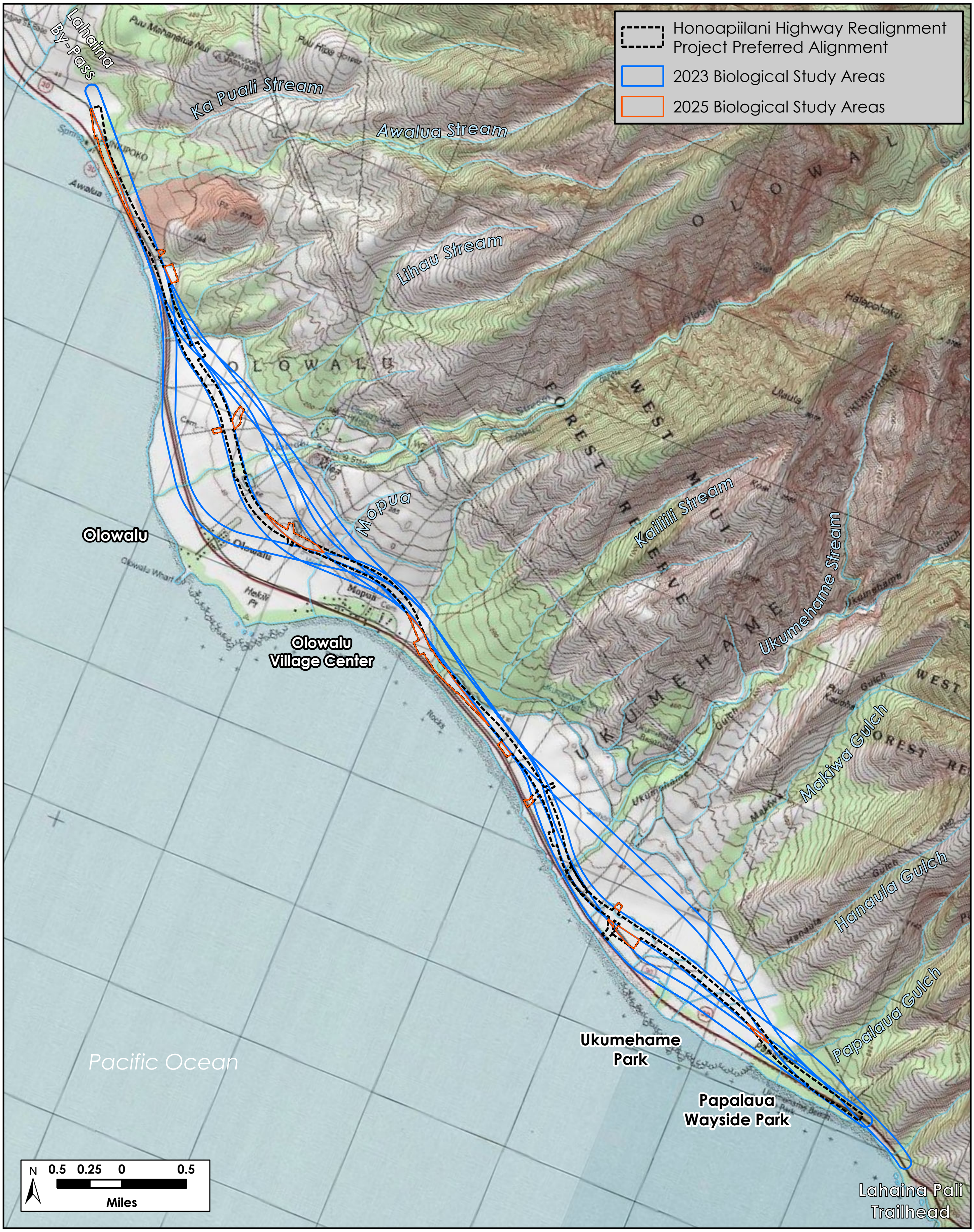
Figure 1. Project Vicinity
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

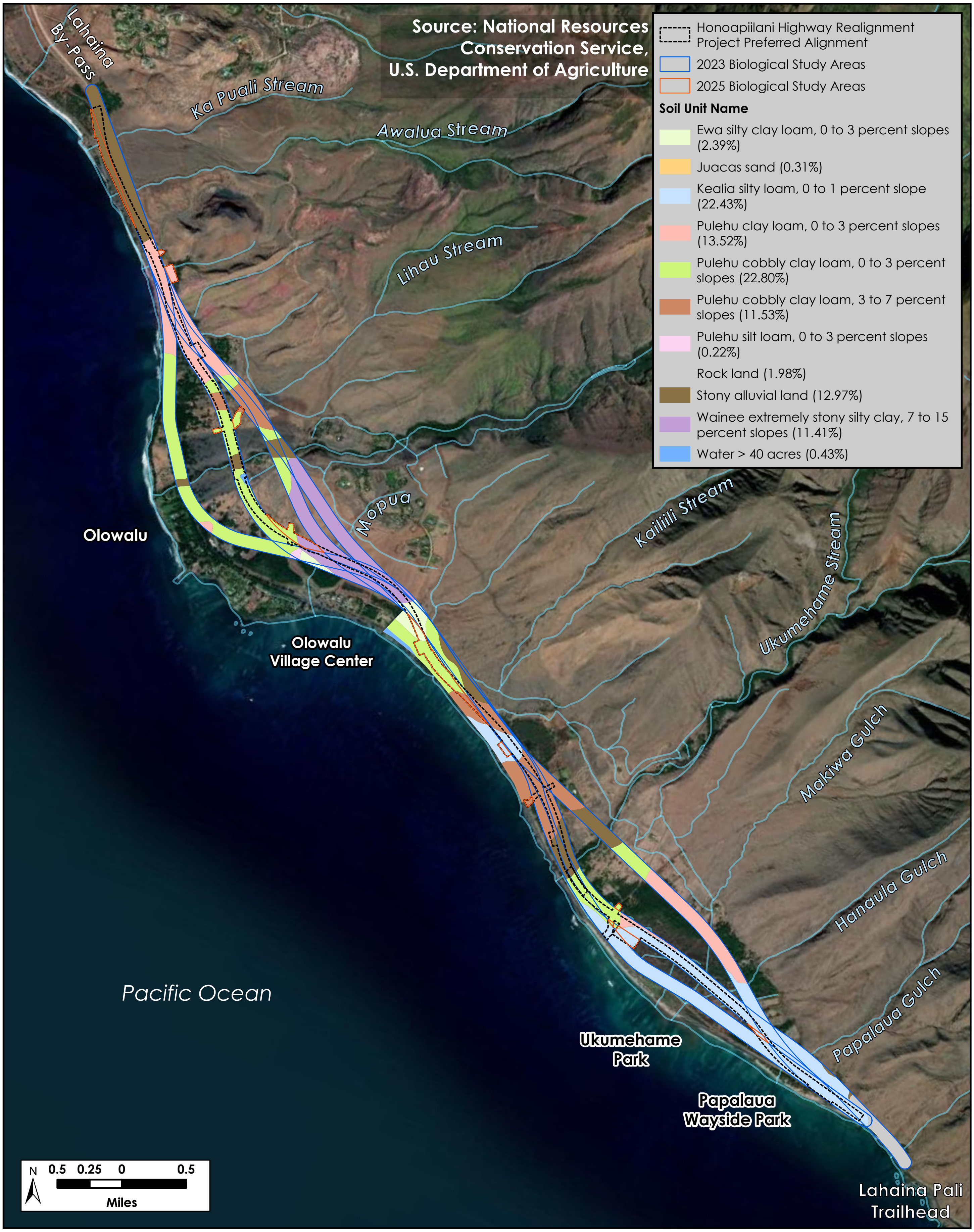
Figure 2. Wetland Delineation Study Area
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

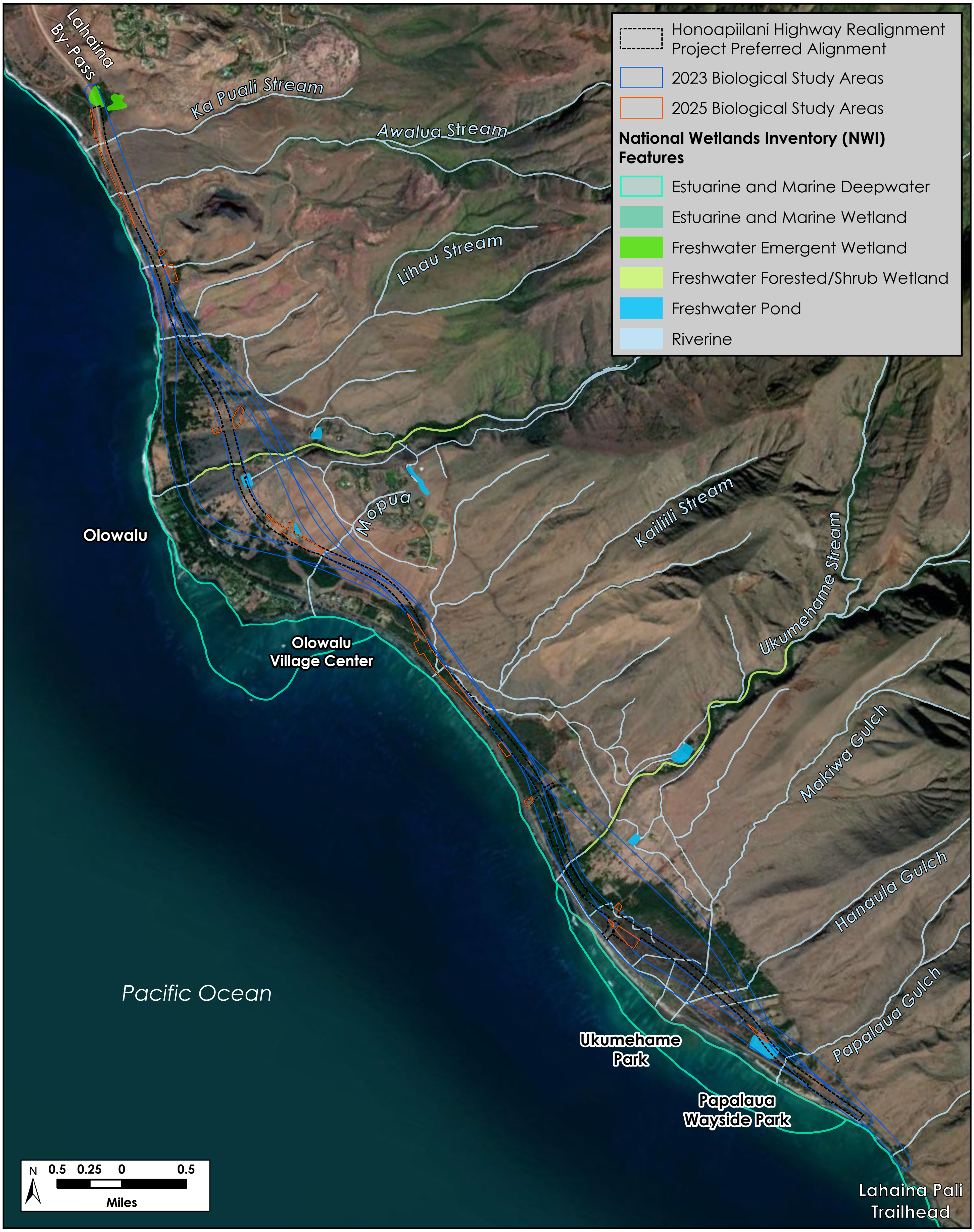
Figure 3. USGS Topographic Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

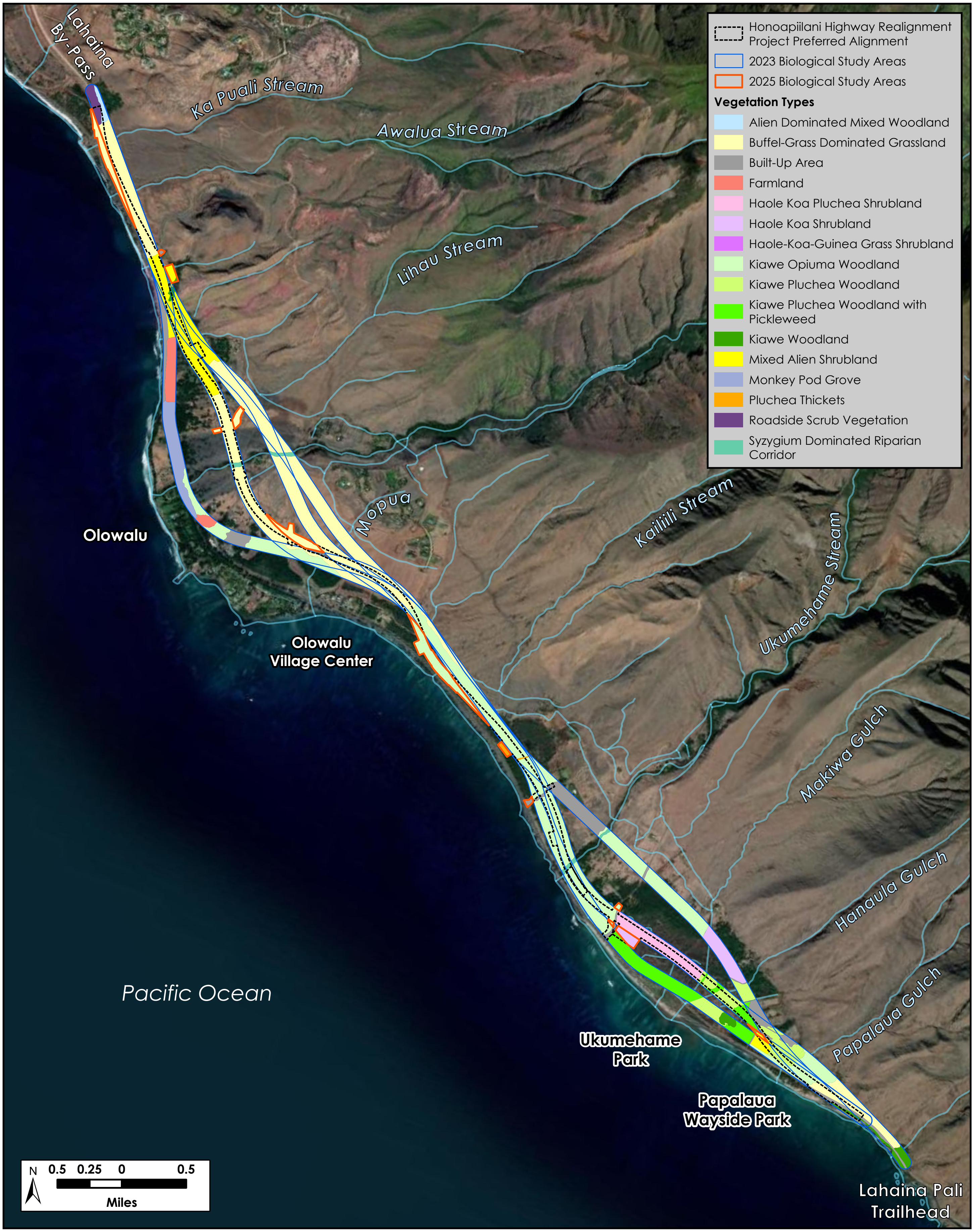
H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 4. Soils Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



H. T. HARVEY & ASSOCIATES
Ecological Consultants

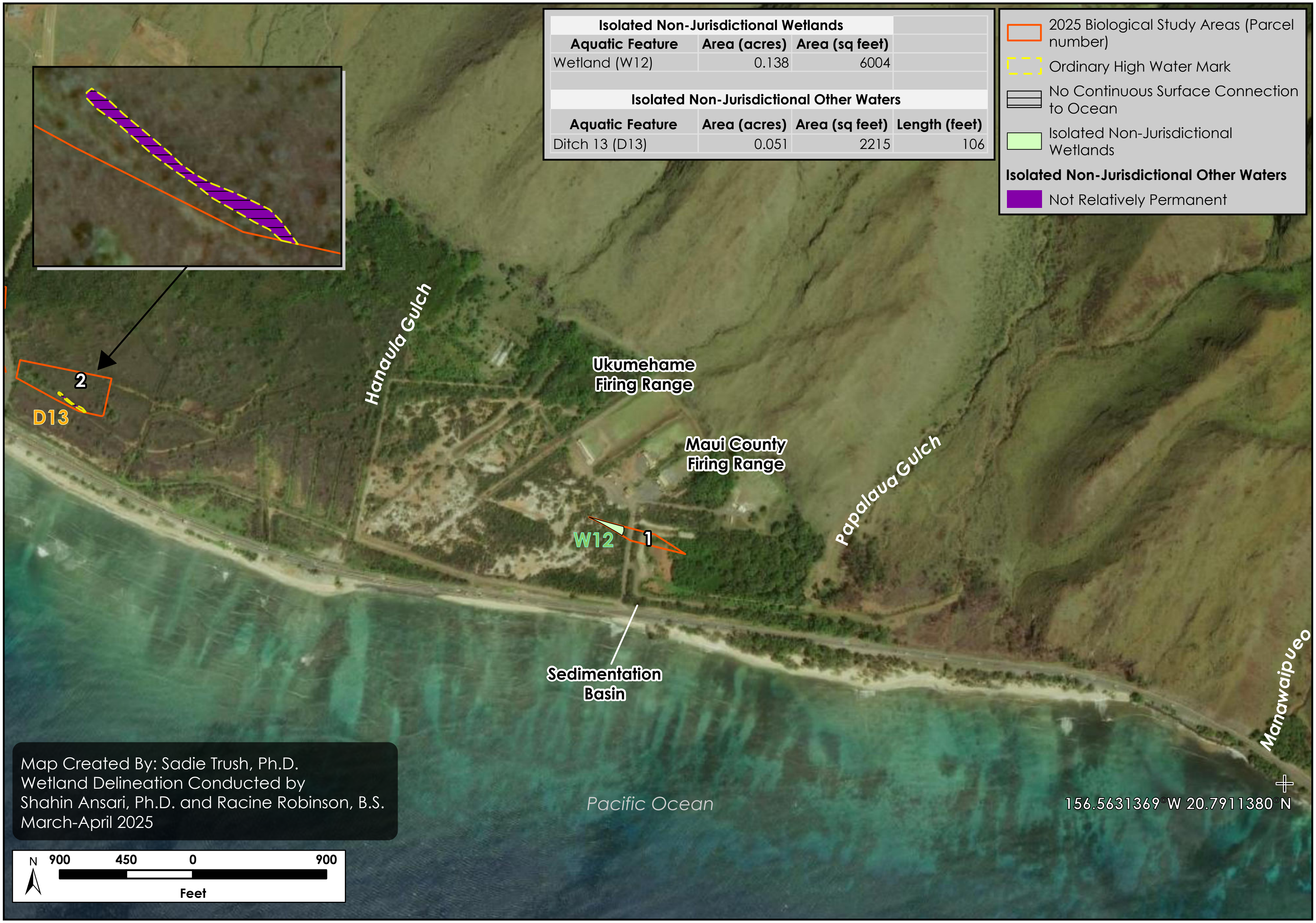
Figure 5. National Wetland Inventory Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

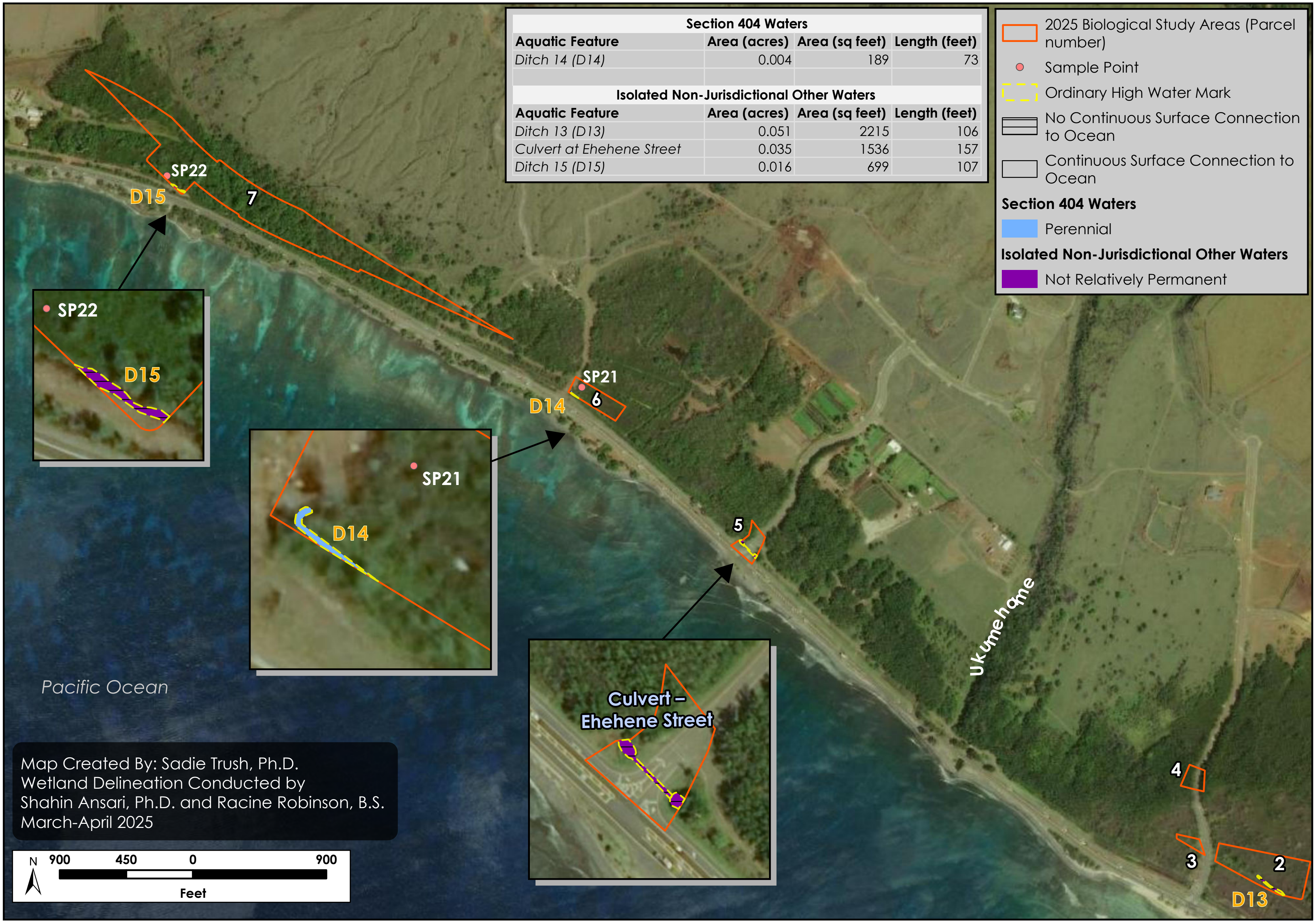
Figure 6. Habitat/Vegetation Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 7. Preliminary Identification of Waters of the U.S. in the Papalaua and Ukumehame Portions of the 2025 Biological Study Area
Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)
May 2025



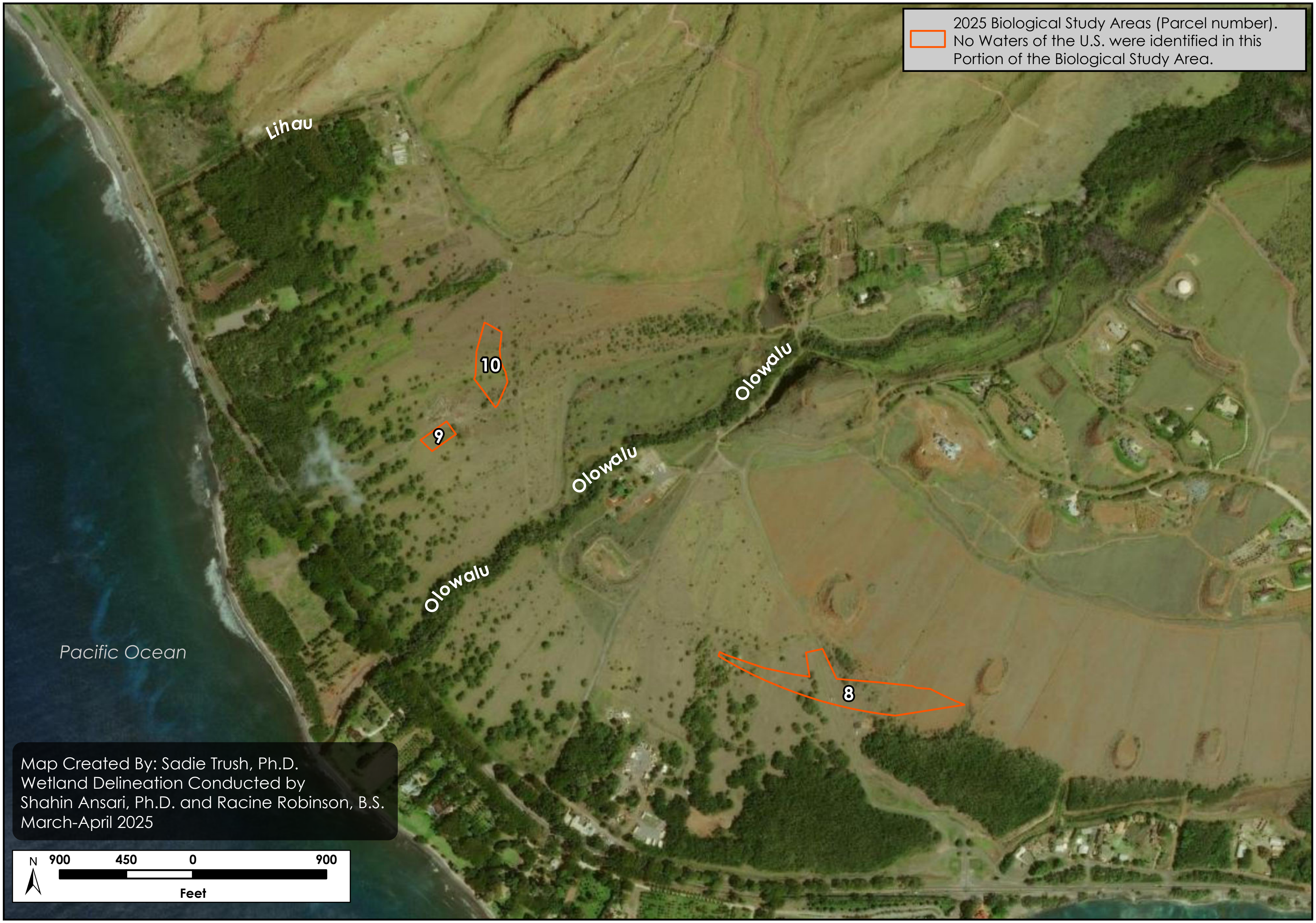
Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Section 404 Waters			
Ditch 14 (D14)	0.004	189	73
Isolated Non-Jurisdictional Other Waters			
Ditch 13 (D13)	0.051	2215	106
Culvert at Ehehene Street	0.035	1536	157
Ditch 15 (D15)	0.016	699	107

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 8. Preliminary Identification of Waters of the U.S. in the Ukumehame Portions of the 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

May 2025



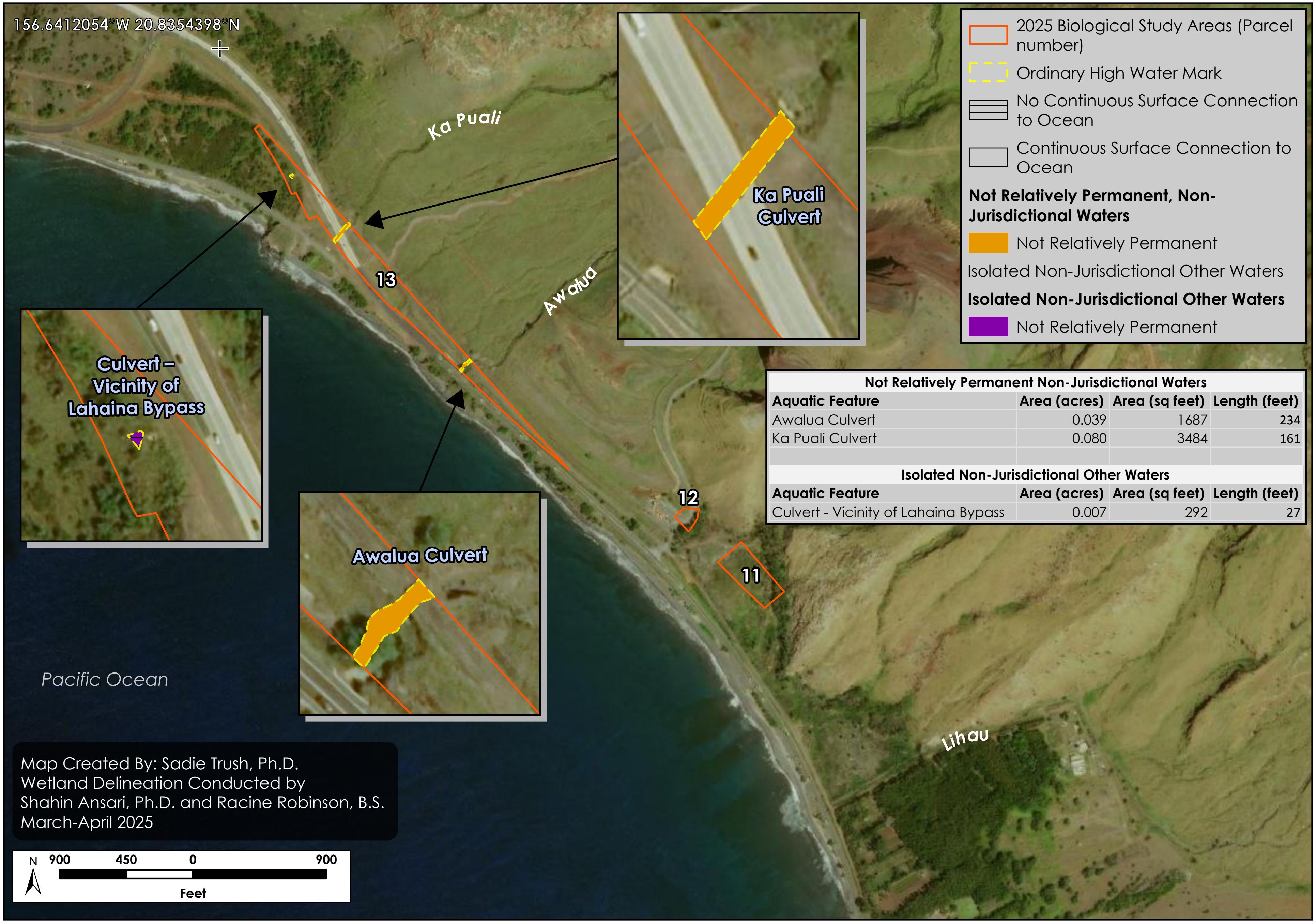
N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 9. Preliminary Identification of Waters of the U.S. in the Olowalu Portion of the 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

May 2025



Not Relatively Permanent Non-Jurisdictional Waters			
Aquatic Feature	**Area (acres)**	**Area (sq feet)**	**Length (feet)**
Awalua Culvert	0.039	1687	234
Ka Puali Culvert	0.080	3484	161

Isolated Non-Jurisdictional Other Waters			
Aquatic Feature	**Area (acres)**	**Area (sq feet)**	**Length (feet)**
Culvert - Vicinity of Lahaina Bypass	0.007	292	27

N:\Projects4600\4692-01\Reports\Wetland Delin 2025 Only\Wet Del 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 10. Preliminary Identification of Waters of the U.S. in the Launiupoko Portion of the 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

May 2025

Appendix B. Wetland Delineation Datasheets with Photos

WETLAND DETERMINATION DATA FORM – Hawaiʻi and Pacific Islands Region

Project/Site: Honoapiilani Highway Improvement Project - East of County Firing Range City: Ukumehame Sampling Date: 5/1/23 Time: 10:30 am

Applicant/Owner: Hawaii Department of Transportation State/Terr/Comlth.: HI Island: Maui Sampling Point: SP12

Investigator(s): Shahin Ansari, Terrell Erickson TMK/Parcel: ____

Landform (hillslope, coastal plain, etc.): ____ Local relief (concave, convex, none): ____

Lat: 156.57761W Long: 20.795880N Datum: ____ Slope (%): ____

Soil Map Unit Name: Kealia Silt Loam NWI classification: Area has "Riverine" features

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 sq feet)			
1. Prosopis pallida	5	Y	FACU
2.			
3.			
4.			
5.			
	5	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 200 sq feet)			
1. Batis maritima	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	5	x 4 =	20
UPL species		x 5 =	
Column Totals:	105 (A)		120 (B)

Prevalence Index = B/A = 1.14

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2.5/2						Clay	Many fine roots
6-18	5YR 3/3	80-98	2.5YR 4/6	2-20			Clay	Prominent contrast

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:

Black concentrations were charcoal and not Mn.

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- X Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):

Water Table Present? Yes ___ No X Depth (inches):

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches):

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

P. pallida trees appeared stunted and and almost dead in this B. maritima dominated patch. Area next to this patch is open parking for County firing range which showed signs of ponding.

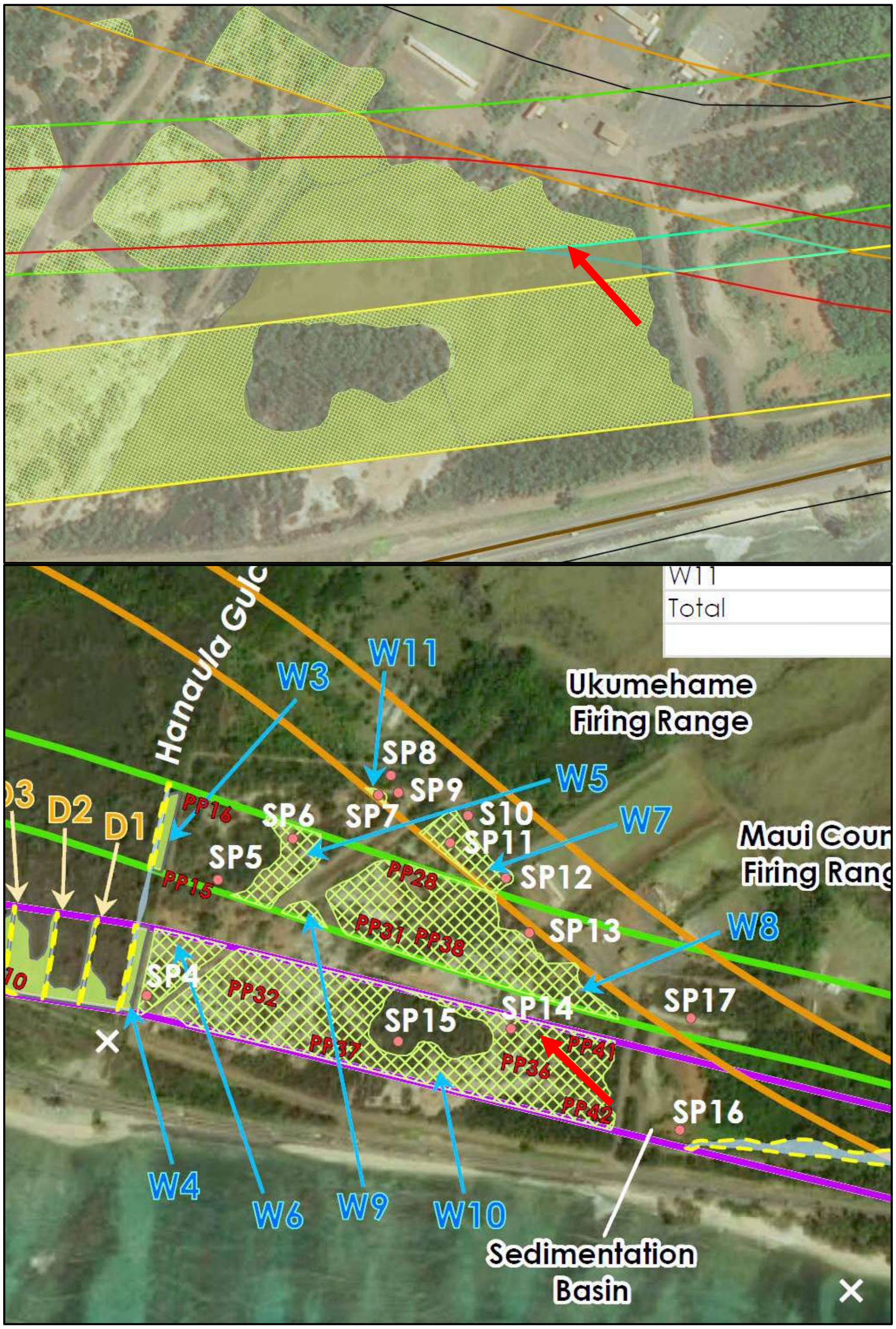


Photo 1. Snippets from the 2023 wetland delineation draft field map (above) and the technical report Figure 7 (below). The red arrow indicates W12 area that was delineated as wetland between the two proposed alignments but was cut to show impacted wetlands within the 2023 biological survey area limits (alignments).

Photo 2. View of wetland 12 taken from the Maui County Road leading to the firing rage. View to the north. Stressed kiawe trees in the foreground with dense ground cover of the obligate pickeleweed (*Batis maritima*) plants in the background.

Photo 3. Photo taken in 2023 near the northern end (toward tip of the triangular shaped W12 parcel) of W12 with dense pickleweed (*Batis maritima*) ground cover and with dead and dying kiawe (*Prosopis pallida*) trees (right corner). View to the east.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Hawaii and Pacific Islands Region** See ERDC/EL TR-12-5; the proponent agency is CECW-COR	***OMB Control #: 0710-0024, Exp: 09/30/2027*** ***Requirement Control Symbol EXEMPT:*** ***(Authority: AR 335-15, paragraph 5-2a)***

Project/Site: Honoapiilani # 4692-02 City: Olowalu Sampling Date: 4/3/25 Time: 9:40 AM

Applicant/Owner: ______ State/Terr/Comlth.: Hi Island: Maui Sampling Point: SP-21

Investigator(s): Shahin Ansari, Racine Robinson TMK/Parcel: ______

Landform (hillside, coastal plain, etc.): Depressional basin Local relief (concave, convex, none): concave

Lat: ______ Long: ______ Datum: ______ Slope (%): 3

Soil Map Unit Name: Pulehu cobbly clay loam, 0-3% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: Depressional basin along dry ditch, adjacent to roadside ditch of Honoapiilani Hwy. Soil disturbed - comprised of rocky fill material with debris (rocks, large cobble, tire debris, trash)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 10x10')			
1. Pluchea	100	X	FAC
2.			
3.			
4.			
5.			
	100	=Total Cover	
Herb Stratum (Plot size: 10x10')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0	=Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: Bare ground - no herbs due to dense Pluchea cover.

SOIL

Sampling Point: SP-21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-3								woody debris/organic material
3-8	7.5YR 2.5/1	100					Loam	Organic debris (non-decayed)
8-17	7.5YR 2.5/1	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6) **(Guam, CNMI, and American Samoa)**
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock/compacted soil

Depth (inches): 17

Hydric Soil Present? Yes ___ No X

Remarks:

Soil very crumbly and dry between 3-8 inches. After 8inches, a little more moist but still crumbles.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) **(Guam, CNMI, and American Samoa)**
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Stunted Prosopis pallida outside of plot

Photo 4. Approximate landscape location of SP21 (white dot to the left). Other features illustrated in this landscape picture are Ditch 14 (pink blob), Ditch 9 (yellow arrows), connection of Ditch 9 to the Pacific Ocean (red arrow), culvert at Ehehene Street (white arrow), and the perennial Ukumehame Stream (blue arrow).

Photo 5. Dense thickets of facultative shrubs *Pluchea* spp. (*Pluchea x fosbergii* and *Pluchea indica*) where SP21 was placed. View to the west. Stressed upland kiawe (*Prosopis juliflora)* trees in the backgrroud. Facultative milo (*Thespesia populnea*) trees in the foreground.

Photo 6. Soil pit at SP21 revealed non-hydric soils of loam and clay textures. The top three inches was composed of woody debris/organic matter.

U.S. Army Corps of Engineers **WETLAND DETERMINATION DATA SHEET – Hawaii and Pacific Islands Region** See ERDC/EL TR-12-5; the proponent agency is CECW-COR	*OMB Control #: 0710-0024, Exp: 09/30/2027* *Requirement Control Symbol EXEMPT:* *(Authority: AR 335-15, paragraph 5-2a)*

Project/Site: Honoapiilani (#4692-02 City: Olowalu Sampling Date: 4/02/25 Time: 10:30 AM

Applicant/Owner: ______ State/Terr/Comlth.: Hi Island: Maui Sampling Point: SP22

Investigator(s): Shahin Ansari, Racine Robinson TMK/Parcel: ______

Landform (hillside, coastal plain, etc.): Slight hillslope Local relief (concave, convex, none): concave

Lat: ______ Long: ______ Datum: ______ Slope (%): 2

Soil Map Unit Name: Pulehu cobbly clay loam, 0-3% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?**	
Hydric Soil Present?	Yes ___	No X	**Yes** ___	**No** X
Wetland Hydrology Present?	Yes X	No ___		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 10x10')			
1. Pluchea	100		FAC
2. Leucaena leucocephala	2		UPL
3.			
4.			
5.			
	102	=Total Cover	
Herb Stratum (Plot size: 10x10')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0	=Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Bare ground and leaf litter in herbaceous stratum, Pluchea blocks any herb growth.

SOIL

Sampling Point: SP22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1								Organic material + woody debris
1-12	5YR 2.5/1	95	5YR 3/3	2	C	M	Clay	
12-18	10YR 3/2	100					Clay	
18-20	10YR 3/1	99	5YR 3/4	1	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6) **(Guam, CNMI, and American Samoa)**
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) **(Guam, CNMI, and American Samoa)**
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- X Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Stunted Leucaena leucocephala in plot. Stunted + stressed Prosopis pallida within area outside of plot.

Photo 4. Approximate landscape location of SP22 (red dot) in the Olowalu area. The area is relatively disturbed and overlaps remnant ditches from the time of the sugarcane plantation. The yellow lines illustrate the approximate location of the isolated non-jurisdiction ditches (D10 and D 11) that were delineated in 2023 and had water in it. The pink line illustrate the approximate location of the ditch delineated during this 2025 survey.

Photo 5. SP22 was placed amidst dense thickets of facultative thickets of *Pluchea spp*. (*Pluchea x fosbergii* and *Pluchea indica*). Stressed out kiawe (*Prosopis pallida*) trees seen in the background were scattered amongst the *Pluchea* thickets.

Photo 6. Soil sampled at SP22 was dry and did not meet any hydric soil indicators. There were some brick pieces in the profile as seen in the sample (picture to the right) suggesting fill.

Appendix C. Ordinary High Water Mark Delineation Datasheets with Photos

U.S. Army Corps of Engineers (USACE)
RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-COR.

Form Approved - OMB No. 0710-0024 Expires: 2027-09-30

Project ID #: 4692-02 | Site Name: 2025 Biological Study Area Parcel 2. | Date and Time: April 3, 2025 1 pm

Location (lat/long): 156.58634N 20.79787W | Investigator(s): Shahin Ansari and Racine Robinson

Step 1 Site overview from remote and online resources.
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [X] aerial photos
- [ ] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
This features is part of the remnant ditch system from the sugarcan plantation time in the Ukumehame region. There were no recent flood or drought events at the time of the survey. The ditch derives its hydrology from the Hanaula Gulch and associated ditches. As expected it was dry and flows only during and after rain.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or human-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls, etc.

Ditch with earthern bed and banks, remnant from when the land was under sugarcane plantation. Linear ditch with no standing water but saturated bed. Woody debris along bed and banks.

Step 3 Mark the boxes next to the indicators used to help identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators used to identify the location of the OHWM may be just below or above the OHWM. Make a slash in boxes next to indicators that are helpful in identifying the OHWM. After the initial assessment, those indicators identified at the OHWM elevation should be changed from slashes to x's. Note, it is not necessary to mark indicators that are present but do not help inform identification of the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and attach a photo log.

Geomorphic indicators

- [X] **Break in slope**
  - [ ] *on the bank*
  - [ ] *undercut bank*
  - [ ] *valley bottom*
  - [ ] Other: ______
- [ ] **Shelving**
  - [ ] *shelf at top of bank*
  - [ ] *natural levee*
  - [ ] *human-made berms or levees*
  - [ ] *other berms:* ______
- [ ] **Secondary channels**
- [ ] **Channel bar**
  - [ ] *shelving (berms) on bar*
  - [ ] *unvegetated*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar*
- [ ] **Instream bedforms and other bedload transport evidence**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.)*
  - [ ] *Weathered clasts or bedrock*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Sediment indicators

- [ ] **Soil development**
- [ ] **Changes in character of soil**
- [X] **Mudcracks**
- [ ] **Changes in particle-sized distribution**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [X] *silt deposits*

Vegetation indicators (*Consider the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain*)

- [ ] **Change in vegetation type from** ______ **to** ______
- [X] **Change in density of vegetation**
- [X] **Exposed roots below intact soil layer**
- [X] **Vegetation matted down and/or bent**
- [ ] **Other vegetation observations** ______

Other physical indicators

- [X] **Sediment deposited on vegetation or structures**
- [ ] **Wracking/presence of organic litter**
- [ ] **Presence of large wood**
- [X] **Leaf litter disturbed or washed away**
- [X] **Water staining**

Other observed indicators? Describe:
No standing water but saturated bed. Ditch suddenly terminates and appeared sedimented.

Project ID #: 4692-02

Step 4 Was additional information used to support identification of the OHWM? ☒ Yes ☐ No

If yes, describe and attach information to data sheet:

The ditch is visible in aerial imagery which was used to corroborate and field delineation.

Step 5 Is an OHWM present at this site? ☒ Yes ☐ No

Describe rationale for location of OHWM or lack thereof by describing any observed indicators (at, above, and/or below the OHWM location).

Bed and lower banks were covered with fallen, matted down, dead branched and debris. Sediment deposit on the woody debris and change from mostly unvegetated bed to vegetated upper banks were were some of the main indicators used to place the OHWM elevation at the ditches.

Additional observations or notes

Attach an imagery log of the site.

Imagery log attached? ☒ Yes ☐ No If no, explain why not: ______

List photographs, or other imagery/sketches, and include descriptions in the table below.

Number photographs in the order that they are taken. Attach imagery and include annotations of features.

Imagery Number	Imagery description
Photo 10	see attached
Photo 11	see attached
Photo 12	see attached.

Photo 10. Break in slope (yellow line), dead matted down woody debris with mostly unvegetated bed with some recently recruited herbaceous plants in the saturated bed were the main OHWM indicators in Ditch 13. The approximate location where ditch enters parcel 2 of the Biological Study Area.

Photo 11. Undercut bank (yellow line) at some places and change in vegetation from unvegetated to vegetated banks were also used to determine the OHWM level in Ditch 13.

Photo 12. Location where Ditch 13 abruptly terminates in the northern portion of parcel 2 of the Biological Study Area.

U.S. Army Corps of Engineers (USACE)
RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-COR.

Form Approved - OMB No. 0710-0024 Expires: 2027-09-30

Project ID #: Honoapiilani Highway | Site Name: Culvert Ehehene Street | Date and Time: April 3, 2025. 2:30 pm

Location (lat/long): 156.59595N 20.80365W | Investigator(s): Shahin Ansari and Racine Robinson

Step 1 Site overview from remote and online resources.
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [X] aerial photos
- [ ] topographic maps
- [ ] Other:

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
This feature is a concrete culvert that runs north-south direction under Ehehene Street parallel to the existing Honoapiilani Highway. No extreme recent flood or drought event occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or human-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls, etc.

While the top beam and headwall of the concrete culverts were visible on both sides of Ehehene Street, the wings of the concrete culvert were overgown with vegetation making is hard to identify the OHWM.

Step 3 Mark the boxes next to the indicators used to help identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators used to identify the location of the OHWM may be just below or above the OHWM. Make a slash in boxes next to indicators that are helpful in identifying the OHWM. After the initial assessment, those indicators identified at the OHWM elevation should be changed from slashes to x's. Note, it is not necessary to mark indicators that are present but do not help inform identification of the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and attach a photo log.

Geomorphic indicators

- [X] **Break in slope**
  - [ ] *on the bank*
  - [ ] *undercut bank*
  - [ ] *valley bottom*
  - [X] Other:
- [ ] **Shelving**
  - [ ] *shelf at top of bank*
  - [ ] *natural levee*
  - [X] *human-made berms or levees*
  - [X] *other berms:* concrete culvert
- [ ] **Secondary channels**
- [ ] **Channel bar**
  - [ ] *shelving (berms) on bar*
  - [ ] *unvegetated*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar*
- [ ] **Instream bedforms and other bedload transport evidence**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.)*
  - [ ] *Weathered clasts or bedrock*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Sediment indicators

- [ ] **Soil development**
- [ ] **Changes in character of soil**
- [ ] **Mudcracks**
- [ ] **Changes in particle-sized distribution**
  - [X] *transition from* soil to concrete
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits*

Vegetation indicators (*Consider the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain*)

- [ ] **Change in vegetation type from** ______ **to** ______
- [ ] **Change in density of vegetation**
- [ ] **Exposed roots below intact soil layer**
- [ ] **Vegetation matted down and/or bent**
- [X] **Other vegetation observations**
  Change from concrete wings of culvert to vegetated bed and bank.

Other physical indicators

- [ ] **Sediment deposited on vegetation or structures**
- [ ] **Wracking/presence of organic litter**
- [ ] **Presence of large wood**
- [ ] **Leaf litter disturbed or washed away**
- [ ] **Water staining**

Other observed indicators? Describe:
Other than for the slight break in the earthen bank along the wings of the culvert, no other OHWM indicators were obvious. The culvert openings and the ditch that it opens into on both sides were dry and vegetated. and the ditch that the culvert opens into is filled. Observations made and photos taken during the 2023 survey show the area around the culvert opening and the shallow ditch it opens into to be mowed, dry and mostly filled in with soil. Although the concrete itself was not blocked.

Project ID #: Honoapiilani Highway

Step 4 Was additional information used to support identification of the OHWM? ☒ Yes ☐ No

If yes, describe and attach information to data sheet:

Observations and photos from the 2023 survey were used to confirm the OHWM level at this culvert. Photos attached.

Step 5 Is an OHWM present at this site? ☒ Yes ☐ No

Describe rationale for location of OHWM or lack thereof by describing any observed indicators (at, above, and/or below the OHWM location).

Other than for the concrete culvert structure and a slight break in slope the OHWM indicators here were very weak.

Additional observations or notes

See attached photos.

Attach an imagery log of the site.

Imagery log attached? ☒ Yes ☐ No If no, explain why not: ______

List photographs, or other imagery/sketches, and include descriptions in the table below.

Number photographs in the order that they are taken. Attach imagery and include annotations of features.

Imagery Number	Imagery description
Photo 13	See attached.
Photo 14	See attached
Photo 15	See attached

Photo 13. Landscape position of the Ehehene Street culvert (white two-way arrow), the ditch system (yellow arrows) that runs parallel to the existing Honoapiilani Highway, perennial Ukumehame Stream (blue arrow), and the location where the ditch system connects to the Pacific Ocean (red arrow) under the Highway.

Photo 14. Ehehene Street culvert (south opening on top and north opening below) was overgrown with vegetation at the time of the 2025 survey.

Photo 15. Ehehene Street culvert – south side (north view) as observed during the 2023 survey. Other than for a slight break in the slope (yellow line) no OHWM indicators were obvious at this disturbed and manipulated culvert location.

U.S. Army Corps of Engineers (USACE)
RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-COR.

Form Approved - OMB No. 0710-0024 Expires: 2027-09-30

The Agency Disclosure Notice (ADN)

Project ID #: Honoapiilani Highway	Site Name: Ditch 14, parcel 6 of 2025 study area	Date and Time: April 3, 2025. 2:00 pm
Location (lat/long): 156.59919N, 20.80637	Investigator(s): Shahin Ansari and Racine Robinson	

Step 1 Site overview from remote and online resources.
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Ditch 14 is part of the old agricultural ditch system that runs parallel to the existing Honoapiilani Highway in the vicinity of Ehehene Street. Normal low flows occurred at the time of the survey. No extreme recent flood or drought event occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or human-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls, etc.

Dense impenetrable thickets of vegetation surround the ditches that made it challenging to find OHWM indicators here.

Step 3 Mark the boxes next to the indicators used to help identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators used to identify the location of the OHWM may be just below or above the OHWM. Make a slash in boxes next to indicators that are helpful in identifying the OHWM. After the initial assessment, those indicators identified at the OHWM elevation should be changed from slashes to x's. Note, it is not necessary to mark indicators that are present but do not help inform identification of the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and attach a photo log.

Geomorphic indicators

- [x] **Break in slope**
  - [ ] *on the bank*
  - [ ] *undercut bank*
  - [ ] *valley bottom*
  - [ ] Other: ______
- [ ] **Shelving**
  - [ ] *shelf at top of bank*
  - [ ] *natural levee*
  - [ ] *human-made berms or levees*
  - [ ] *other berms:* ______
- [ ] **Secondary channels**
- [ ] **Channel bar**
  - [ ] *shelving (berms) on bar*
  - [ ] *unvegetated*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar*
- [ ] **Instream bedforms and other bedload transport evidence**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.)*
  - [ ] *Weathered clasts or bedrock*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Sediment indicators

- [ ] **Soil development**
- [ ] **Changes in character of soil**
- [ ] **Mudcracks**
- [ ] **Changes in particle-sized distribution**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits*

Vegetation indicators (*Consider the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain*)

- [ ] **Change in vegetation type from** ______ **to** ______
- [ ] **Change in density of vegetation**
- [ ] **Exposed roots below intact soil layer**
- [ ] **Vegetation matted down and/or bent**
- [ ] **Other vegetation observations**

Other physical indicators

- [ ] **Sediment deposited on vegetation or structures**
- [x] **Wracking/presence of organic litter**
- [x] **Presence of large wood**
- [ ] **Leaf litter disturbed or washed away**
- [x] **Water staining**

Other observed indicators? Describe:
Pooled water under very dense thickets of the facultative Pluchea spp. shrubs.

Project ID #: Honoapiilani Highway

Step 4 Was additional information used to support identification of the OHWM? ☐ Yes ☒ No
If yes, describe and attach information to data sheet:

Step 5 Is an OHWM present at this site? ☒ Yes ☐ No
Describe rationale for location of OHWM or lack thereof by describing any observed indicators (at, above, and/or below the OHWM location).

Break in slope with pooled water.

Additional observations or notes

The ditch is covered under dense woody thickets of the Pluchea shrubs and fallen logs of kiawe trees precluding access. Only a small portion of the ditch was visible. Aerial imagery shows this ditch to potentially be a continuation of Ditch 9 (delineated in the 2023 study for this project) that runs parallel to the existing Honoapiilani Highway. The entire ditch system is a remnant from the old sugarcane plantation. Stretches of the ditch system including Ditches 9 and this Ditch 14 are filled in.

Attach an imagery log of the site.

Imagery log attached? ☒ Yes ☐ No If no, explain why not:

List photographs, or other imagery/sketches, and include descriptions in the table below.

Number photographs in the order that they are taken. Attach imagery and include annotations of features.

Imagery Number	Imagery description
Photo 16	See attached
Photo 17	See attached
Photo 18	See attached
Photo 19	See attached

Photo 16. Landscape position of the Ditch 14 (pink blob to the left), the ditch system (yellow arrows) that runs parallel to the existing Honoapiilani Highway, Ehehene Street culvert (white two-way arrow), perennial Ukumehame Stream (blue arrow), and the location where the ditch system connects to the Pacific Ocean (red arrow) under the Highway.

Photo 17. Ehehene Street culvert (south opening on top and north opening below) was overgrown with vegetation at the time of the 2025 survey.

Photo 18. Brown (reflecting in photo her; blue arrows) Water in Ditch 14 under thickets of facultative Pluchea shrubs.

Photo 19. OHWM (yellow line) observed at Ditch 14 with water stained leaves on the bank. Blue arrow shows where standing water was observed.

U.S. Army Corps of Engineers (USACE)
RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-COR.

Form Approved - OMB No. 0710-0024 Expires: 2027-09-30

Project ID #: Honoapiilani Highway | Site Name: Ditch 15, Olowalu Village | Date and Time: April 2, 2:30 pm

Location (lat/long): 156.60647N, 20.80988W | Investigator(s): Shahin Ansari and Racine Robinson

Step 1 Site overview from remote and online resources.
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Ditch is in the agricultural area in Olowalu. It is isolated with no surface connection to the ocean. No recent extreme flood or drought event occurred leading up to the delineation of this feature.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or human-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls, etc.

Very difficult to identiy the OHWM as the the ditch was covered with woody debris that was then overgrown with thickets of Pluchea shrubs.

Step 3 Mark the boxes next to the indicators used to help identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators used to identify the location of the OHWM may be just below or above the OHWM. Make a slash in boxes next to indicators that are helpful in identifying the OHWM. After the initial assessment, those indicators identified at the OHWM elevation should be changed from slashes to x's. Note, it is not necessary to mark indicators that are present but do not help inform identification of the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and attach a photo log.

Geomorphic indicators

- [X] **Break in slope**
  - [X] *on the bank*
  - [ ] *undercut bank*
  - [ ] *valley bottom*
  - [ ] Other: ______
- [ ] **Shelving**
  - [ ] *shelf at top of bank*
  - [ ] *natural levee*
  - [ ] *human-made berms or levees*
  - [ ] *other berms:* ______
- [ ] **Secondary channels**
- [ ] **Channel bar**
  - [ ] *shelving (berms) on bar*
  - [ ] *unvegetated*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar*
- [ ] **Instream bedforms and other bedload transport evidence**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.)*
  - [ ] *Weathered clasts or bedrock*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Sediment indicators

- [ ] **Soil development**
- [ ] **Changes in character of soil**
- [X] **Mudcracks**
- [ ] **Changes in particle-sized distribution**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [X] *silt deposits*

Vegetation indicators (*Consider the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain*)

- [ ] **Change in vegetation type from** ______ **to** ______
- [ ] **Change in density of vegetation**
- [ ] **Exposed roots below intact soil layer**
- [ ] **Vegetation matted down and/or bent**
- [ ] **Other vegetation observations**

Other physical indicators

- [ ] **Sediment deposited on vegetation or structures**
- [ ] **Wracking/presence of organic litter**
- [ ] **Presence of large wood**
- [ ] **Leaf litter disturbed or washed away**
- [X] **Water staining**

Other observed indicators? Describe:
Very difficult to observe OHWM indicators as the ditch was very overgrown with woody debris and Pluchea shrubs.

Project ID #: Honoapiilani Highway

Step 4 Was additional information used to support identification of the OHWM? ☐ Yes ☒ No

If yes, describe and attach information to data sheet:

Step 5 Is an OHWM present at this site? ☒ Yes ☐ No

Describe rationale for location of OHWM or lack thereof by describing any observed indicators (at, above, and/or below the OHWM location).

Other than break in bank and pooled water, OHWM indicators were very difficult to see in this ditch that was overgrown with vegetation and also covered with dead woody debris. Silt deposits on the woody debris and water staining of leaves on the bank were also observed.

Additional observations or notes

Attach an imagery log of the site.

Imagery log attached? ☒ Yes ☐ No If no, explain why not:

List photographs, or other imagery/sketches, and include descriptions in the table below.

Number photographs in the order that they are taken. Attach imagery and include annotations of features.

Imagery Number	Imagery description
Photo 20	See attached
Photo 21	See attached
Photo 22	See attached

Photo 20. Ditch 15 overgrown with thickets of *Pluchea* spp. (*Pluchea x foxbergii* and *Pluchea indica*). Shovel indicates the location of the ditch under the dense vegetation.

Photo 21. Ditch 15 - Dense vegetation made it very difficult to identify the OHWM indicators. Break in slope (shovel on top of bank) and saturated bed were used to identify the OHWM level. A ruler could be easily inserted down to about a foot in bed but not on the banks.

Photo 22. Water in Ditch 15 was covered by dense woody debris.

U.S. Army Corps of Engineers (USACE)

RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-COR.

Form Approved - OMB No. 0710-0024 Expires: 2027-09-30

Project ID #: Honoapiilani Highway	Site Name: Awalua Stream Culvert	Date and Time: April 2, 2025 3:30 pm

Location (lat/long): 20.82993N, 156.63674W

Investigator(s): Shahin Ansari and Racine Robinson

Step 1 Site overview from remote and online resources.
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [X] aerial photos
- [ ] topographic maps
- [ ] Other: ______

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Awalua Stream is an intermittent stream that runs through undeveloped buffel grass grassland. The stream was dry at the time of the survey. No recent extreme flood or drought events occurred.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or human-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls, etc.

This is a concrete culvert that carries Awalua Stream over a an inner paved road that runs parallel to the main Honoapiilani Highway. The upstream or eastern portion of the stream is not channelized and has heavily eroded steep earthern banks.

Step 3 Mark the boxes next to the indicators used to help identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators used to identify the location of the OHWM may be just below or above the OHWM. Make a slash in boxes next to indicators that are helpful in identifying the OHWM. After the initial assessment, those indicators identified at the OHWM elevation should be changed from slashes to x's. Note, it is not necessary to mark indicators that are present but do not help inform identification of the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and attach a photo log.

Geomorphic indicators

- [X] **Break in slope**
  - [ ] *on the bank*
  - [ ] *undercut bank*
  - [ ] *valley bottom*
  - [X] Other: Concrete culvert
- [X] **Shelving**
  - [ ] *shelf at top of bank*
  - [ ] *natural levee*
  - [X] *human-made berms or levees*
  - [ ] *other berms:* ______
- [ ] **Secondary channels**
- [X] **Channel bar**
  - [ ] *shelving (berms) on bar*
  - [X] *unvegetated*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar*
- [ ] **Instream bedforms and other bedload transport evidence**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.)*
  - [ ] *Weathered clasts or bedrock*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Sediment indicators

- [ ] **Soil development**
- [ ] **Changes in character of soil**
- [ ] **Mudcracks**
- [ ] **Changes in particle-sized distribution**
  - [ ] *transition from* ______ to ______
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits*

Vegetation indicators (*Consider the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain*)

- [ ] **Change in vegetation type from** ______ **to** ______
- [ ] **Change in density of vegetation**
- [ ] **Exposed roots below intact soil layer**
- [ ] **Vegetation matted down and/or bent**
- [X] **Other vegetation observations**

Concrete unvegetated bed with concrete north bank and stone wall as the south bank.

Other physical indicators

- [ ] **Sediment deposited on vegetation or structures**
- [ ] **Wracking/presence of organic litter**
- [ ] **Presence of large wood**
- [ ] **Leaf litter disturbed or washed away**
- [ ] **Water staining**

Other observed indicators? Describe:

Project ID #: Honoapiilani Highway

Step 4 Was additional information used to support identification of the OHWM? ☐ Yes ☒ No

If yes, describe and attach information to data sheet:

Step 5 Is an OHWM present at this site? ☒ Yes ☐ No

Describe rationale for location of OHWM or lack thereof by describing any observed indicators (at, above, and/or below the OHWM location).

Transect was placed perpendicular to the bed of the culvert between the inner road and the Honoapiilani Highway. The concrete wall that formed the north bank was a support feature for the road that was not used for the OHWM. The elevation of the rock wall that formed the southern bank indicated the OHWM level here. This rockwall along with the unvegetated concrete bed clearly indicated the OHWM level for this feature.

Additional observations or notes

Kiawe (Prosopis pallida) and dead buffel grass (Cenchrus ciliaris) dominated the banks of concrete channel that carries Awalua Stream between the inner road and the eastern side of the Honoapiilani Highway. The culvert continues under the Honoapiilani Highway carryig Awalua Stream to the Pacific Ocean. Very dry conditions prevailed at the time of the survey. There were no signs of water or moisture in the stream bed.

Attach an imagery log of the site.

Imagery log attached? ☒ Yes ☐ No If no, explain why not:

List photographs, or other imagery/sketches, and include descriptions in the table below.

Number photographs in the order that they are taken. Attach imagery and include annotations of features.

Imagery Number	Imagery description
Photo 23	See attached.
Photo 24	See attached

Photo 23. Awalua Stream concrete culvert (east view) location of transect between the inner (unnamed) paved road and the Honoapiilani Highway. The south side rock wall feature (yellow line) with the vegetated bank was used to determine the OHWM level here.

Photo 24. Landscape location (red arrow) of the delineated culvert feature on the west side of the inner (unnamed) road that runs parallel to the Honoapiilani Highway (not seen here). Awalua Stream flows in the east-west direction under this inner road.

U.S. Army Corps of Engineers (USACE)
RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET
The proponent agency is Headquarters USACE CECW-COR.

Form Approved - OMB No. 0710-0024 Expires: 2027-09-30

Project ID #: Honoapiilani Highway	Site Name: Culvert in vicinity of Lahaina Bypass	Date and Time: April 2, 4 pm
Location (lat/long): 156.63988N, 20.83322W	Investigator(s): Shahin Ansari and Racine Robinson	

Step 1 Site overview from remote and online resources.
Check boxes for online resources used to evaluate site:

- [ ] gage data
- [ ] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [ ] land use maps
- [x] aerial photos
- [ ] topographic maps
- [ ] Other:

Describe land use and flow conditions from online resources.
Were there any recent extreme events (floods or drought)?
Concrete culvert in the Launiupoko watershed near the Lahaina Bypass. No extreme flood or drought events occurred leading up to the delineation.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or human-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls, etc.

The cuvert was about 25 feet away from the western edge of the road. It was was not visible from the roadside. as it was overgrown with buffel grass (Cenchrus ciliaris).

Step 3 Mark the boxes next to the indicators used to help identify the location of the OHWM.
OHWM is at a transition point, therefore some indicators used to identify the location of the OHWM may be just below or above the OHWM. Make a slash in boxes next to indicators that are helpful in identifying the OHWM. After the initial assessment, those indicators identified at the OHWM elevation should be changed from slashes to x's. Note, it is not necessary to mark indicators that are present but do not help inform identification of the OHWM.
Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and attach a photo log.

Geomorphic indicators

- [x] **Break in slope**
  - [ ] *on the bank*
  - [ ] *undercut bank*
  - [ ] *valley bottom*
  - [ ] Other:
- [ ] **Shelving**
  - [ ] *shelf at top of bank*
  - [ ] *natural levee*
  - [ ] *human-made berms or levees*
  - [ ] *other berms:*
- [ ] **Secondary channels**
- [ ] **Channel bar**
  - [ ] *shelving (berms) on bar*
  - [ ] *unvegetated*
  - [ ] *vegetation transition (go to veg. indicators)*
  - [ ] *sediment transition (go to sed. indicators)*
  - [ ] *upper limit of deposition on bar*
- [ ] **Instream bedforms and other bedload transport evidence**
  - [ ] *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - [ ] *bedforms (e.g., pools, riffles, steps, etc.)*
  - [ ] *Weathered clasts or bedrock*
  - [ ] *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Sediment indicators

- [x] **Soil development**
- [ ] **Changes in character of soil**
- [ ] **Mudcracks**
- [ ] **Changes in particle-sized distribution**
  - [x] *transition from* concrete to sediment
  - [ ] *upper limit of sand-sized particles*
  - [ ] *silt deposits*

Vegetation indicators (*Consider the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain*)

- [x] **Change in vegetation type from** ______ **to** ______
- [ ] **Change in density of vegetation**
- [ ] **Exposed roots below intact soil layer**
- [ ] **Vegetation matted down and/or bent**
- [ ] **Other vegetation observations**

Other physical indicators

- [ ] **Sediment deposited on vegetation or structures**
- [ ] **Wracking/presence of organic litter**
- [ ] **Presence of large wood**
- [ ] **Leaf litter disturbed or washed away**
- [ ] **Water staining**

Other observed indicators? Describe:
The upper concrete beam and wings of culvert were the main indicators. There was no water and rocks were set in the spillway. The culvert was surrounded by mostly upland buffel grass.

Project ID #: Honoapiilani Highway

Step 4 Was additional information used to support identification of the OHWM? ☐ Yes ☒ No

If yes, describe and attach information to data sheet:

The upper concrete beam and wings of culvert were used to delineate the OHWM level here.

Step 5 Is an OHWM present at this site? ☒ Yes ☐ No

Describe rationale for location of OHWM or lack thereof by describing any observed indicators (at, above, and/or below the OHWM location).

Additional observations or notes

Attach an imagery log of the site.

Imagery log attached? ☐ Yes ☐ No If no, explain why not:

List photographs, or other imagery/sketches, and include descriptions in the table below.

Number photographs in the order that they are taken. Attach imagery and include annotations of features.

Imagery Number	Imagery description
Photo 25	See attached.

Photo 25. The top beam and the wings of the concrete culvert were used to delineate the OHWM level at this feature.

HT Harvey & Associates
Update to Wetland Field Studies Conducted in 2023, 2024, and 2025

H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellence

Memorandum

Project No. 4692-02

April 30, 2025

To: **James Sullivan, Environmental Planner, WSP USA**

From: **Shahin Ansari, Senior Ecologist, H. T. Harvey & Associates**

CC: **Kelly Hardwicke, Principal in Charge, H. T. Harvey & Associates**
Jamie Bents, Project Manager, WSP USA

Subject: **Honoapiilani Highway Improvements Project – Update to Wetland Field Studies Conducted in 2023, 2024, and 2025**

The purpose of this memo is to summarize the findings of the three (2023, 2024, and 2025) separate wetland field studies conducted for the Honoapiilani Highway Improvements Project (Project). This memo also makes the jurisdictional determinations made in the three corresponding technical reports of findings consistent with the March 12, 2025, the U.S. Environmental Protection Agency (EPA) and Department of the Army (DA) (the agencies) guidance (EPA 2025) to field staff on implementation of "continuous surface connection" and restricting jurisdiction to "relatively permanent waters" consistent with the U.S. Supreme Court's May 25, 2023, decision in the case of *Sackett v. Environmental Protection Agency* and the September 2023 Conforming Rule.

In 2023, a wetland delineation for the Honoapiilani Highway Improvements Project was completed and a technical report of findings prepared in December 2023 (H. T. Harvey & Associates 2023) and published in the Project's December 2024 Draft Environmental Impact Study (DEIS) (USDOT et al. 2024). This technical report was initially prepared consistent with the U.S. Environmental Protection Agency's and the Department of Army's final rule published in January of 2023 [("Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023)] and applied the longstanding approach to determine jurisdiction for tributaries, adjacent wetlands, and additional waters, that is, certain types of waters are jurisdictional (under the January 2023 final rule) if they meet either the relatively permanent standard or significant nexus standard. Under this rule, even wetlands and waters lacking a continuous surface connection could still be considered "adjacent" waters of the U.S.

While substantial consideration was made in this 2023 effort to describe surface connection of various features to the Pacific Ocean, the project only attempted to determine jurisdictional Waters of the U.S. (WoUS) status in light of the May 25, 2023, Supreme Court decision in *Sackett v. Environmental Protection Agency* or the Clean Water Act conforming rule of September 2023 [("Revised Definition of 'Waters of the United States';

Conforming," 88 FR 61964, September 8, 2023)] in areas where a distinct lack of surface connection was observed in field studies originally conducted under the January 2023 rule (e.g., only very obviously "isolated" features were marked as potentially non-jurisdictional based on field studies that did not focus at the time closely on connection). Also, at drafting of the 2023 report, ephemeral streams that have a continuous surface connection to the ocean were determined to be jurisdictional in the absence of detailed guidance on that implementation regarding not relatively permanent waters. The 2023 technical report determined a total of 9.13 acres of potential Section 404 WoUS (4.59 acres of jurisdictional wetlands and 4.54 acres of jurisdictional other waters) and a total of 16.709 acres of non-jurisdictional waters (16.67 acres of potentially isolated non-jurisdictional wetlands and 0.037 acres of potentially isolated non-jurisdictional other waters).

In 2024, upon review of the 2023 wetland delineation technical report, the U. S. Army Corps of Engineers (USACE), in an email (POH-2022-00114) to the Hawaii Department of Transportation, expressed that the Project's proposed potentially non-jurisdictional wetlands in the Ukumehame region might be connected to the Pacific Ocean (ocean) via discreet features such as an underground culvert and requested further focused surveys and direct evidence clarifying surface connections of these wetlands to the ocean under the Clean Water Act conforming rule of September 2023. Therefore, on May 2, 2024, the Project team visited the Project site to investigate potential surface connection to the ocean of the wetlands delineated in 2023 in the Ukumehame region. A follow up memo dated August 13, 2024 (H. T. Harvey & Associated 2024), detailed the findings of this field investigation that was also published in the Project's December 2024 DEIS (USDOT et al. 2024). Applying the conforming September 2023 rule, this memo determined that *all* wetlands delineated in the 2023 study in the Ukumehame region were non-jurisdictional due to lack of evidence of a continuous surface connection to the ocean. The jurisdictional determination on other waters outside of the Ukumehame region made in the 2023 report, however, was not addressed in this August 2024 memo, as these features had not been requested by the USACE to be revisited in the field.

In 2025, based upon comments received on the DEIS, the four proposed alignments were further refined leading to the selection of a preferred alternative. While the vast majority of the Biological Study Area (BSA) surveyed in 2023 overlaps the preferred alternative, there were a few scattered parcels along the preferred alternative that were not part of the 2023 wetland field studies. Therefore, in April and May 2025, additional wetland delineation was conducted in 13 distinct parcels along the current preferred alignment totaling 31.3 acres. The results of this delineation are described in a separate memo to WSP USA, dated April 29, 2025. A total of 0.004 acres of Section 404 WoUS were delineated in the 2025 additional BSA. The Project's April 29, 2025 memo was prepared consistent with the March 12, 2025, the U.S. Environmental Protection Agency (EPA) and Department of the Army (DA) (the agencies) guidance (EPA 2025) to field staff on implementation of "continuous surface connection" and restricting jurisdiction to "relatively permanent waters" consistent with the U.S. Supreme Court's May 25, 2023, decision in the case of *Sackett v. Environmental Protection Agency* and the September 2023 Conforming Rule. Also, in this April 29, 2025 memo the term "seasonal drainage" (which was previously used in the 2023 wetland delineation report to describe streams and other waterbodies that only flowed during or shortly after rain events, i.e. ephemeral streams and non-wetland ditches) was changed to "not relatively permanent" and such features were also determined to be non-jurisdictional under current USACE practice in applying the September 2023 rule.

Table 1 below summarizes the findings of the three separate wetland studies for the Project after making consistent with the March 12, 2025, the agencies guidance to field staff on implementation of "continuous surface connection" and restricting jurisdiction to "relatively permanent waters" consistent with the U.S. Supreme Court's May 25, 2023, decision in the case of *Sackett v. Environmental Protection Agency* and the September 2023 Conforming Rule. Updated wetland delineation maps for the Project are included as an attachment. A total of 0.964 Section 404 waters are delineated in the Project area.

Table 1. Summary of Jurisdictional and Non-Jurisdictional Waters of the U.S. Delineated Within the Honoapiilani Highway Improvements Project, 2023 and 2025 Biological Study Area

Habitat Type	Area (acres)	Notes
Total Isolated Non-Jurisdictional Wetlands	***21.403***	
W1	*4.131*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be isolated non-jurisdictional in the 2024 supplemental memo.*
W2	*0.442*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W3	*0.228*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W4	*0.234*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W5	*0.910*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W 6	*0.949*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W 7	*0.811*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no*

Habitat Type	Area (acres)	Notes
		continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.
W 8	*4.792*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W 9	*0.153*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W 10	*8.575*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W 11	*0.040*	*Ukumehame wetland. Determined to be jurisdictional in the 2023 report. Found no continuous surface connection to ocean in 2024 follow up field study and determined to be non-jurisdictional in the 2024 supplemental memo.*
W 12	*0.138*	*Ukumehame wetland. Delineated in 2023, not part of 2023 wetland delineation map because outside of the project's proposed alignments. Found no continuous surface connection to ocean in 2024 follow up field study. Included in project's 2025 preferred alignment.*
Total Jurisdictional Waters	***0.964***	
Ukumehame Stream	*0.330*	*Perennial stream with connection to Pacific Ocean via culvert under the existing highway.*
Olowalu Stream	*0.260*	*Perennial stream with connection to Pacific Ocean via culvert under the existing highway.*
Ditch 9 (D9)	*0.370*	*Perennial water body. Vicinity of Ehehene Street. Continuous surface connection to Pacific Ocean via culvert under the existing highway.*
Ditch 14 (D14)	*0.004*	*Perennial water body. Vicinity of Ehehene Street. Continuation of Ditch 9 delineated during the 2025 field study. Continuous surface connection to the ocean.*
Total Not Relatively Permanent Non-Jurisdictional Waters	***2.565***	
Manawaipueo Gulch/Stream	*0.140*	*Not relatively permanent stream in Ukumehame watershed with continuous surface connection to ocean*

Habitat Type	Area (acres)	Notes
Papalaua Gulch/Stream	*1.670*	*Not relatively permanent stream in Ukumehame watershed with continuous surface connection to ocean via culvert under the existing Highway.*
Mopua Stream	*0.200*	*Not relatively permanent stream in Olowalu watershed with no continuous surface connection to ocean*
Lihau Stream	*0.160*	*Not relatively permanent stream in Olowalu with continuous surface connection to ocean*
Awalua Stream	*0.152*	*Not relatively permanent stream in Launiupoko watershed with continuous surface connection to ocean*
Awalua Stream Culvert	*0.039*	*Not relatively permanent stream culvert in Launiupoko watershed with continuous surface connection to ocean. Delineated in 2025*
Ka Puali Stream	*0.124*	*Not relatively permanent stream in Launiupoko watershed with continuous surface connection to ocean*
Ka Puali Culvert	*0.080*	*Not relatively permanent stream culvert in Launiupoko watershed with continuous surface connection to ocean. Delineated in 2025*
Total Isolated Non-Jurisdictional Other Waters	***1.283***	
Hanaula Gulch/Stream	*0.160*	*Not relatively permanent stream in Ukumehame with no continuous surface connection to ocean*
Ditch 1 (D1)	*0.041*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not have a continuous surface connection to the Pacific Ocean.*
Ditch 2 (D2)	*0.040*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not have a continuous surface connection to the Pacific Ocean.*
Ditch 3 (D3)	*0.037*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not have a continuous surface connection to the Pacific Ocean.*
Ditch 4 (D4)	*0.049*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not have a continuous surface connection to the Pacific Ocean.*
Ditch 5 (D5)	*0.018*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not*

Habitat Type	Area (acres)	Notes
		have a continuous surface connection to the Pacific Ocean.
Ditch 6 (D6)	*0.186*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not have a continuous surface connection to the Pacific Ocean.*
Ditch 7 (D7)	*0.226*	*Not relatively permanent waterbody connected to Ditch 7 in Ukumehame region which is connected to Hanaula Gulch which does not have a continuous surface connection to the Pacific Ocean.*
Ditch 8 (D8)	*0.380*	*Perennial waterbody. No continuous surface connection to the Pacific Ocean.*
Ditch 10 (D10)	*0.021*	*Not relatively permanent water body in the vicinity of Olowalu village. Possibly connected to D11 and D15 but neither have continuous surface connection to the ocean.*
Ditch 11 (D11)	*0.009*	*Not relatively permanent water body. Vicinity Olowalu village. Possibly connected to D10 and but neither have continuous surface connection to the ocean.*
Ditch 12 (D12)	*0.007*	*Perennial water body (a lava tube type hole with standing water at a depth of about 20 feet) in the vicinity of Lahania Bypass in Launiupoko. No continuous surface connection to another ditch or stream or ocean.*
Ditch 13 (D13)	*0.051*	*Not relatively permanent waterbody in Ukumehame region. Delineated in 2025 field study. Maybe connected to D6. Neither have a continuous surface connection to the Pacific Ocean.*
Ditch 15 (D15)	*0.016*	*Not relatively permanent water body. Vicinity Olowalu village. Possibly connected to D10 and D11 but neither have continuous surface connection to the ocean.*
Culvert Ehehene Street	*0.035*	*Not relatively permanent waterbody at Ehehene Street in the Ukumehame region with no continuous surface connection to ocean. Delineated in 2025*
Culvert Vicinity of Lahaina Bypass	*0.007*	*Not relatively permanent water body in the vicinity of Lahaina Bypass. Delineated in 2025.*
Total Section 404 Waters of the U.S.	**0.964**	
Total Non-Jurisdictional Waters	**25.251**	
Total Non-Jurisdictional Upland Areas	**907.115**	
Total Wetland Delineation Study Area	**933.33**	

In conclusion, H. T. Harvey & Associates' delineation of Section 404 WoUS conducted for the Project has been based upon our best professional judgement in a rapidly changing and sometimes uncertain regulatory environment. Federal jurisdiction is solely dependent on the determination and confirmation by USACE. Acceptance may require a site visit by a USACE representative to confirm the delineation data points gathered in the surveyed area. The delineations conducted for this Project are not official until the Hawaii Department of Transportation and the Federal Highways Administration receives a letter of Jurisdictional Determination from USACE.

References

[EPA] Environmental Protection Agency. 2025. Memorandum to the Field Between the U.S. Department of Army, U. S. Army Corps of Engineers and the U.S. Environmental Protection Agency Concerning the Proper Implementation of "Continuous Surface Connection" Under the Definition of "Waters of the United States" Under the Clean Water Act. March 12, 2025. <https://www.epa.gov/system/files/documents/2025-03/2025cscguidance.pdf> Accessed April 5.

H. T. Harvey & Associates. 2023. Honoapiilani Highway Improvements Project Preliminary Identification of Waters of the United States Technical Report. Prepared for WSP USA. *In* Appendix 3.9 – Water Resources, Wetlands, and Floodplains – Supplemental Information *of* Draft Environmental Impact Statement. <https://www.honoapiilanihwyimprovements.com/pdfs/deis/app_03_09.pdf>.

H. T. Harvey & Associates. 2024. Memorandum: Honoapiilani Highway Improvements Project – Field Investigations About Surface Connections of Potentially Non-Jurisdictional and Jurisdictional Wetlands to Waters of the U.S. Prepared for WSP USA. *In* Appendix 3.9 – Water Resources, Wetlands, and Floodplains – Supplemental Information *of* Draft Environmental Impact Statement. <https://www.honoapiilanihwyimprovements.com/pdfs/deis/app_03_09.pdf>.

[USDOT] U.S. Department of Transportation, [FHWA] Federal Highways, and [HDOT] Hawaii Department of Transportation. 2024. Draft Environmental Impact Statement. Honoapiilani Highway Improvements Project, West Maui: Ukumehame to Launiupoko Draft Environmental Impact Statement. <https://www.honoapiilanihwyimprovements.com/info-plus-docs/>.

Attachment

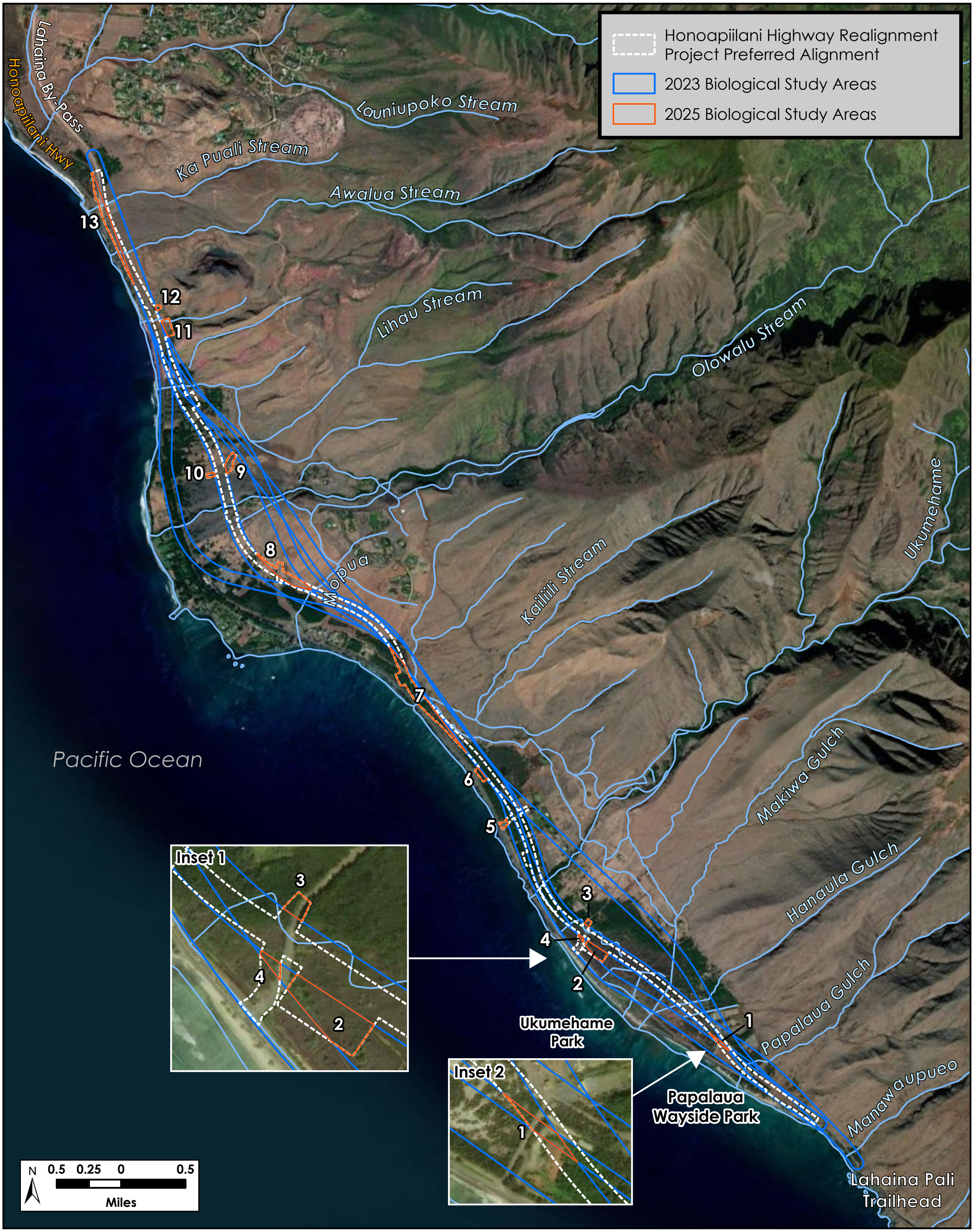
Updated Wetland Delineation Figures for 2023 and 2025 Biological Study Areas

Attachment—Updated Wetland Delineation Figures for 2023 and 2025 Biological Study Areas

N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2025.aprx

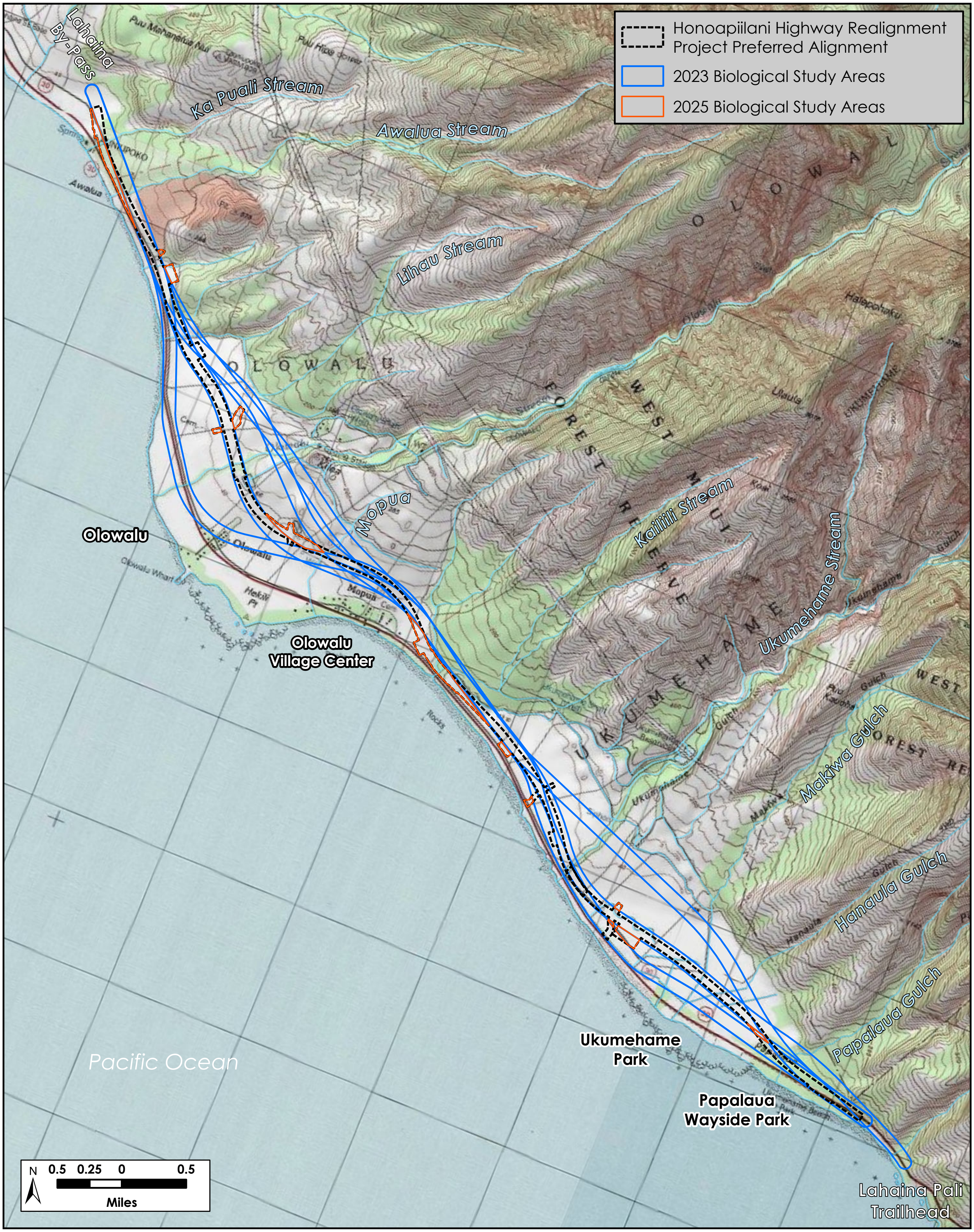
H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Project Vicinity
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 2. Wetland Delineation Study Area
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2025.aprx

H. T. HARVEY & ASSOCIATES

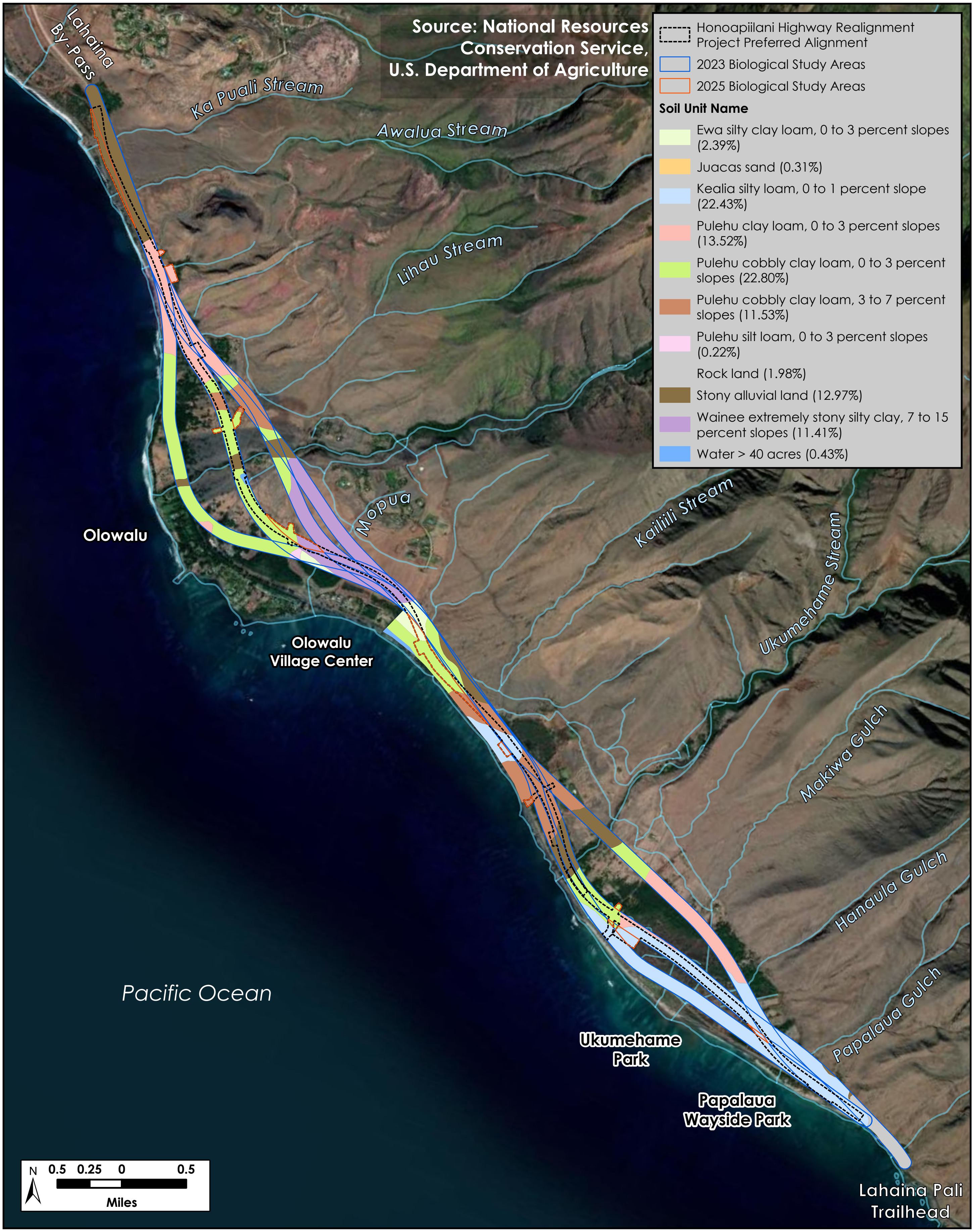
Ecological Consultants

Figure 3. USGS Topographic Map

Honoapiilani Highway Improvement Project

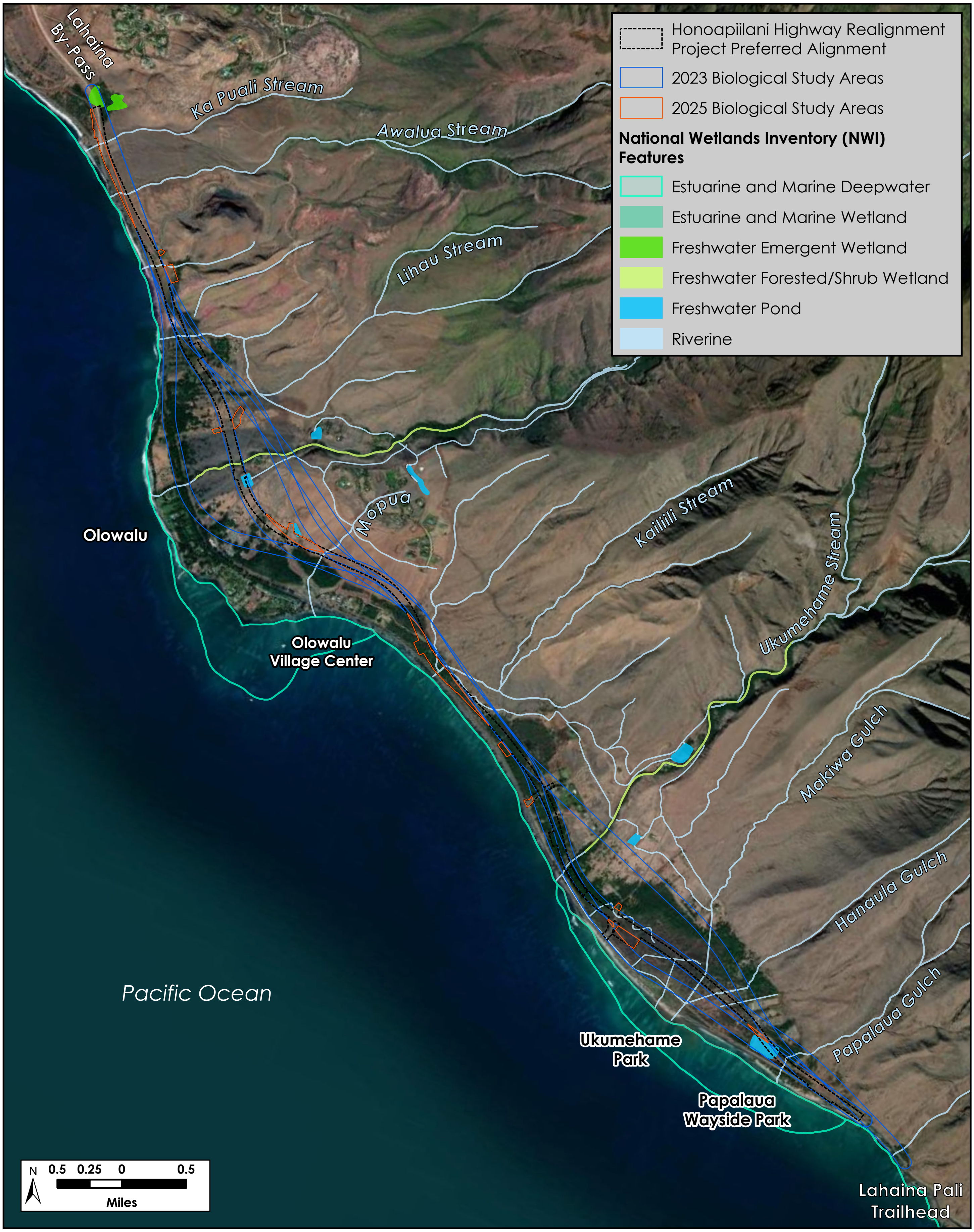
Preliminary Delineation of Wetlands and Other Waters (4692-02)

April 2025



H. T. HARVEY & ASSOCIATES
Ecological Consultants

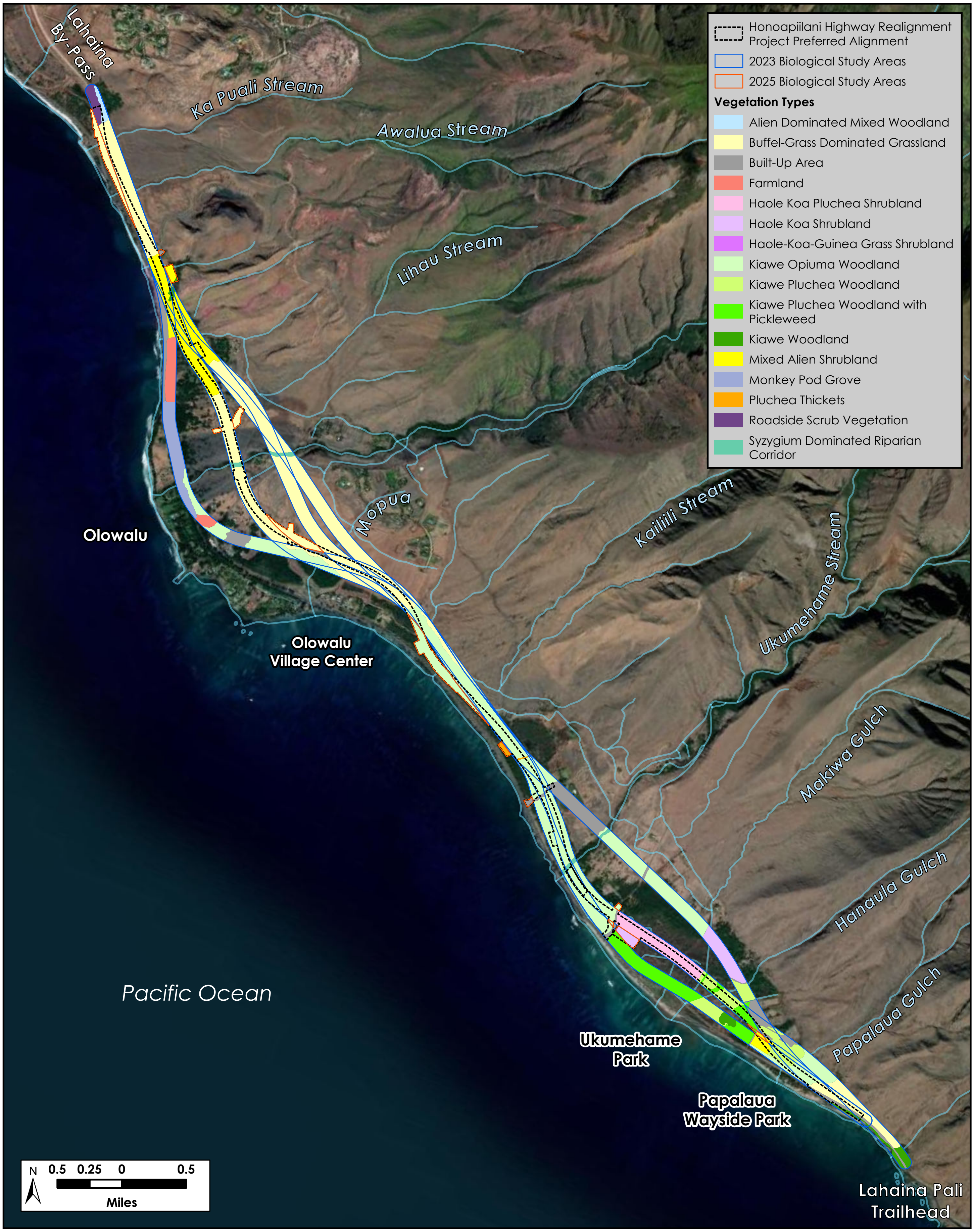
Figure 4. Soils Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 5. National Wetland Inventory Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025



N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2025.aprx

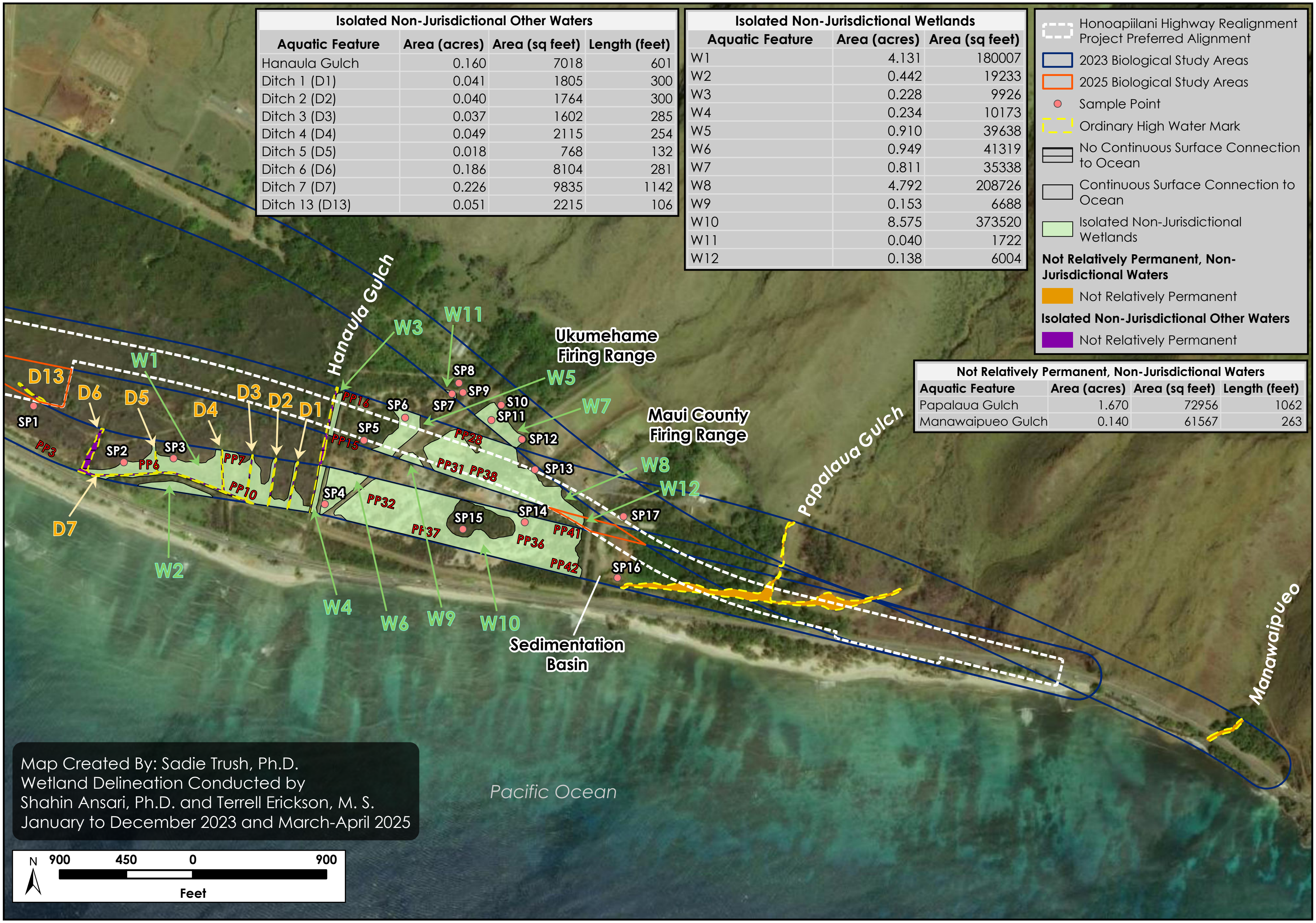
H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 6. Habitat/Vegetation Map
Honoapiilani Highway Improvement Project
Preliminary Delineation of Wetlands and Other Waters (4692-02)
April 2025

Isolated Non-Jurisdictional Other Waters			
Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Hanaula Gulch	0.160	7018	601
Ditch 1 (D1)	0.041	1805	300
Ditch 2 (D2)	0.040	1764	300
Ditch 3 (D3)	0.037	1602	285
Ditch 4 (D4)	0.049	2115	254
Ditch 5 (D5)	0.018	768	132
Ditch 6 (D6)	0.186	8104	281
Ditch 7 (D7)	0.226	9835	1142
Ditch 13 (D13)	0.051	2215	106

Isolated Non-Jurisdictional Wetlands		
Aquatic Feature	Area (acres)	Area (sq feet)
W1	4.131	180007
W2	0.442	19233
W3	0.228	9926
W4	0.234	10173
W5	0.910	39638
W6	0.949	41319
W7	0.811	35338
W8	4.792	208726
W9	0.153	6688
W10	8.575	373520
W11	0.040	1722
W12	0.138	6004

Not Relatively Permanent, Non-Jurisdictional Waters			
Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Papalaua Gulch	1.670	72956	1062
Manawaipueo Gulch	0.140	61567	263



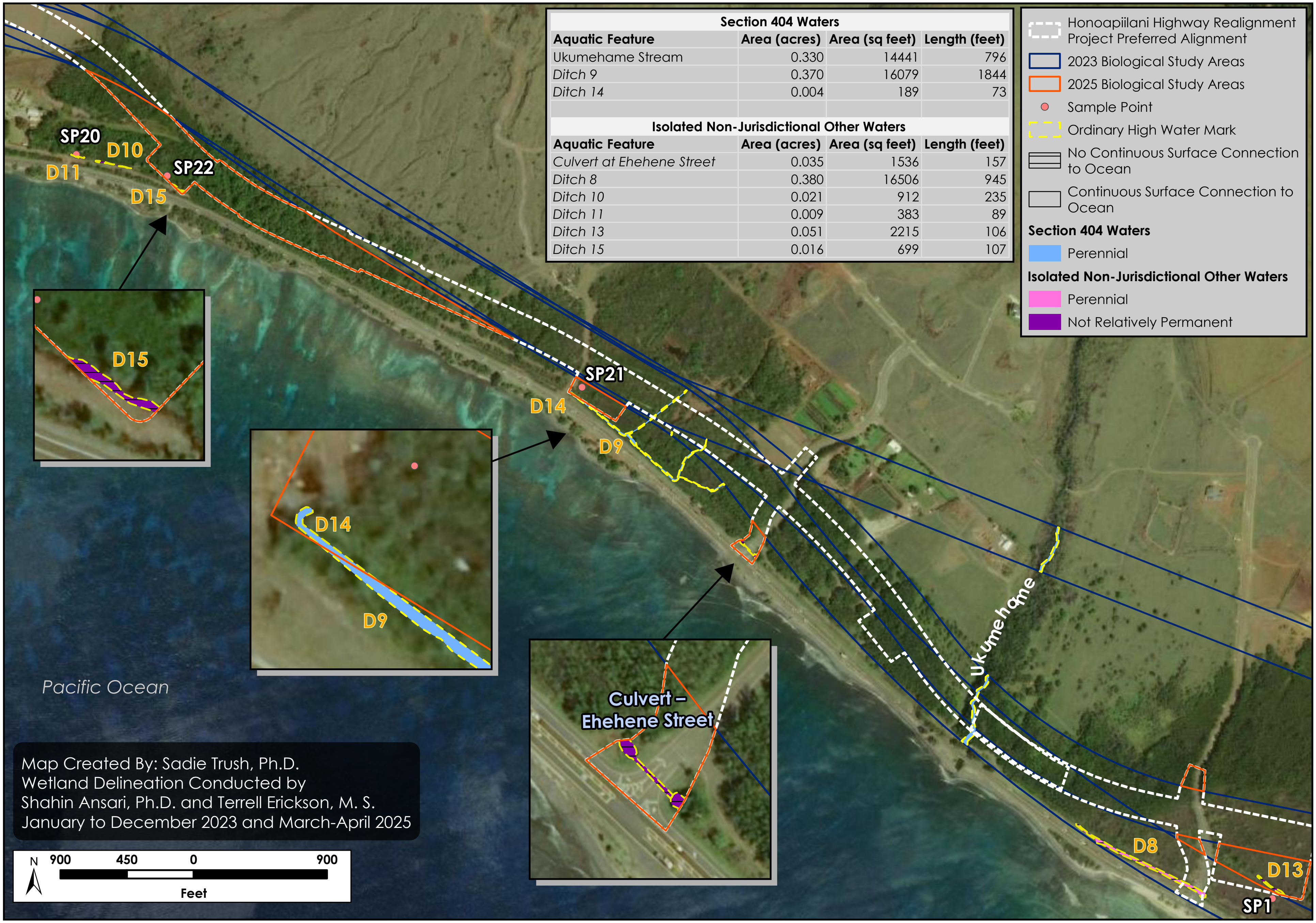
N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 7. Preliminary Identification of Waters of the U.S. in the Papalaua and Ukumehame Portions of the 2023 and 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

April 2025



Section 404 Waters

Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Ukumehame Stream	0.330	14441	796
Ditch 9	0.370	16079	1844
Ditch 14	0.004	189	73

Isolated Non-Jurisdictional Other Waters

Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Culvert at Ehehene Street	0.035	1536	157
Ditch 8	0.380	16506	945
Ditch 10	0.021	912	235
Ditch 11	0.009	383	89
Ditch 13	0.051	2215	106
Ditch 15	0.016	699	107

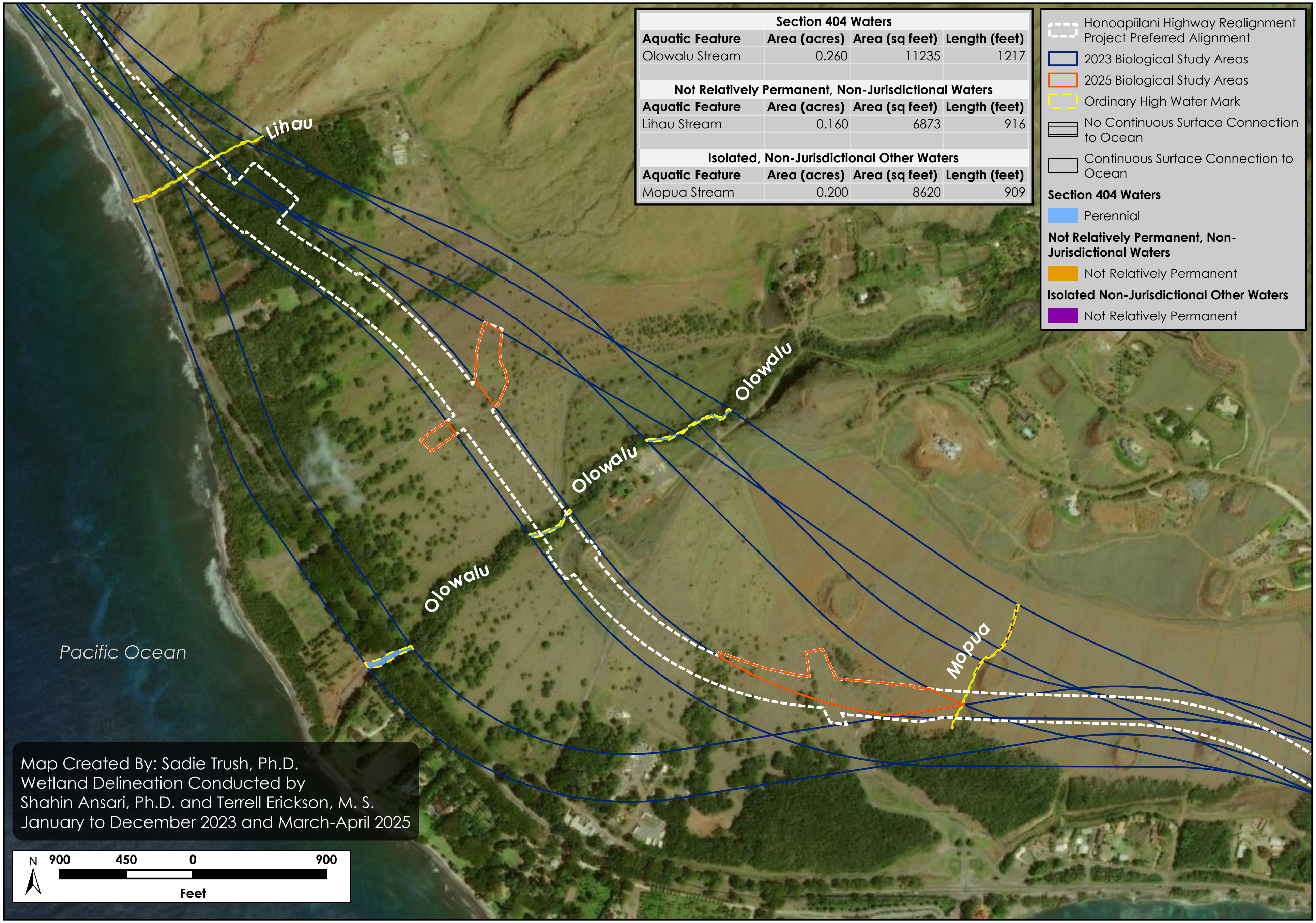
N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2023 & 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 8. Preliminary Identification of Waters of the U.S. in the Ukumehame Portions of the 2023 and 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

May 2025



Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Section 404 Waters			
Olowalu Stream	0.260	11235	1217
Not Relatively Permanent, Non-Jurisdictional Waters			
Lihau Stream	0.160	6873	916
Isolated, Non-Jurisdictional Other Waters			
Mopua Stream	0.200	8620	909

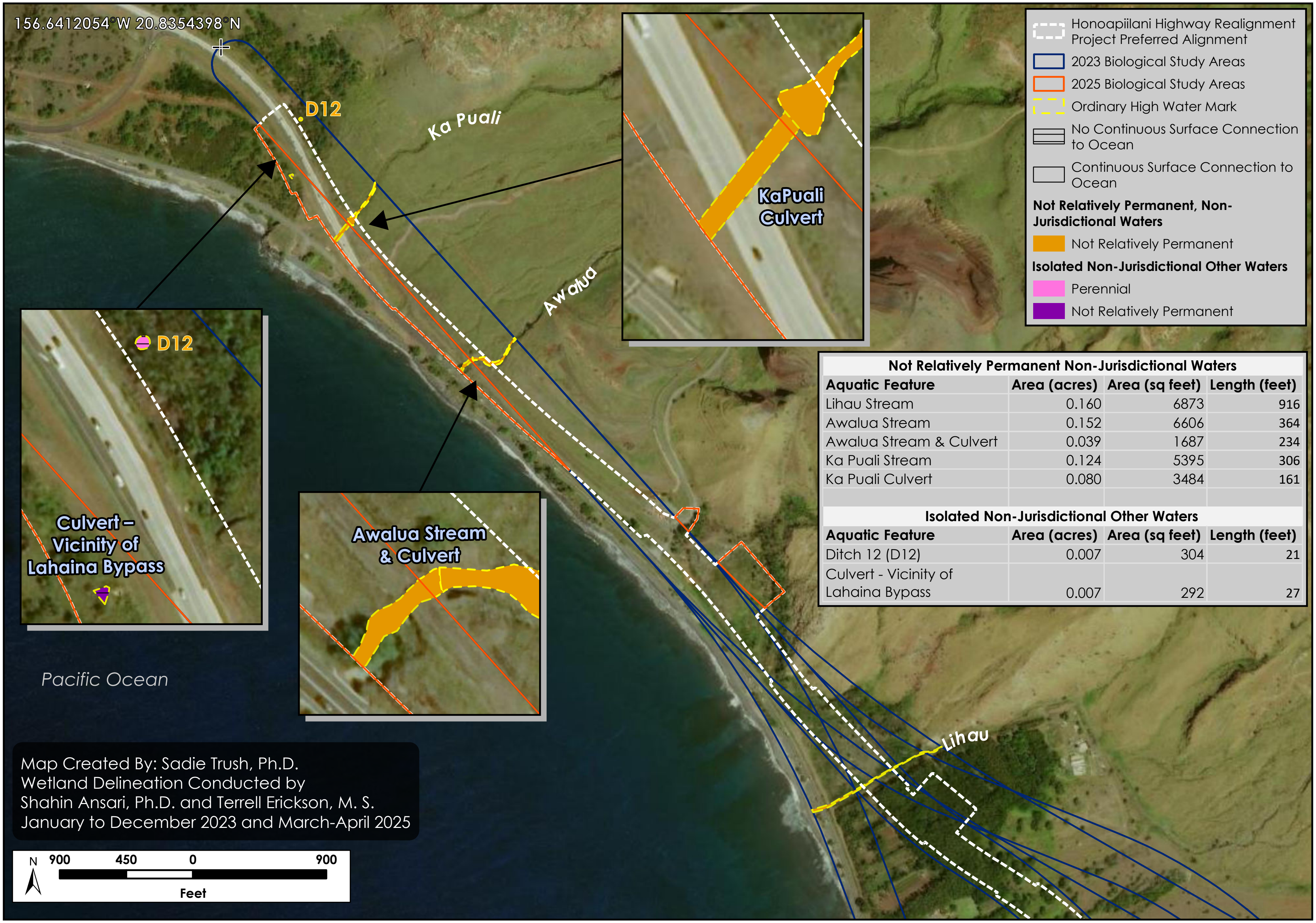
N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2023 & 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 9. Preliminary Identification of Waters of the U.S. in the Olowalu and Launiupoko Portions of the 2023 and 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

April 2025



Not Relatively Permanent Non-Jurisdictional Waters			
Aquatic Feature	**Area (acres)**	**Area (sq feet)**	**Length (feet)**
Lihau Stream	0.160	6873	916
Awalua Stream	0.152	6606	364
Awalua Stream & Culvert	0.039	1687	234
Ka Puali Stream	0.124	5395	306
Ka Puali Culvert	0.080	3484	161

Isolated Non-Jurisdictional Other Waters			
Aquatic Feature	**Area (acres)**	**Area (sq feet)**	**Length (feet)**
Ditch 12 (D12)	0.007	304	21
Culvert - Vicinity of Lahaina Bypass	0.007	292	27

N:\Projects4600\4692-01\Reports\Wetland Delin\Wetland Delin 2023 & 2025.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 10. Preliminary Identification of Waters of the U.S. in the Olowalu and Launiupoko Portions of the 2023 and 2025 Biological Study Area

Honoapiilani Highway Improvement Project Preliminary Delineation of Wetlands and Other Waters (4692-02)

April 2025

Agency Correspondence

REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: Honolulu District

- I am requesting a JD on property located at: Honoapiilani Highway
  (Street Address)
  TMK: see attached County: Maui State: Hawaii
  Acreage of Parcel/Review Area for JD: 4300 acres
  Section: -- Township: -- Range: --
  Latitude (decimal degrees): 20.808573 Longitude (decimal degrees): -156.601503
  (For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- ☐ I currently own this property. ___ I plan to purchase this property.
  ☐ I am an agent/consultant acting on behalf of the requestor.
  ☑ Other (please explain): ownership varies; parcels will be aquired by the State of Hawaii Department of Transportation.
- Reason for request: (check as many as applicable)
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
  ☑ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
  ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
  ☐ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
  ☐ A Corps JD is required in order to obtain my local/state authorization.
  ☐ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
  ☐ I believe that the site may be comprised entirely of dry land.
  ☐ Other: ______________________
- Type of determination being requested:
  ☑ I am requesting an approved JD.
  ☐ I am requesting a preliminary JD.
  ☐ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
  ☐ I am unclear as to which JD I would like to request and require additional information to inform my decision.

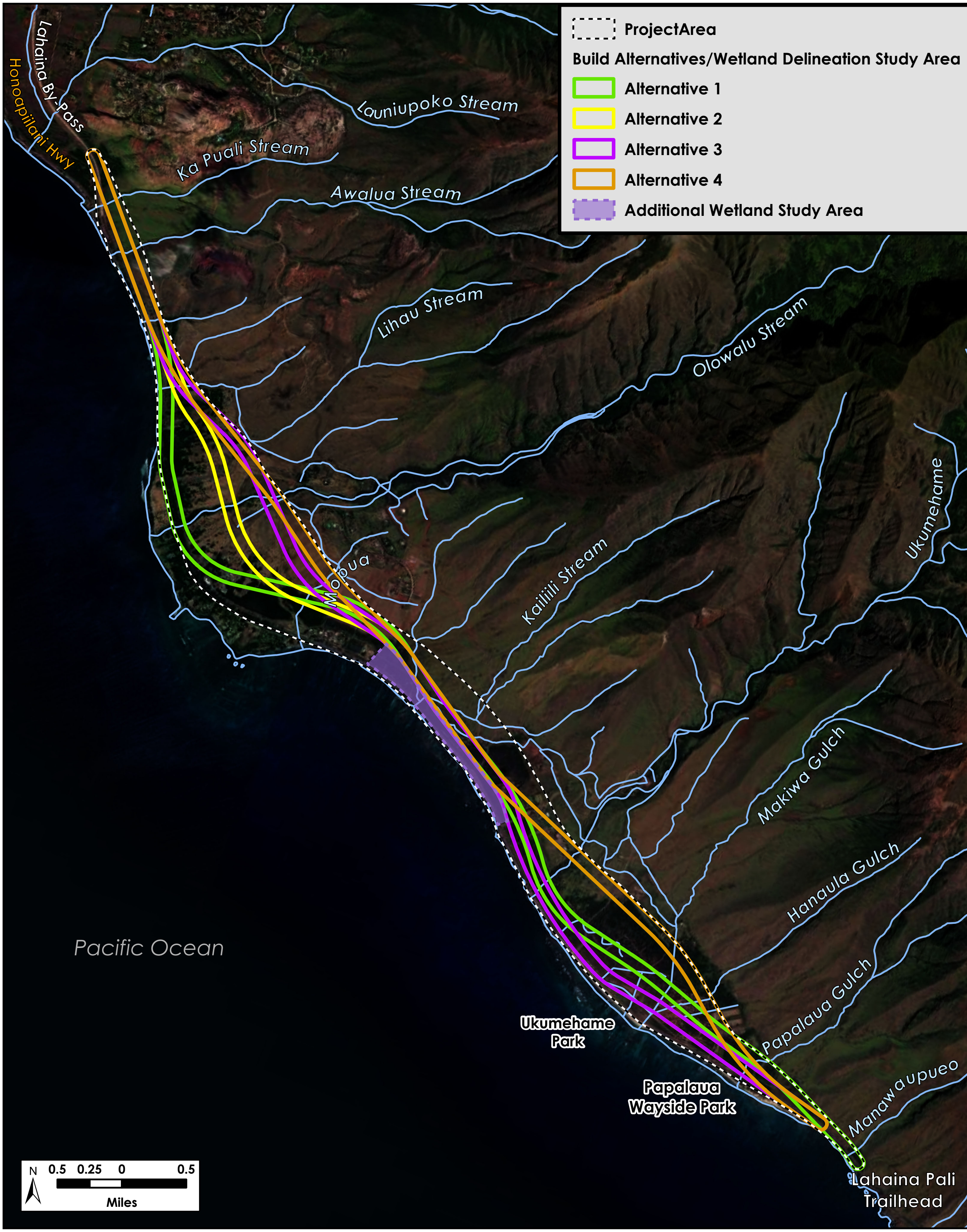
By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: ______________________ Date: ______________

- Typed or printed name: ______________________
  Company name: ______________________
  Address: ______________________
  ____
  Daytime phone no.: ______________________
  Email address: ______________________

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

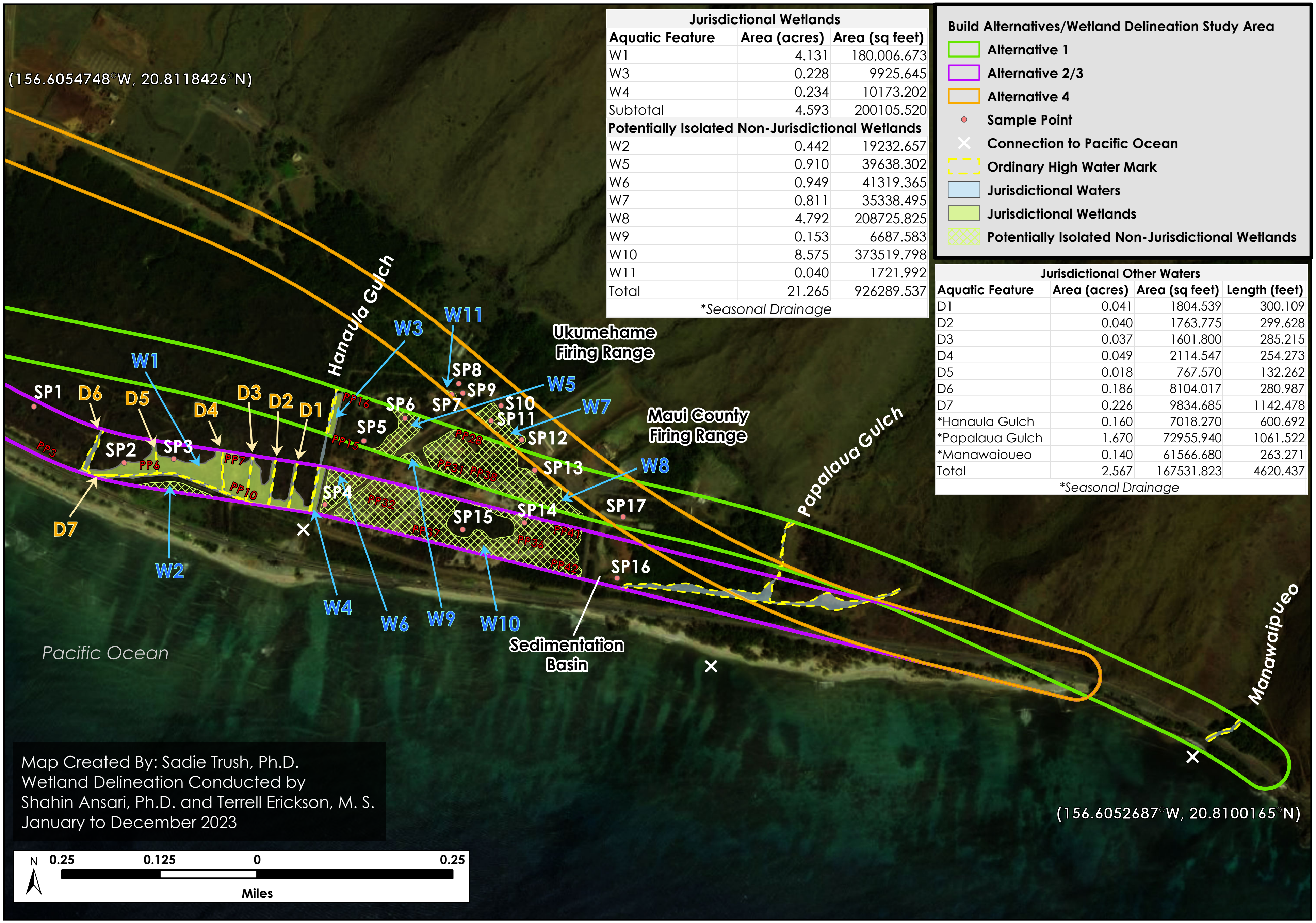
Honolulu District Office
U.S. Army Corps of Engineers
Regulatory Office, Building 230
Ft. Shafter, Hawaii 96858-5440
Phone: 808-835-4303
Fax: 808-835-4126
Email: CEPOH-RO@usace.army.mil



N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 2. Wetland Delineation Study Area
Honoapiilani Highway (4692)
September 2023



Jurisdictional Wetlands		
Aquatic Feature	Area (acres)	Area (sq feet)
W1	4.131	180,006.673
W3	0.228	9925.645
W4	0.234	10173.202
Subtotal	4.593	200105.520
Potentially Isolated Non-Jurisdictional Wetlands		
W2	0.442	19232.657
W5	0.910	39638.302
W6	0.949	41319.365
W7	0.811	35338.495
W8	4.792	208725.825
W9	0.153	6687.583
W10	8.575	373519.798
W11	0.040	1721.992
Total	21.265	926289.537

*Seasonal Drainage

Jurisdictional Other Waters			
Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
D1	0.041	1804.539	300.109
D2	0.040	1763.775	299.628
D3	0.037	1601.800	285.215
D4	0.049	2114.547	254.273
D5	0.018	767.570	132.262
D6	0.186	8104.017	280.987
D7	0.226	9834.685	1142.478
*Hanaula Gulch	0.160	7018.270	600.692
*Papalaua Gulch	1.670	72955.940	1061.522
*Manawaioueo	0.140	61566.680	263.271
Total	2.567	167531.823	4620.437

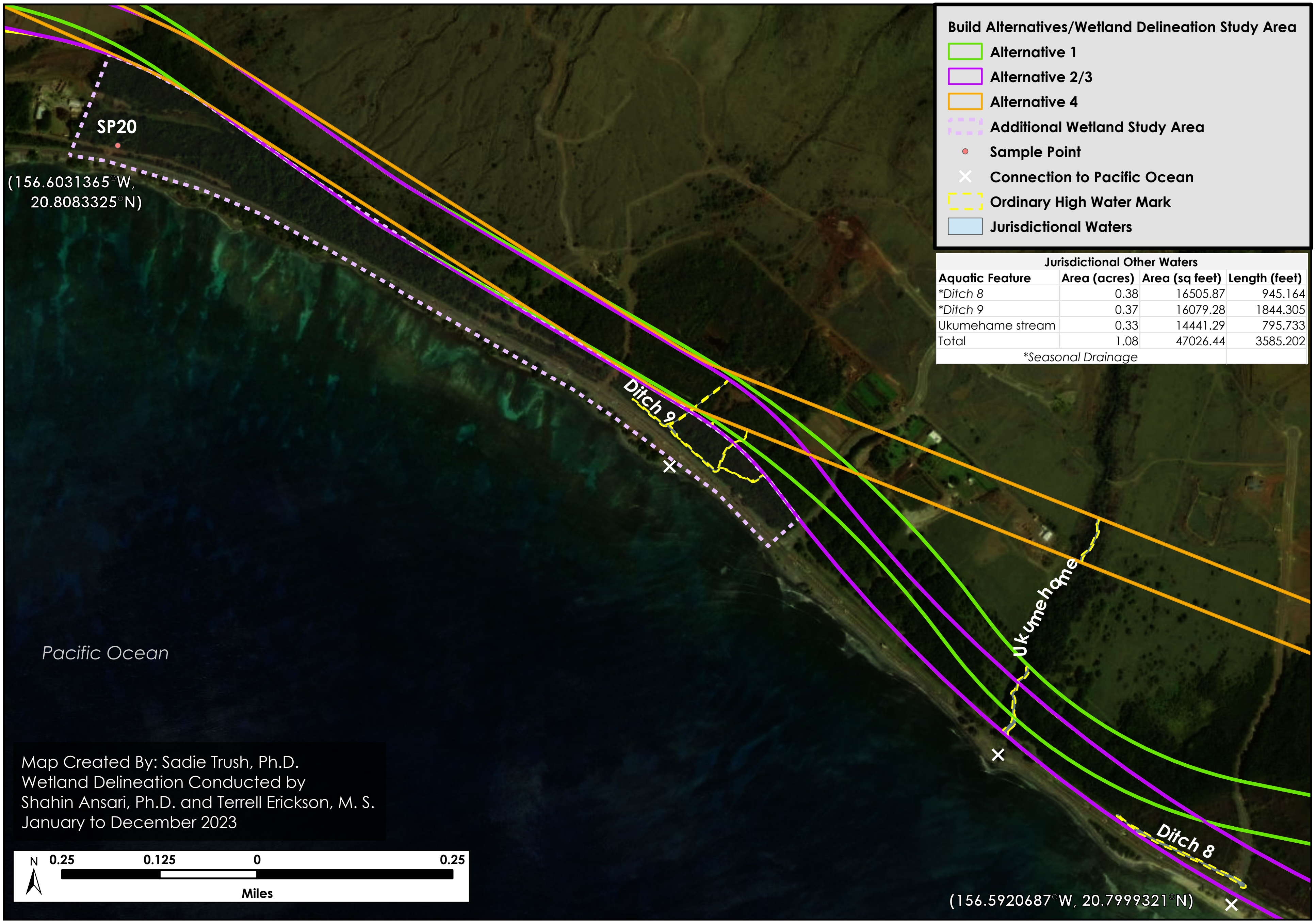
*Seasonal Drainage

N:\Projects4600\4692-01\Shp_100223\Figs7_to_9.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Preliminary Identification of Jurisdictional Wetlands, Potentially Isolated Non-Jurisdictional Wetlands, and Jurisdictional Other Waters in the Papalaua and Ukumehame Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



Jurisdictional Other Waters

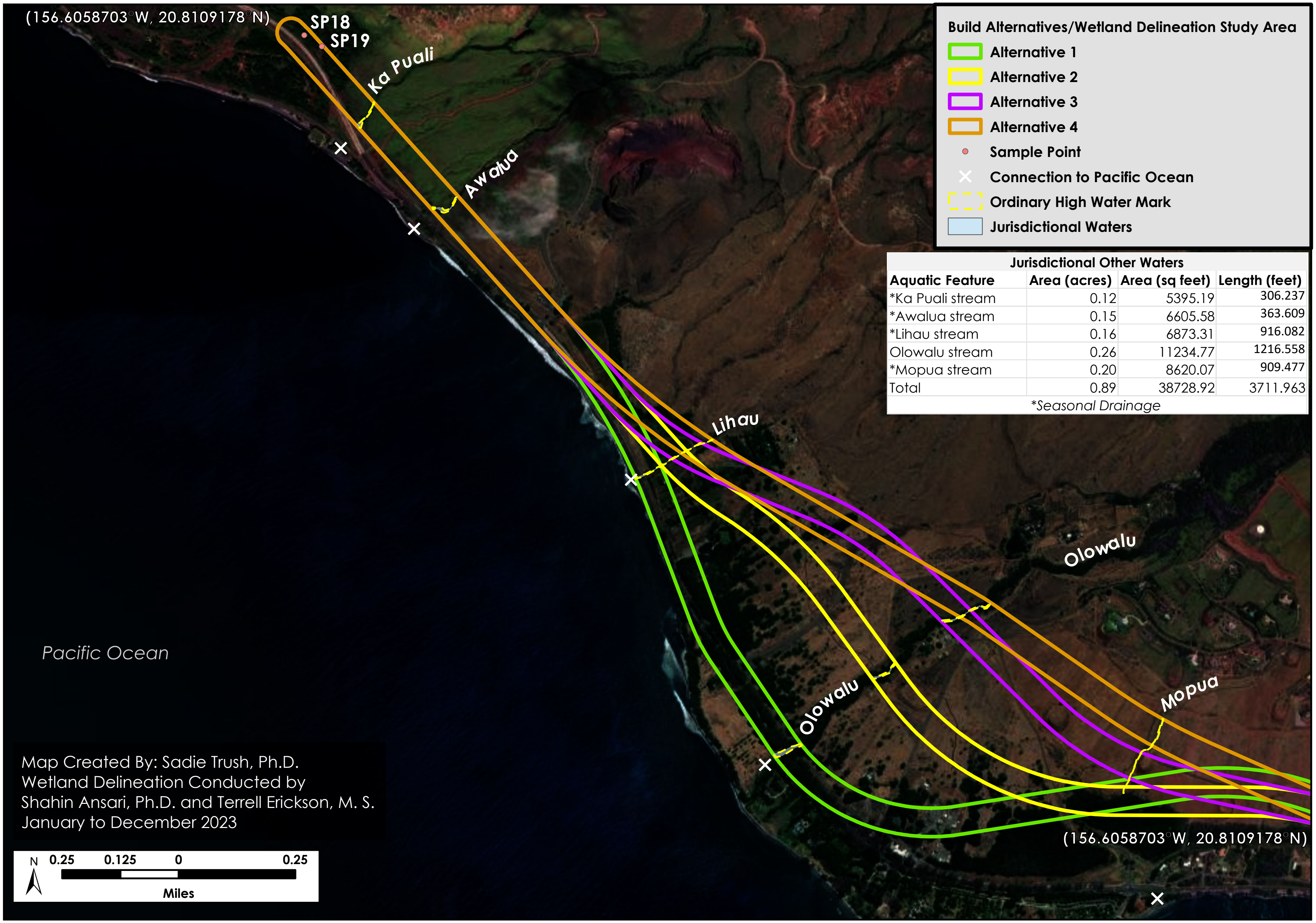
Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Ditch 8	0.38	16505.87	945.164
Ditch 9	0.37	16079.28	1844.305
Ukumehame stream	0.33	14441.29	795.733
Total	1.08	47026.44	3585.202

**Seasonal Drainage*

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 2. Preliminary Identification of Jurisdictional Wetlands, Potentially Isolated Non-Jurisdictional Wetlands, and Jurisdictional Other Waters in the Papalaua and Ukumehame Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



Jurisdictional Other Waters

Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
*Ka Puali stream	0.12	5395.19	306.237
*Awalua stream	0.15	6605.58	363.609
*Lihau stream	0.16	6873.31	916.082
Olowalu stream	0.26	11234.77	1216.558
*Mopua stream	0.20	8620.07	909.477
Total	0.89	38728.92	3711.963

*Seasonal Drainage

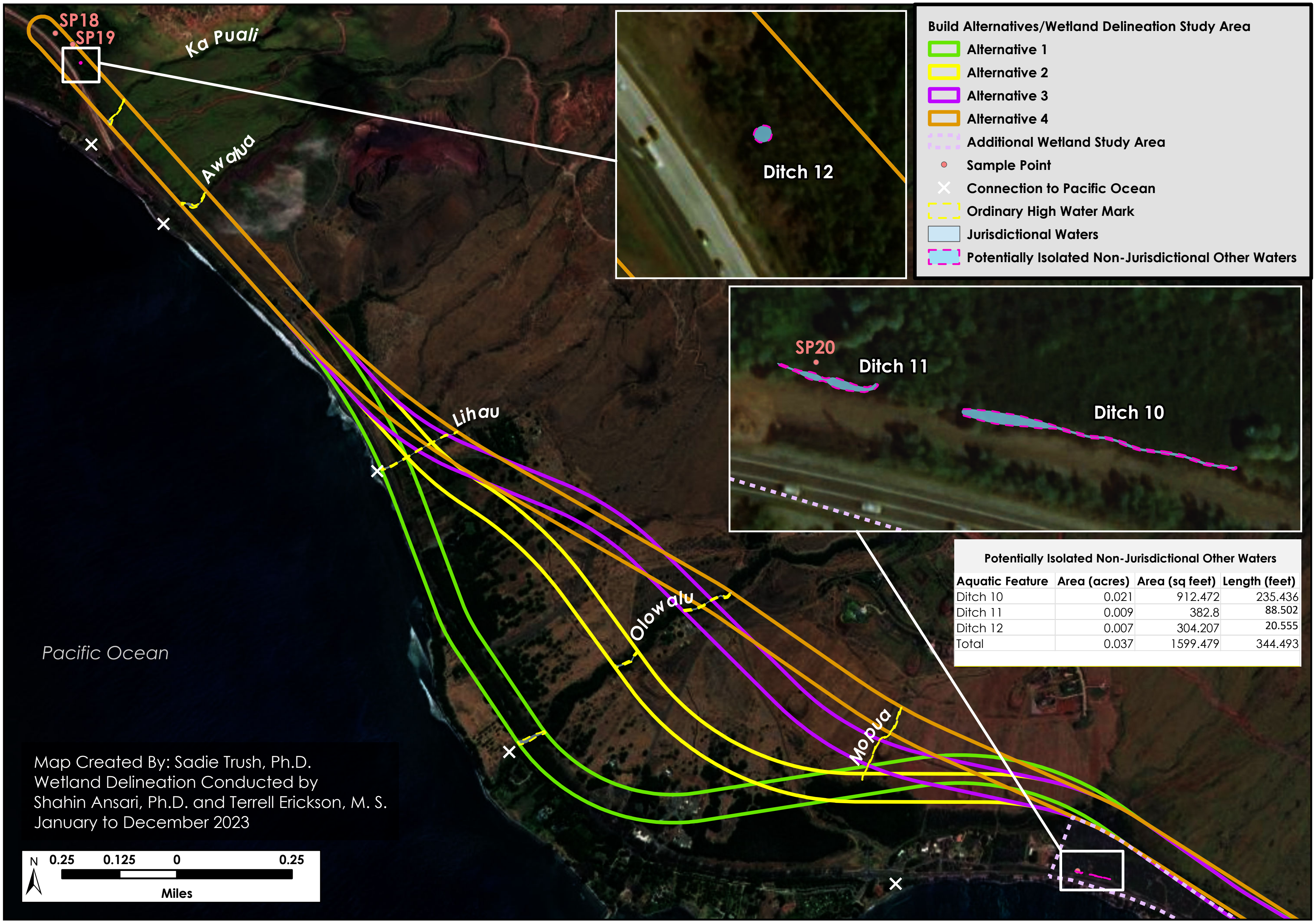
N:\Projects4600\4692-01\Shp_100223\Figs7_to_9.aprx

H. T. HARVEY & ASSOCIATES

Ecological Consultants

Figure 3. Preliminary Identification of Jurisdictional Other Waters in the Olowalu and and Launiupoko Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



Potentially Isolated Non-Jurisdictional Other Waters

Aquatic Feature	Area (acres)	Area (sq feet)	Length (feet)
Ditch 10	0.021	912.472	235.436
Ditch 11	0.009	382.8	88.502
Ditch 12	0.007	304.207	20.555
Total	0.037	1599.479	344.493

N:\Projects4600\4692-01\Shp_100223\Figs7_to_9.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 4. Preliminary Identification of Jurisdictional and Potentially Isolated Non-Jurisdictional Other Waters in the Olowalu and Launiupoko Areas of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023

Alternative 1 Land Acquisitions	Alternative 2 Land Acquisitions	Alternative 3 Land Acquisitions	Alternative 4 Land Acquisitions	Tax Map Key	OwnerCat
X	X	X	X	47001030	Govt. County
X	X	X	X	48001001	Govt. State
X	X	X	X	48001003	Govt. State
X	X	X	X	48002002	Govt. State
X	X	X	X	48002008	Govt. State
	X	X	X	48002041	Govt. County
X	X	X	X	48002042	Govt. State
X	X	X	X	48002045	Govt. State
X	X	X	X	48002046	Govt. County
X	X	X	X	48002047	Govt. State
			X	48002049	Govt. County
X	X	X		48002057	Govt. County
X	X	X		48002058	Govt. County
X	X	X	X	48002059	Govt. County
X	X	X		48002068	Govt. County
	X	X		48002069	Govt. County
X	X	X	X	48002070	Govt. County
X	X	X		48002071	Govt. County
			X	48002075	Private
			X	48002090	Private
			X	48002091	Private
			X	48002092	Private
			X	48002094	Private
			X	48002095	Private
			X	48002096	Private
			X	48002098	Private
			X	48002107	Private
			X	48002108	Private
			X	48002109	Private
			X	48002110	Private
			X	48002111	Private
			X	48002112	Private
			X	48002113	Private
X				48002114	Private
X				48002115	Private
			X	48002116	Private
			X	48002117	Private
			X	48002118	Private
			X	48002120	Private
X			X	48002121	Private
	X	X		48002125	Private
X	X	X	X	48003008	Govt. State
X				48003034	Govt. State
X	X	X	X	48003039	Govt. State
X			X	48003098	Private
X			X	48003099	Private
X	X	X	X	48003100	Private
X	X	X	X	48003101	Private
X	X			48003102	Private
X	X			48003103	Private
X	X			48003104	Private
X	X	X		48003105	Private

		X	X	48003106	Private
		X	X	48003107	Private
	X	X	X	48003108	Private
		X	X	48003109	Private
		X	X	48003110	Private
	X	X	X	48003111	Private
X	X			48003112	Private
X	X			48003113	Private
X	X	X	X	48003114	Private
X	X	X	X	48003115	Private
X	X	X	X	48003116	Private
		X	X	48003117	Private
X	X	X	X	48003118	Private
X	X	X	X	48003125	Private

Agency	Acres
DPR	114.95
DLNR	1865.31
DLNR	37.39
DLNR	188.77
DLNR	383.81
DPR	6.71
DLNR	31.91
DOT	11.88
DPR	44.86
Army National Guard	39.28
DPR	0.47
DPR	9.15
DPR	0.52
DPR	4.41
DPR	18.01
DPR	1.04
DPR	36.57
DPR	29.76
	7.14
	3.89
	7.99
	12.28
	5.36
	5.41
	3.56
	7.24
	7.41
	13.28
	6.36
	5.00
	5.00
	5.00
	6.60
	11.00
	12.76
	7.34
	11.73
	55.40
	3.16
	5.16
	0.46
DLNR	609.91
DLNR	0.53
DLNR	65.38
	15.03
	15.57
	27.10
	29.37
	16.89
	27.80
	50.28
	40.73

	16.69
	41.14
	82.82
	16.17
	17.22
	16.58
	24.61
	25.21
	28.83
	26.20
	16.04
	15.59
	42.72
	2.27
	4304.02562

* Spreadsheet shows which TMKs are crossed by the 140ft ROW associated with each alternative.

Executive Summary

During 23 visits from January-September 2023, H. T. Harvey & Associates wetland ecologists performed a delineation of wetlands and other waters in support of the Honoapiilani Highway Improvement Project located in West Maui. The Project Area overlaps three watersheds in West Maui: Ukumehame, Olowalu, and Launiupoko. Approximately 902 acres within the Project's study area, which was defined to encompass the project's temporary and permanent impact areas, were surveyed for jurisdictional waters (wetlands and other waters) that may be subject to regulation under Section 404 of the Clean Water Act administered by the U.S. Army Corps of Engineers. This area (902 acres) included a 300 feet swath centered around each of the four proposed Build Alternatives and an additional 37 acres outside of these Build Alternatives. Because the study spanned from January to September, it allowed for observations and consideration of both wet and dry seasons when sampling. The results are based on the observation of conditions present across these multiple surveys. In total, 9.130 acres of jurisdictional wetlands and other waters were mapped in the wetland delineation study area. When estimated separately for each Build Alternative this includes: 0.228 and 1.337 acres of jurisdictional wetlands and other waters respectively in Build Alternative 1; 4.365 and 2.255 acres of jurisdictional wetlands and other waters respectively in Build Alternative 2; 4.365 and 2.280 acres of jurisdictional wetlands and other waters in Build Alternative 3; and zero jurisdictional wetlands and 1.777 acres of jurisdictional other waters in Build Alternative 4. Additionally, 16.709 acres of potentially isolated non-jurisdictional wetlands and other waters were identified within the study area If determined to be waters of the U.S., these features would be regulated under Section 401 of the Clean Water Act.

Habitat Type	Area (acres)	Notes
Total Jurisdictional Wetlands	***4.593***	
Wetland 1	*4.131*	*Surface connection to the Pacific Ocean via Ditch 7 and the Hanaula Gulch culvert under the existing highway*
Wetland 3	*0.228*	*Surface connected to the Pacific Ocean via the Hanaula Gulch*
Wetland 4	*0.234*	*Surface connected to the Pacific Ocean via the Hanaula Gulch*
Total Potentially Isolated Non-Jurisdictional Wetlands	***16.672***	
Wetland 2	*0.442*	*No surface connection to the ocean*
Wetland 5	*0.910*	*Wetlands 5 and 6 are connected in the area in between the Build Alternatives. Wetland 6 is separated from Wetland 4 via a built-up dirt road and fence. No surface connection to the ocean*
Wetland 6	*0.949*	*Wetlands 5 and 6 are connected in the area in between the Build Alternatives. Wetland 6 is separated from Wetland 4 via a built-up dirt road and fence. No surface connection to the ocean*

Habitat Type	Area (acres)	Notes
Wetland 7	*0.811*	*No surface connection to ocean*
Wetland 8	*4.792*	*No surface connection to ocean*
Wetland 9	*0.153*	*No surface connection to ocean*
Wetland 10	*8.575*	*No surface connection to ocean*
Wetland 11	*0.040*	*No surface connection to ocean*
Total Jurisdictional Other Waters	***4.537***	
Manawaipueo Gulch	*0.140*	*Connection to Pacific Ocean via culvert under the existing highway*
Papalaua Gulch	*1.670*	*Connection to Pacific Ocean via culvert under the existing highway*
Hanaula Gulch	*0.160*	*Connection to Pacific Ocean via culvert under the existing highway*
Ditch 1	*0.041*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 2	*0.040*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 3	*0.037*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 4	*0.049*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 5	*0.018*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 6	*0.186*	*Connection to Ditch 7 which is connected to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 7	*0.226*	*Connection to the Pacific Ocean via Hanaula Gulch culvert under the existing highway*
Ditch 8	*0.380*	*Vicinity of Pohaku Aeko Street. Connection to Pacific Ocean via culvert under the existing highway*
Ukumehame Stream	*0.330*	*Connection to Pacific Ocean via culvert under the existing highway*
Ditch 9	*0.370*	*Vicinity of Ehehene Street. Connection to Pacific Ocean via culvert under the existing highway*
Mopua Stream	*0.200*	*Connection to Pacific Ocean via culvert under the existing highway*
Olowalu Stream	*0.260*	*Connection to Pacific Ocean via culvert under the existing highway*
Lihau Stream	*0.160*	*Connection to Pacific Ocean via culvert under the existing highway*
Awalua Stream	*0.150*	*Connection to Pacific Ocean via culvert under the existing highway*
Ka Puali Stream	*0.120*	*Connection to Pacific Ocean via culvert under the existing highway*

Habitat Type	Area (acres)	Notes
Total Potentially Isolated Non-Jurisdictional Other Waters	**0.037**	
Ditch 10	*0.007*	*No surface connection to another ditch or stream or ocean.*
Ditch 11	*0.009*	*No surface connection to another ditch or stream or ocean.*
Ditch 12	*0.021*	*No surface connection to another ditch or stream or ocean.*
Total Potential Waters of the U.S.	**9.130**	
Total Potentially Isolated Non-Jurisdictional Waters of the U.S.	**16.709**	
Total Non-Jurisdictional Upland Areas	**876.161**	
Wetland Delineation Study Area Total	**902.000**	

N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

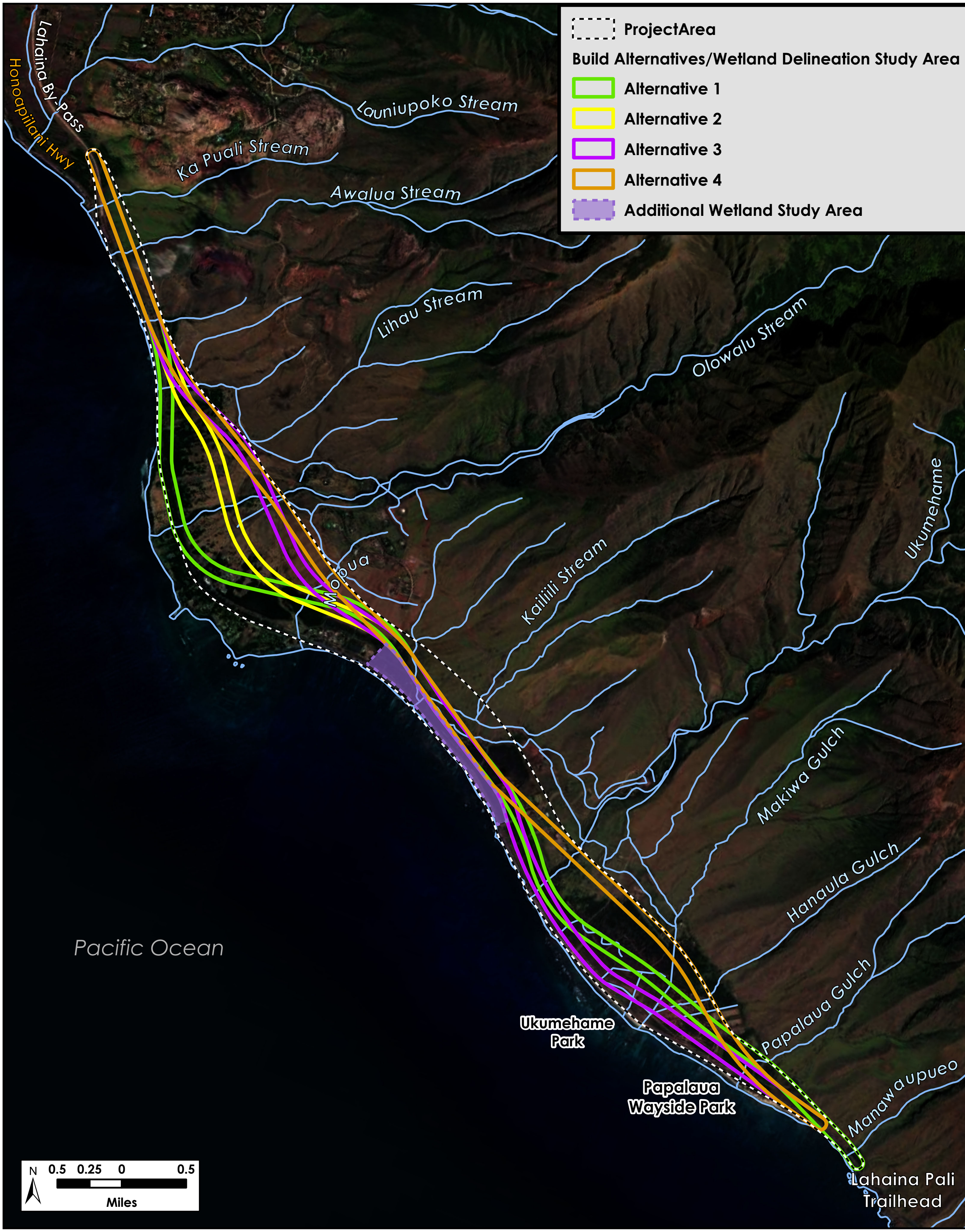
H. T. HARVEY & ASSOCIATES

Ecological Consultants

Figure 1. Project Vicinity

Honoapiilani Highway (4692)

September 2023



N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

H. T. HARVEY & ASSOCIATES

Ecological Consultants

Figure 2. Wetland Delineation Study Area

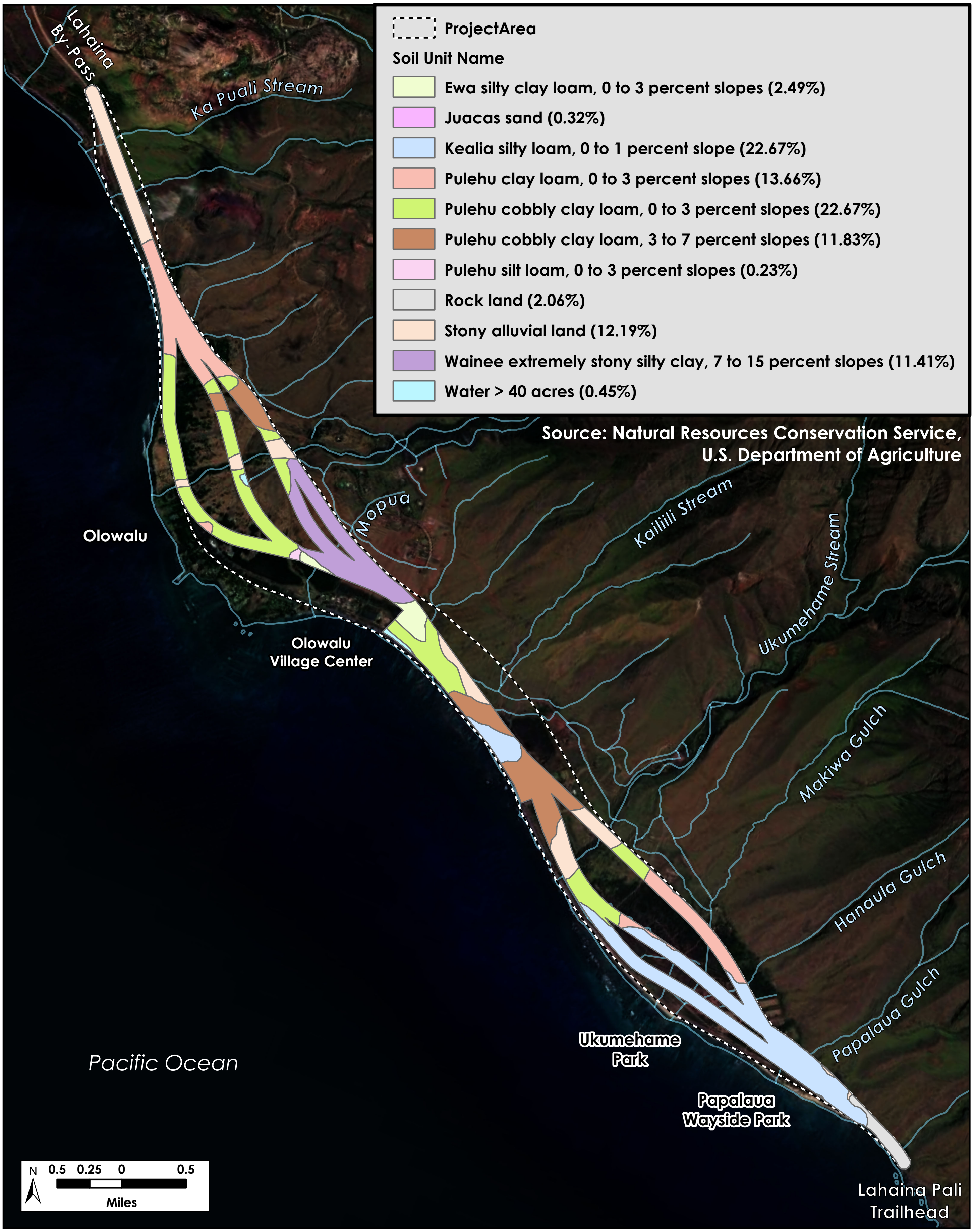
Honoapiilani Highway (4692)

September 2023

N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

Figure 3. Topographic Map
Honoapiilani Highway (4692)
September 2023

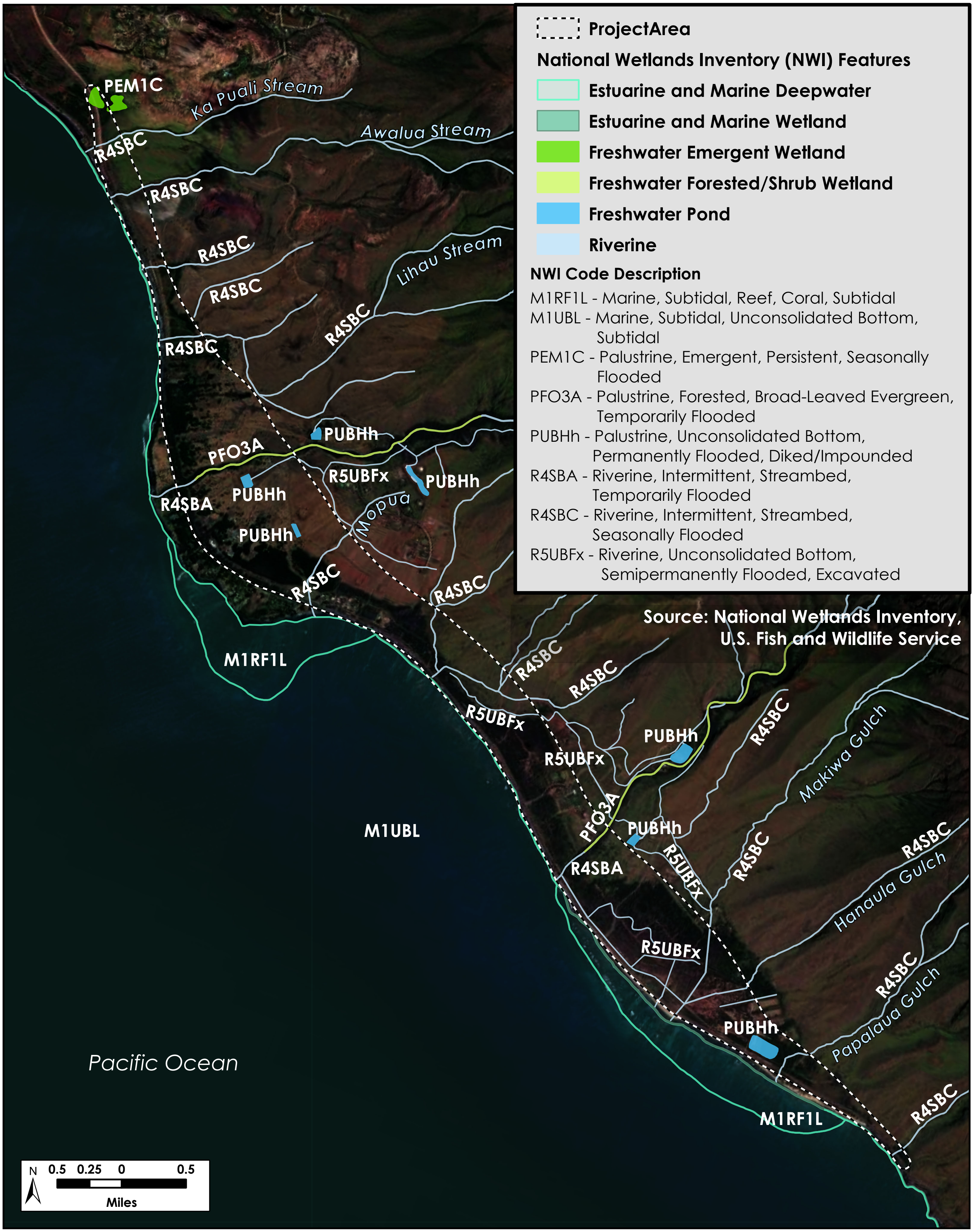
H. T. HARVEY & ASSOCIATES
Ecological Consultants



N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

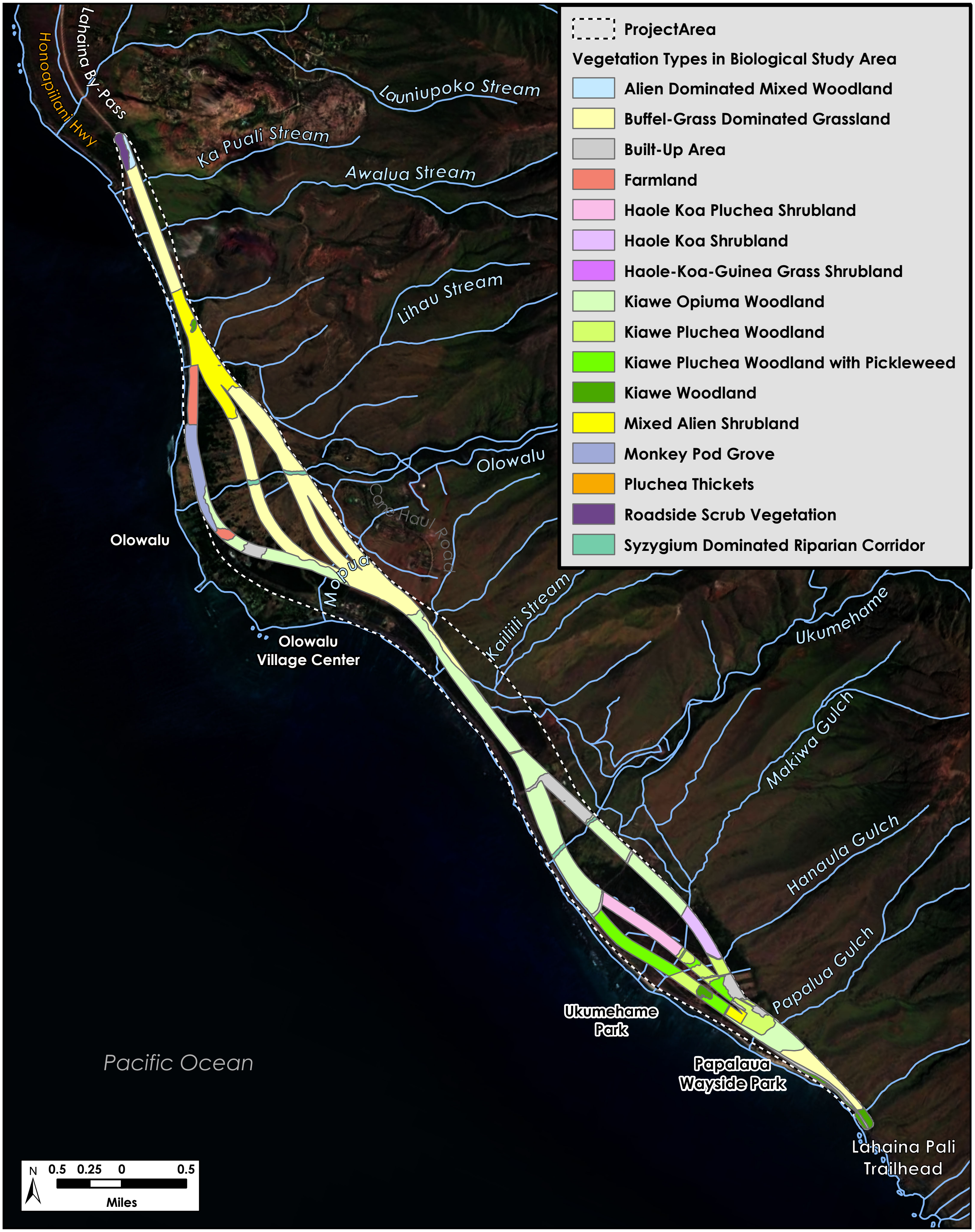
Figure 4. Soils Map
Honoapiilani Highway (4692)
September 2023



N:\Projects4600\4692-01\Shp_100223\Figs1_to_6.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

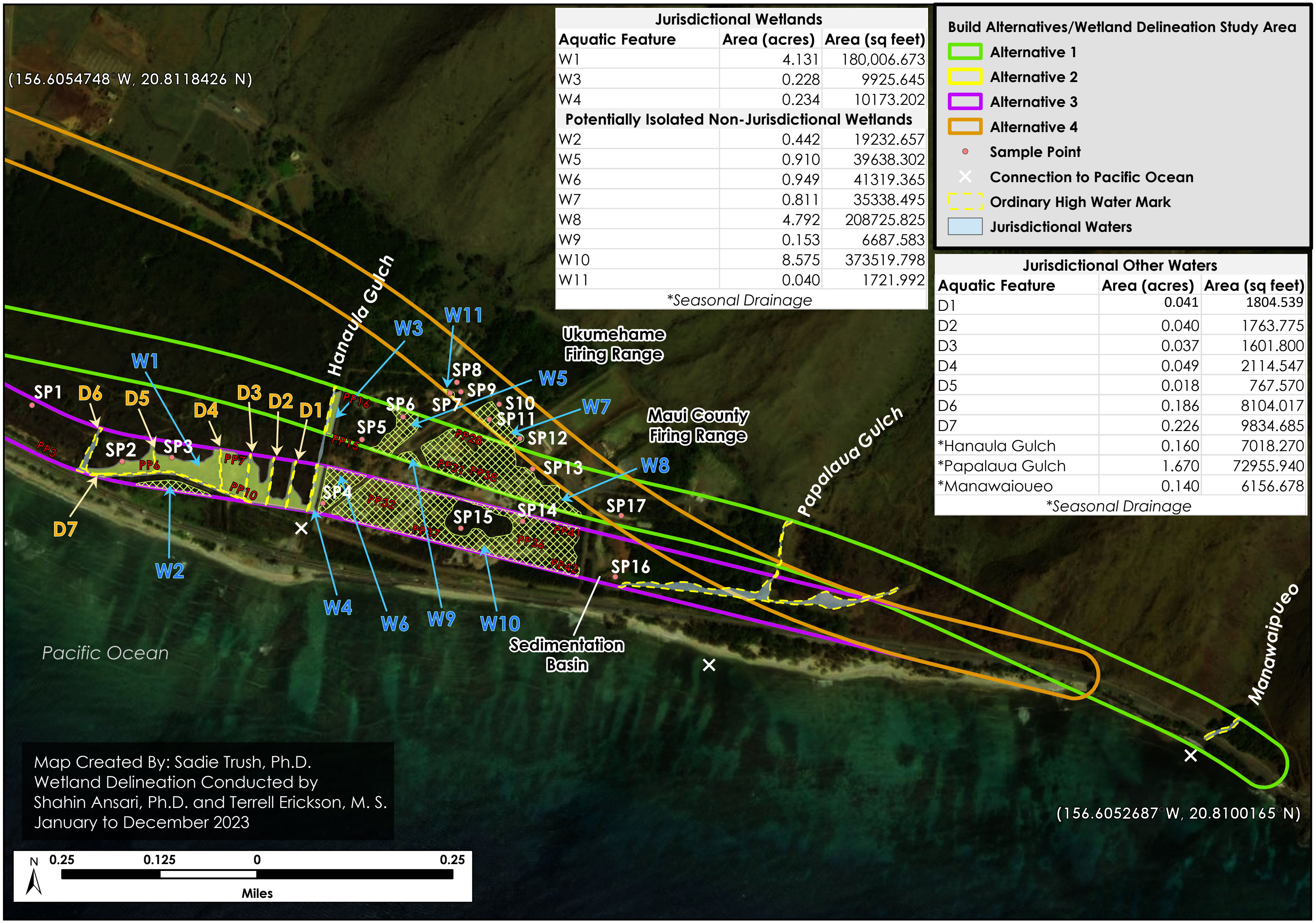
Figure 5. National Wetlands Inventory Map
Honoapiilani Highway (4692)
September 2023



D:\Projects4600\4692-01\SadieMaps\HonoHabitat\HonoHabitat.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 6. Habitat/Vegetation Types
Honoapiilani Highway (4692)
September 2023



Jurisdictional Wetlands

Aquatic Feature	Area (acres)	Area (sq feet)
W1	4.131	180,006.673
W3	0.228	9925.645
W4	0.234	10173.202
Potentially Isolated Non-Jurisdictional Wetlands		
W2	0.442	19232.657
W5	0.910	39638.302
W6	0.949	41319.365
W7	0.811	35338.495
W8	4.792	208725.825
W9	0.153	6687.583
W10	8.575	373519.798
W11	0.040	1721.992

*Seasonal Drainage

Jurisdictional Other Waters

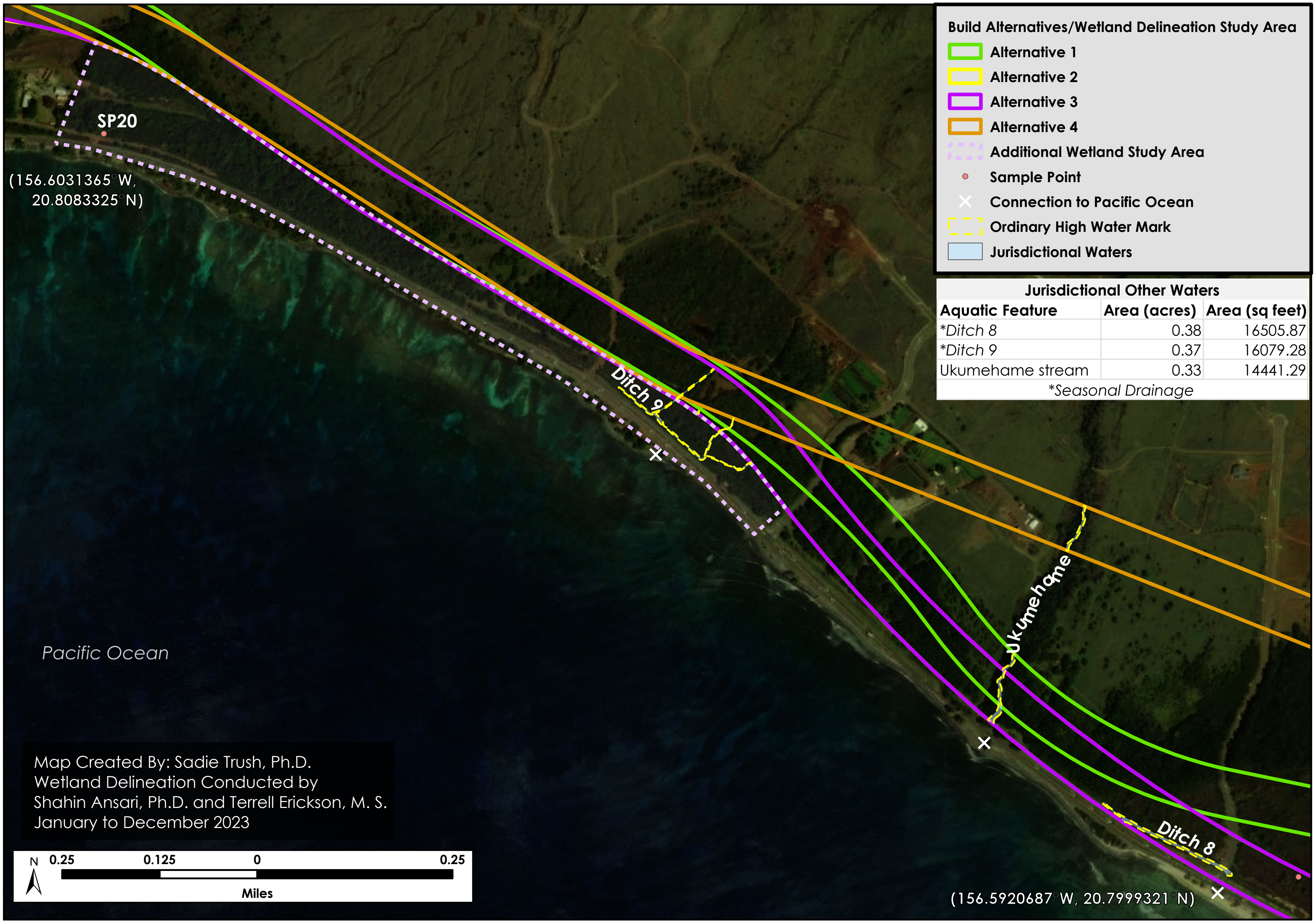
Aquatic Feature	Area (acres)	Area (sq feet)
D1	0.041	1804.539
D2	0.040	1763.775
D3	0.037	1601.800
D4	0.049	2114.547
D5	0.018	767.570
D6	0.186	8104.017
D7	0.226	9834.685
*Hanaula Gulch	0.160	7018.270
*Papalaua Gulch	1.670	72955.940
*Manawaioueo	0.140	6156.678

*Seasonal Drainage

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 7. Preliminary Identification of Jurisdictional Wetlands, Potentially Isolated Non-Jurisdictional Wetlands, and Jurisdictional Other Waters in the Palalaua and Ukumehame Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



Jurisdictional Other Waters

Aquatic Feature	Area (acres)	Area (sq feet)
Ditch 8	0.38	16505.87
Ditch 9	0.37	16079.28
Ukumehame stream	0.33	14441.29

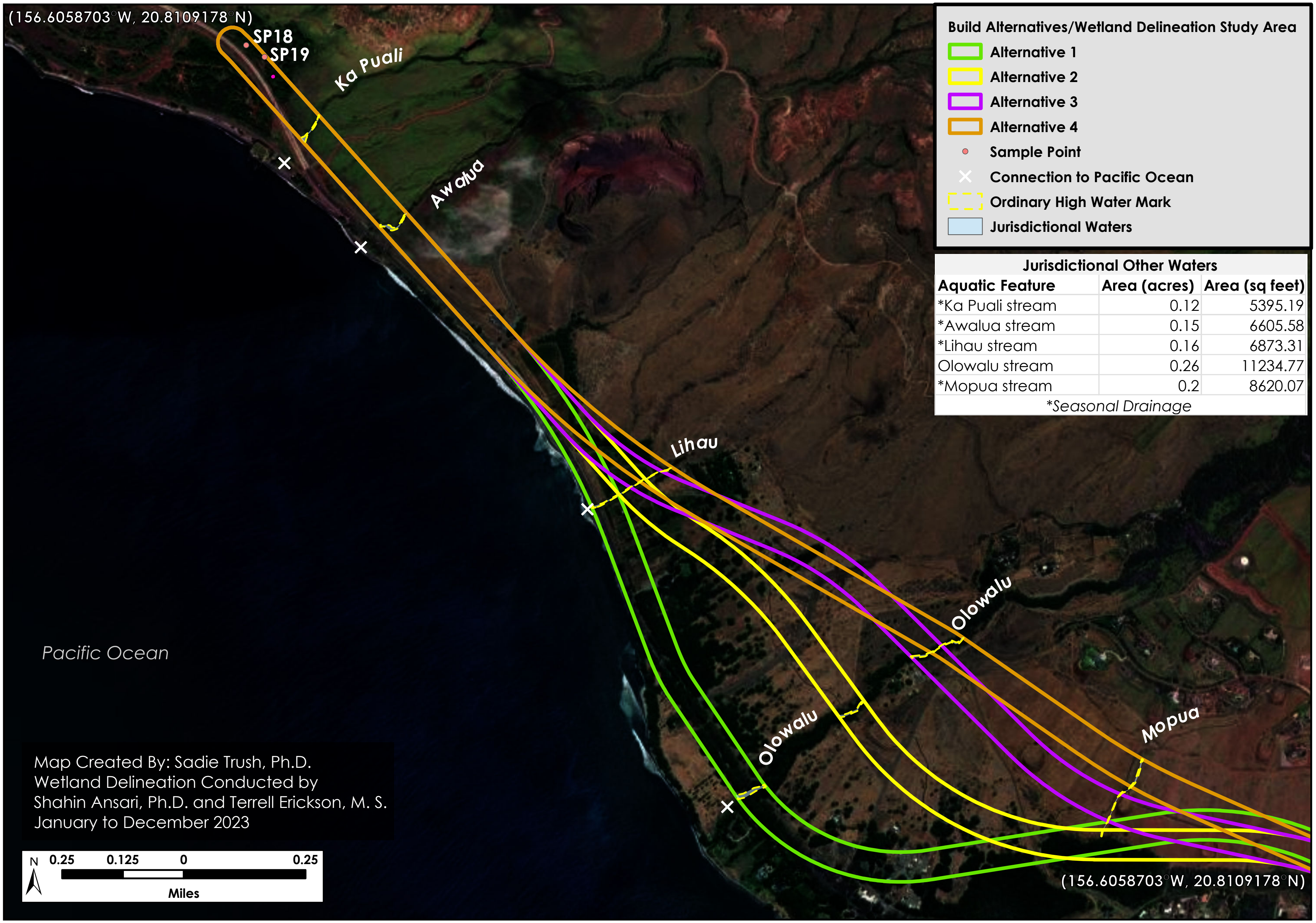
Seasonal Drainage

N:\Projects4600\4692-01\Shp_100223\Figs7_to_9.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 8. Preliminary Identification of Jurisdictional Other Waters in the Ukumehame Portion of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



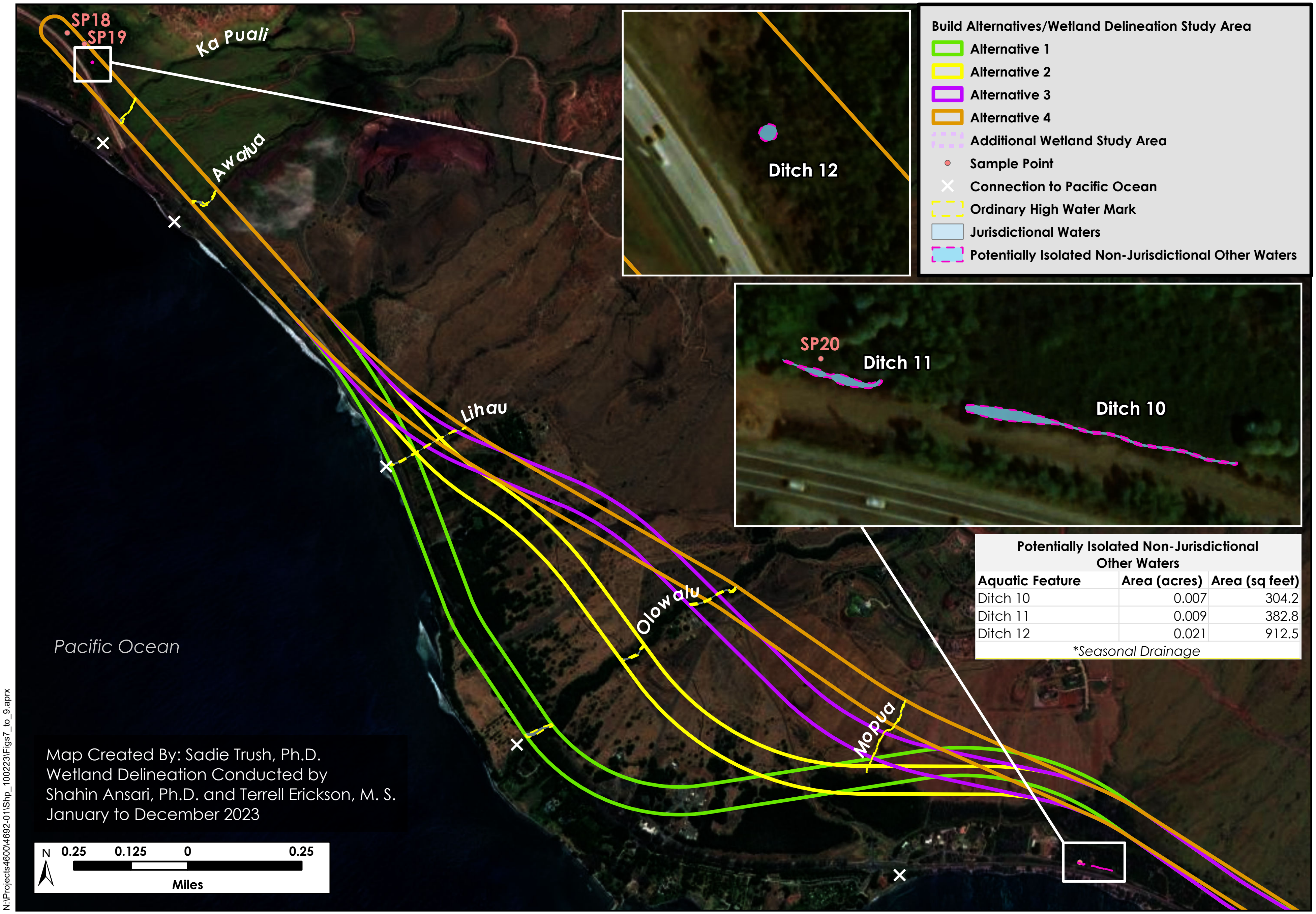
Jurisdictional Other Waters		
Aquatic Feature	Area (acres)	Area (sq feet)
*Ka Puali stream	0.12	5395.19
*Awalua stream	0.15	6605.58
*Lihau stream	0.16	6873.31
Olowalu stream	0.26	11234.77
*Mopua stream	0.2	8620.07

*Seasonal Drainage

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 9. Preliminary Identification of Jurisdictional Other Waters in the Olowalu and Launiupoko Portions of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023



Potentially Isolated Non-Jurisdictional Other Waters		
Aquatic Feature	Area (acres)	Area (sq feet)
Ditch 10	0.007	304.2
Ditch 11	0.009	382.8
Ditch 12	0.021	912.5
*Seasonal Drainage		

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 10. Preliminary Identification of Jurisdictional and Potentially Isolated Non-Jurisdictional Other Waters in the Olowalu and Launiupoko Areas of the Wetland Delineation Study Area

Honoapiilani Highway Improvement Project (4692-02)
Preliminary Delineation of Wetlands and Other Waters
December 2023

Sullivan, James

From:	Sullivan, Genevieve <genevieve.h.sullivan@hawaii.gov>
Sent:	Monday, January 8, 2024 2:28 PM
To:	Sullivan, James
Cc:	Powell, Lisa (FHWA); Aiu, Pua; Yoshioka, Wayne
Subject:	Fw: Jurisdictional Determination Request - Honoapiilani Highway, West Maui
Attachments:	JD_Request_Form_Honoapiilani_Hwy.pdf; Project_Location_Map_Honoapiilani_Hwy_.pdf; Preliminary_Wetland_Delineation Maps_Honoapiilani_Hwy.pdf; TMK_Parcels_for_Acquisition_Honoapiilani_Hwy.xlsx
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hi James,

Please find the JD submittal below.

Thanks!
Gen

From: Sullivan, Genevieve
Sent: Tuesday, January 2, 2024 11:10 AM
To: Brewer, J D CIV USARMY CEPOA (USA) <Jason.D.Brewer@usace.army.mil>
Cc: Powell, Lisa (FHWA) <lisa.powell@dot.gov>
Subject: Jurisdictional Determination Request - Honoapiilani Highway, West Maui

Aloha Jason and Happy New Year!

Please accept this email as the Section 404 Jurisdictional Determination Request for the Honoapiilani Highway Improvements Project

The following documents are attached:

1. Jurisdictional Determination Request Form
2. Project Location Map - Honoapiilani Hwy Improvements
3. Preliminary Identification of Waters of the United States - Project Maps
4. Tax Map Key (TMK) Parcels for Acquisition
5. Executive Summary and Figures Only - The Preliminary Identification of Waters of the United States Technical Report
Executive_Summary_and_Figures_Only_Technical_Report_Honoapiilani_Hwy.pdf
6. The Preliminary Identification of Waters of the United States Technical Report
Wetland_Delination_Technical_Rpt_Honoapiilani_Hwy.pdf

Please let me know if the OneDrive links don't work for you and reach out anytime with questions.
And thank you so much for your patience as the project team put together this JD submittal package.

Kind Regards,

Genevieve
808-599-0504

Genevieve Hilliard Sullivan
Planner VI, HDOT Highways

808-587-1834 | genevieve.h.sullivan@hawaii.gov
http://hidot.hawaii.gov/highways/
869 Punchbowl Street Room 301, Honolulu, HI, 96813