# APPENDIX O

*Jurisdictional waters determination*
*Hawaiian Memorial Park*
*Kāne'ohe, O'ahu – February 2019*
*Prepared by: AECOS, Inc.*

*And*

*Memo*
*Preliminary Fieldwork on "Lipalu Channel"*
*At Hawaiian Memorial Cemetery,*
*Kāne'ohe, O'ahu – February 2019*
*Prepared by: AECOS, Inc.*

# Jurisdictional waters determination
# Hawaiian Memorial Park
# Kāneʻohe, Oʻahu

Prepared by:

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February 12, 2019

# Jurisdictional waters determination
# Hawaiian Memorial Park, Kāneʻohe, Oʻahu

February 12, 2019 *AECOS* No. 1567

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## Introduction

Hawaiian Memorial Life Plan, Ltd., owner of Hawaiian Memorial Park (HMP), a full-service cemetery located in Kāneʻohe on the windward side of Oʻahu (Figure 1), is proposing to expand the cemetery. The proposed expansion ("Project") includes 11.4 ha (28.2 ac) of new cemetery space and 5.9 ha (14.5 ac) dedicated for a cultural preserve. Implementation of the Project will require the state Land Use Commission (LUC) to reclassify 21.63 ha (53.45 ac) from the State Conservation District to the Urban District ("Petition Area"). *AECOS*, Inc. was contracted by HHF Planners to assess federal jurisdiction, as authorized by the Clean Water Act (CWA), of a seep located in the eastern portion of the Petition Area ("survey area").

### Site Description

Kāwā Watershed - The Petition Area is located in Kāwā watershed (state code 32011; Parham et al., 2008), which extends north to Kāneʻohe Bay from Oneawa Hills ridgeline. This relatively small watershed encompasses only 37 ha (92 ac), about half of which is either residential or commercial property, one third undeveloped hillside land, and one fifth golf course and cemetery (Oceanit Laboratory, Inc. et al., 2002). Kāwā Stream is listed as perennial[1] (HCPSU, 1990; Parham et al., 2008), originating about 120 m (394 ft) above sea level (ASL) within the Hawaii State Veterans Cemetery (USGS, 1998). However, the segment through the cemetery is entirely underground within a stormwater conduit. The longest length of this stream channel is 4.2 km or 2.6 mi.

[1] A perennial stream has year-round, continuous flow in at least some segments. Flow is not always continuous through the entire reach in an interrupted perennial stream.


Figure 1. The survey area in the Kāwā Stream watershed on Windward Oʻahu.

Springs and seeps maintain baseflow in Kāwā Stream (Burr, 2001; Oceanit Laboratory, Inc. et al., 2002; Element Environmental, 2018), which, at 0.14 cubic meters per second (cms) or 4.95 cubic feet per second (cfs; USGS, 2018), is very low by Oʻahu standards. The City and County of Honolulu storm drain system is another source of water to Kāwā Stream. The Petition Area contributes flow to the storm drain system via inlets at Ohaha Place and at Lipalu Street (see Fig. 1).

The U.S. Geological Survey (USGS) has operated an instantaneous streamflow gage in Kāwā Stream (Sta. No. 16265000) downstream of the Project area—just upstream of Kaneohe Bay Drive—since September 29, 2016 (USGS, 2018). The average annual streamflow measured over the 2-year period is 0.14 cms (4.95 cfs) and the average gage height is 1.09 m (3.58 ft). The most extreme recorded flow during this time period was on February 18, 2016 and was measured at 45 cms (1,600 cfs) with a gage height of 2.99 m (9.84 ft).

Petition Area - The Petition Area in Hawaiian Memorial Park is located on the western flank of Oneawa Hills and slopes in a northwest direction from the hillside toward the Pikoiloa subdivision of Kāneʻohe. The soils in the vicinity of the seep are mapped as Kaneohe Silty Clay, 30–65% slopes (KHOF; USDA-NRCS, 2018a). These well-drained soils formed in alluvium and colluvium derived from igneous rock. The surrounding area includes historic *ʻauwai* used for terraced agriculture and roads used for dairy farm operations (Honua Consulting, 2018).

An abandoned well at the eastern end of the Petition Area passively draws from an apparently perennial spring. The well is 3.5 m (11.5 ft) deep and water level is consistently above the sloped ground level on the downstream side of the well (Figure 2; TNWRE, 2018) contained by the concrete wall of the well. A dilapidated concrete cap of approximately 1 m x 1 m (3 ft x 3 ft) partially covers the opening of the well. A seep emerges from the ground just down from the well. Flow from the spring and seep has eroded a shallow and somewhat braided channel ("seep channel") extending down the slope.

This seep channel is between one and five meters (3 to 16 ft) wide and water depth at the time of our survey was less than 10 cm (4 in). Banks are mostly less than 20 cm (8 in) high. Water appears to regularly occupy the bed of organic-rich silt; biofilms produced by bacteria and appearing as oily sheens and iron-rich (rust-colored) floc throughout the channel (Figure 3). These sheens indicate groundwater seepage occurs throughout the length of the channel, the result of which is a gaining reach of stream.

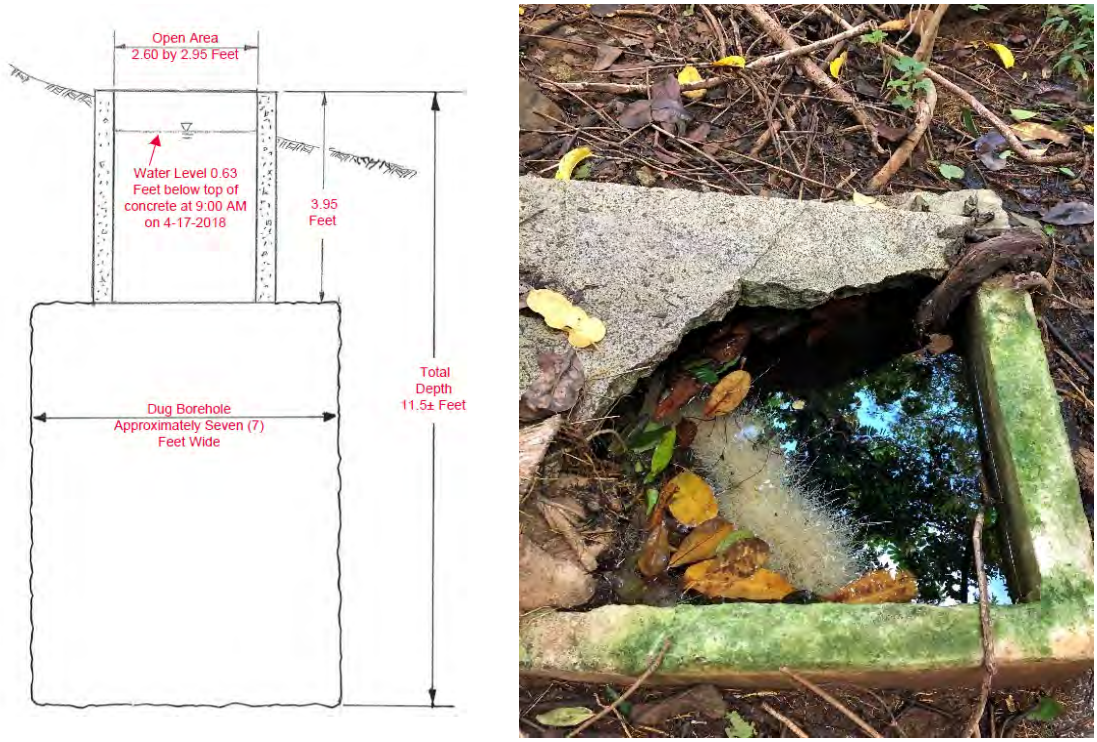


Figure 2. Schematic cross section of survey site well (after TNWRE, 2018) and photo showing dilapidated state of the well cover (December 2018).

The following conclusions were drawn from a series of boreholes dug above the well and from siphon and pump tests of the well (TNWRE, 2018):

- The spring is maintained by a natural discharge of groundwater moving downslope through poorly permeable residual soils overlying unweathered Kailua volcanics at depth.
- In the vicinity of the well, the groundwater is semi-confined and movement is through surface soils at depths of 3 m (10 ft) or more.
- The upper one-third to one-half of the linear seep is maintained by subsurface leakage from the well.
- Flow in the seep channel increases gradually from the well to the storm drain inlet.

The seep channel enters the lower end of a more deeply incised channel ("incised channel") that carries intermittent flow from channels upslope (Figure 4). Flow is directed across a concrete apron and into a culvert (Figure 5) that is part of the City and County of Honolulu storm water system. The incised

channel above the confluence with the seep channel appears to contain flow only after large storm events (freshets) and is fed by multiple erosional gullies. The incised channel is between one and three meters (3 to 10 ft) wide and nearly vertical banks are up to 1.5 m (4.9 ft) high. Boulders are on the channel bottom and tree roots growing on the stream banks are exposed (Figure 6).

Upslope, erosional gullies (Figure 7) on the hillslope direct runoff into the incised channel. Flow in these small gullies is ephemeral and not of sufficient volume and duration to create physical indicators of flow, such as a stream bed and banks.


Figure 3. Groundwater seeps are indicated by biofilms that appear as oily sheens and rust-colored floc.


Figure 4. View looking upstream where flow from the shallow seep channel joins the larger incised channel just upstream of the inlet to the City and County storm drain system.

A population of blackline Hawaiian damselfly or *pinapinao ānuenue* (*Megalagrion nigrohamatum nigrolineatum*) inhabits the seep in the Petition Area. Up to 8 males were observed during entomological surveys in 2017 (Montgomery, 2017) and two were observed by us during the December 2018 surveys. The blackline Hawaiian damselfly is endemic to Oʻahu where the nymphs (immatures) inhabit pools along middle reach and headwater segments

of perennial streams and in seepage-fed pools bordering such streams (Polhemus and Asquith, 1996). The weak-flying adults inhabit middle reach stream corridors and where they perch on streamside rocks and vegetation. The blackline Hawaiian damselfly and several other species of endemic damselflies are listed as endangered (HDLNR, 2015; USFWS, 2012). U.S. Fish and Wildlife Service (USFWS) has designated critical habitat for the blackline Hawaiian damselfly, crimson Hawaiian damselfly (*M. leptodemas*), and oceanic Hawaiian damselfly (*M. oceanicum*) on windward Oʻahu, upslope of Hawaiian Memorial Park above the 700-ft (210-m) elevation (USFWS, 2012).


Figure 5. Flow from the perennial seep channel within the larger incised channel is directed to an inlet of the City and County storm drain system in Pikoiloa.

## Climate and Weather

The nearby National Weather Service (NWS) Luluku rain gage (LULH1) records an average annual rainfall of 213 cm (84 in; NOAA-NWS, 2018). However, the

Luluku gauge is further *mauka* and annual rainfall in the Project watershed is more likely around 142 cm (56 in) and typically greatest from October through March (Giambelluca et al., 2013). Rainfall in 2018 has been higher than average: 310.9 cm (122.4 in) of rain fell in 2018 through November 30 (162% of average) and 43 cm (17 in) of rain fell in November alone (127% of average; NOAA-NWS, 2018).

Figure 6. View towards the storm drain inlet from the incised channel.

Average streamflow at Sta. No. 16265000 on Kāwā Stream on the day of our survey was 0.06 cms (2.06 cfs) and the average gage height was 1.10 m (3.63 ft; USGS, 2018). Measurable rainfall did not occur on the day of or the day prior to our survey (NOAA-NWS, 2018). Between November 30 and December 6, 2018, at LULH, well *mauka* of the Petition Area, 0.61 cm (0.24 in) of rain was recorded.

The Petition Area is not in a flood hazard area as classified by the Federal Emergency Management Agency (FEMA; HDLNR, 2018). The National Wetlands Inventory (NWI) Wetlands Mapper (USFW, nd)—an inventory of surface waters and wetlands—does not show aquatic features present in the Petition area.

Figure 7. Small erosional gullies through upland in the Project area that direct stormwater runoff from the surrounding hillslopes towards the incised channel.

## Jurisdictional Waters

Waters of the U.S. (jurisdictional waters) are surface waters that come under federal jurisdiction as authorized by the Clean Water Act (CWA) and Rivers and Harbors Act (RHA). Authority over these waters is granted to various federal

agencies, including the U.S. Environmental Protection Agency (USEPA), with the U.S. Army Corps of Engineers (USACE) having permit authority for actions that impact jurisdictional waters. Jurisdictional waters include all tidal waters and a subset of streams (both perennial and intermittent), lakes, reservoirs, and wetlands.

A 2015 rule issued by USACE and USEPA, "The Clean Water Rule," (USACE and USEPA, 2015) clarified the scope of waters of the U.S.—with the intent of increasing predictability and consistency of waters protected under the CWA. The basis for assuming jurisdiction of certain waters, as described in the Clean Water Rule, is the extent of connectivity to traditional navigable waters, interstate waters, or territorial seas (USEPA, 2015). In the three years since the rule was enacted, the validity of the rule has been contested through the courts and the rule is not implemented in many states. At the present time (as of August 16, 2018), the Clean Water Rule is in effect in Hawai'i (*South Carolina Coastal Conservation League et al. v. Pruitt* et al. No. 2-18-cv-330-DCN) [2].

As applicable to the Project, jurisdictional waters defined in the Clean Water Rule include: (1) tributaries to tidal waters, interstate waters, and territorial seas; (2) waters (including wetlands) adjacent to tidal waters, interstate waters, territorial seas, and tributaries; and (3) waters (including wetlands) that have a significant nexus to and are within 4,000 ft of the high tide line or ordinary high water mark (OHWM) of tidal waters, interstate waters, territorial seas, and tributaries.

The Clean Water Rule specifically excludes the following waters (even those that meet requirements for jurisdictional waters, such as those listed above): (1) ditches with ephemeral or intermittent flow that are not a relocated tributary or excavated in a tributary, (2) erosional features including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and grassed waterways, and (3) stormwater control features.

# Methods

On December 5, 2018, *AECOS* biologists Susan Burr and Chad Linebaugh, conducted a survey of the Petition Area around the spring to determine presence of waters of the U.S. (jurisdictional waters) and, if present, to establish

[2] On December 11, 2018 the USEPA and USACE issued a pre-publication draft of a revised definition of waters of the U.S (USACE and USEPA, 2018). This proposed definition will not be applicable until after the public rulemaking process has been completed.

jurisdictional limits (that is, delineate[3]) of those waters. A reconnaissance survey was undertaken by Susan Burr and Eric Guinther on November 19, 2018. We examined the jurisdictional potential of four branch channels and assessed the area for the presence of wetlands and biota of interest.

Tributaries - We delineated the ordinary high water mark (OHWM)—the jurisdictional limits—in the two channels we determined to have physical indicators of flow, including bed and banks. The Clean Water Rule (USEPA and USACE, 2015) lists the following physical characteristics as indicators of the OHWM: clear and natural line impressed on the banks, shelving, changes in the character of the soil, destruction of terrestrial vegetation, litter, debris, and other appropriate means that consider the characteristics of the surrounding areas.

Wetlands - We completed a wetland data determination form to characterize an area just upslope of the incised channel, a location within the survey area selected as most likely to be wetland based on topography (SP 1; Figure 8). Filling in of the wetland data sheet followed methods described in *Corps of Engineers Wetland Delineation Manual* ("Manual"; USACE, 1987) and *Regional Supplement for Hawai'i and Pacific Islands* (USACE, 2012a). The wetland status of plant species derived from the 2012 National Wetland Plant List (USACE, 2012b) and a 2016 update (Lichvar, et al., 2016). Sources used for the delineation effort included: the National Wetlands Inventory (NWI) Wetlands Mapper (USFWS, n.d), web soil survey (USDA-NRCS, 2018a), and the Flood Hazard Assessment Tool (HDLNR, 2018).

We marked the OHWM in the field with 32 pairs of wire flags. We took a set of photographs (upstream, left and right bank, and downstream) from the center of the channel at each pair of flags to document the markings and to record the character of the environment. We prepared two OHWM delineation data sheets to characterize two segments of the channels within the Project area. We recorded the OHWM flags and SP 1 with a handheld, global navigation satellite system (GNSS) instrument (Trimble 6000 Series, Geo XT). Satellite coverage was poor at that location against the side of a ridge and having a closed tree canopy. These circumstances resulted in more than half (62%) of the recorded positions having an accuracy of between one and five meters. These recorded geospatial positions were used along with a topographic map and renditions by the archaeologists to prepare the maps presented in this report.

[3] The process of determining the line on the ground (and shown on maps) separating jurisdictional waters from upland is termed a "delineation". Although *AECOS* can "delineate" limits of jurisdictional waters, jurisdictional determination is the purview of USACE, and that agency must concur with our delineation for it to become official.

We inspected the inlet and outlet of the storm drain system to evaluate if the channels within the Petition Area have a significant nexus on Kāwā Stream and measured distances of the various features using ArcGIS.

## Results

Figure 8 depicts the features we surveyed in the area in November and December 2018. The jurisdictional seep channel is 68 m (223 ft) long (to the culvert entrance) and the jurisdictional segment of the incised channel is 33 m (100 ft) long above the confluence with the seep channel.


Figure 8. Map of survey area showing extent of jurisdictional limits (stream course rendered in blue) and erosional gullies (non-jurisdictional) as dashed yellow lines.

Tributaries - Although wetland plants are rooted in a few short segments of the seep channel, the channel is best classified as a tributary rather than a wetland because: (1) plants cover less than 5% of the area and (2) the channel has been carved by flowing water and physical indicators of flow are apparent in the channel. The seep channel and a segment of the incised channel have physical indicators of flow (i.e., bed and banks and ordinary high water marks; see Fig. 4). The shallow seep channel begins just downstream of the well and continues for approximately 68 m (223 ft) downslope where it joins the incised channel that discharges directly into a culvert that is part of the City and County storm drain system (see Fig. 5). This inlet to the storm drain is approximately 390 m (1,280 ft) from Kāwā Stream.

The streambed of the seep channel consists primarily of saturated sediment that his high in organic matter. Boulders present in the area are sometimes on the streambed or the stream banks—some appearing to have been placed to manipulate flow. Little shelving occurs within the channel, indicating volume of flow is limited and relatively constant. Soil is saturated within the channel but appears to have low moisture outside of the channel. Terrestrial plants, including octopus tree, African tulip (*Spathodea campanulate*), *lauae* or maile-scented fern (*Phymatosorus grossus*), shoebutton ardisia (*Ardisia elliptica*), and fiddlewood (*Citharexylum caudatum*), are rooted above the OHWM. The stream channel is largely devoid of vegetation, although a few hydrophytes, namely *kalo* or taro (*Colocasia esculenta*) and umbrella sedge (*Cyperus involucratus*), are established in the channel. A small stand of red ginger (*Alpinia purpurata*) occupies a section of the seep channel, although the plants do not appear to be healthy. Aquatic animals, including the blackline Hawaiian damselfly and red-rimmed melania (*Melania tuberculata*), inhabit the stream channel. We did not observe any fishes or amphibians.

Physical indicators of flow (bed and banks and OHWM) first appear in the incised channel approximately 36 m (118 ft) upslope from the confluence with the seep channel. The incised channel did not contain water at the time of our survey. The stream bed consists of boulders and recently-deposited silt and the channel is configured in "steps" to form a series of small waterfalls and plunge pools when the stream is flowing. Terrestrial plants, including octopus tree, African tulip, shoebutton ardisia, and fiddlewood, are rooted above the OHWM and roots are exposed on the eroding banks. Only a few seedlings of shoebutton ardisia are present on the streambed. Wracking is present at and above the ordinary high water mark. We did not observe any aquatic flora or fauna in the incised channel.

Wetlands - Within the survey area, hydrophytic vegetation was present only within parts of the seep channel; however, we investigated the relatively bare

ground of a flat area (SP 1) for the presence of a wetland. The absence of ground cover here is due to shading by the closed canopy of octopus (*Schefflera actinophylla*) and Java plum (*Syzygium cumini*) trees. The soil (see Figure 9) conforms with the mapped soil type of Kaneohe silty clay and is not on the list of hydric soils (soils that could be associated with wetlands for O'ahu; USDA-NRCS, 2018b). This area is not a wetland.

Figure 9. Soil at SP 1 is a non-hydric silty clay loam.

Attachment A includes OHWM delineation sheets and the wetland data determination form (SP 1) for the Project area. Photographs taken to document the OHWM delineation process are included in Attachment B.

## Assessment

Tributaries - The seep channel and incised channel have physical indicators of flow within the Petition Area of Hawaiian Memorial Park. Flow from these channels is directed into an underground culvert that part is the City and County of Honolulu storm water system of Pikoiloa subdivision. Water from the Petition Area flows approximately 600 m (2,000 ft) in the storm water system prior to discharge into Kāwā Stream. The Clean Water Rule specifies that waters that otherwise qualify as tributaries do not lose status as tributaries if, for any length, there are one or more constructed or natural breaks—so long as a bed and banks and an ordinary high water mark can be identified upstream of the break. Therefore, the seep channel and incised channel identified in Fig. 8 are considered jurisdictional waters. Any work below the OHWM may require a permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

Wetlands – Wetlands are not present within the survey area.

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Attachment A

OHWM delineation sheets
and wetland data
determination form

# OHWM Delineation Cover Sheet



| | | | |
|---|---|---|---|
| **Project:** | Hawaiian Memorial Park | **Date:** | December 5, 2018 |
| **Location:** | Kāneʻohe, Oʻahu | **Investigator(s):** | Susan Burr, Chad Linebaugh |

**Project Description:**
Hawaiian Memorial Life Plan, Ltd. proposes to expand the cemetery. The proposed expansion includes 11.4 ha (28.2 ac) of new cemetery space and 5.9 ha (14.5 ac) dedicated for a cultural preserve ("Project"). Implementation of the Project would require the State of Hawai'i Land Use Commission (LUC) to reclassify 21.63 ha (53.45 ac) from the State Conservation District to the Urban District ("Petition Area"). *AECOS*, Inc. was contracted by HHF Planners to assess federal jurisdiction, as authorized by the Clean Water Act (CWA), of a seep located in the eastern portion of the Petition Area.

**Describe the river or stream's condition (disturbances, in-stream structures, etc.):**

- The longest continuous length of Kāwā Stream, a perennial stream, is 0.6 km or 0.4 mi—originating at 120 m (394 ft) above sea level (ASL) in the National Veteran's Cemetery. Springs and seeps maintain the low baseflow of 0.14 cubic meters per second (cms) or 4.95 cubic feet per second (cfs; USGS, 2018). The City and County of Honolulu storm drain system is another source of water to Kāwā Stream. The Petition Area contributes flow to the storm drain system via inlets at Ohaha Place and Lipalu Street.
- A dug well and perennial seep issue water from the ground at the eastern end of the Petition Area. Flow from the seep has carved a relatively narrow and shallow channel ("seep channel") in the ground. The channel is between one and five meters (1 to 16 ft) wide, water depth is less than 10 cm (4 in), and banks are mostly less than 20 cm (8 in) high. Wetted width appears to frequently occupy the entire stream bed and organic-rich silts comprise the channel bottom. Iron-rich bacteria that produce biofilms appear as oily sheens throughout the channel—indicating it is a gaining reach of stream.
- The seep channel enters the lower end of a larger, more deeply incised channel ("incised channel") and flow from the combined channels is directed across a concrete apron and into a culvert at Ohaha Place that is part of the City and County of Honolulu stormwater system. The incised channel appears to contain flow only after large storm events (freshets) and is fed by three or more erosional gullies. The incised channel is between one and three meters (3 to 10 ft) wide and nearly vertical banks are up to 1.5 m (4.9 ft) high. Boulders are on the channel bottom and tree roots growing on the stream banks are exposed. 'Erosional gullies on the hillside direct stormwater runoff into the incised channel. Flow in these gullies is ephemeral—flow is not of sufficient volume and duration to create physical indicators of flow, including bed and banks.

**Off-site Information**

**Remotely sensed image(s) acquired:** ■ Yes ☐ No [If yes, attach image(s) to datasheet(s) and indicate approx. locations of transects, OHWM, and any other features of interest on the image(s); describe below]. Description:

See Attachment A Figure 1. World Imagery satellite and aerial imagery.

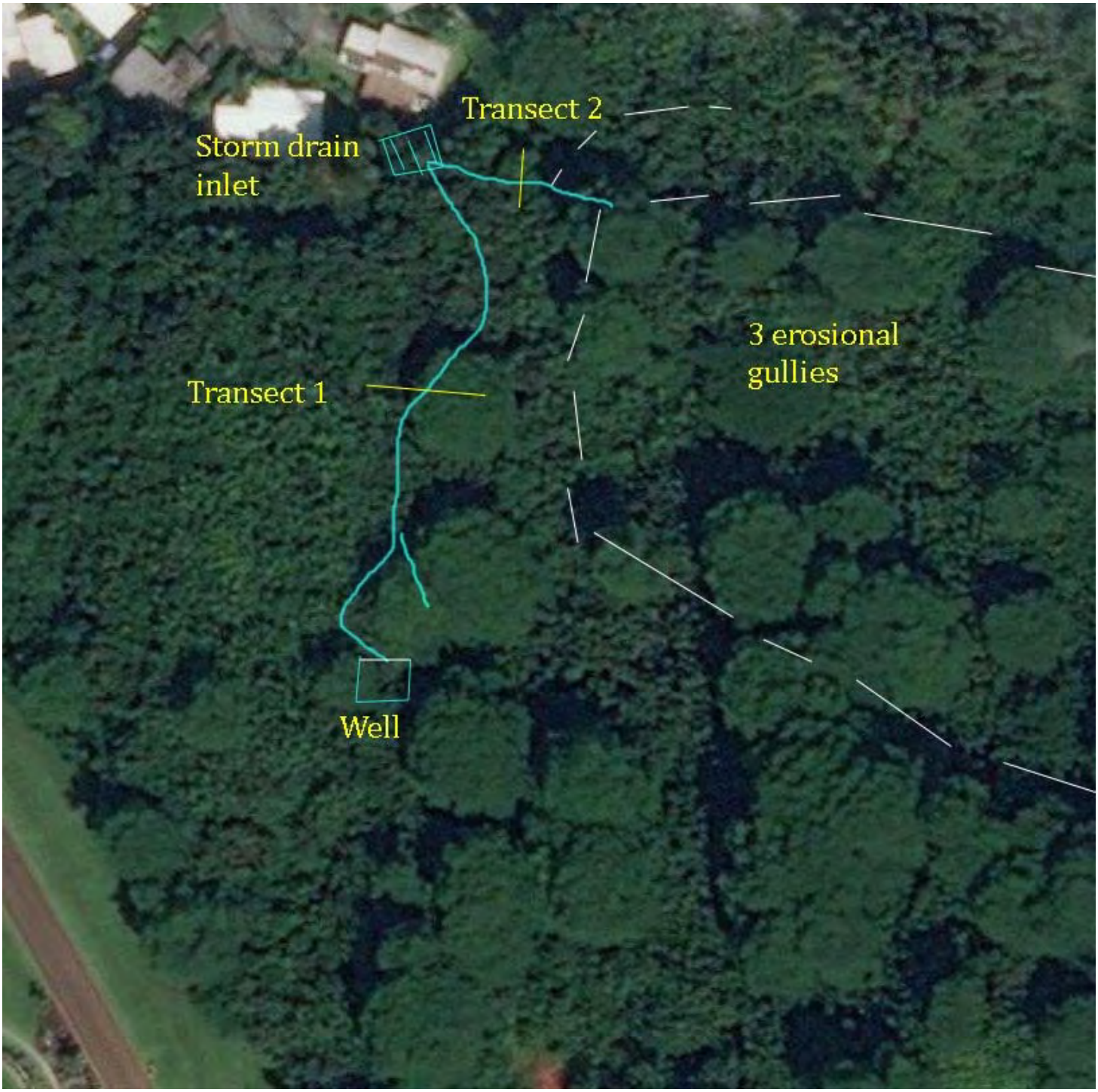
**Hydrologic/hydraulic information acquired:** ■ Yes ☐ No [If yes, attach information to datasheet(s) and describe below]. Description:

Average streamflow at Sta. No. 16265000 on Kāwā Stream on December 5, 2018 was 0.06 cms (2.06 cfs) and the average gage height was 1.10 m (3.63 ft; USGS, 2018). Rainfall was not recorded on the day of or the day prior to our survey (NOAA-NWS, 2018). Between November 30 and December 6, 2018, at LULH, upslope of the Petition Area, 0.61 cm (0.24 in) of rain was recorded.

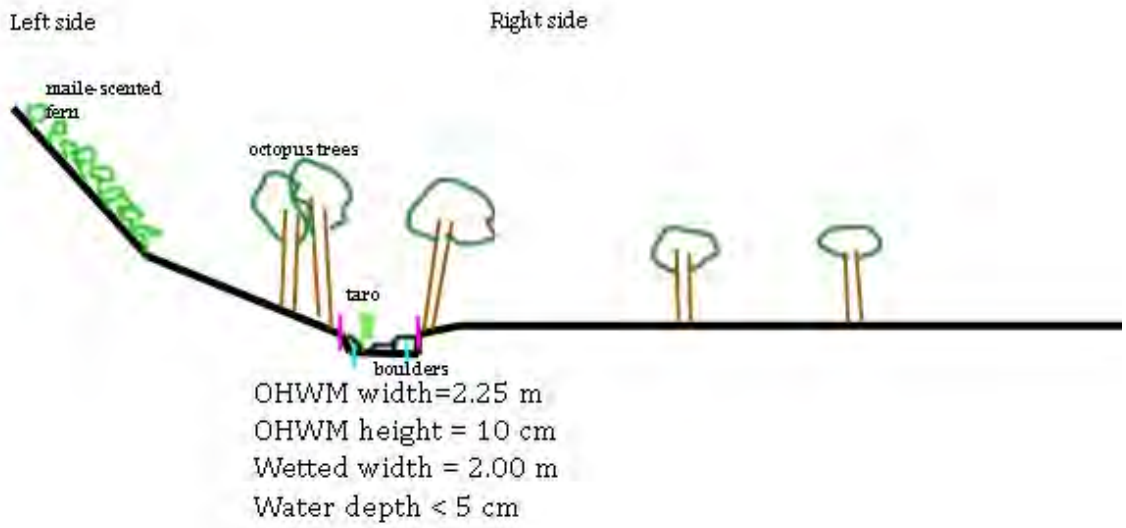
**List and describe any other supporting information received/acquired:**

None

Instructions: Complete one cover sheet and one or more datasheets for each project site. Each datasheet should capture the dominant characteristics of the OWHM along some length of a given stream. Complete enough datasheets to adequately document up and/or downstream variability in OHWM indicators, stream conditions, etc. Transect locations can be marked on a recent aerial image or GPS coordinates noted on the datasheet.


Transect 2
Storm drain
inlet
3 erosional
gullies
Transect 1
Well

**Transect (cross-section) drawing:** (choose a location that is representative of the dominant stream characteristic over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)




| **Break in slope at OHWM:** | ■ Sharp (>60°) | ☐ Moderate (30-60°) | ☐ Gentle (<30°) | ☐ None |
|---|---|---|---|---|

Notes/Description:

Short banks are nearly vertical and floodplain is nearly flat. Left side floodplain is at base of steep slope covered with maile-scented fern (*Phymatosorus grossus*). Right floodplain is extensive. Octopus trees (*Schefflera actinophylla*) are scattered throughout the floodplain.

**Sediment Texture:** Estimate percentages to describe the general sediment texture above and below OHWM.

| | Clay/Silt <0.05 mm | Sand 0.05 - 2 mm | Gravel 2 mm - 1 cm | Cobbles 1 - 10 cm | Boulders >10 cm | Developed Soil Horizons (Y/N)? |
|---|---|---|---|---|---|---|
| Above OHWM | 95 | 0 | 0 | 0 | 5 | |
| Below OHWM | 15 | 0 | 0 | 0 | 85 | |

Notes/Description: Boulders serve as a step in this segment of the seep channel. Elsewhere in the channel, boulders line the edge or direct flow into the seep channel. Archaeologists have recorded evidence of *'auwai* in the area. Soil moisture is less above OHWM.

**Vegetation:** Estimate absolute percent cover to describe general vegetation characteristics above and below OHWM.

| | Tree (%) | Shrub (%) | Herb (%) | Bare (%) |
|---|---|---|---|---|
| Above OHWM | 30 | 0 | 20 | 50 |
| Below OHWM | 0 | 0 | 10 | 90 |

Notes/Description:

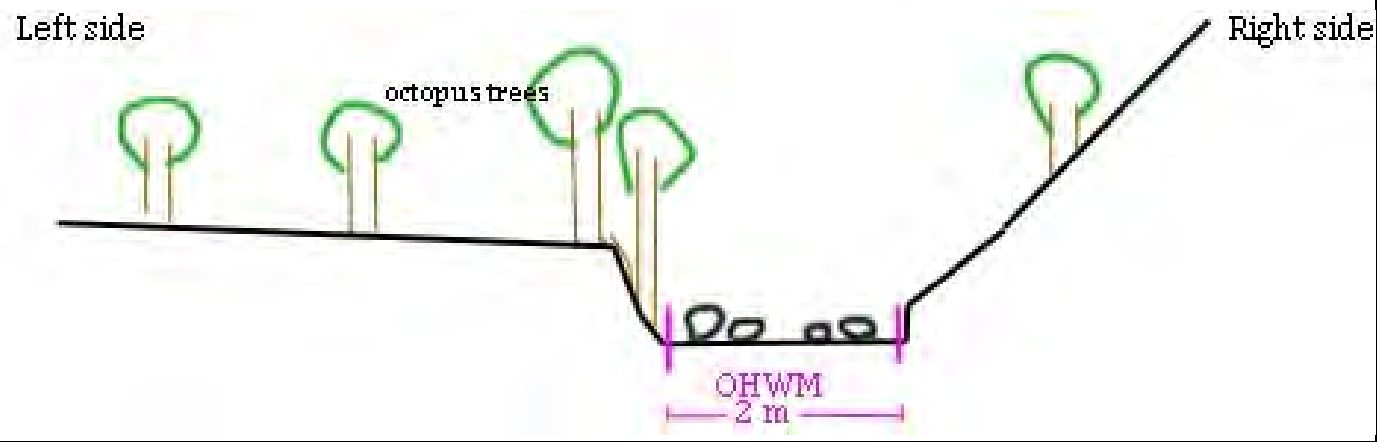
OHWM is at exposed roots of octopus trees. Octopus trees are scattered throughout floodplain. Taro (*Calocasia esculenta*) and umbrella sedge (*Cyperus involucratus*) are present below OHWM.

**Other Evidence:** List/describe any additional field evidence and/or lines of reasoning to support delineation.

- Blackline Hawaiian damselfly or *pinapinao ānuenue* (*Megalagrion nigrohamatum nigrolineatum*) and red-rimmed melania (Melania tuberculata)inhabit the seep.
- Iron-oxidizing bacteria produce biofilms throughout seep channel.

| Datasheet No. 2 | **OHWM Delineation Datasheet** | Page 4 of 4 |
|---|---|---|

**Transect (cross-section) drawing:** (choose a location that is representative of the dominant stream characteristic over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)




| **Break in slope at OHWM:** | ☐ Sharp (>60°) | ■ Moderate (30-60°) | ☐ Gentle (<30°) | ☐ None |
|---|---|---|---|---|

Notes/Description:

OHWM is at moderate break in bank slope. Stream channel is incised by approximately 1 m and banks above OHWM are steep. Floodplain is present on the left side of channel. Hillslope rises quickly on the right side of the channel,.

**Sediment Texture:** Estimate percentages to describe the general sediment texture above and below OHWM.

| | Clay/Silt <0.05 mm | Sand 0.05 - 2 mm | Gravel 2 mm - 1 cm | Cobbles 1 - 10 cm | Boulders >10 cm | Developed Soil Horizons (Y/N)? |
|---|---|---|---|---|---|---|
| Above OHWM | 100 | 0 | 0 | 0 | 0 | N |
| Below OHWM | 50 | 0 | 0 | 0 | 50 | N |

Notes/Description: Boulders are on the stream bed, but are absent above the OHWM. Soil moisture is low both above and below OHWM.

**Vegetation:** Estimate absolute percent cover to describe general vegetation characteristics above and below OHWM.

| | Tree (%) | Shrub (%) | Herb (%) | Bare (%) |
|---|---|---|---|---|
| Above OHWM | 80 | 0 | 5 | 15 |
| Below OHWM | 0 | 0 | 2 | 98 |

Notes/Description:

Exposed roots of octopus trees are along the eroding bank. Trunks are all above OHWM and exposed roots are above and below OHWM. Octopus trees are scattered throughout floodplain and on hillslope. No hydrophytic vegetation are present in channel; a few scattered Java plum seedlings are present in the channel

**Other Evidence:** List/describe any additional field evidence and/or lines of reasoning to support delineation.

- Wracking above OHWM.
- Some soil cracking in channel plunge pools.
- OHWM of channel begins downstream of confluence of three erosional gullies.

Attachment B

Photographs of OHWM flags

#

Flag A1 Left bank

Flag A1 Downstream

Flag A1 Upstream

Flag A1 Right bank

#

Flag A2 Left bank

Flag A2 Downstream

Flag A2 Upstream


Flag A2 Right bank

Flag A3 Downstream

Flag A3 Left bank

Flag A3 Upstream

Flag A3 Right bank

Flag A4 Left bank

Flag A4 Downstream

Flag A4 Upstream

Flag A4 Right bank

Flag A5 Left bank

Flag A5 Downstream

Flag A5 Upstream

Flag A5 Right bank

Flag A6 Left bank

Flag A6 Downstream

Flag A6 Upstream

Flag A6 Right bank

Flag B1 Left bank

Flag B1 Downstream

Flag B1 Upstream

Flag B1 Right bank

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Flag B2 Downstream

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Flag A7 Left bank

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Flag C3 Upstream

Flag C3 Right bank

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Flag C2 Downstream

Flag C2 Left bank

Flag C2 Upstream

Flag C2 Right bank

#

#

--No photo—

Flag C1 Left bank

Flag C1 Downstream

Flag C1 Upstream

Flag C1 Right bank

*AECOS*, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe, Hawaiʻi 96744
Phone: (808) 234-7770 Fax: (808) 234-7775
Email: aecos@aecos.com

February 21, 2019 *AECOS* No. 1576B

Ronald Sato
HHF Planners
rsato@hhf.com

# Memo
# Preliminary Fieldwork on "Lipalu Channel" at Hawaiian Memorial Cemetery, Kāneʻohe, Oʻahu

On February 4, 2019, *AECOS* biologists, Susan Burr and Bryson Luke, investigated "Lipalu Channel" in the Hawaiian Memorial Park Petition Area, windward Oʻahu. The purpose of the survey was to identify the potential extent of federal jurisdiction under the Clean Water Act (CWA). Our assessment was based in part on a 2015 rule, the "Clean Water Rule," issued by U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) defining waters of the U.S. (jurisdictional waters). The Clean Water Rule is in effect in the State of Hawaiʻi, but is currently being contested through the courts, and, in 2018, the USEPA and USACE drafted a proposed revised definition of waters of the U.S.

Within the Petition Area, Lipalu Channel and three unnamed branches appear to be jurisdictional under the CWA. Lipalu Channel is tributary to Kāwā Stream, which discharges into Kāneʻohe Bay (Figure 1), and, is therefore jurisdictional by rule. Lipalu Channel enters the City and County of Honolulu storm drain system through a culvert underneath Lipalu Street. This portion of the storm drain system discharges into a channelized tributary of Kāwā Stream approximately 250 m (820 ft) away at Namoku Street.

Lipalu Channel is a non-relatively permanent waterbody (non-RPW), with physical flow sufficient to create discontinuous indicators of an ordinary high water mark (OHWM). The channel has bed and banks, which, like the OHWM, are not continuous throughout the length of the channel. We flagged the farthest point upstream of clear physical indicators of flow on Lipalu Channel and three tributaries (Figure 2). The average width

of each channel (indicated as blue dashed lines in Fig. 2) is approximately 1 m (3 ft) and the channels are incised to mostly less than 1 m (3 ft), becoming broader and deeper near the Lipalu Street culvert entrance. Sediment sorting, destruction of terrestrial vegetation, and a break in bank slope were the most frequently observed indicators of OHWM.

The nearest NOAA rain gage, "Luluku" (located *mauka* of the survey area), recorded approximately 2.3 mm (0.09 in) of rain during our survey. Lipalu Channel was mostly dry during our survey, but this brief rain shower resulted in flowing water through some segments and isolated pools contained aquatic insects. We did not observe any fishes or crustaceans in Lipalu Channel, whose presence would indicate perennial flow.

*AECOS* can conduct a further survey to establish (delineate) the actual boundaries of the limits of jurisdiction along the channels and submit a request to USACE for an official jurisdictional determination (JD). JDs are the purview of the USACE, and that agency must concur with our delineation product for it to become official. Please let me know if you want us to delineate these features or if you have any questions.

Sincerely,

Susan Burr
*AECOS*, Inc.

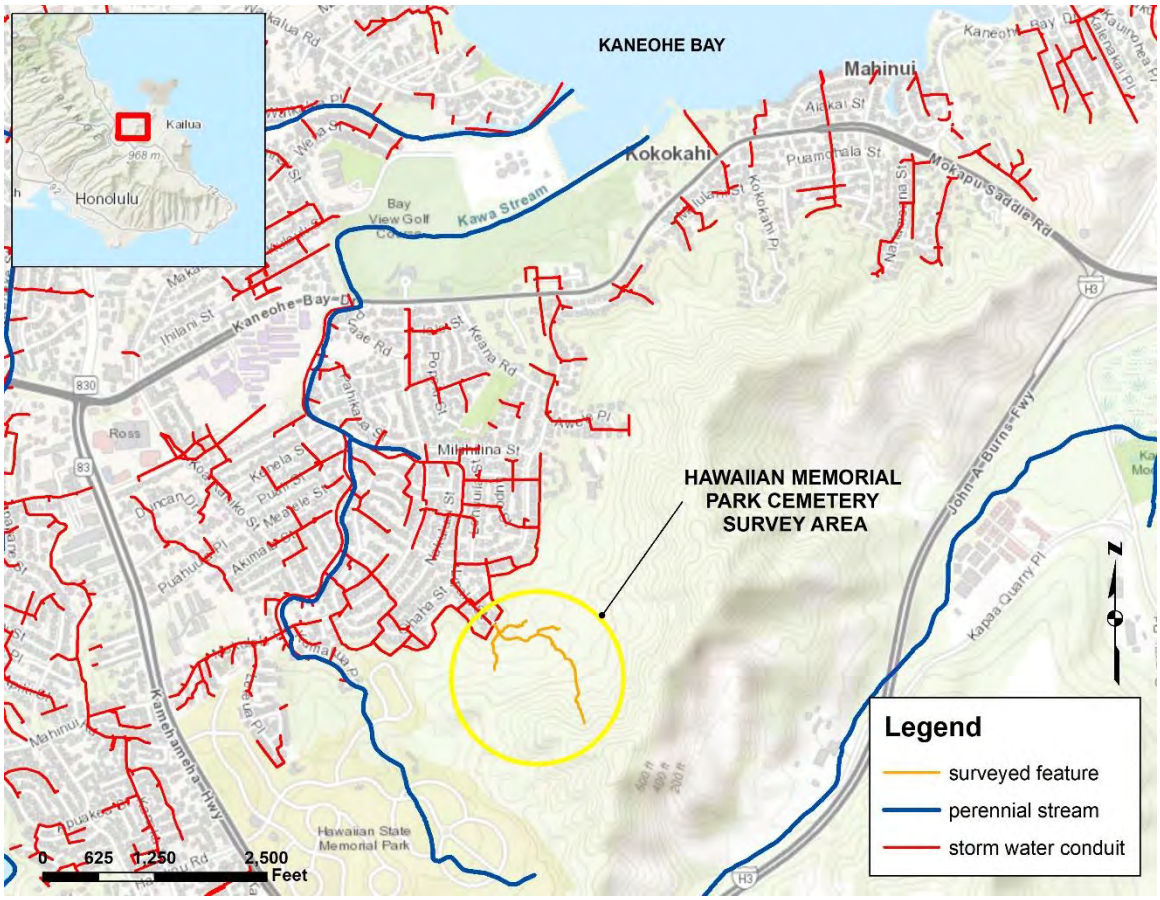


Figure 1. The survey area in the Kāwā Stream watershed on Windward O'ahu.


Figure 2. Map of survey area showing estimated extent of jurisdictional limits (stream course rendered in blue dashed lines) and non-jurisdictional channels (rendered in yellow dashed lines).


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