DRAFT

KA HOʻOILINA MAU O LOKOEA
PERPETUATING CULTURAL PRACTICES AT A PUʻUONE FISHPOND:
ARCHAEOLOGICAL SITE PRESERVATION PLAN
LOKOEA FISHPOND
KAWAILOA AHUPUAʻA, WAIALUA DISTRICT,
OʻAHU ISLAND, HAWAIʻI
TMK (1) 6-2-003:002

Prepared for:
Kamehameha Schools
Honolulu, HI 96813

Prepared by:
Christopher M. Monahan, Ph.D.
TCP Hawaiʻi, LLC
Kailua, HI 96734

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"There is a daily right to take fish; the right to take the anae is only in the windy times, that is when they can be caught" (Wewehi in 1848, kuleana holder at Lokoea, NR 596 v3, translated by Frances Frazier, Hawaiʻi State Archives) (photo from http://blogs.ksbe.edu/lenelson/2011/04/08/holo-holo-at-loko-ea/)

“On the sixteenth of this month a tidal wave arrived . . . As to the auwai of Ukoa pond outside Lokoea, it was covered with sand. However, the fish of the pond were not disturbed because the fishpond gates are firmly guarded.” (translated from *Nupepa Kuokoa,* November 30, 1867, by Kahi Wight)

Ukoʻa was a very strange fishpond—extraordinary fishes lived there. A fish might be a *kumu* fish on one side and an *ʻanae* mullet, on the other; or one side might be a *weke pueo,* and the other an *ʻanae;* or a fish might be silver white like a white cock and when scaled the flesh might be striped and variegated inside . . . Sometimes they [the mullet] were thin, with woody heads, and sometimes they disappeared altogether.

(Samuel Manaiakalani Kamakau, translated by Mary Kawena Pukui from the Hawaiian newspaper *Ke Au ʻOkoʻa* and compiled in *Ka Poʻe Kahiko, the People of Old* [Kamakau 1991:84])

ACKNOWLEDGEMENTS

Work on this project began in early 2013, and completion of this preservation plan—while marking the end of the historical preservation process—is really just the beginning of the final stages of bringing Lokoea back to life. Mahalo nui loa to Kamehameha Schools, especially Jason Alapaki Jeremiah and Sean McNamara, who have always supported our archaeological work even when we take too long to finish it. We also thank the Mālama Loko Ea Foundation, including Rae DeCoito (Executive Director), James Estores, Benson Lee, Jessica Casson, Ikaika Lum and Sayo Costantino, for enlightening discussions during our initial round of fieldwork in 2013. Mahalo as well to Kimi Makaiau (Alu Like, Inc.) and Mahealani Matsuzaki (Kamehameha Schools) for their aloha. More recently, we have benefited from discussions with Graydon (Buddy) Keala, a kahuna on fishponds and aquaculture in Hawai‘i with over 30 years of experience revitalizing and operating loko i‘a.

Doug Thurman conducted the archaeological fieldwork with Chris Monahan for the companion Archaeological Inventory Survey. He also prepared most of the plan maps that appear in our reports for this project. Malia Evans helped us finish two of the test units during the Phase 2 fieldwork.

A special appreciation is also in order to Kumu Elizabeth Kahi Wight (Kapi‘olani Community College) for her expert translation and interpretation of Hawaiian language documents for this project. She provided the Hawaiian phrase (“Ka Ho‘oilina Mau o Lokoea”) that appears in the title of this plan in response to my badly-butchered ideas of what I was trying to convey.

Finally, aloha to Mele, Lokoea’s former resident kākū (barracuda). You will be missed but your spirit lives on!

ABSTRACT—EXECUTIVE SUMMARY

This Archaeological Site Preservation Plan for Lokoea Fishpond is based on the results of a companion Archaeological Inventory Survey (AIS) (Monahan and Thurman 2015) that was reviewed and accepted by the State Historic Preservation Division in a letter (Log Nos. 2014.04619, 2015.01199; Doc. No. 1505SL03) dated May 4, 2015; and substantive consultation with Mālama Loko Ea Foundation (MLEF) since 2013. This plan is organized around a few high-level concepts that go far above and beyond the minimum requirements for an HAR § 13-277 preservation plan: first, balancing the interests of diverse stakeholders with different kuleana and visions as to what Lokoea should be in the future is a valuable educational process in itself. It shows how historic preservation can work if people are willing to compromise in recognition of the fact that environmental and socio-economic conditions today are different from those under which Lokoea was first established. Second, the results of the AIS lend themselves to five specific thematic units that can serve as educational objectives for place-based learning at Lokoea. These five themes highlight significant archaeological, historical and cultural findings at Lokoea. Any or all of these can serve as curriculum units for an intensive study of Lokoea, one that could be based in a field setting, or to compare and contrast Lokoea with other pu‘uone fishponds.

The preservation plan integrates basic historic-preservation objectives from HAR § 13-277 with specific recommended actions and tasks needed to meet these objectives for each feature. This is the most important part of the plan because it provides the most specific detail on proposed objectives, actions and tasks. An illustrated narrative for each feature describes these integrated recommendations. New maps—produced specifically for this plan—accompany several of the most complex feature discussions. We have also provided a color-coded plan view map, with a narrative description, depicting a probability model (low, moderate and high) of encountering historically-significant materials or features in subsurface context. The accompanying discussion offers some comments regarding an archaeological perspective on mechanical excavation at Lokoea. Finally, we offer some practical observations on implementing this plan.

Finally, it is important to state that the first draft version of this plan was finished in 2014, and that the current version of this plan has been completely revised and updated based on substantive consultation and active collaboration with MLEF. Prior to 2014, MLEF was still a “grass roots,” largely volunteer, organization that was building capacity to take on the major changes envisioned at Lokoea. In 2015, the organization’s first Executive Director (Rae DeCoito) was hired. Since this time, we have been collaborating and consulting to finalize the subject plan.

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INTRODUCTION

TCP Hawai‘i, LLC, developed this Archaeological Site Preservation Plan (Preservation Plan) for Lokoea fishpond in Kawailoa Ahupua‘a, Waialua District, O‘ahu, TMK: (1) 6-2-003:002 (Figure 1 through Figure 3). The plan is based on the results of a recent Archaeological Inventory Survey (AIS) by Monahan and Thurman (2015); and substantive consultation with Mālama Loko Ea Foundation (MLEF) since 2013.

The approximately 7.0-acre project area is adjacent to Kamehameha Highway and the Haleiwa Beach House restaurant (previously Jameson’s By The Sea Restaurant) in Hale‘iwa. The landowner and project proponent is Kamehameha Schools (KS). The plan was developed in collaboration with the Mālama Loko Ea Foundation (MLEF), a 501 3(c) non-profit, community group engaged in educational activities at this pu‘uone-type (inland, brackish) fishpond.[1] MLEF has been granted operating rights at Lokoea from KS.

This report satisfies the required components of HAR § 13-277 governing Preservation Plans (Appendix A), but it also aims to go well above and beyond regulatory concerns by providing Lokoea’s stakeholders with a road map for perpetuating cultural practices in a way that is both authentic and practical.

Christopher M. Monahan, Ph.D., is the Principal Investigator for this project. He has 15 years of professional experience in Hawai‘i, and another 12 years worldwide in a supervisory capacity.

Lokoea (State Site # 50-80-04-233) is closely associated with ‘Uko‘a Fishpond (State Site # 50-80-04-236). [2] Although approximately one mile apart, these cultural resources are physically connected by a stream channel that has likely always been present during the time of human occupation of this area. As such, there are significant metaphysical and spiritual connections between these wahi pana (legendary places), which are known in the historical literature as royal fishponds. For example, these ponds share a mo‘o named Laniwahine, who was also their kia‘i (guardian). Numerous ali‘i, including Kakuhihewa, Ka‘ahumanu and Lili‘uokalani, had exclusive rights to Lokoea in the 19th century.

The “long house” of Laniwahine refers to the entire Lokoea-‘Uko‘a system; and the archaeological features at Lokoea—especially its oldest structural components—effectively create three artificially-separate bodies of water that can be managed somewhat independently by several mākāhā: (1) ‘Uko‘a—referring to waters from its far east end to just outside the gates at Lokoea (this includes the so-called Keiki pond); (2) Lokoea proper—referring to the main pond south of the central island; and (3) the system’s outlet to the ocean, today known as Lokoea Stream, and in some 19th century documents described as the ‘auwai (irrigation channel) to ‘Uko‘a.

Our AIS report (Monahan and Thurman 2015) concluded that, although substantial portions of Lokoea have been altered, modified and rebuilt over time, from its origin in the pre-Contact period through the Historic and Modern eras, its basic structure and configuration has not changed substantially. This is due primarily to the natural, physiographic constraints and opportunities presented by the landscape. Furthermore, from a Hawaiian perspective, it is probably true that fishponds, more than any other traditional constructions, have *always* required significant maintenance and modification over time. Thus, the evidence for alteration and rebuilding at Lokoea, as documented in the AIS, is inherent to the very nature of fishponds, *especially* pu‘uone fishponds, and does not necessarily detract from its historic significance.

[1] Unless quoting from published material, in which case the original style is maintained, Hawaiian words are not italicized in TCP Hawai‘i documents since Hawaiian is an official state language rather than a “foreign” language.
[2] Lokoea can also be spelled Loko Ea (or sometimes even Loko‘ea in some sources). The Lokoea spelling is used throughout this report—unless quoting from published material—since this is how it appears in historical documents such as Land Commission records and Hawaiian-language newspapers. There is no single correct spelling.

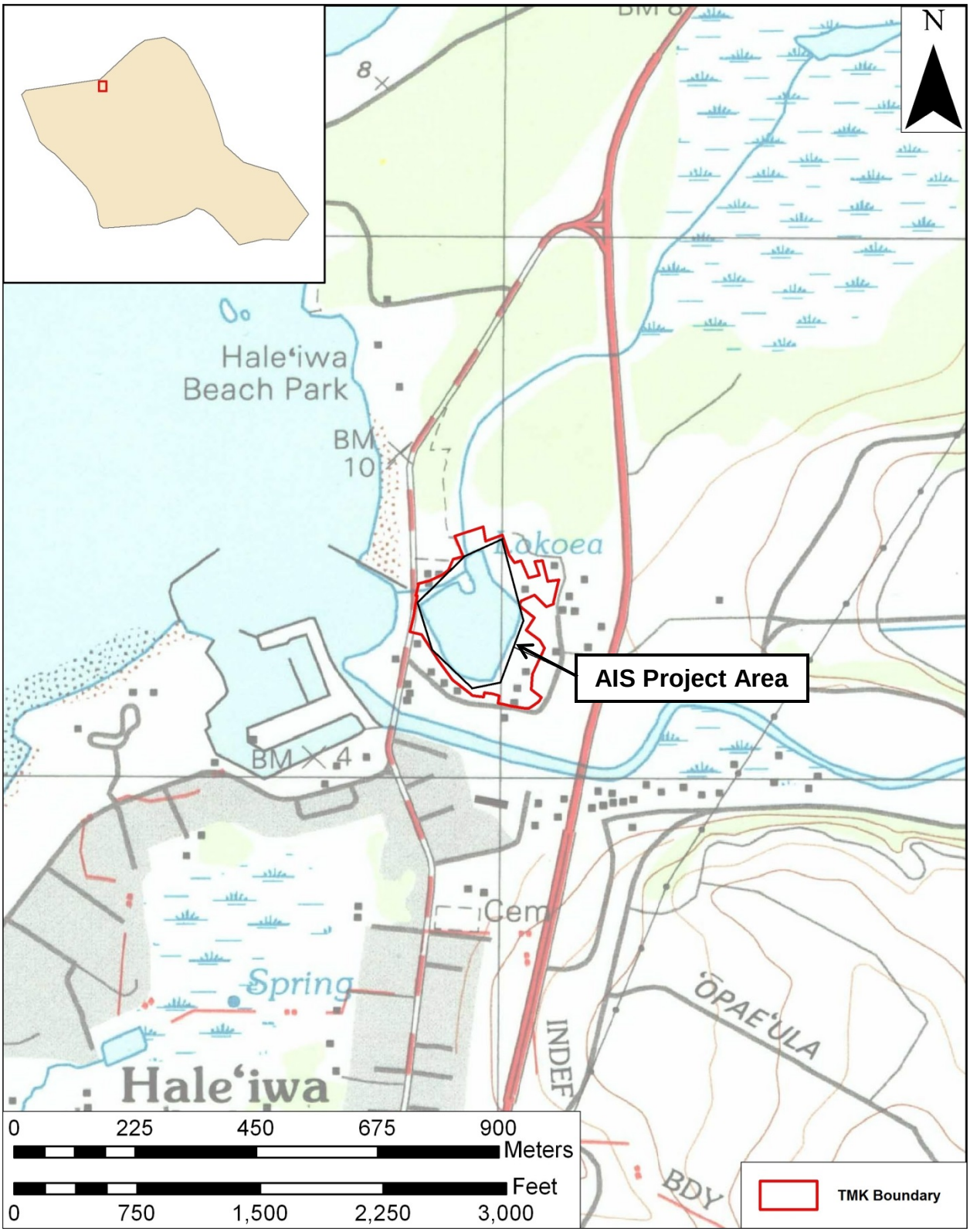

Figure 1. Project area location depicted on 1999 USGS Haleiwa quadrangle 7.5-minute series topographic map; the AIS project area is outlined in black; TMK is outlined in red

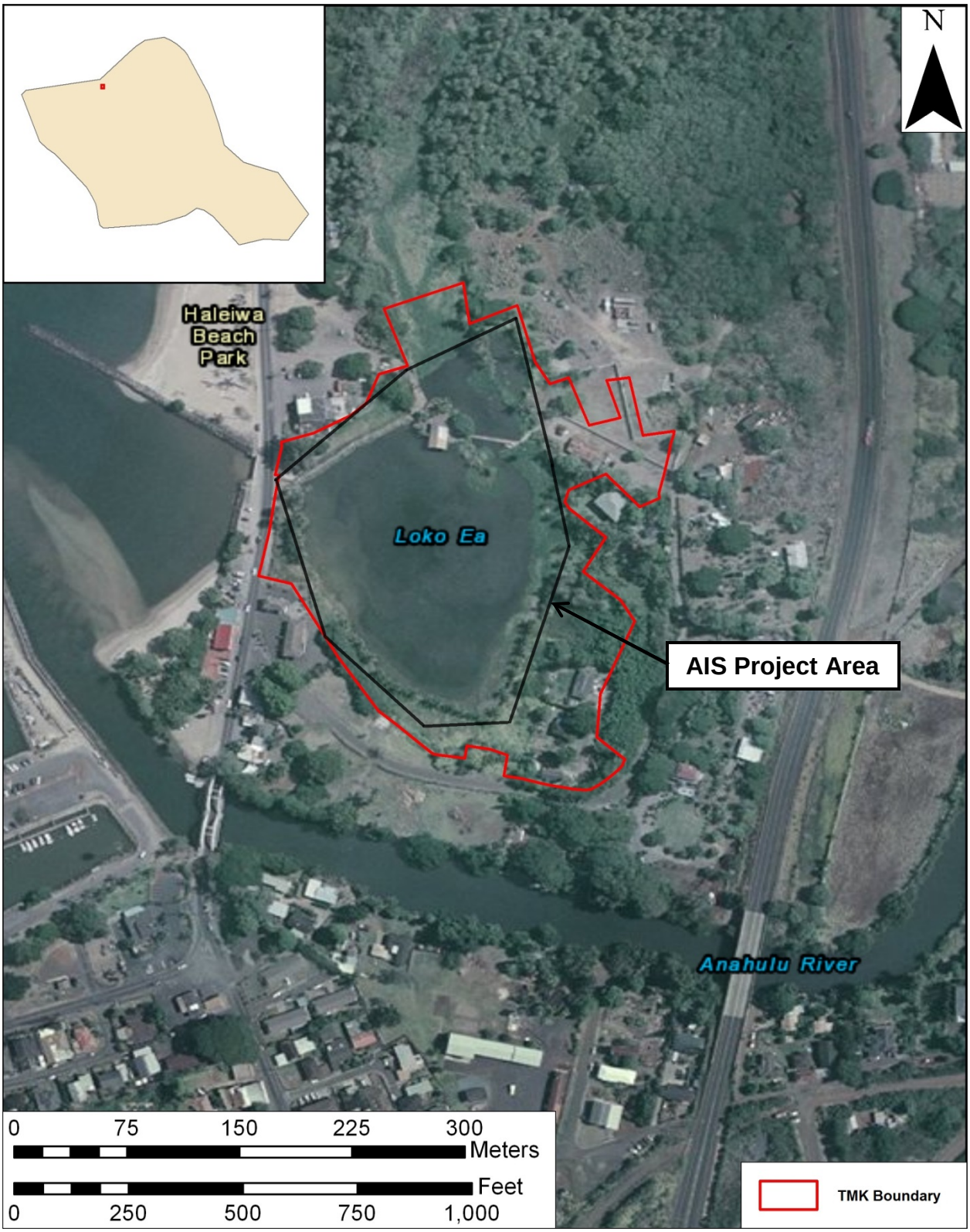

Figure 2. Project area location depicted on an aerial photograph (base map from ESRI ArcGIS); the AIS project area is outlined in black; TMK is outlined in red

Figure 3. TMK map of the project area and environs (base map from ESRI ArcGIS)

With these comments in mind, as documented in detail in the companion AIS report (Monahan and Thurman 2015), TCP Hawai‘i evaluated Lokoea, in its entirety, including all seven of its archaeological features, as historically significant under criteria b, c, d and e. Ongoing use and maintenance of the fishpond will have an effect on this historic property; this plan is intended to mitigate such effects.

Historic Preservation Context

Prior to the start of fieldwork for the AIS, in December, 2012, we initiated formal consultation with the State Historic Preservation Division (SHPD) and with the Office of Hawaiian Affairs (OHA), notifying these agencies of our intention to conduct an HAR § 13-276 AIS in support of a proposed project to develop a Preservation Plan (see Appendix B). SHPD did not formally respond, but OHA replied in writing in January, 2013[3] (HRD12_6576), indicating support for the project and recommending that additional consulting parties (other than MLEF) should also be part of the process moving forward (see Appendix B).

A completed (draft) AIS report was submitted to SHPD in October, 2014; SHPD provided review comments and revision requests in January, 2015; the final revised AIS report was accepted by SHPD in a letter (Log Nos. 2014.04619, 2015.01199; Doc. No. 1505SL03) dated May 4, 2015. In its acceptance letter (see Appendix B), the SHPD stated:

> As stipulated in HAR §13-284-7(e), when SHPD comments that the project will have an “effect, with agreed upon mitigation commitments,” then detailed mitigation plans shall be developed for SHPD review and acceptance. Per HAR §13-284-8(a)(1)(A), the agreed-upon mitigation measure for this project is preservation. Pursuant to HAR §13-284-8(a)(3)(e), we look forward to receiving an archaeological preservation plan that meets HAR §13-277 and information on your consultation with Native Hawaiian Organizations (NHOs), including the Office of Hawaiian Affairs (OHA) as indicated in HAR §13-284-8(a)(2).

The subject Preservation Plan, developed in consultation and active collaboration with MLEF and its fishpond consultant Graydon (Buddy) Keala, fulfills SHPD’s request for the agreed-upon mitigation measure. In the Consultation section (below), we list additional consulting parties that were consulted anew for this Preservation Plan (e.g., OHA).

It is important to state that a first draft version of this Preservation Plan was finished in 2014. The first draft plan was intended for internal use and review; the current, completely revised, version of this plan has been updated based on substantive consultation and active collaboration with MLEF, including face to face meetings (see Consultation section, below). Prior to 2014, MLEF was still a “grass roots,” largely volunteer, organization that was building capacity to take on the major changes envisioned at Lokoea. In 2015, the organization’s first Executive Director (Rae DeCoito) was hired. Since this time, we have been collaborating and consulting to finalize the subject plan.

Proposed Project: Repair & Maintenance of Lokoea as a Working Fishpond

For the purposes of this Preservation Plan, MLEF’s long-term objective is to return Lokoea to a fully functioning loko i‘a (fishpond) while preserving its integrity as a historic property, including all of its component features. In order to achieve this objective, MLEF has to obtain applicable County, State and Federal permits for repair and maintenance of the fishpond.[4] MLEF’s consultant, Graydon (Buddy) Keala, a Native Hawaiian with over 30 years of practical experience operating, repairing and maintaining more than 35 loko i‘a on the islands of Hawai‘i, Moloka‘i, Maui, O‘ahu and Kaua‘i, will direct and manage all phases of the Proposed Project, and ensure the preservation measures in this plan are followed.

[3] OHA’s letter is incorrectly dated January 7, 2012, but it should be 2013.

[4] Lokoea is located on land classified as Agricultural according to the boundaries of the State Land Use Districts. The City & County of Honolulu’s Land Use Ordinance (LUO) zoning designation is AG-1 (Restricted Agriculture).

The Proposed Project includes invasive vegetation removal; dredging of the main (approximately 6-acre) fishpond to bring it back to traditional fishpond aquaculture depth; dry-stacked masonry wall repair (focusing immediately on Feature 2, and later on Feature 1); and mākāhā (gate) repair along both the Feature 2 (immediately) and Feature 1 (later). The rest of this sub-section describes the Proposed Project repair and maintenance tasks in greater detail. The entire repair and maintenance program needed to return Lokoea to a fully functioning fishpond will take a few years to complete. Accordingly, the repair and maintenance work has been divided into several phases, as follows:

- **Phase 1** – Removal of encroaching vegetation consisting of invasive grass matting along the southeast side of the main fishpond fronting the line of coconut palms, an area measuring approximately 0.75 acres. Removal of this grass matting will require use of a mini-excavator on the banks using a winch/cable with grappling hook to grab pieces of grass and pull it onto the south bank. The grass material will be left to dry and later removed to the back lot using a bobcat and rubbish bin.
- **Phase 2** – Dredging the main pond to a depth of 2-3 feet, totaling about 20,000 cubic yards of material from the west and south main pond perimeter, in order to improve water quality for the fish. Dredging will use a floating system that is entirely based on the water, and will not impact that land: a floating 6" submersible dredge pump will take the discharge effluent material to a floating dewatering system to separate water from solid materials. The separation will be done by a mechanical centrifuge system that will extrude almost dry material and create turbidity-free clear water that can put directly back into the fishpond.
- **Phase 3** – Repair and maintenance of the Feature 2 fishpond wall using dry-stacked (no mortar or concrete) methods and pōhaku that resemble the existing rock work in order to maintain the overall visual integrity of Lokoea. Several tasks need to be completed at Feature 2. First, a culvert built in the late 1960s at the makai end of the wall, which was not a part of the original wall construction circa 1930, will be closed (filled in with pōhaku); second, a project to increase the width of Feature 2 that was started around 2010 will be completed by adding more pōhaku to the south side of the wall—this wall will be finished with an outer layer of pōhaku that resemble the existing rock work; third, the gate at the makai end of the wall shall be repaired using a cement form sluice that will be also be covered in a veneer of dry-stacked pōhaku resembling the existing rock work.
- **Phase 4** – Repair and maintenance of the Feature 1 fishpond wall using dry-stacked (no mortar or concrete) methods and pōhaku that resemble the existing rock work in order to maintain the overall visual integrity of Lokoea. Several tasks need to be completed at Feature 1. First, the makai gate, which was originally built in the 1930s but has been repaired and improved over the years (e.g., with a stainless steel gate system), is failing structurally (poured in place concrete slab structure has been cracked by one or more tidal surge events) and will be repaired by removing the existing structure and replacing it with one in exactly the same style (i.e., 1930s plantation-style); second, a long section of the south side of the makai end of the wall, which has been in a state of partial collapse into the main pond over the years, will be repaired by using—and restacking—its own constituent rocks; third, numerous puka (holes) along the soil-sedimentary upper surface of Feature 1 will be filled with silty clay sediment (not silt or sand) and manually compacted in order to prevent failure at a later time.

Specific preservation measures for these archaeological features—and for all of the component features of the historic property of Lokoea—are discussed in detail further in this plan. Although there are no additional plans to conduct any other repair or maintenance work at this time that may impact other archaeological features at Lokoea, we nonetheless describe protection measures that should be followed for every feature later in the plan.

CONCEPTUAL PRINCIPLES OF PRESERVATION

This Preservation Plan is designed to strike a balance between several potentially-conflicting objectives that may be prioritized differently by various stakeholders at Lokoea (Figure 4). We believe this balancing act represents a "teachable moment," or educational opportunity, in itself, because it requires pragmatic, "real world" thinking and discussion about individual and community values at Lokoea. It also explicitly reflects the types of pros and cons (costs and benefits) cultural practitioners need to consider in planning and carrying out their work in twenty-first century Hawai'i. For example, what features are worth preserving and rebuilding? Which ones can be altered or destroyed for the betterment of the fishpond? What types of building materials and methods are appropriate? What are the regulatory issues? How are the current conditions of the day different from those under which the fishpond was first built and then modified over time?

Regarding the different stakeholders, individuals who wish to practice aquaculture—biologists or fish farmers—will probably be primarily interested in the operation and maintenance of the fishpond, regardless of whether its materials and methods are historically appropriate to its original construction. Thus, for example, repair or replacement of the current concrete and metal sluice gates may be the best option going forward because the gates function just fine, even though they do not resemble the original, Hawaiian-style mākāhā, which would have been built with perishable (organic) materials. For the sake of discussion, we refer to these stakeholders—those who place the operation of the living fishpond above all other concerns—as the "Functionality" group (see Figure 4).

Archaeologists and others primarily interested in historical authenticity, on the other hand, may favor restoration of the fishpond's structural elements and physical appearance to a more traditional, Hawaiian style, regardless of how this affects its functionality. These individuals might favor *replacement* of the existing sluices gates with perishable structures even though such mākāhā may be difficult to build and maintain since there are probably few kūpuna who retain such knowledge. These "Historical Authenticity" stakeholders would support getting rid of *all* concrete, mortar and metal at Lokoea.

Finally, land managers and others concerned with legal and administrative matters may be most concerned with regulatory and other practical matters such as clean water requirements, accessibility for people with disabilities, hazards ("trips, slips and falls") and site security (trespassing). These individuals also need to consider the economic costs of preservation and development. These "Health, Safety and Cost" stakeholders may not particularly care much about functionality or historical authenticity unless it can be accomplished safely, in full regulatory compliance, and with available funding.

We believe all these objectives can be met, to varying degrees, by keeping in mind the overall educational value of recognizing and exploring the interplay between historical authenticity and cultural practice at Lokoea. At the same time, any substantial alterations to the fishpond need to be grounded in an understanding of the impacts of environmental and socio-economic change. For example, it seems an inescapable conclusion that sea levels are on the rise and that, in the future, we should expect low frequency, high-impact events such as tidal surges to be more severe.[5] It is also clear that fresh water availability at Lokoea is less than it used to be. Likewise, the current socio-economic system is very different from that under which the fishpond was originally built. Carol Wyban (1992), who lived and worked at Lokoea in the 1980s, commented on how difficult it is to properly operate and maintain it with only a few workers or volunteers. It literally does "take a village" to keep a pu'uone fishpond like Lokoea in working order; and, any preservation or development plans need to take into consideration such issues as staffing, how skilled cultural specialists will be integrated into the work, etc. Figure 4 is a simplified, depiction of the main objectives that must be balanced at Lokoea in the context of temporal change.

[5] In January, 2014, there was a major storm-surge event in Hale'iwa that flooded Lokoea, deposited a large amount of sand at the mouth of Lokoea Stream, adjacent to Feature 1, and apparently damaged one of the concrete gates

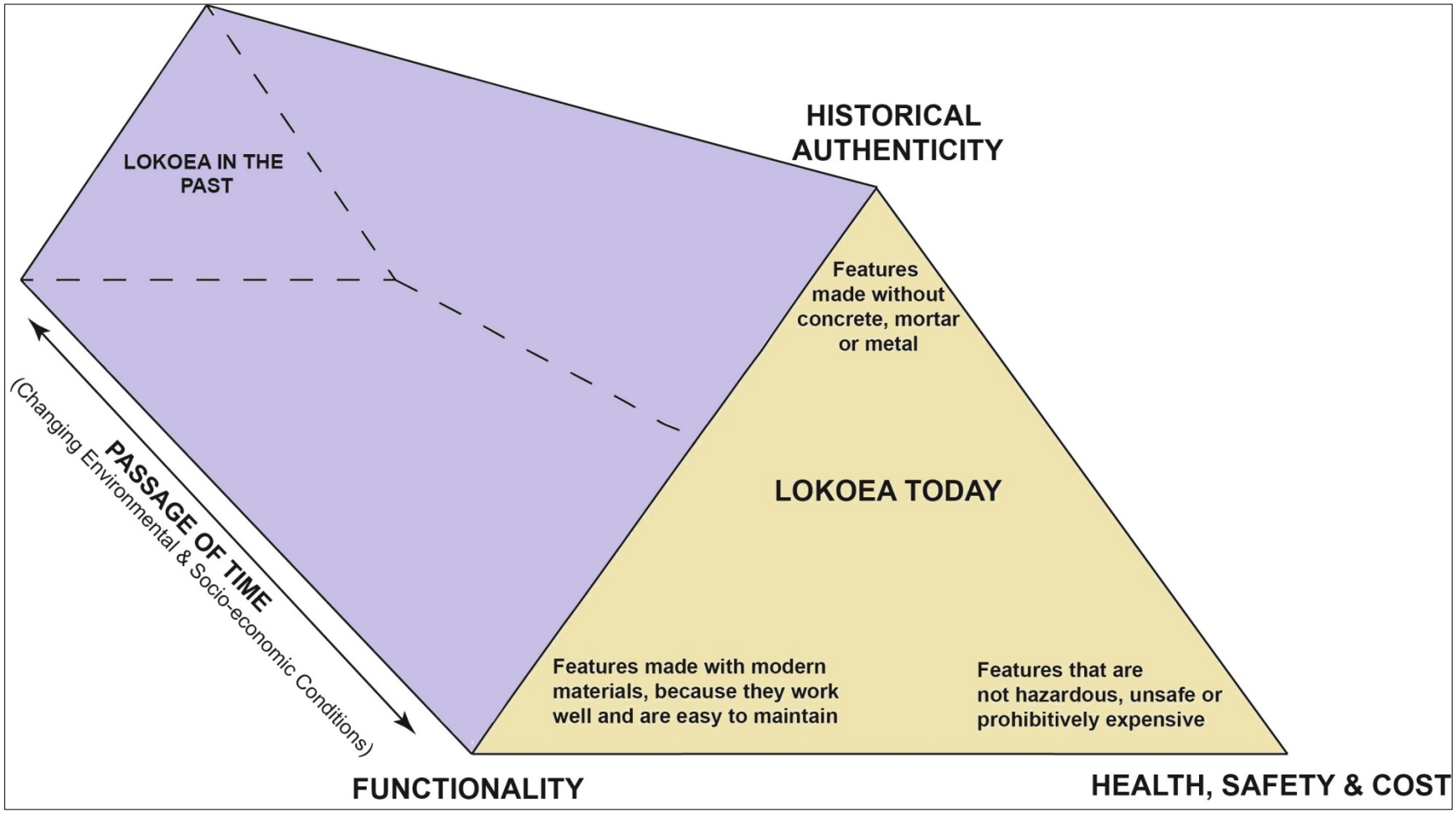

Figure 4. Diagrammatic depiction of the interplay between historical authenticity, function and health, safety and cost issues in the context of changing environmental and socio-economic conditions through time

ENVIRONMENTAL SETTING

The environmental setting at Lokoea is presented here as an integral component of the overall wahi pana of Lokoea, which includes both its cultural and natural resources.

Topography and Terrain

Lokoea is on a low-lying, nearly level coastal plain no more than about 1 m (3 ft.) above sea level. Very small variations in elevation are important to its overall structure and function. Towards the mauka (east) side of the pond near its north end, there is an elevated bluff, about 2 m (6 ft.) high, of lithified coral reef. This is an important part of the Lokoea landscape as a "high and dry" place to store materials, meet and get organized, observe the entire pond, etc. Towards the makai (west) side, the landscape rises gently up to the Kamehameha Highway, which is aligned along the natural "back beach" berm of Jaucas sand that protects much of the coastal plain from high-water events, but not necessarily major storms.

Geology and Soils

A major constraint on the size and shape of the Lokoea basin is the hard rock geology evident in the eastern margins of the pond. Along this side, a lithified coral reef (limestone) representing a high sea stand rests conformably over a weathered pāhoehoe flow (Figure 5 and Figure 6). This lithified coral likely represents the Waimānalo Sea Stand dating to approximately 120,000 years before present, an interglacial period when sea levels in Hawai‘i were approximately 7.5 m (24.8 ft) above current levels (Macdonald et al. 1983; Ziegler 2002).

In their paleoenvironmental investigation of ‘Uko‘a Fishpond, Athens et al (1995), citing several prior studies (Macdonald and Abbott 1970; Rosenau et al. 1971; Stearns 1978; Hirata and Associates 1988), in addition to their direct observations, discuss the basic geology and geochronology of the ‘Uko‘a basin. They conclude the entire basin, which includes Lokoea, is essentially a Holocene phenomenon, meaning it has been in place and largely unchanged from a hard-rock structural perspective for the last 8,000 years or so, long before anyone ever stepped foot on O‘ahu. For our purposes, this means the current topography and terrain, which is a major factor in determining Lokoea's hydrological regime (i.e., the way water moves across the land, where it comes from and where it goes) has not fundamentally changed throughout the time of human use of this landscape, which is not to say that the *sources* and *amount* of water have not been altered, because it is clear that the system once had substantially more water in it than it does today.

Information on soils and any direct quotes come from Foote et al. (1972) (Figure 7). The immediate pond margins are surrounded by Tropaquets, described as "poorly-drained soils periodically flooded by irrigation in order to grow crops that thrive in water" . . . "used for production of taro, rice, and watercress on flooded paddies." The makai side of the pond, along the Kamehameha Highway, is characterized by Jaucas sands, which are "very deep, excessively drained, very rapidly permeable soils on vegetated beach areas along the sea coast, which formed in calcareous sand deposits."

Various types of silty clays are found around the rest of the pond. Because these soils are relatively impermeable, firm and consolidated, they provide physical constraints on the lateral movement of Lokoea's water. These silty clays along the south and southeast sides of the pond create natural boundaries to this fundamentally marshy area which, when stressed with too much water, more easily punches through the Jaucas sand to the west and flows into the ocean, rather than connecting with the Anahulu Stream to the south.

Figure 5. Illustrating the hard rock geology of Lokoea in its eastern margins, view north; tall grass (left background) is the waterway to ʻUkoʻa; Wyban (1992:18) identified the natural feature in the foreground as a "koʻa (shrine)"

Figure 6. Illustrating the hard rock geology (lithified coral reef atop weathered pāhoehoe) along the eastern margin of the pond, view ENE; this is a small cave (designated the "north cave" or Feature 6 in the current study)

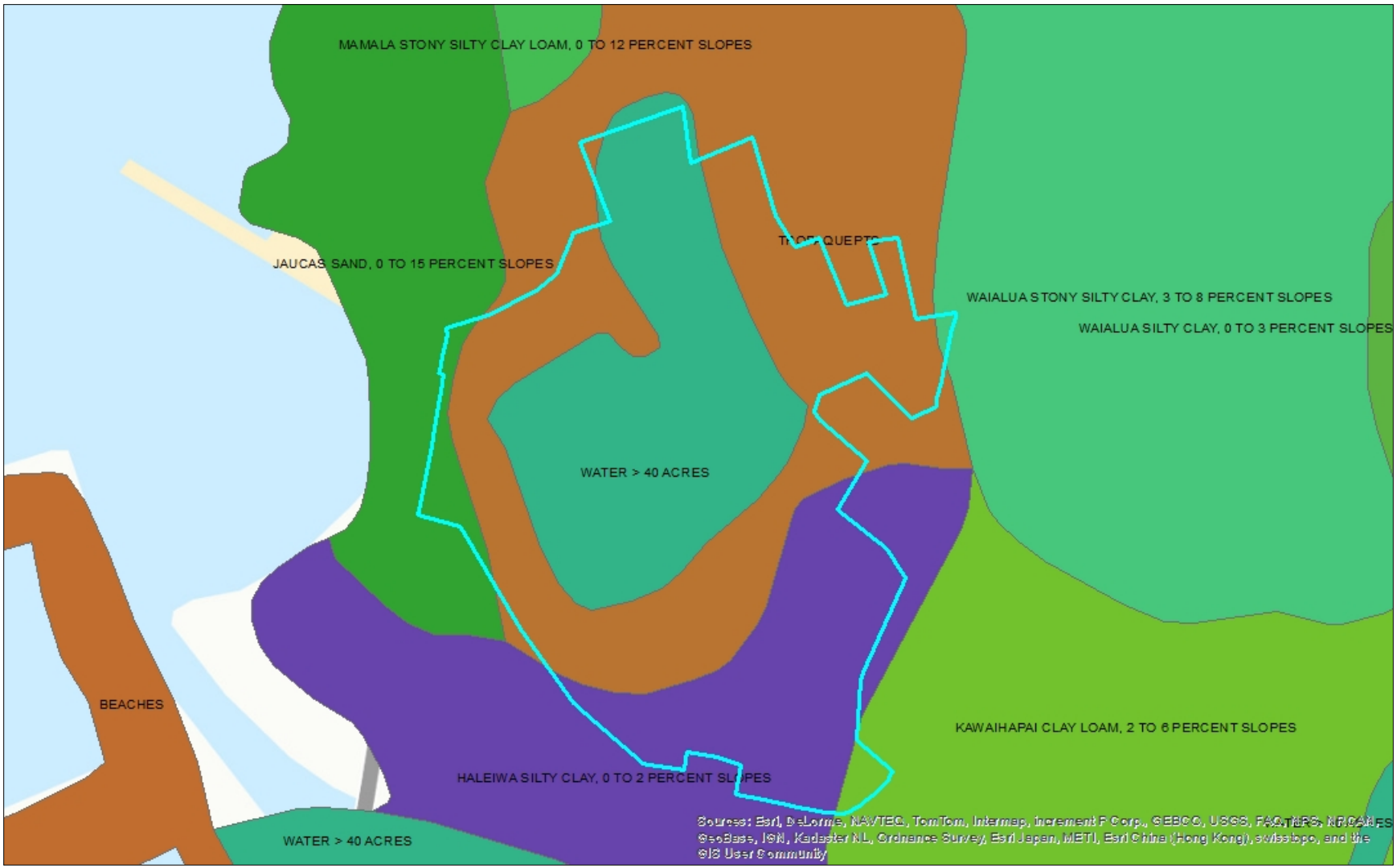

Figure 7. Soil survey data for the project area and environs (base map from ESRI ArcGIS)

Fauna

Lokoea is currently home to numerous native species and a few aliens, as well as several visitors, as summarized in the lists below. Staff of MLEF provided currently-observed fish, other aquatic life and birds at Lokoea.[6]

Native fish and other aquatics currently observed

- ʻAʻama, a type of crab (*Grapsus grapsus tenuicrustatus*)
- Āhole, Hawaiian flagtail (*Kuhlia sandvicensis*), also āholehole, for its young stage
- ʻAmaʻama, mullet (*Mugil cephalus*)
- Awa, milkfish (*Chanos chanos*)
- Kākū, barracuda (*Sphyraenidae* spp.)
- Manini, a type of surgeonfish (*Acanthurus triostegus*)
- Moi, threadfish (*Polydactylus sexfilis*)
- ʻOʻopu, a general name for various types of goby
- ʻŌpae, a general name for various types of shrimp
- Palani, a type of surgeonfish (*A. dussumieri*)
- Pualu (also puwalu), a type of surgeonfish (*Acanthurus xanthopterus* or *A. mata*)
- Ulua, jacks (*Caranx* spp.), also pāpio, used to describe the young stage of this fish

Invasive fish and other aquatics currently observed

- Tilapia (indeterminate species);
- Tōʻau or blacktail snapper (*Lutjanus fulvus*)
- Samoan crab (*Scylla serrata*)

Native birds currently observed at Lokoea[7]

- Aukuʻu or black-crowned night heron (*Nycticorax nycticorax hoactli*)
- ʻAlae keʻokeʻo (alternatively, ʻalae kea) or Hawaiian coot (*Fulica alai*)

Flora

Some plants at Lokoea probably date from historic times. These include the hau (*Hibiscus tiliace*) thicket on its southwest margin and on the central island; and some milo (*Thespesia populnea*) trees near the top of Lokoea Stream. There are many coconut palms (*Cocus nucifera*) and some date palms (*Phoenix* spp.) around the shoreline of the main pond and the Keiki pond—all of these appear to post-date 1960. There is a large ironwood tree (*Casuarina* spp.) near the mouth of Lokoea Stream, just before the bridge on Kamehameha Highway. There are at least two types of marsh grass growing in the main pond and the waterway to ʻUkoʻa—incidentally, both of these, if left unchecked and not cut back, soon expand and fill in the pond. Bougainvillea (*Nyctaginaceae bougainvillea*) grows along a portion of the lithified coral bluff along the northeast side of the pond. The MLEF staff is also actively planting various native species around the central island including ti (kī) (*Cordyline fruticosa*) and others.

Hydrology

Prior to the construction of the pump station at ʻUkoʻa by the Waialua Sugar Company—which appears on maps as early as 1906—the water throughout the entire Lokoea-ʻUkoʻa system must have been substantially higher. Based on visual inspection of the oldest constructed features at Lokoea, estimates of 2–3 feet higher seem reasonable but could have been more. Feature 2, in particular, has a distinctive line of lichen growth that is currently well above today's high water mark, but seems to evidence a time when

[6] The faunal and floral lists were compiled in 2014. One of the more interesting residents of Lokoea was a (now-deceased) large barracuda named "Mele" in the waterway to ʻUkoʻa that MLEF staff pointed out to us.
[7] Wyban (1992) also noted ʻAlae ʻula or Hawaiian mudhen (*Gallinula chloropus sandvicensis*) in the 1980s

the water was generally much higher. Wyban (1992) has discussed this specific issue at length in her memoir about Lokoea, and recounts oral history from the early to middle twentieth century that suggests children used to jump off the bridge at Lokoea Stream into the water, which is now rarely more than about a foot deep (Figure 8). James Estores tells how one of his tutu used to jump off one of the milo trees into Lokoea Stream.

According to James Estores, in 1994, the spring at ʻUkoʻa was capped—instead of letting it continue to flow down into Lokoea—by the Waialua Sugar Company when it ceased operations.

Figure 8. Lokoea Stream outlet under the bridge along Kamehameha Highway; historical accounts (Wyban 1992:8) describe children jumping from the bridge into the stream—which these days is rarely deeper than about a foot—in the middle twentieth century, indicating there used to be a few to several more feet of water in this stream system; view west

SUMMARY OF THE AIS FINDINGS

The Archaeological Inventory Survey (AIS) by Monahan and Thurman (2015) provided a large amount of information on the cultural, historical and archaeological significance of Lokoea. The purpose of this section is to provide an abstracted synthesis of the AIS results as a precursor to the specific recommendations of this plan. For more detailed, technical data and analyses than presented in this summary, the reader should refer directly to the AIS report.

In addition to fulfilling the minimal, legal requirements of HAR § 13-276, the AIS was designed to answer several primary research questions: When was Lokoea first established as a pu‘uone fishpond? What are its structural materials and methods, and what main functions do these structures serve? How have these structural features been modified over time? How does Lokoea fit into the larger cultural landscape of Kawailoa kai? And, what does Lokoea tell us about traditional Hawaiian landscape design and resource management?

In addition to thoroughly inspecting all of the historic-age (older than 50 years) structural features at Lokoea—mostly dry-stacked rock constructions, rock and mortar structures, and concrete work—we also studied the natural landscape and how it relates to the humanly-modified features. Archival research, consultation with KS and MLEF, and our direct observation also resulted in the identification of several other features than are either modern constructions (not historic-age features) or natural (non-archaeological) features of cultural interest and significance. We formally described a total of seven (7) archaeological features and eight (8) “other” types of features (Figure 9) (see also Monahan and Thurman 2015:57, Table 3 for a summary).

We completed eight (8) hand-excavated test units (TU-1 through TU-8) (see Figure 9). Excavation at Feature 1, the largest rock structure at Lokoea, demonstrated subsurface evidence of major structural failure and repair of the wall over time. We discovered such evidence at both places we dug (near the middle of the wall and at the makai end). In the middle of the wall, we recovered a carved wooden artifact—believed to be a tiller, or handle, of a composite rudder of a small western-style sail boat—near the base of TU-1, just above the water table. Its form and inferred function, taxonomic identification (non-native Douglas fir), radiocarbon dating (early 19th century) and stratigraphic context all suggest Feature 1 has been more or less completely rebuilt during the historic period. We found a buried concrete sluice gate just makai of the current gate at the makai end of Feature 1. Archival evidence and direct observation indicate the exterior of this wall was completely rebuilt after 1957. Regardless of this evidence of reconstruction and repair, the earliest (1928) aerial photograph we have depicts Feature 1 in the same position and orientation it is today; and John Papa ‘Ī‘ī’s comment about the “sluice gate” at Lokoea in this general location around 1810 (‘Ī‘ī 1959:98) seems to suggest it is a pre-Contact (prehistoric) construction.

Excavation at Feature 2, the smaller wall connecting the central island to the east side of the property, demonstrated that its core construction materials and methods differ from Feature 1; they appear to be a traditional style, even though we believe, based on our analysis of aerial imagery, that Feature 2 appears to post-date 1928. Based on the 1928 aerial photograph, we believe this wall originally connected the natural cluster of small coral outcrops (which we have designated Feature F) with the east side of the fishpond (the natural bluff). As the 1928 aerial suggests, this would have meant the cluster of coral outcrops—today a series of “stepping stone”-like mini-islands—was once filled in with sediment and connected with the central island. Thus, the current Feature 2 wall appears to have been built in the 1930s with some subsequent alterations (e.g., the culverts appear to be 1960s structures).

We did not excavate at or around Feature 3 (the Keiki pond) because we are sure its major structural components date from a phase of construction in the 1960s; thus, it is not an original structural component of Lokoea.

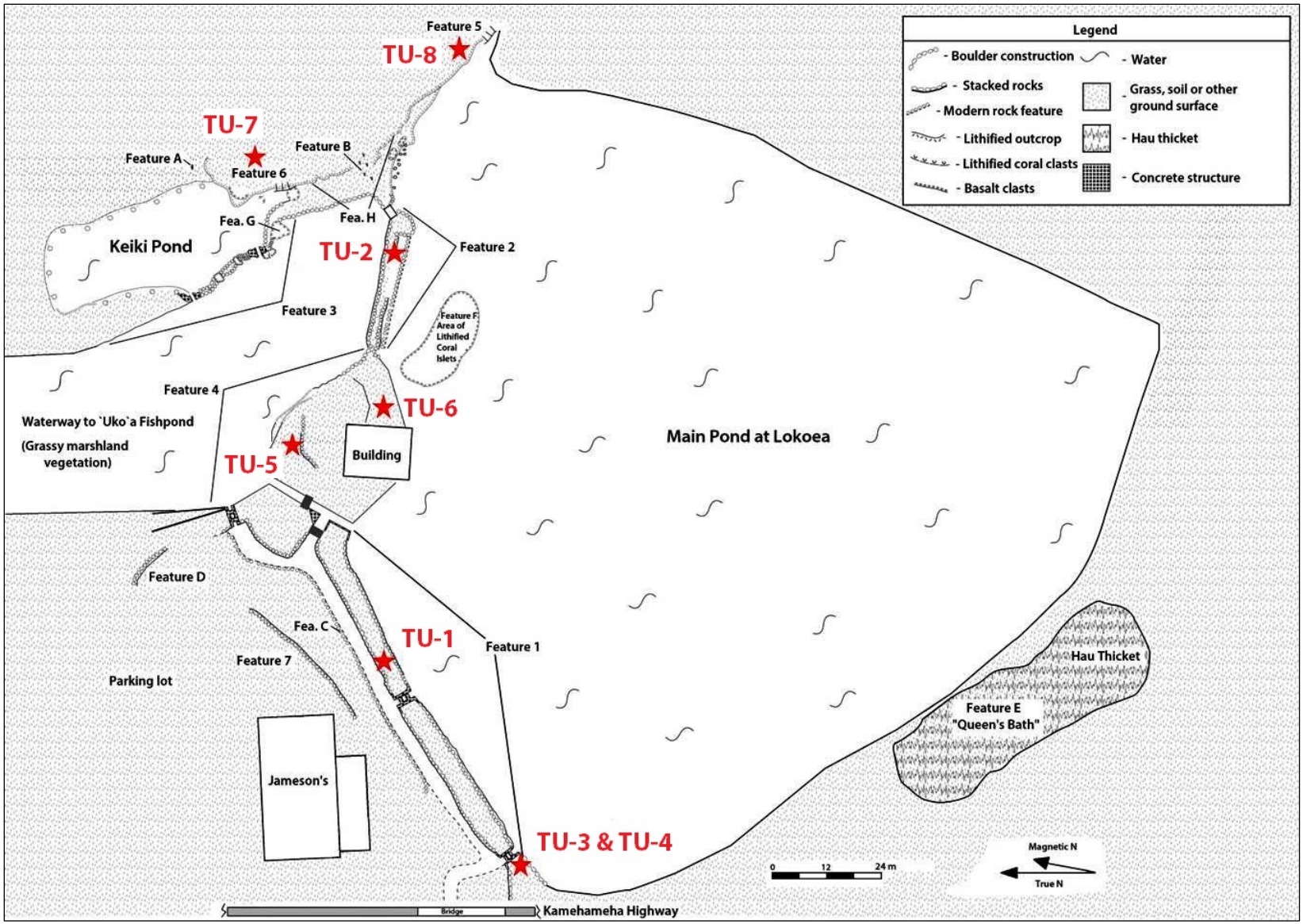

Figure 9. Plan view of Lokoea showing the seven (7) archaeological features, eight (8) "other" features, and location of eight (8) test units; note, Jameson's is now the Haleiwa Beach House restaurant

At Feature 4, the central island, we recovered traditional Hawaiian artifacts in excavation near the base of a test unit (TU-5) on the north-side lower terrace area. As far as we know, these finds—a basalt net weight or sinker, a possible hammerstone and several pieces of fire-affected rock—are the first traditional Hawaiian artifacts recovered in a controlled excavation at Lokoea. Unfortunately, these artifacts were not associated with a subsurface feature that could be dated; however, they do come from a discrete sedimentary layer that could be re-located in the future for additional investigation. A wood charcoal sample from a subsurface fire place feature on the south side of the central island (TU-6) was identified as Douglas fir, and we did not submit it for dating because it is not a pre-Contact (prehistoric) feature. Both of the excavations on the central island confirmed our hypothesis that it was originally built by filling in of sediments around, atop and between coral outcrops. This feat of civil engineering, or landscape design, was most certainly one of the earliest Hawaiian alterations to Lokoea; and it enabled the construction of the fishpond walls (Feature 1 and 2) that collectively (with the central island) separate Lokoea from ʻUkoʻa.

Excavations on the top of the bluff along the east side of Lokoea (TU-7 and TU-8) failed to identify any old deposits; and it would appear this upper area has been thoroughly scraped (graded or bulldozed), thus erasing what must have once been a habitation area with an overview of the fishpond.

Although it is challenging due to the many instances of disturbance and rebuilding we documented, a large body of diverse information is consistent with the interpretation that Lokoea originated in pre-Contact times. The central island, which we have shown was originally constructed by infilling of sediments around, atop and between coral outcrops, seems to have at one time extended out further into the main fishpond where it connected with a smaller gated wall—the original Feature 2—that is no longer in the same position anymore. We have also demonstrated unequivocally that traditional Hawaiian artifacts are located in deep deposits under the central island.

As a result of the information provided in the AIS, TCP Hawaiʻi evaluated Lokoea, in its entirety, including all seven of the archaeological features, as historically significant under criteria a, c, d and e. Criterion b applies because many aliʻi, including Queen Liliʻuokalani whose bath is adjacent to the pond, spent time at Lokoea. Criterion c applies because of the quality of much of the wall building and overall engineering of the entire system, which ingeniously walls off the ʻUkoʻa waterway from the south end of the wetland, thereby creating what we call Lokoea. Criterion d applies because of the wealth of potential archaeological data that still lies locked in the subsurface deposits of Lokoea. Criterion e applies because of Lokoea's ongoing role in the perpetuation of the cultural practice of fish-farming and aquaculture by Native Hawaiians.

THEMATIC UNITS FOR PLACE-BASED EDUCATION AT LOKOEA

The plan is organized around several thematic units based on the results of the AIS, which have been summarized in the previous section. These themes, which reflect significant historical, cultural and archaeological aspects of Lokoea, can be used as educational tools for "place based" learning at Lokoea. They also represent objective end points for the specific recommended preservation actions. Different forms of preservation are proposed for different features and areas at Lokoea. In order for these recommendations to be relevant and useful to furthering the educational value of Lokoea, they should be directly linked to satisfying the thematic objectives.

The following is a brief summary of these themes, which can be expanded upon by educators practicing place-based instruction at Lokoea by referring to the results of the AIS report.

1. Puʻuone Fishponds, as Illustrated by Lokoea, Exemplify Fundamentals of Hawaiian Landscape Design

Hawaiian landscape design—as illustrated by puʻuone fishponds, in general, and Lokoea, specifically—is fundamentally about minimally altering the natural environment with man-made structures that enhance rather than over-power the inherent "lay of the land." Through the study of modern and historic maps and aerial images of Lokoea, along with being on the ground, one can appreciate the physiographic constraints and opportunities provided by variation in the local topography, soils, and hydrology; and one comes to understand why Hawaiians built this fishpond in this location as a way of taking advantage of its proximity to both fresh and ocean waters. A careful study of Features 1, 2 and 4, in particular, in the context of the waterway from ʻUkoʻa, the raised coral bluff and the "back beach" berm along Kamehameha Highway, exemplify fundamentals of Hawaiian landscape design.

2. Lokoea Exemplifies the Impacts of Local and Global Environmental Change in Hawaiʻi

Two independent yet interrelated hydrological changes are occurring, and have been occurring throughout recent and historical times: sea levels are rising and fresh-water inputs from terrestrial sources are lower than they once were. These conditions are different from those under which Lokoea was first constructed in pre-Contact times. Rising seas are part of a global environmental change whose impacts can be viewed directly at Lokoea—for example, during and after normal and storm-related high-tide events that exceed the fishpond's structural design capabilities. The structural features closest to the ocean, that is, the large wall and sluice gate (Feature 1), exhibit just such damage that needs to be stabilized. At the same time, anecdotal evidence (oral-historical as well as observations of weathering and patina on Lokoea's rock structures) suggests fresh water was once on the order of 2–3 feet higher in the historical past. This latter change—basically a reduction in available fresh water from overland (i.e., filling into the headlands of ʻUkoʻa and flowing down to Lokoea; plus, Lokoea's very own underground springs emanating from the base of the coral bluff)—may be reversible or at least improved by way of enacting changes in local and regional water management. Whatever happens going forward, these conditions are different from those under which the fishpond was first formalized and operated in pre-Contact times; and these differences are worth discussing and teaching about at Lokoea.

3. Lokoea as the Gates of the "Long House" of ʻUkoʻa

We believe the observation should be made more explicitly that the structural features at Lokoea constitute the mākāhā for the entire ʻUkoʻa-Lokoea system stretching back through Kawailoa (the-long-water) over a mile. As highlighted on page ii of this plan and also in the AIS report, 19th-century accounts in Hawaiian newspapers describe tidal waves that filled the Lokoea Stream with sand but did not harm the fishpond's most valuable resources because the "gates were well guarded." Even though

they have changed in materials and construction techniques over time, it is clear that the gates along Feature 1 and around the central island (Feature 4) still offer a great deal of flexibility in terms of managing water inputs from the ocean versus the land; and, although environmental conditions have changed through time, these management principles have not. Lokoea's structural features are still, to this day, a critical buffer between ʻUkoʻa and the ocean, as well as a vital resource management tool for the entire system. Without the structural features at Lokoea, there would be no manageable fishpond complex at either ʻUkoʻa or Lokoea. Lokoea would be nothing more than the southern end of a long marsh without these gates and structures.

4. Lokoea and ʻUkoʻa as a Single Unitary Entity

If Lokoea is to be fully understood from a Hawaiian perspective, and if its value and significance as a natural and cultural resource is to be holistically realized, educators must stress the plain fact that, from a physical standpoint—that is, taking into consideration all geographic factors—Lokoea and ʻUkoʻa are a single entity. Available oral-historical information such as Hawaiian legends supports this interpretation. The knowledge that these fishponds are intimately connected both physically and metaphysically has powerful implications for their management going forward: changes enacted at one end of the system have impacts at the other end. In the AIS, we recommended the entire system be renamed the ʻUkoʻa-Lokoea Fishpond Complex to honor and reflect this Hawaiian reality.

5. Moʻolelo about Lokoea-ʻUkoʻa Reflect its Supernatural Attributes that are Intrinsic to Hawaiian World Views

There are quite a few legendary accounts about ʻUkoʻa-Lokoea that can be organized and understood in the context of how they express a sense of mystery and supernatural appeal. For example, the fish of these fishponds have been described as "very strange" and "extraordinary" (e.g., see Kamakau's translated quotation, p. iii of this plan). The guardian moʻo Laniwahine is described as a fierce and terrifying force who must be honored and obeyed but never crossed. The caves along the coral bluff at Lokoea may be places where Laniwahine once lived or rested. There are legends about subterranean passages from ʻUkoʻa to the sea. Laniwahine is sometimes described as a human woman and sometimes as a shark, along with her brother, Puhiʻula. All of these oral-historical accounts exemplify a common Hawaiian tradition of imbuing valuable resources such as fishponds with otherworldly attributes, mystery, and even danger in order to keep people from abusing them. This is a kind of ecology or environmentalism that is characteristically Hawaiian, and this powerful sense of mystery is still very much in evidence today if one spends any serious quiet time at Lokoea.

CONSULTATION

Initial Efforts: AIS & Development of First Draft Version of Preservation Plan

Prior to the start of fieldwork for the AIS, in December, 2012, we initiated formal consultation with the State Historic Preservation Division (SHPD) and with the Office of Hawaiian Affairs (OHA), notifying these agencies of our intention to conduct an HAR § 13-276 AIS in support of a proposed project to develop a Preservation Plan (see Appendix B). SHPD did not formally respond, but OHA replied in writing in January, 2013[8] (HRD12_6576), indicating support for the project and recommending that additional consulting parties (other than MLEF) should also be part of the process moving forward (see Appendix B).

In 2013–2014, Chris Monahan met several times on site with James Estores, (then) primary steward of Lokoea and co-founder—along with Benson Lee—of MLEF. We had conversations about developing a Preservation Plan (PP) for Lokoea. We talked about transforming the fishpond to an appearance and style that most closely reflects its traditional Hawaiian design and construction while recognizing the overall objective of having a working fishpond. We also discussed the practical realities of accomplishing these objectives in the modern world under different conditions than in the past. James was 100% supportive of our efforts to develop a PP that attempted to balance these overall goals. We developed a relationship of trust that TCP Hawai‘i would always work in a pono (righteous) manner on behalf of Lokoea.

Recent Efforts: Current Version of Preservation Plan Based on MLEF's Proposed Project

In 2015, we were contacted by the new Executive Director of MLEF, Rae DeCoito, who invited TCP Hawai‘i to join a working and planning group dedicated to revising and implementing the PP in support of MLEF's overall efforts to return Lokoea to a working fishpond.

In addition to extensive and substantive email consultation, we also attended a half-day consultation/collaboration session with the working and planning group at Lokoea on April 28, 2015. Attendees included: Rae DeCoito and other MLEF staff, KS staff, Buddy Keala and Chris Monahan. We discussed both the AIS and the first draft version of the PP. We conducted a site inspection of all the archaeological features. And, we discussed the specifics of the Proposed Project (fishpond repair and maintenance) as well as the preservation measures for each archaeological feature.

On September 22, 2015, we attended remotely (by phone) another consultation meeting with the working and planning group at Lokoea.

Following this meeting, we had numerous email and phone consultation communications with both Rae DeCoito and Buddy Keala regarding our drafting of a revised PP (the current document) as the Proposed Project specifics became finalized.

Ongoing Efforts

Once the current plan has been circulated for internal review and revision—with staff of KS, MLEF and MLEF's fishpond consultant Buddy Keala all having weighed in and concurred—we will distribute draft copies to other consulting parties, including Native Hawaiian organizations (NHO) and individuals. A preliminary list at this time includes: OHA, Hi‘ilei Kawelo (Executive Director, Paepae o He‘eia), and Ah Lan Diamond (Cultural Programs Director, Waimea Valley). The latter two consulting parties have extensive, practical experience with fishpond repair and maintenance (Hi‘ilei) as well as place-based cultural education and practice programs (both wāhine). This consultation list may be expanded. Any substantive results of ongoing consultation efforts will be included in the final PP. We will not request a final review from SHPD until reasonable consultation efforts have been completed.

[8] OHA's letter is incorrectly dated January 7, 2012, but it should be 2013.

PRESERVATION ACTIONS AT LOKOEA

There is a common misconception that Preservation Plans are basically about putting a fence around something and leaving it alone forever in order to "preserve" it. This outdated concept does not apply very well to Hawaiian fishponds, which have increasingly become integral to the resurgence of traditional cultural practices in Hawai‘i; and, it certainly does not apply to Lokoea, which is an active place visited by numerous educational groups. The preservation rule (HAR § 13-277) is formally entitled "Archaeological Site Preservation and Development Plan" because there are many possible actions one can take in the name of preservation besides simply "leaving it alone."

In fact, in the preservation rule's listing of the main components of a Preservation Plan, it includes a brief description of several possible "forms of preservation": avoidance and protection (conservation), stabilization, rehabilitation, restoration, reconstruction, interpretation, and appropriate cultural use. Thus, the rule was clearly written in anticipation of supporting a wide variety of creative solutions to managing historic properties in the name of preservation and development. The rest of the rule deals almost entirely with physical buffers geared mainly towards protecting significant historic properties during and after construction projects. The rule also discusses the need to describe the consultation process. All of these components are included in this section.

In general, as discussed in the Introduction, the overarching objective of this plan is to strike a balance between fishpond function, historical authenticity, and practical matters. In essence, we are trying to simultaneously transform and improve a working fishpond while we strip away and replace modern materials and methods with something the original designers and builders of the fishpond would recognize. All of this must be carried out with due respect to regulatory constraints and other contemporary concerns that were not necessarily relevant throughout most of Lokoea's history. We need also look to the future and consider the potential impacts of changing environmental and socio-economic conditions. Some of these—for example, global climate change and sea-level rise—are clearly beyond the reach of anyone at Lokoea, and it makes no sense to plan otherwise, so we need to anticipate dealing with high tides and tidal surges when considering changes to the fishpond. Other changes—for example, increasing the availability of fresh water or the number of professional staff—may be possible, and thus, can be considered as components of future planning.

The *forms* of preservation and development at Lokoea can be conceptualized as points along a continuum of **interaction** with its constituent features, from no interaction, or "none" (avoidance and protection), to active interaction, or "intensive" (appropriate cultural use). No interaction, also known as "passive preservation," means in essence putting a buffer around something and leaving it alone. Active interaction, or "active preservation," prioritizes the appropriate cultural use of a site or feature above and beyond the historic value of leaving it alone. Some of the other possible forms of preservation such as stabilization, rehabilitation, restoration and reconstruction are intermediate steps between "no interaction" and cultural use. The last form of preservation, interpretation, involves the recovery of additional data during the course of implementing these intermediate steps.

As summarized below and in Table 1, different features are proposed for different forms of preservation. The features are described and documented in detail in the companion AIS (Monahan and Thurman 2015). Following this feature-by-feature discussion, we have a separate section on the use of mechanical excavation at Lokoea.

Finally, the feature-by-feature discussion below also includes some "Other Long-term Alterations" that are not part of the Proposed Project, and not part of MLEF's plans going forward. We have included these other observations because they may be useful in the future. These are mostly aesthetic changes that do not impact the fishpond's functionality, and, if implemented, will not have an adverse impact on the historic property of Lokoea or its component features.

Table 1. Forms of Preservation for all Features at Lokoea

Fea.*	Formal Description	Forms of Preservation	Comments
1	Main fishpond wall: sediment-filled, rock-retained wall w. cast-in-place concrete & metal sluice gates	1. Appropriate cultural use 2. Repair & maintenance 3. Other recommended long-term alterations**	Portions of this feature require immediate repair, including part of south-facing wall and makai sluice gate; cleaning and removal of specified materials is also recommended
2	Smaller fishpond wall: core-and-fill rock wall w. prefabricated concrete culverts	1. Appropriate cultural use 2. Repair & maintenance	Recommended actions: closing off (filling in) makai culvert; replacement of mauka culvert w. new sluice gate; widening of Feature 2 wall; cleaning/ removal of specified materials
3	Mortar and rock walls, natural basalt outcrops, earthen and boulder embankments	1. Appropriate cultural use 2. Other recommended long-term alterations**	Minimal actions needed (see text)
4	Central island containing house, rock terracing, concrete and hollow-tile retaining walls, concrete sluice gates and holding tanks	1. Appropriate cultural use 2. Other recommended long-term alterations**	Portions of this feature require immediate stabilization, including the concrete and hollow-tile retaining walls; in general, we recommend working to restore a "plantation-era" (1930s) look and feel to the structures on the central island
5	Small cave under south end of lithified reef outcrop	1. Avoidance and protection (conservation) 2. Appropriate cultural use	Appropriate cultural use defined as visiting this cave only, but not entering; it should be kept clean up of rubbish
6	Small cave under north end of lithified reef outcrop	1. Avoidance and protection (conservation) 2. Appropriate cultural use	Appropriate cultural use defined as visiting this cave only, but not entering; it should be kept clean up of rubbish
7	Low, dry-stacked rock wall	Avoidance and protection (conservation)	Passive preservation (leave it alone)
A	Kū pōhaku on prepared rock base	Avoidance and protection (conservation)	This recent construction should be protected
B	Earthen/ boulder ramp to top of bluff from east end of Feature 2	None	This feature is not historic in age, but its alteration could affect historically-significant features
C	Low, dry-stacked rock wall	None	This feature is not historic in age, but its alteration could affect Lokoea Stream
D	Dry-stacked rock wall on north side of driveway into the property	None	Treatment of this recent construction is not a historic preservation issue
E	Hau thicket/ "Queen's bath"	Avoidance and protection (conservation)	This area is probably a wahi pana and should be protected
F	Group of small islets of lithified coral reef in main pond	None	This feature, which is not historic in age, should be cleaned up and restored to its natural state
G	Possible Koʻa pōhaku (shrine)	Avoidance and protection (conservation)	This natural feature should be protected
H	Informal stacking and in-filling of cracks and pukas along bluff	None	This feature is not historic in age, but its alteration could affect historically-significant features such as the caves

* Numbered features are historically-significant component features of the historic property of Lokoea; lettered features are "other" non-historic properties
** Other recommended long-term alterations = These are not related to the Proposed Project as described in this plan; these are included as possible forms of preservation that may be implemented in the future

Feature 1 – Large Gated Wall Separating Lokoea Stream from the Main Pond

Appropriate Cultural Use

Appropriate cultural use involves ensuring that Feature 1 continues to carry out its main functions: first, to create a barrier between the main pond and the stream; and, second, to allow for the control of water flow on either side of the wall through its two sluice gates.

In order to maximize the *quality* of cultural use of this feature, it would be beneficial to clean up and remove all unnecessary infrastructure not directly related to its function. Starting at the west end of Feature 1, there is a lot of material (primarily security barriers) that should be removed (Figure 10 and Figure 11). These materials include metal posts and chain-link fencing, barbed wire, old signs, and an old wooden gate with heavy posts, which detract from the aesthetic appeal of Lokoea and do not really deter would-be trespassers anyway, who can easily get around these obstacles. There are also old utility pipes and conduits (either water or electrical) which are no longer functional and should be removed.[9]

Repair & Maintenance

1. The south side of the west half of Feature 1 needs to be repaired due to storm damage. According to James Estores, this damage was caused by the 2011 tsunami centered near Japan. Other than the makai sluice gate, whose structural integrity was compromised by storm damage in the 1980s, this south section of the west half of Feature 1 is the most damaged part of the wall (Figure 12). It is important to reiterate information summarized earlier in the report (and in the AIS by Monahan and Thurman 2015) that this collapsed section dates from no earlier than circa 1957—it was part of an earlier repair job that added rock material to the sides of the older wall in order to reinforce it. Therefore, the needed repair will consist of resetting and restacking rocks that were placed there no more than 59 years ago. Repair of this section of Feature 1 will consist of removing loose rocks from the damaged area and resetting/restacking them to fit with the overall line of the existing Feature 1 wall. All work will be dry-stacking with no mortar. Rocks from the partially collapsed section of Feature 1 that have fallen into the main pond may be used to repair this wall section. The final visible courses of rock will resemble the existing Feature 1 wall in terms of their average size and edge rounding.
2. Spot repair of the soil-sedimentary ground surface of Feature 1 is needed at several places where small "sink holes" are present. Rock-free, terrigenous sediments (preferably silty clay but not silt or sand) should be manually compacted into these holes. Silty clay is the preferred material because it is relatively impermeable but still flexible.10 Pure clay has a tendency to contract and crack when dry, which can lead to movement of the core of the wall. Pure silt is not impermeable enough.
3. Replacement of the cast-in-place concrete and metal sluice gate at the makai end of Feature 1 is needed because this structure is cracked and failing and will soon fall into the pond. It was originally built in the 1930s, then repaired in the 1980s. It should be rebuilt using comparable materials as used in the 1930s, resulting in a consistent appearance with its companion gate in the middle of Feature 1. The most distinctive feature of this building style is an uppermost finish course of dressed basalt blocks.

[9] The white PVC pipe running from Kamehameha Highway along this feature is the fishpond's sole source of potable water and should be avoided by any clean-up activities.
[10] This is the type of sediment (silty clay) we encountered when we excavated into the central core of Feature 1.

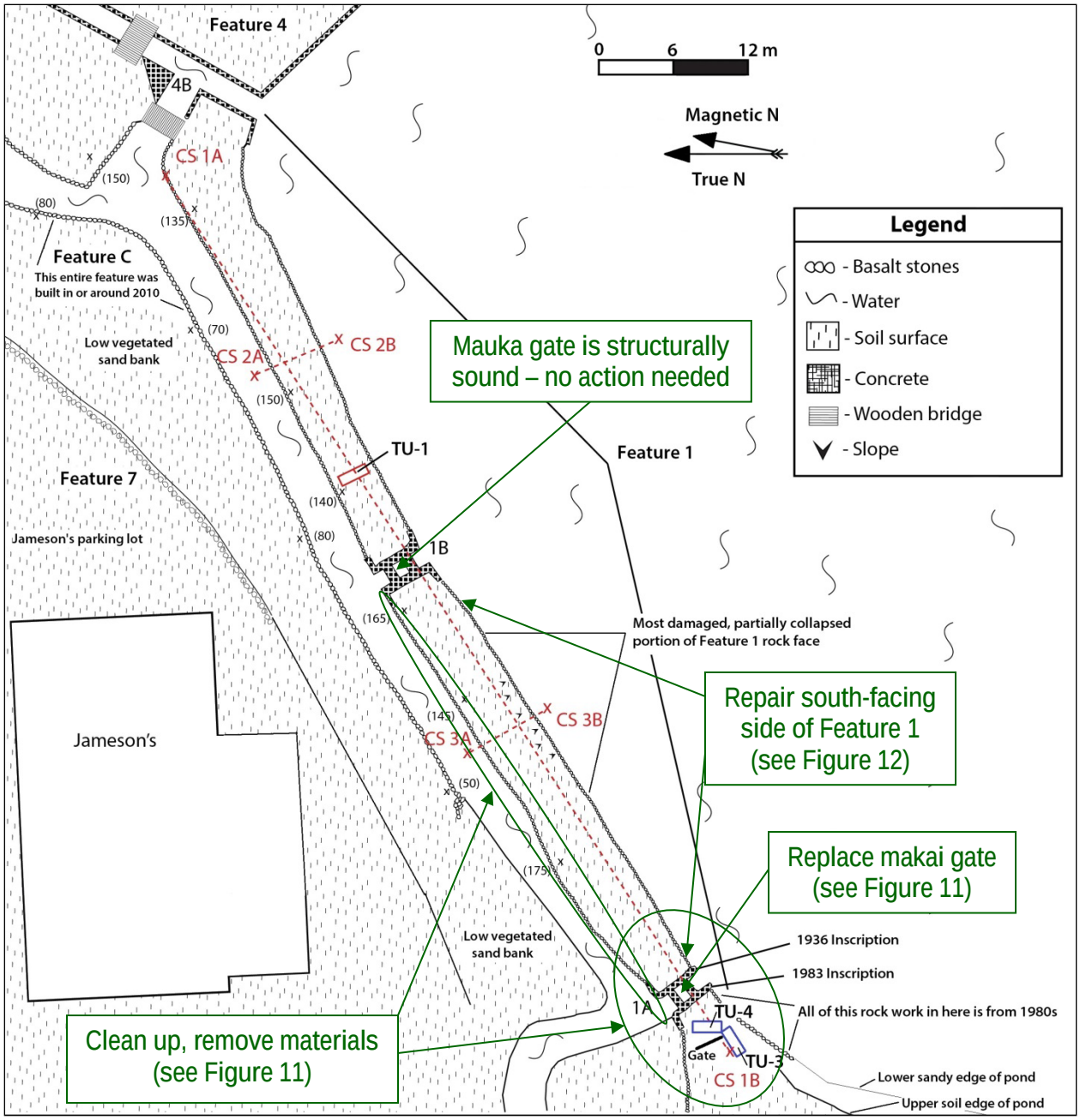

Figure 10. Feature 1 plan view with preservation actions indicated in green (see text for complete discussion); note, Jameson's is now the Haleiwa Beach House restaurant

Figure 11. West end of Feature 1 showing some of the materials (arrows) that should be removed in order to improve the aesthetic value of Lokoea, view west; note structural cracks in concrete gate

Figure 12. The main area of collapse that needs to be stabilized on Feature 1 along its south side at the west end; view northeast

Other Recommended Long-term Alterations – Not Part of the Proposed Project

One long-term alteration that is not part of the Proposed Project, would not affect its functionality, but would improve its overall appearance, is to strip away the current (constructed circa 1957 or a bit later) outer, retaining walls of Feature 1, particularly the mortar between and around the angular and sub-angular boulders. This outer retaining wall—which is not original to Feature 1—could be replaced with dry-stacked, rounded and sub-rounded boulders, which are the original materials and construction methods (Figure 13). The AIS fieldwork demonstrated that the latter style—which is exemplified most effectively by the existing north side of Feature 2 (the smaller wall connecting the central island to the mauka [east] side of the fishpond), resembles the old appearance of Feature 1 before it was modified in the late 1950s. Given the likelihood of a significant sea-level rise, and the possibility of there being more frequent, future storms of an intense nature, it seems unwise to reduce Feature 1 back to original (lower and narrower) dimensions (as demonstrated in the AIS). Instead, repair work should focus on not disturbing the old core of the wall, but only its outer (late 1950s) surface. In this way, the wall would continue to be a formidable structure, able to withstand tidal surges, but one that more closely resembles its traditional (original) appearance.

One cosmetic issue relates to the overall height of the upper ground surface of Feature 1. Over time, it appears the western end of this wall has been raised significantly by dumping "clean out" sediment from storm deposits that accumulate in the makai sluice gate and in the Lokoea Stream channel. A cross section of the long axis of Feature 1 shows it is significantly higher at the west end. Rather than try to level out the entire upper ground surface of the feature, it seems more reasonable to simply dump "clean out" sediments elsewhere in the future.

Figure 13. Representative section of Feature 1 on its north side illustrating the most recent (late 1950s) outer layer of angular rock and mortar over the original dry-stacked rounded boulders; view south

Feature 2 – Small Wall with Culverts Separating Main Pond from ʻUkoʻa Waterway

Appropriate Cultural Use

A properly functioning Feature 2 is vital to the overall health and operation of the fishpond. Appropriate cultural use of this wall with two culverts consists of ensuring it continues to create a barrier between the main pond and the waterway to ʻUkoʻa (which Buddy Keala calls the middle pond); and, thus, allows for the control of water flow on either side of the wall.

In order to maximize the *quality* of cultural use of this feature, it should be cleaned up of all unnecessary materials not directly related to its function. Starting at the east end of Feature 2, there is a short wooden utility pole—now abandoned and not wired up to any other pole—adjacent to the mauka culvert (Figure 14). Photographs from the 1970s supplied by KS for information only (not reproduced in this or the AIS report) show this was part of a wooden gate. A shorter wooden post, the other side of the narrow gate, is no longer in place, but a constructed base of mortar and rock is still there (Figure 15). All of this material—the utility pole and the mortared bases for both the pole and the post—should be removed. These were constructed during the 1960s phase of work at Lokoea. Near the makai culvert, there are assorted pipes and metal on the ground surface (south side of Feature 2) that should be removed.

Repair & Maintenance

1. The Feature 2 wall needs to be widened to improve safe pedestrian access between the central island and the mauka storage/warehouse area (on the elevated limestone flats). Large school and volunteer work groups frequently come out to Lokoea, and passage is currently single file on this narrow wall. Widening of the wall—which was constructed circa 1930—is also needed to allow for small mechanized equipment (such as a Bobcat or Tractor) to cross over the pond to the central island. Starting around 2010, MLEF staff began filling in along the south side of Feature 2 with assorted rocks (Figure 16; see Figure 14). MLEF proposes to complete this widening as depicted in Figure 14. *In order to preserve and protect the original Feature 2 wall structure*, completion of this widening effort will not move, remove or otherwise disturb the existing wall structure, which will be covered on its south side by the new rock and on its upper surface by soil-sediment. Also, the final courses of this widened wall, and any new courses that are visible from anywhere in or around the pond, when complete, will be dry-stacked pōhaku that are visually consistent with the existing (circa 1930) Feature 2 wall (Figure 17). This widening work will effectively create a veneer of circa 1930-looking dry-stacked pōhaku on the south side of the expanded Feature 2 wall. The overall finished height and profile (cross-section shape) of the widened wall should be consistent with the original (i.e., slightly tapered and wider at its base).

2. Close off (by filling in with pōhaku) the existing makai culvert at Feature 2, which was originally cut into the circa 1930 wall in the 1960s, is not part of its original design of this wall, and is not needed for operation of the fishpond (Figure 18). This closing off work will not use concrete or any other modern materials. Rocks and rubble will be used to fill in the existing breach in the wall. The final appearance of this wall, which will extend back to the central island, will be dry-stacked pōhaku that are visually consistent with the existing (circa 1930) Feature 2 wall.

3. Replacement of the mauka culvert at Feature 2 with a sluice gate using modern materials (e.g., concrete and milled wood) is needed for operation of the fishpond (Figure 19). None of the original, circa 1930 pōhaku will be moved, removed or otherwise disturbed by this work. When complete, the final courses of this new sluice gate, including any that are visible from in or around the pond, will be dry-stacked pōhaku that are visually consistent with the existing (circa 1930) Feature 2 wall.

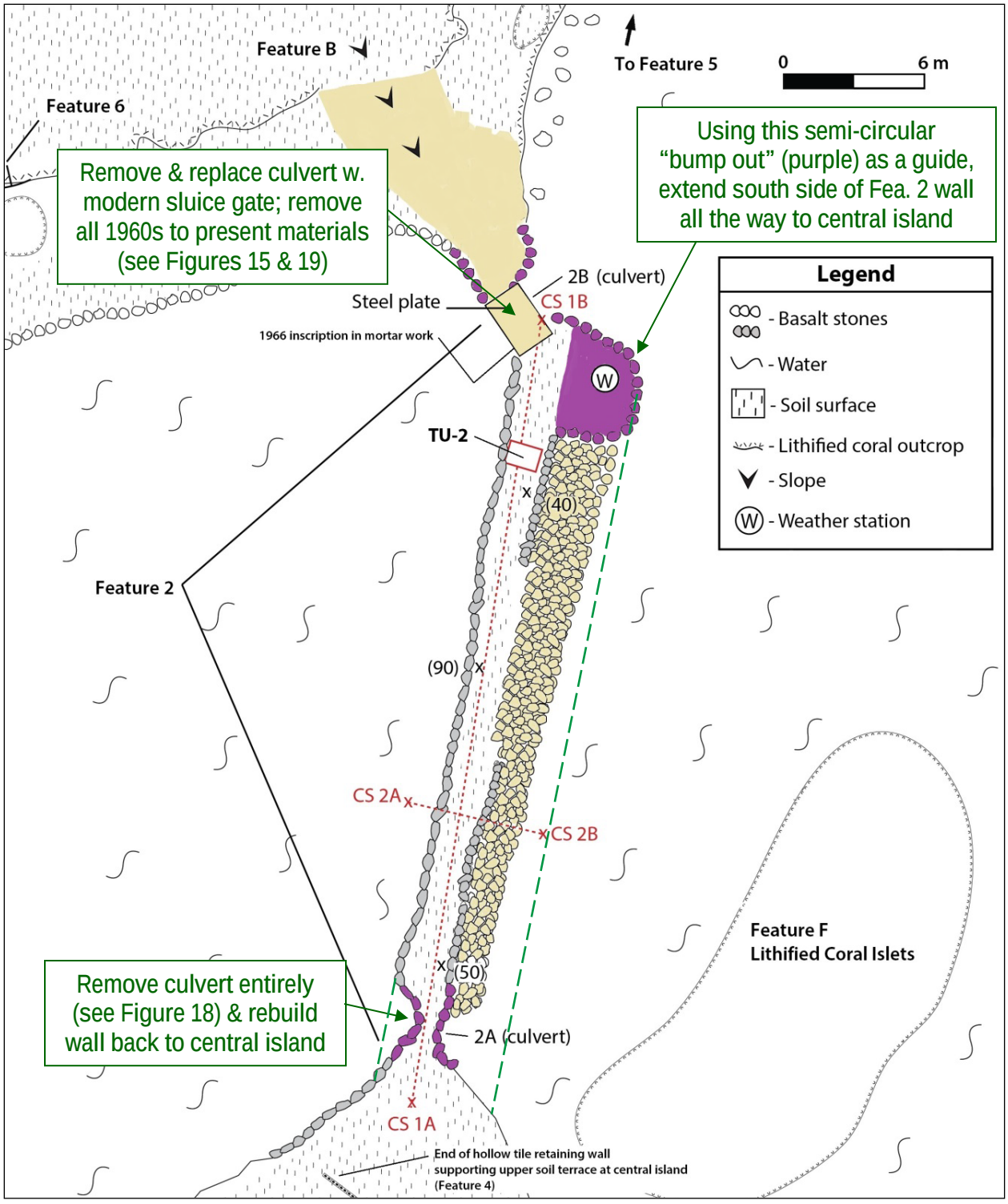

Figure 14. Feature 2 plan view with preservation actions in green; gray rock work is oldest; purple is 1960s work; yellow is circa 2010 work; green dashed lines represent lateral limits of proposed wall widening

Figure 15. Mauka (east) end of Feature 2 showing culvert under steel plate, abandoned wooden post (left) and base of constructed footing for what was once a gate post (photo scale sits in old footing); view east

Figure 16. Detail of south side of Feature 2 showing recently-added (circa 2010) rock material; view west

Figure 17. Representative section of north side of Feature 2 showing old-style (circa 1930s) design; view south

Figure 18. Makai (west) culvert that will be closed (filled in); view southwest

Figure 19. Mauka gate at Feature 2; everything left of dashed line will be removed; new sluice gate will be built into the dry-stacked boulder wall to the right; black arrow indicates weather station to be removed (if not already)

Feature 3 – Keiki Pond

Appropriate Cultural Use

Archival work during the AIS showed the Keiki pond (Feature 3) was not part of the original design of Lokoea. It was formalized as a separate pond in the 1960s. Prior to this time, it was a marshy spillway, or lateral (mauka) extension of the ʻUkoʻa waterway (similar to "overflow parking" for high water in the Lokoea-ʻUkoʻa system). MLEF's fishpond consultant, Buddy Keala, has determined this pond to be very useful "as is" for raising fingerlings, with no changes or little repair work needed except for plugging small gaps in the two existing sluice gates. Ongoing experiments with plugging these gaps have shown that organic matting from coconut palms (i.e., the sheathing that wraps around the trunks) creates an excellent (and traditional) seal.

Other Recommended Long-term Alterations – Not Part of the Proposed Project

From a functional perspective, there is no reason to ever dismantle or remove the Keiki pond wall or the sluice gates, which function well (Figure 20). However, one long-term alteration that is not part of the Proposed Project, would not affect its functionality, but would improve its overall appearance, is to cover the sides of the existing walls with a dry-stacked pōhaku veneer that is visually consistent with the existing (circa 1930) Feature 2 rock work (Figure 21 and Figure 22).

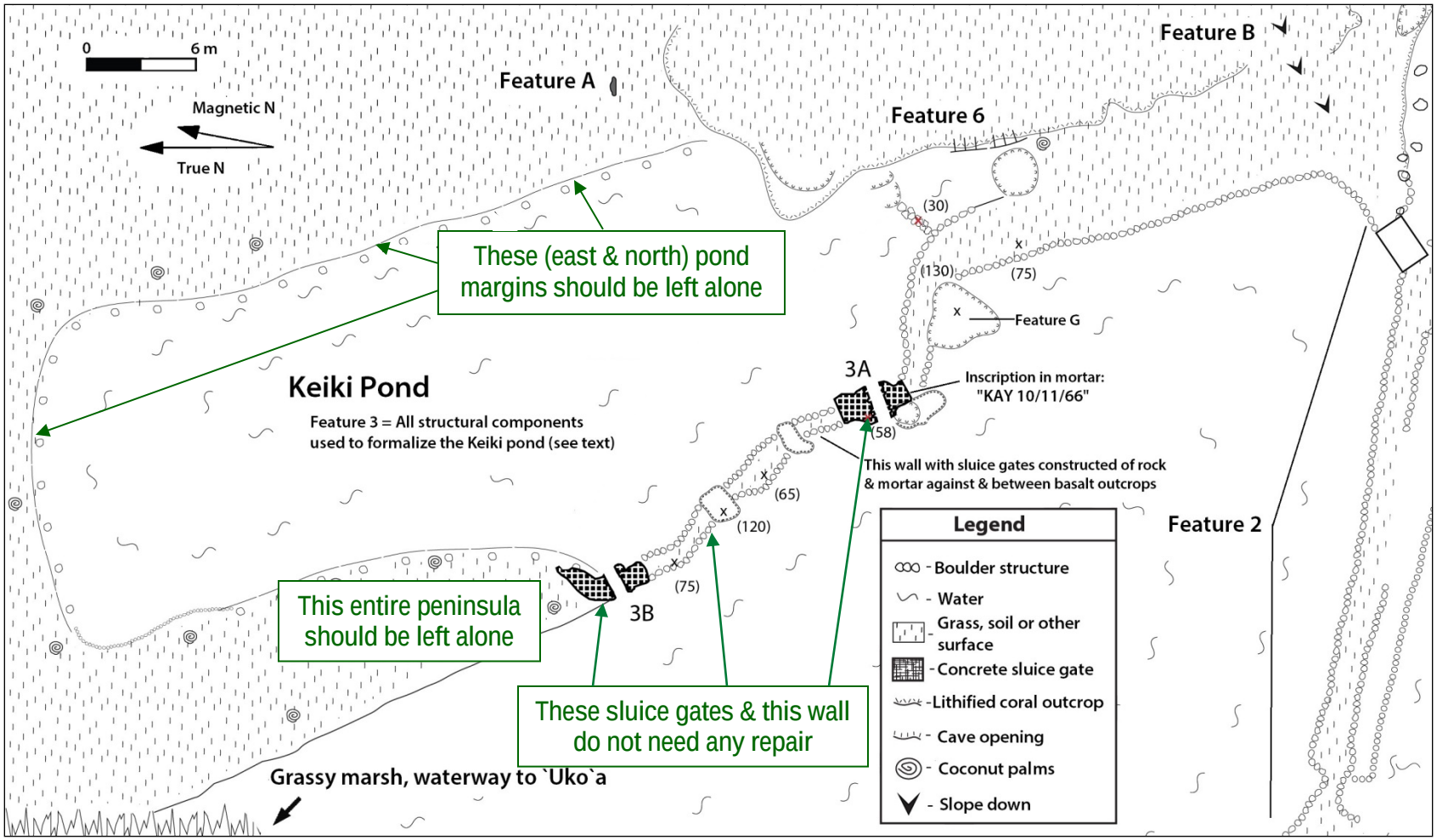

Figure 20. Feature 3 plan view with preservation comments in green (see text for complete discussion)

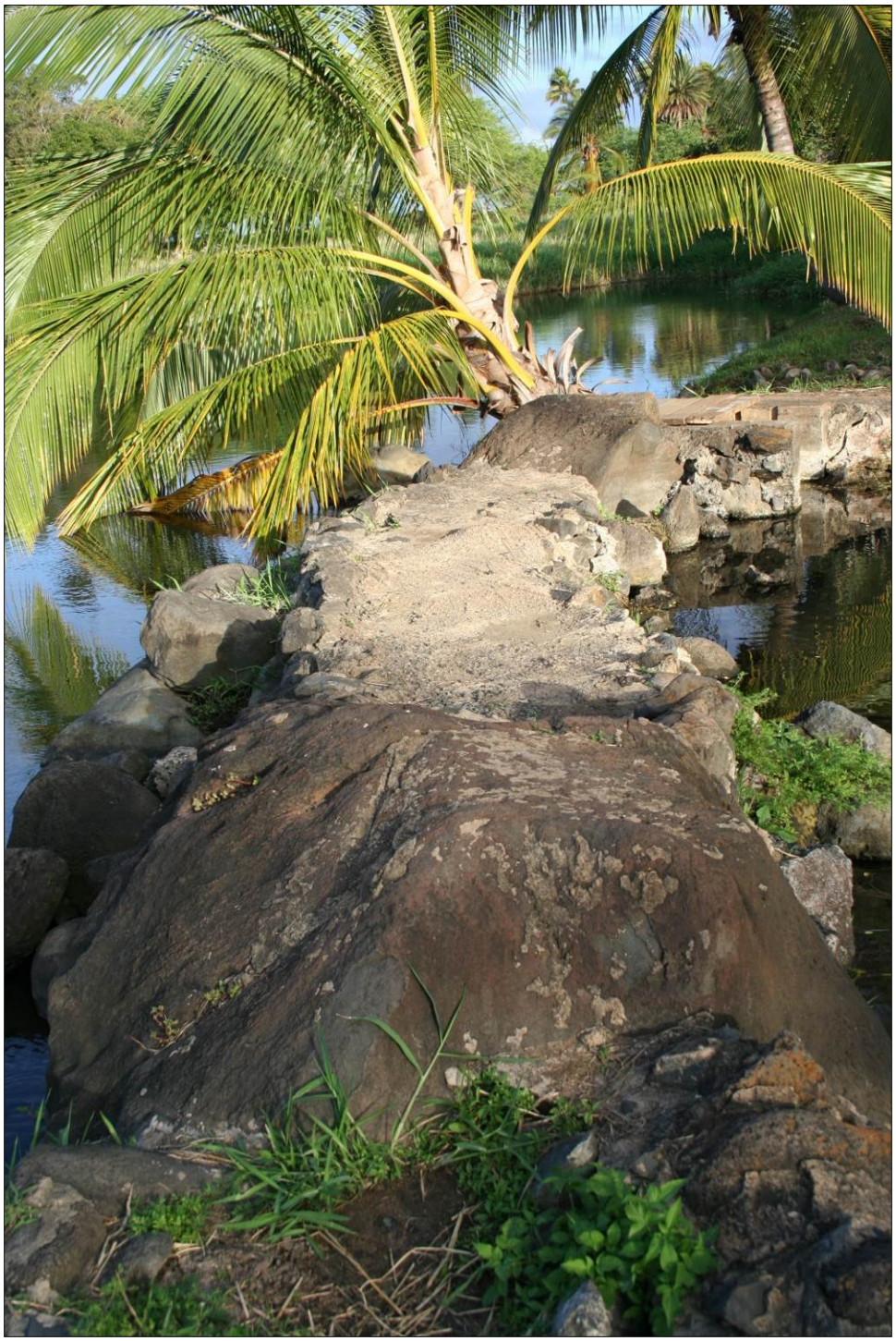

Figure 21. North portion of wall structure at Feature 3—which incorporates naturally-occurring basalt outcrops (foreground) connected by mortar-and-rock sections; view north-northwest

Figure 22. South portion of wall structure at Feature 3; view south-southeast

Feature 4 – Central Island

During the AIS, we documented a subsurface cultural layer (in TU-5) from the oldest human occupation at Lokoea and the original (presumably pre-Contact) construction of the central island. Our TU-5 appears to have sampled the north edge of the old central island. As long as deep, mechanical excavation is not conducted on the central island, this deposit—and any laterally-equivalent deposits—will not be affected (see also "An Archaeological Perspective on Mechanical Excavation at Lokoea," below)

Appropriate Cultural Use

Feature 4 is the gathering place for educational groups and cultural programs at Lokoea. It is also critical to the fishpond's operation as the central hub of the primary man-made structures (including Features 1 and 2) (Figure 23). In order to maximize the quality of its cultural use, we recommend clean up and removal of any materials not directly related to these functions: landscaping and construction equipment should be stored inside the storage room attached to the office or across the fishpond at the warehouse on the bluff. In general, the island should not be used to stockpile materials such as sand or soil or lumber.

Other Recommended Long-term Alterations – Not Part of the Proposed Project

Several long-term alterations that are not part of the Proposed Project, would not affect its functionality, but would improve its overall appearance, relate to the repair of several structural features on the central island (Figure 24 to Figure 26): (1) the high concrete retaining wall supporting the west side of the upper terrace between the main building and Feature 1—this was built sometime between the middle 1940s and the 1960s (see Figure 26); (2) the concrete retaining wall supporting the northwest side of the lower terrace—this is part of the 1930s-era structures forming the central sluice gate system that cuts through the central island (see Figure 24); and (3) the hollow-tile retaining wall supporting the east side of the upper terrace—this seems to date from the same building phase as the high concrete retaining wall discussed above (middle 1940s to the 1960s). Repair of these structures is beyond the scope of the Proposed Project, but since they are historic in age (more than 50 years), their replacements should consist of similar materials that fit their time periods (i.e., 1930s–1960s).

Since they are currently functioning quite well, the various concrete and metal sluice gates and storage compartments/ holding tanks need not be altered or changed at this time. If they do need work in the future, they should be rehabilitated, restored and/or reconstructed in the 1930s style in order to maintain the "plantation era" feel of the central island.

There is a set of dry-stacked, rock-retaining structures on the east and northeast sides of the central island. These informally-constructed features vary in terms of their physical condition from fair to poor, and their age is unknown. Their integrity has been diminished over time by the growth of a large hau thicket that until recently covered this area. When and if this rock work needs to be replaced, it would be aesthetically pleasing if it were finished in the dry-stacking style seen along the north side of Feature 2. Likewise, if repair work is ever needed of the dry-stacked, rock-retaining structure between the lower and upper terraces on the north side of the island (see Figure 25), it should be built in this Feature 2 style.

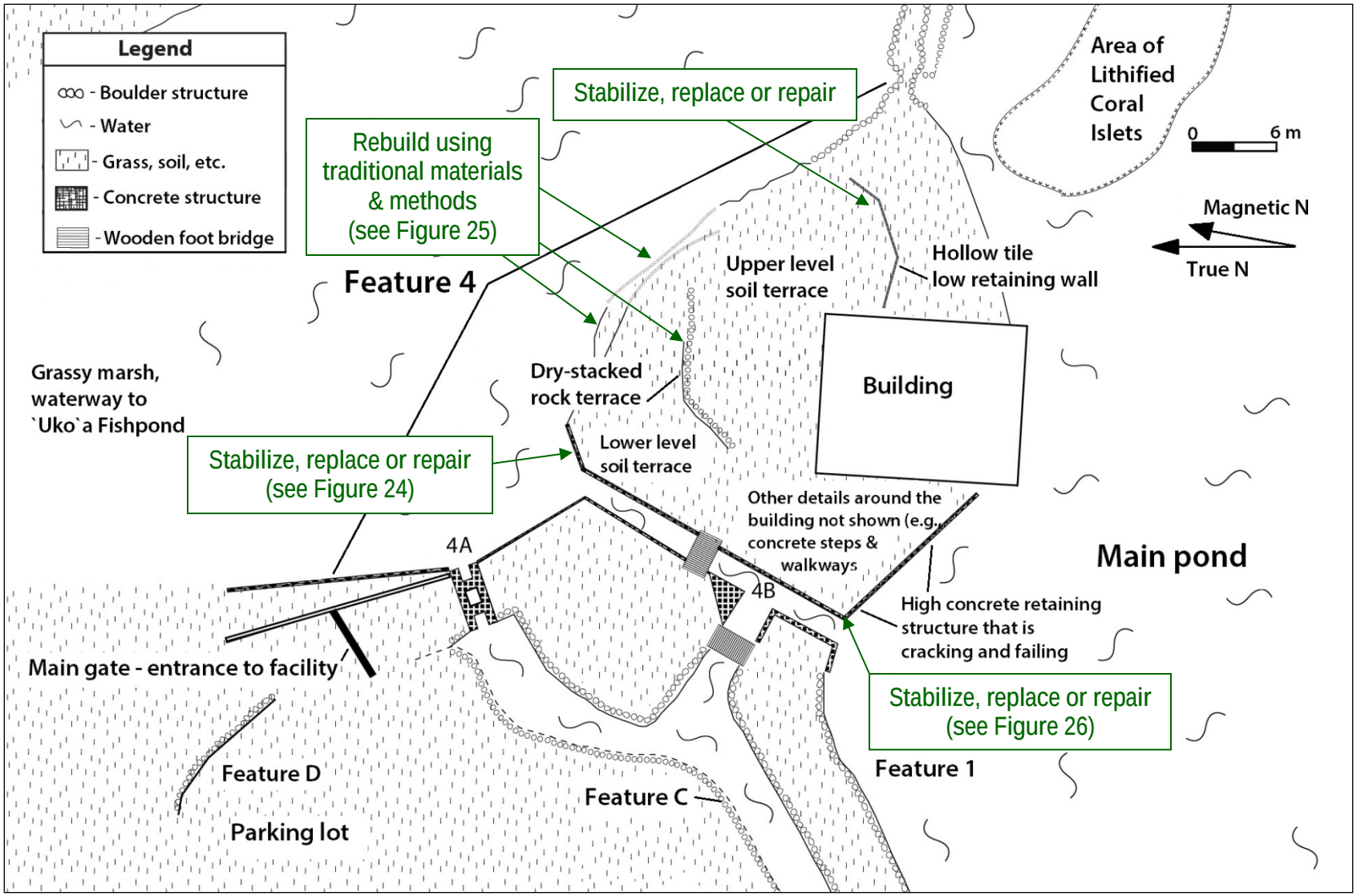

Figure 23. Feature 4 plan view with other recommended long-term alterations in green (see text for complete discussion)

Figure 24. View of central island from main gate (entrance); structure needing stabilization indicated by yellow arrow

Figure 25. Closer view of the upper and lower terraces; we believe there is a cesspool or tank in the upper terrace

Figure 26. Damage to high concrete wall supporting the upper terrace upon which the main building is located

Features 5 and 6 – Small Caves Under Limestone Bluff

The two small caves along the east side of Lokoea are discussed together because their preservation treatments are identical. Neither of these will be impacted by the Proposed Project.

Avoidance and Protection (Conservation)

These small caves with pūnāwai should be avoided and protected from disturbance in perpetuity. There is no reason to erect any physical barriers in front of these caves, which would only draw attention to them. Feature 5, the south cave, is relatively inaccessible from the Lokoea property; in fact, it is easier to access from the adjacent property (TMK [1] 6-2-003:001), and it would be a good idea to work with the landowner to educate he/she about staying away from it.

Appropriate Cultural Use

As documented in the AIS report, the north cave (Feature 6) contains a triangular upright slab of lithified coral several feet inside the drip line (Figure 27). We did not find any other items of possible cultural significance in either of the caves, but the presence of fresh water springs and association with the moʻo Laniwahine (some believe one or both caves may be her home) suggests some Native Hawaiians may wish to visit these quiet places for cultural or religious purposes. We recommend these caves be kept clean of rubbish in recognition of their special value.

Figure 27. White-colored upright coral slab within the north cave (Feature 6); the slab is about 40 cm high

Feature 7 – Dry-stacked Rock Boundary Wall

This feature will not be impacted by the Proposed Project.

Avoidance and Protection (Conservation)

This low, dry-stacked rock wall along the property boundary with the old Jameson's (now Haleiwa Beach House) parcel should be avoided and protected from disturbance in perpetuity (Figure 28). The rock work suggests it was built in the 19th century and likely represents a boundary marker. It would be a good idea to work with the adjacent (Jameson's parcel) landowner to educate he/she about the wall's preservation status.

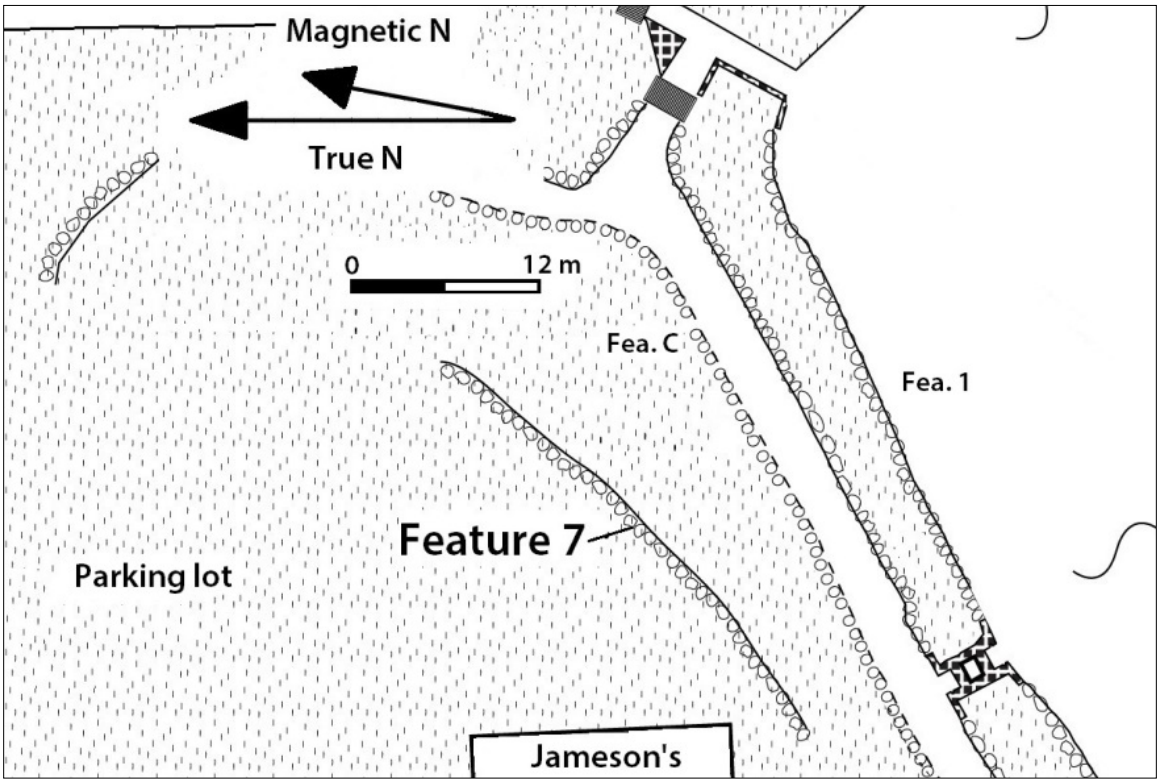

Figure 28. Plan view showing the location of Feature 7, dry-stacked boundary wall along the TMK boundary with 6-2-003:014; note the building (mauka edge of its footprint is shown at the bottom) is now Haleiwa Beach House restaurant (not Jameson's)

Other Features

As documented in the companion AIS report, eight other features were identified that are *not* historic-age archaeological sites. Some of these have cultural, historical or spiritual value to people once or currently associated with Lokoea (e.g., the Queen's bath, a modern Kū pōhaku and a possible Koʻa shrine); some of these were recently built by MLEF and previous pond tenants to meet their resource management needs (e.g., the low rock-retaining feature on the north side of Lokoea Stream). A dry-stacked rock wall by the driveway (main entrance to the property) was recently built during an educational program.

In general, we did not investigate or research most of these "other" features in great detail, because it fell outside of our scope of work. We did gather informal observations and manaʻo from KS and MLEF personnel. The primary reason for including these features is to aid in future cultural resource management of Lokoea by memorializing the presence of phenomena that will pass into historic "old age" someday if left alone. For the purposes of this plan, we have also included comments below to guide any future modification or removal of these features, which may, in some cases, affect intact or component features of the significant historic property of Lokoea.

Feature A – Kū Pōhaku

This shrine or guardian stone on the east side of the Keiki pond was built recently (circa 2010) by MLEF staff for whom it holds cultural and spiritual significance. The treatment of this feature is not strictly a historic preservation matter, but it would be desirable to avoid and protect (conserve) this Kū pōhaku. None of the preservation actions proposed in this plan will impact this feature in any way. In the future, should it be necessary to impact this part of the Lokoea project area and/ or move Feature A, it could be easily dismantled and rebuilt elsewhere. The single standing stone is balanced on a base of several small boulders and cobbles.

Feature B – Earthen/ Boulder Ramp up to Bluff

This ramp of earth and rocks was recently built by MLEF to connect the east side of the fishpond at Feature 2 with the raised bluff upon which sits the current warehouse facility. Previously, one had to scramble up the low cliff face or climb a small ladder to get to the top. This feature is not a historic property (it was built around 2010), but its constituent materials (earth and rocks) rest directly on and against landscape features (the ground surface underneath and the vertical bluff face to the east) that may contain significant cultural materials. If this ramp is ever removed or excavated out, it would be important to carefully consider the possibility of exposing old, intact sediments, in particular, the limestone bluff face and the underlying, original ground surface. Care should be taken to understand where the limestone cliff face begins, so it can be avoided by mechanical equipment; the same caution applies to the original (pre-ramp construction) ground surface underlying Feature B. We are not suggesting its recent construction damaged or covered any specific significant resources. Any major impact (such as mechanical excavation or alteration) to Feature B should be well conceived and carefully planned in consultation with someone who thoroughly understands Lokoea's natural and cultural landscape.

Feature C - Low, Dry-stacked Rock Wall along Lokoea Stream

This informally-constructed, dry-stacked, rock-retaining feature along Lokoea Stream is not a historic property; its alteration or removal will not affect any significant historic properties since it is located in a sandy stream bed that has been formed and remodeled many times by flowing water from both mauka to makai and vice versa. This feature was built recently (in or around 2010) by MLEF to stabilize and keep in place the north bank of the stream as it flows from the ʻUkoʻa waterway past Jameson's (now Haleiwa Beach House) to the sea; and as ocean water flows in during high tide events. Photographs from the 1970s show the stream channel used to meander through this area, portions of which were slightly raised (elevated) and covered with vegetation. This meandering has been arrested and replaced by the now channelized stream. Altering or removing this recently-constructed feature might have implications for

hydrologists and regulatory issues related to water, but it does not raise any specific historic preservation concerns.

Feature D - Dry-stacked Rock Wall along Driveway into the Property

Treatment of this feature is not a historic preservation concern since it is a modern wall built in the last decade or less for educational purposes. Neither its alteration nor removal would cause any impacts to significant historic properties at Lokoea.

Feature E - Hau Thicket ("Queen's Bath")

We investigated this area during the AIS fieldwork, searching in particular for physical evidence of rock work consistent with a formal bath or pool within the hau thicket. We did not find any such evidence—the bushes are more or less entirely devoid of rocks (we found a grand total of two)—but there is a small earthen depression that may be the location of an old bath or pool. We also noted oral-historical information in Wyban (1992) that a previous tenant at Lokoea (Kearns) reportedly dumped dredged sediment from the main pond into the bath/ pool. In any case, regardless of whether any remnants of the bath/ pool can be identified (one could conceivably, for example, conduct trench excavation to search for formal rock work), the hau thicket, itself, probably qualifies as a wahi pana (legendary place) and should be protected. In February, 2013, Monahan observed the results of a recent, unsightly "trim job" of the hau bush (Figure 29 and Figure 30). We believe more care should be taken to cut back the hau bushes in the future if folks would like to continue respecting this wahi pana.

Feature F - Group of Small Islets of Lithified Coral

This natural feature of small lithified coral islets in the main pond adjacent to Feature 2 and the central island was once connected by a series of portable, arched wooden and metal walkways. These walkways appear in photographs from the middle 1970s and were probably installed during the 1960s period of transformation of Lokoea by the Kearns family. Today, these walkways are in ruins and scattered among the coral islets presenting more of a hazard than anything else. These walkways have no specific historic preservation value, and we recommend they should be removed. In general, these islets should be cleaned up of any and all artificial materials. In their clean, natural state, they contribute to the inherent beauty, setting and sense of place at Lokoea; and represent something that the fishpond's original caretakers would have recognized as authentic.

Feature G - Possible Koʻa Pōhaku

This natural landscape feature was described by previous tenants of Lokoea as a possible koʻa pōhaku (shrine), an interpretation which we do not agree with. For a number of reasons, including its physical location at the fishpond, it simply does not resemble koʻa with which we are familiar. There is no human modification of this feature, which is a naturally-occurring remnant of lithified coral directly overlying weathered pāhoehoe. Regardless of whether it is a koʻa, its unique shape and location likely had cultural significance to the fishpond's original inhabitants, even if we do not know the exact nature of this significance. Like the coral islets (Feature F), this rock formation contributes to Lokoea's unique beauty, setting and sense of place. This feature should be avoided and protected (conserved) as a valuable component of the traditional Hawaiian landscape at Lokoea.

Feature H - Informal Stacking and In-filling of Cracks and Pukas along Bluff

As described in the AIS, this feature—a series of several locations along the bluff face—is not historic in age, but appears to date from the last few decades. Its alteration, however, could affect historically-significant features such as the caves if the rocks filling the cracks and pukas are removed or disturbed. We recommend leaving these informal stackings and infillings alone since they are functioning as designed (i.e., to reinforce the bluff; to level the ground surface above the bluff face).

Figure 29. Results of hau thicket trimming, February, 2013

Figure 30. Detail of February, 2013, trimming of hau thicket

An Archaeological Perspective on Mechanical Excavation at Lokoea

There is a common misconception in historic preservation that no mechanical excavation whatsoever can take place at a significant archaeological site. At Lokoea, however, portions of the site have already been disturbed or have been filled in or created recently, making it highly unlikely that they contain historically-significant materials or subsurface features. For certain necessary actions at Lokoea, including stabilization of structural retaining walls, the use of mechanical equipment is probably unavoidable. This brief section and the map below provide some examples and "food for thought" going forward about this issue. This information is not intended to be comprehensive.

Figure 31 is a graphic depiction of a three-color coding system: red represents areas with a high probability of containing historically-significant materials and features in subsurface deposits; green represents areas with a low probability of containing significant, subsurface materials or features; and, yellow represents areas with a moderate probability of containing such materials or features.

We recommend not using mechanical excavation equipment in the red areas, most of which are difficult or impossible for large machines to access anyway. These areas include Feature 1; Feature 4 starting at the sluice gate near the main entrance; the older, intact portions of Feature 2; and the areas in, around and over the two small caves (Features 5 and 6).[11] If use of mechanical equipment such as backhoes or even smaller machines (e.g., Bobcats) is necessary, these excavations should be monitored by a qualified archaeologist working under an archaeological monitoring plan that specifies the type and extent of digging, the machine that will be used, and how the machine will avoid sensitive cultural resources. The plan should reference the AIS by Monahan and Thurman (2015).

For example, replacement of the makai sluice gate (Feature 1), which is structurally unsound, will likely require the use of mechanical equipment. The AIS found evidence of an older, buried concrete gate immediately makai of the existing gate starting at about a foot below the ground surface. The rest of this structure, which either comes very close to, or rests right against, the existing gate, should be exposed by hand excavation and documented prior to removal of the failed sluice gate. Extending further makai (to the west), the AIS found mostly disturbance and fill from a 1980s rebuilding effort, but possible remnants of the very oldest (traditional-style) wall were exposed in deep excavation, just above the water table; therefore, this area is yellow in Figure 31 given its moderate potential for additional subsurface finds.

Stabilization of the northwest corner of the central island (Feature 4) will require heavy equipment as well (see Figure 26). Removal of all or parts of this structure may expose older layers dating from the original build-up and establishment of the central island.

The green areas consist mostly of pond margins that have been completely modified by mechanical equipment starting in the middle twentieth century. Areas close to these shorelines are highly unlikely to contain any historically-significant materials or features since they appear to have once been the edges of marshy wetlands. Today, these shorelines have a steep, abrupt profile with large, angular boulders protruding from them; originally, these shoreline profiles would have been more gently-sloping as they graded into marshlands. Other green areas include the sandy Lokoea Stream sediments, which have been reworked and modified repeatedly by fluvial and tidal action; much of the Keiki pond (Feature 3); and the south side of Feature 2. In general, we would recommend that none of these green areas need to be monitored should mechanical excavation occur.

Finally, mechanical excavation in the yellow areas (moderate possibility of encountering historically-significant subsurface materials or features) should be evaluated on a case-by-case basis since these occur between high (red) and low (green) areas; and since, with a single exception (makai of the makai gate at Feature 1), these areas have not been tested (excavated during AIS work).

[11] Heavy mechanical equipment, in general, should not be used over/atop the two caves since this coral bluff is inherently friable and subject to shifting or collapse.

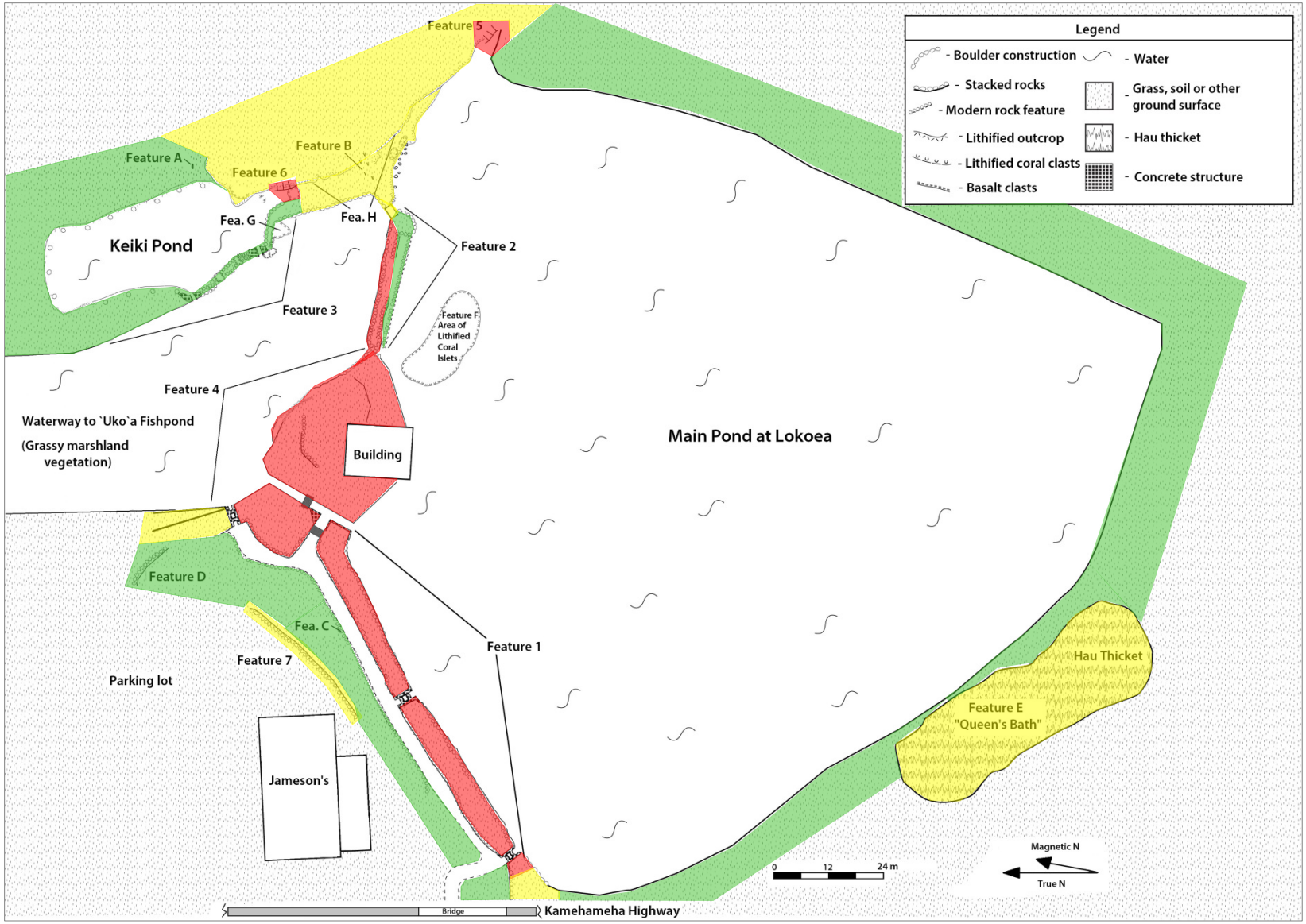

Figure 31. Plan view of Lokoea with color-coded depiction of low (green), moderate (yellow) and high (red) probability of encountering historically-significant subsurface deposits (see text for complete discussion); note, uncolored portions of the map have not been evaluated in this plan

CONCLUSION

This Archaeological Site Preservation Plan for Lokoea Fishpond is based on the results of a companion Archaeological Inventory Survey (AIS) (Monahan and Thurman 2015) that was reviewed and accepted by the State Historic Preservation Division in a letter (Log Nos. 2014.04619, 2015.01199; Doc. No. 1505SL03) dated May 4, 2015; and substantive consultation with Mālama Loko Ea Foundation (MLEF) since 2013. It is important to state that the first draft version of this plan was finished in 2014, and that the current version of this plan has been completely revised and updated based on substantive consultation and active collaboration with MLEF. Prior to 2014, MLEF was still a "grass roots," largely volunteer, organization that was building capacity to take on the major changes envisioned at Lokoea. In 2015, the organization's first Executive Director (Rae DeCoito) was hired. Since this time, we have been collaborating and consulting to finalize the subject plan. This revised plan has also benefited from the substantive input of MLEF's fishpond consultant, Graydon (Buddy) Keala, a Native Hawaiian with over 30 years of practical experience operating, repairing and maintaining more than 35 loko iʻa on the islands of Hawaiʻi, Molokaʻi, Maui, Oʻahu and Kauaʻi. He will direct and manage all phases of the Proposed Project, and ensure the preservation measures in this plan are followed during the Proposed Project activities.

This plan is organized around a few high-level concepts: first, as outlined in the Introduction, balancing the interests of diverse stakeholders with different kuleana and visions as to what Lokoea should be in the future is a valuable educational process in itself (see Figure 4). It shows how historic preservation can work if people are willing to compromise in recognition of the fact that environmental and socio-economic conditions today are different from those under which Lokoea was first established.

Second, the results of the AIS lend themselves to five specific thematic units that can serve as educational objectives for place-based learning at Lokoea. These five themes highlight significant archaeological, historical and cultural findings at Lokoea. Any or all of these can serve as curriculum units for an intensive study of Lokoea, one that could be based in a field setting, or to compare and contrast Lokoea with other puʻuone fishponds.

Third, the preservation plan integrates basic historic-preservation objectives from HAR § 13-277 with specific recommended actions (see Table 1). This is the most important part of the plan because it provides the most specific detail on proposed objectives, actions and tasks. An illustrated narrative for each feature describes these integrated recommendations. New maps—specifically produced for this plan—accompany several of the most complex feature discussions (i.e., Features 1–4).

We have also provided a color-coded plan view map, with a narrative description, depicting a probability model (low, moderate and high) of encountering historically-significant materials or features in subsurface context (see Figure 31). The accompanying discussion offers some comments regarding an archaeological perspective on mechanical excavation at Lokoea.

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LIST OF APPENDICES

A. HAR § 13-277 (Rules Governing Preservation Plans in Hawai‘i)

B. Consultation and Regulatory Correspondence

APPENDIX A. HAR § 13-277

DEPARTMENT OF LAND AND NATURAL RESOURCES

Adoption of Chapter 13-277
Hawaii Administrative Rules

October 31, 2002

SUMMARY

Chapter 13-277, Hawaii Administrative Rules, entitled "Rules Governing Requirements for Archaeological Site Preservation and Development", is adopted.

HAWAII ADMINISTRATIVE RULES

TITLE 13

DEPARTMENT OF LAND AND NATURAL RESOURCES

SUBTITLE 13

STATE HISTORIC PRESERVATION DIVISION RULES

CHAPTER 277

RULES GOVERNING REQUIREMENTS FOR ARCHAEOLOGICAL SITE PRESERVATION AND DEVELOPMENT

§13-277-1 Policy and purpose. This chapter provides standards for preservation approaches to ensure proper preservation in the public's interest. [Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-3, 6E-7, 6E-8, 6E-42)

§13-277-2 Definitions. As used in this chapter unless the context requires otherwise:

"Agency" means any state or county governmental entity.

"Consultation process" means notifying interested organizations and individuals that a project could affect historic properties of interest to them; seeking their views on the identification, significance evaluations, and mitigation treatment of these properties; and considering their views in a good faith and appropriate manner during the review process.

"Historic property" means any building, structure, object, district, area, or site, including heiau and underwater site, which is over fifty years old.

"Interpretation" means the presentation of information about an historic property to the public.

"Mitigation" means the measures taken to minimize impacts to significant historic properties. Mitigation may take different forms, including, but not limited to, preservation, archaeological data recovery, reburial, ethnographic documentation, historic data recovery, and architectural recordation.

"Person" means any individual, firm, association, agency, organization, partnership, estate, trust, corporation, company, or governmental unit that is proposing a project.

"Preservation" means the mitigation form in which a historic property is preserved.

"Project" means any activity directly undertaken by the state or its political subdivisions or supported in whole or in part through appropriations, contracts, grants, subsidies, loans, or other forms of funding assistance from the state or its political subdivisions or involving any lease, permit, license, certificate, land use change, or other entitlement for use issued by the state or its political subdivisions.

"Project area" means the area the proposed project may potentially affect, either directly or indirectly. It includes not only the area where the project will take place, but also the proposed project's area of potential effect.

"Significant historic property" means any historic property that meets the criteria of the Hawaii register of historic places or the criteria enumerated in subsection 13-275-6(b) or 13-284-6(b).

"State historic preservation division" or "SHPD" means the state historic preservation division within the state department of land and natural resources.

[Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-1, 6E-3, 6E-7, 6E-8, 6E-42)

§13-277-3 Preservation plan. A preservation plan prepared pursuant to chapters 13-275 or 13-284, shall:

(1) Identify for each significant historic property which forms of preservation will be implemented: avoidance and protection (conservation), stabilization, rehabilitation, restoration, reconstruction, interpretation, or appropriate cultural use;

(2) Specify the buffer zones around each significant historic property and depict them on a map of sufficient scale;
(3) Specify short-term protection measures for each significant historic property that will be within or near a construction area;
(4) Discuss the agency or person's consultation process for historic properties deemed significant under paragraphs 13-275-6(b)(5) or 13-284-6(b)(5). The agency or person shall consult with ethnic organizations and individuals for whom the historic properties are of significance. The comments on preservation treatment expressed by these individuals or organizations shall be considered when preparing the preservation plan. The plan shall include a list of individuals and organizations consulted, and shall summarize their input.
(5) Specify the long term preservation measures to be undertaken at each significant historic property. [Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-1, 6E-3, 6E-7, 6E-8, 6E-42)

§13-277-4 Buffer zones. (a) Buffer zones shall ensure that the integrity and context of the historic property is preserved, in many cases including the visual integrity.

(b) The size of a buffer zone shall be proposed by the person or agency on a site-by-site basis. Size will vary with the local terrain, eventual use of the site, surrounding land uses, the type of site, and the criterion for which a site is significant.

(c) The manner in which a buffer zone will be treated with regards to demarcation, landscaping and other activities shall be proposed by the person or agency on a site-by-site basis.

(d) Once approved, buffer zones shall be marked on overall project maps, and physical markers shall be placed in the ground delineating the buffers. [Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-1, 6E-3, 6E-7, 6E-8, 6E-42)

§13-277-5 Interim protection measures. Interim protection measures shall protect the significant

§13-277-5

historic property and its buffer zone during construction activities. Interim measures may include:

(1) Flagging the perimeter of the buffer zone;
(2) Erecting barriers (such as plastic fencing) along the buffer zone;
(3) Placing avoidance instructions on construction plans and specifications;
(4) On-site, pre-construction briefing of the hired construction firm; and
(5) Having an archaeological monitor on-site during ground alteration activities. [Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-3, 6E-7, 6E-8, 6E-42)

§13-277-6 Long term preservation measures. Long term preservation measures shall follow the appropriate Secretary of the Interior's Standards for Historic Preservation Projects. The preservation plan shall address the following long term preservation measures:

(1) Maintenance measures to be followed;
(2) Methods for clearing vegetation;
(3) The manner in which litter is controlled;
(4) Access to the site and possible use of the site for cultural practices, if appropriate;
(5) Approaches to interpret and inform the public about the site, if appropriate;
(6) Permanent marked markers, if appropriate;
(7) If appropriate, provisions to address potential future impacts and site stability; and
(8) Provisions for reasonable monitoring of site integrity by the person or agency, and SHPD inspection to assure compliance. [Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-3, 6E-7, 6E-8, 6E-42)

§13-277-7 Interpretation requirements. (a) When using interpretive text for signs, brochures, etc., the text shall be reviewed and approved by SHPD.

(b) Interpretive signs shall be:
(1) Of sufficient quality to enhance public understanding of the site;
(2) Culturally sensitive, based on consultation with appropriate organizations and individuals; and

(3) Located so as not to adversely affect the site visually.

(c) Any data recovery work to improve the interpretation of the site shall meet the standards set forth in chapter 13-278. [Eff] (Auth: HRS §§6E-1, 6E-3, 6E-7, 6E-8, 6E-42) (Imp: HRS §§6E-3, 6E-7, 6E-8, 6E-42)

§13-277-8 Penalty. Non-compliance with the provisions and procedures established by this chapter may result in a directive to the person not to proceed with construction in the project area, a denial or revocation of SHPD's written concurrence or agreement, and penalties as provided in section 6E-11, HRS, chapters 13-275, 13-278, 13-281, 13-282, 13-284, HAR, and applicable laws. [Eff] (Auth: HRS §6E-3) (Imp: HRS §§6E-1, 6E-3, 6E-8, 6E-42)

APPENDIX B. CONSULTATION & REGULATORY CORRESPONDANCE

TCP Hawai‘i, LLC

Documenting Traditional Cultural Properties of Hawai‘i
Preserving and Restoring Cultural and Natural Resources of Hawai‘i

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December 20, 2012

To: [Consulting party]

Re: Consultation for an Archaeological Inventory Survey of Loko Ea, Kawailoa Ahupua‘a, Waialua District, O‘ahu Island, Hawai‘i, TMK (1) 6-2-003:002

Aloha [Consulting party],

TCP Hawai‘i, LLC, is conducting an Archaeological Inventory Survey (AIS) of Loko Ea in Kawailoa Ahupua‘a, Waialua District, O‘ahu Island, TMK: (1) 6-2-003:002 (see Figure 1) in support of a project to develop an Archaeological Site Preservation and Development Plan (hereafter, Preservation Plan, or PP). The approximately seven-acre project area is located near Kamehameha Highway and Jameson’s By The Sea Restaurant in Hale‘iwa. The AIS fieldwork is scheduled to begin in mid-January and to last approximately one week. The purpose of this letter is to notify you that the subject project could affect historic properties of interest to you or your organization. In accordance with Hawai‘i state law, consultation for this project includes (1) notifying you of the proposed project; and (2) seeking your views on the identification, significance evaluations and mitigation treatment of these properties.

Project Background

The project proponent is Kamehameha Schools, 567 South King Street, Suite 200, Honolulu, HI 96813. The project representative is Sean McNamara, phone (808) 534-3952, email: semcnama@ksbe.edu. The AIS is being conducted in order to inform the PP, which will be developed in collaboration with KS’ non-profit partner organization Mālama Loko Ea. This community group has begun restoration efforts at Loko Ea, which is a pu‘uone-type (inland, brackish) fishpond, including the raising of ‘ama‘ama, ‘āholehole and others. The pond is also frequented by native and endemic birds such as ‘alae ke‘oke‘o and ‘auku‘u. The results of the AIS will provide specific archaeological, historical and cultural information on Loko Ea, in the context of other significant resources such as ‘Ukoa Fishpond and the wider cultural landscape of the muliwai of Anahulu Stream. This information will facilitate project planning and consultation for the PP.

Historic Preservation Context

The proposed work will satisfy the general requirements of HRS Chapter 6E-42 and HAR Chapter 13-284; and the specific details in HAR Chapter 13-276 governing the conduct and components of an AIS.

Loko Ea (State Site # 50-80-04-233) is closely associated with ʻUkoa Fishpond (State Site # 50-80-04-236). These cultural resources were physically connected in historic and pre-Contact times. As such, there are significant metaphysical and spiritual connections between these wahi pana, both of which are well known in the historical literature as royal fishponds. Numerous aliʻi, including Kakuhihewa, Kaʻahumanu and Liliʻuokalani, had exclusive rights to Loko Ea in the nineteenth century. Substantial modifications to the pond were made by the Waialua Sugar Company.

In general, the objectives of the current AIS are to develop a spatial and temporal reconstruction of the evolution of Loko Ea from ancient times to the present. Paleoenvironmental work at ʻUkoa Fishpond (Athens 1993; Athens et al. 1995) suggests human settlement of the project area environs is at least 1,000 years old. Subsurface testing will focus on identifying phases of fishpond modification as well as evidence of habitation around the margins. Work at the ground surface will focus on identifying all features greater than 50 years in age. These data will eventually be integrated into an overall picture of how Loko Ea has changed through time.

An important component of the current AIS is the translation and interpretation of Hawaiian language documents, including newspapers and Land Commission documents. Our overall approach is to treat the Hawaiian-language information as a complementary component of the AIS, rather than as merely background information. This integrated approach guarantees the AIS will go above and beyond regulatory adequacy by addressing meaningful research objectives in a holistic way that expresses a Hawaiian sense of place about the project area.

Participating in the Consultation Process for this Project

In addition to consulting with Mālama Loko Ea, which we anticipate will lead us to specific individuals that may share relevant information on the identification, significance evaluation and mitigation treatment of historic properties at Loko Ea, we also seek your participation in this process. This consultation letter has been sent to representatives of SHPD/DLNR and OHA. Please let us know if you are aware of other individuals or organizations you believe should be included in consultation for this AIS.

When a draft AIS report is completed, you will also be sent a copy for your review and comment. Should you have any input at the present time regarding the identification, significance evaluations and/or mitigation treatment of any affected historic properties, please contact Chris Monahan to discuss how we can work together to address your concerns.

Please feel free to contact me if you have any questions about this request for consultation.

With aloha,

Christopher M. Monahan, Ph.D.
Principal Investigator, Archaeologist
TCP Hawaiʻi, LLC
333 Aoloa Street, #303
Kailua, HI 96734
(808) 754-0304
mookahan@yahoo.com

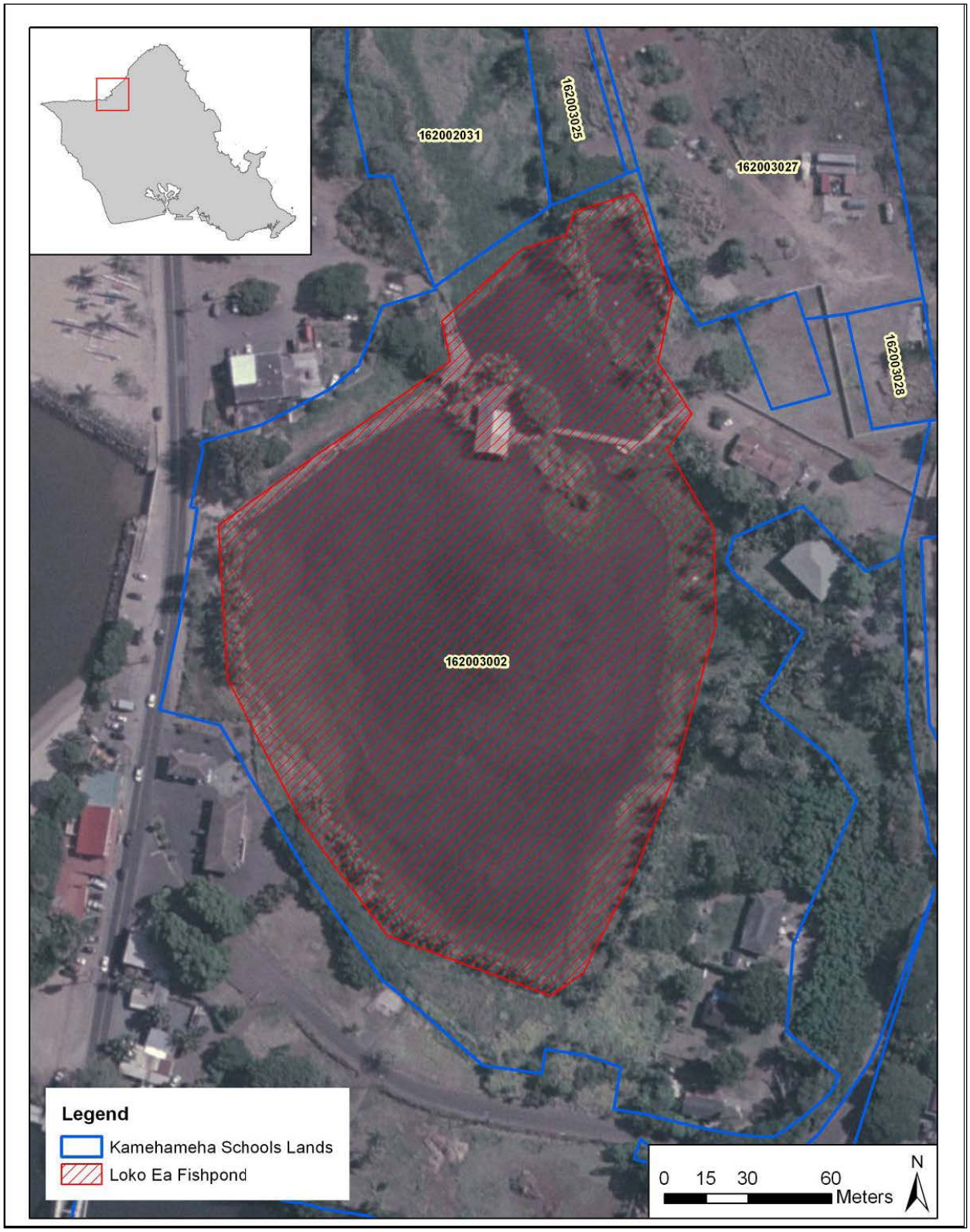

Figure 1. Loko Ea boundary depicted in red; note, KS lands around the fishpond extend out to the blue line

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD12_6576

January 7, 2012

Christopher M. Monahan, Ph.D.
TCP Hawai'i, LLC
333 Aoloa Street, #303
Kailua, Hawai'i 96734

Re: Pre- Archaeological Inventory Survey consultation
Kawailoa Ahupua'a, Waialua District, Island of O'ahu

Dear Dr. Monahan:

The Office of Hawaiian Affairs (OHA) is in receipt of your December 20, 2012 letter with enclosures seeking comments ahead of an archaeological inventory survey (AIS) that will be conducted to support the Loko Ea fishpond restoration project (project). This project is proposed by the Kamehameha Schools, in collaboration with the community group Mālama Loko Ea in Kawailoa Ahupua'a on the Island of O'ahu.

OHA applauds the Kamehameha Schools and Mālama Loko Ea for their efforts to move this project forward and we look forward to seeing it completed. We have no substantive comments or recommendations for individuals and organizations to be included in the consultation process at this time. As you letter mentions, initial consultation with Mālama Loko Ea has the potential to lead you to other groups and/or individuals who may have a desire to participate in the consultation process.

We look forward to receiving the draft AIS report and the opportunity to provide comments at that time. Should you have any questions, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Kamana'opono M. Crabbe, Ph.D.
Ka Pouhana, Chief Executive Officer

KM:kl

C: Sean McNamara, Kamehameha Schools (via email)

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

May 4, 2015

Chris Monahan, PhD
Principal, Archaeologist
TCP Hawai'i LLC
333 Aoloa St., #303
Kailua, HI 96734

Log Nos. 2014.04619, 2015.01199
Doc. No. 1505SL03
Archaeology

Dear Dr. Monahan:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Inventory Survey of Lokoea Fishpond
Kawailoa Ahupua'a, Wailua District, Island of O'ahu
TMK: (1) 6-2-003:002

Thank you for the opportunity to review the draft report titled *Continuity and Change at a Pu'uone Fishpond: Archaeological Inventory Survey Lokoea Fishpond Kawailoa Ahupua'a, Waialua District, O'ahu Island, Hawai'i TMK (1) 6-2-003:002* (Monahan and Thurman, February 2015). We received the original draft on October 9, 2014 (Log No. 2014.04619); provided consultation comments via email on January 9, 2015; and the revised draft on March 27, 2016 (Log No. 2015.01199).

This well researched and well written archaeological inventory survey (AIS) of Lokoea Fishpond (Site 50-80-04-233) was conducted on behalf of the landowner, Kamehameha Schools (KS). The AIS was conducted to develop a spatial and temporal reconstruction of the evolutionary history of Lokoea in support of developing an archaeological site preservation and development plan for Lokoea. The pu'uone-type fishpond measures about 6 acres in size and is closely associated with 'Uko'a Fishpond, located about a mile to the north. These two fishponds are connected by a stream channel. The 7-acre project area is adjacent to Kamehameha Highway and Jameson's By The Sea Restaurant in Hale'iwa.

The AIS involved extensive archival and historical research, with an emphasis on Hawaiian language and community resources. The fieldwork included a survey, development of a combined tape and compass and laser distance/range finder and compass map of the entire 7-acre project area, completion of smaller plan view maps for individual features, and subsurface testing. The work focused on determining construction materials and methods, identifying building phases, and site occupation dates. Subsurface testing involved hand excavation of eight test units within five locations–(1) near the midpoint of the long wall (Feature 1) defining the northwest portion of the pond (TU-1); (2) at the *makai* end of the same wall (TU-3 and TU-4); (3) near the east end of the shorter wall (Feature 2) separating the main pond from the 'Uko'a waterway (TU-2); (4) on the north (TU-5) and south (TU-6) sides of the central island (Feature 4); and (5) atop the lithified coral bluff along the east side of the fishpond (TU-7 and TU-8).

Site 50-80-04-233 was assessed as significant per Hawaii Administrative Rule (HAR) §13-284-6 under Criteria b (association with various *ali'i*), c (construction engineering), d (potential to yield additional significant information), and e (its ongoing role in perpetuating traditional cultural knowledge and practices). Pursuant to HAR §13-284-7,

the project effect determination is "effect, with proposed mitigation commitments." Per HAR §13-284-8 the proposed mitigation is development of a preservation plan that meets the requirements of HAR §13-277. We concur with the assessments, the project effect determination, and mitigation in the form of a preservation plan that meets the requirements of HAR §13-277.

The AIS report meets the requirements of HAR §13-276-5. It is accepted. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library.

As stipulated in HAR §13-284-7(e), when SHPD comments that the project will have an "effect, with agreed upon mitigation commitments," then detailed mitigation plans shall be developed for SHPD review and acceptance. Per HAR §13-284-8(a)(1)(A), the agreed-upon mitigation measure for this project is preservation. Pursuant to HAR §13-284-8(a)(3)(e), we look forward to receiving an archaeological preservation plan that meets HAR §13-277 and information on your consultation with Native Hawaiian Organizations (NHOs), including the Office of Hawaiian Affairs (OHA) as indicated in HAR §13-284-8(a)(2).

Please contact me at (808) 692-8019 or at Susan.A.Lebo@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Susan A. Lebo

Susan A. Lebo, PhD
Oahu Lead Archaeologist
Acting Archaeology Branch Chief