

**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
Honolulu, Hawaii**

October 24, 2025

**Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii**

REGARDING: Request for Administrative Fines and Other Penalties Against James D. Greig and Rhodette R. M. Greig for Conservation District Enforcement Case OA 25-29 Regarding the Alleged Permit Noncompliance, Construction of Shoreline Erosion Control Device, and Encroachment Upon State Land Located Makai of 55-271 Kamehameha Highway, Tax Map Key (TMK): (1) 5-5-002:088

The Board may go into Executive Session pursuant to Section 92-5(a)(4), Hawaii Revised Statutes, in order to consult with its attorney on questions and issues pertaining to the Board's powers, duties, privileges, immunities, and liabilities.

AGAINST: James D. Greig and Rhodette R. M. Greig (collectively, the "Greigs")

LOCATION: Makai of 55-271 Kamehameha Highway, Laie Beach Lots, Laie, Koolauloa, Oahu, Tax Map Key ("TMK"): (1) 5-5-002:088 ("Parcel 088")

LANDOWNER: State of Hawaii

SUBZONE: Resource

EXHIBITS:

1. Location Maps (pages 10-11)
2. Land Court App 772 & Map 43 (page 12)
3. Site Photos (pages 13-25)
4. Emergency CDUP OA 18-04 (pages 26-31)
5. Muliwai Shoreline Erosion Alternatives (pages 32-68)
6. Notification of Alleged Noncompliance (pages 69-72)
7. Notice of Alleged Violation ENF: OA 25-29 (& 25-28) (pages 73-76)
8. OCCL August 11, 2025, Letter (pages 77-80)
9. Greigs September 10, 2025, Email (pages 81-82)
10. Rules and Statutes regarding the Conservation District (pages 83-86)

Summary

The Office of Conservation and Coastal Lands (OCCL) alleges that James D. Greig and Rhodette R. M. Greig (collectively, the “Greigs”), landowners of 55-271 Kamehameha Highway, TMK: (1) 5-5-002:088 (“Parcel 088”) conducted unauthorized land uses on State of Hawaii land in the Resource Subzone of the State Land Use Conservation District fronting the subject parcel. The alleged violations include the alleged noncompliance with the conditions of an Emergency Conservation District Use Permit (CDUP) for a temporary erosion control structure, including but not limited to failing to remove it from State land at the end of the authorization period and at the Department’s request, and the alleged unauthorized construction or installation of erosion control measures or devices within the Conservation District on State land.

Description of Area

Sand and Swell Patterns

The subject area is near the north end of Pounders (Pahumo) Beach and Laie Beach Park and the south end of Laniloa Beach in Laie on the northeast shores of the island of Oahu. Oahu’s northeast or east shorelines are characterized by long narrow sand beaches and offshore fringing reefs. The shallow fringing reefs protects the shoreline from the full energy of east or northeast tradewind waves and refracted north swells. Landward of the beach and its erosion scarp consists of a low-lying sandy coastal plain.

Pahumo beach is sandy and contains some beach rock which continues to be exposed as the area experiences a long-term trend of erosion near the subject area. The shoreline area fronting the subject parcel erodes at an average rate of 0.88 feet per year.

Residential Development

Parcel 088 is a residential lot that appears to contain two single-family residences. The “Limited Warranty Deed” for Parcel 088 (and TMK: (1) 5-5-001:057) recorded at the Bureau of Conveyances on May 8, 1998, notes that Parcel 088 contains several easements (Ref Doc No(s) 98-065521). One of those easements is for “Pedestrian Purposes” (**Exhibit 2**). Based on staff site visits to the area, it appears the Greigs have posted “No Trespassing” signs to potentially discourage the public from utilizing the easement for “Pedestrian Purposes”. See page 20 of **Exhibit 3**.

According to the Hawaii Cesspool Prioritization Tool, Parcel 088 contains a cesspool that has been identified by the Department of Health and the Cesspool Conversion Working Group in the Priority 1 zone, meaning that the cesspool poses a significant hazard to human well-being and the environment, and is recommended to be converted or decommissioned by 2050.

Site Photos

Exhibit 3 contains photos of the subject area.

History

Emergency Permit OA 18-04 (Exhibit 4)

The erosion scarp eventually came to a height of 6 to 10 feet and within 8.5 feet of one of the residences on Parcel 088. See pages 13 and 14 of **Exhibit 3**.

On September 14, 2017, the Greigs, along with the owners of the adjacent Parcel 019, obtained Emergency Conservation District Use Permit (Emerg. CDUP) OA 18-04 for the installation of a temporary erosion control structure consisting of a “SEABlanket” anchored at the base by two rows of sand-filled “SEAtubes” (or burritos). The temporary erosion control structure and devices were to stabilize approximately 250 feet of shoreline fronting Parcel 088 and the adjacent Parcel 019. The Department authorized the temporary erosion control structure for three years, during which time the permittees were to work on a long-term solution, including the potential options identified in the submitted report “Muliwai Shoreline Erosion Alternatives” (**Exhibit 5**).

Alleged Unauthorized Land Uses in the Conservation District

Noncompliance with Emerg. CDUP OA 18-04

On September 14, 2020, Emerg. CDUP OA 18-04 expired, and the temporary emergency erosion control measures and devices were to be removed from the shoreline area fronting Parcel 088 and 019.

On September 15, 2021, OCCL conducted a site visit and observed that the temporary erosion control structure remained on State land in the shoreline area fronting Parcels 088 and 019. It appeared that the erosion control structure was dilapidated and unmaintained with liberated materials posing a nuisance and hazard to the nearshore environment. See page 16 of **Exhibit 3**.

On October 11, 2021, the Department issued a Notification of Alleged Noncompliance for noncompliance with the conditions of Emerg. CDUP OA 18-04. The letter also noted that the Department did not have evidence of progress towards or plan for long-term erosion management. No response was received from the Greigs regarding the Notification of Alleged Noncompliance. See **Exhibit 6**.

Enforcement OA 25-29

On April 7, 2025, the Governor’s Office forwarded a complaint to the Department regarding alleged unauthorized erosion control materials and devices in the shoreline area of the subject location.

On April 8, 2025, OCCL conducted a site visit to the area and observed the expired and unauthorized temporary erosion control structure and devices still occupying the shoreline area fronting Parcels 088 and 019. Staff observed that the temporary erosion control structure and devices continued to be dilapidated and unmaintained with liberated materials continuing to pose a nuisance and hazard to the nearshore environment. See pages 18 and 19 of **Exhibit 3**.

On April 14, 2025, the Department issued a Notice of Alleged Violation (NOAV – ref. ENF: OA 25-28 & 25-29) for the expired and unauthorized erosion control structure and devices in the shoreline area fronting Parcels 088 and 019.¹ See **Exhibit 7**.

On May 5, 2025, OCCL and the Greigs met at their request regarding the NOAV and their potential or planned progress towards removal of the alleged unauthorized erosion control structure and devices from the shoreline area fronting Parcel 088.

On July 1, 2025, OCCL conducted a site visit to the area and observed that the expired and alleged unauthorized erosion control structure and devices still occupied the shoreline area fronting Parcel 088. Additionally, it appeared to staff that the Greigs had made little to no progress towards compliance and removal of the erosion control structure and devices from the shoreline area fronting Parcel 088. See page 20 of **Exhibit 3**.

On August 11, 2025, OCCL issued a letter to the Greigs noting the lack of information and communications from the Greigs regarding the progress, or lack of, towards removing the expired and unauthorized erosion control devices fronting Parcel 088. The letter requested that the Greigs remove and submit evidence of removal of the alleged unauthorized erosion control structure and devices from the shoreline area within 30-days or face further enforcement actions. See **Exhibit 8**.

On September 10, 2025, the Greigs emailed OCCL stating that they were still in the process of removing failed sandbags and other encroachments from the beach as they become visible. The letter also noted that they would be submitting their plan within the next two to three weeks. See **Exhibit 9**.

On September 11, 2025, OCCL conducted a site inspection to the subject area and observed the unauthorized erosion control structure and devices and exposed and posing a nuisance to the beach and nearshore areas. Staff did not observe anyone at the property or beach working to remove the unauthorized erosion control structure and devices, and it appeared to staff that

¹ Staff notes that ENF: OA 25-28 and the portion of the expired and unauthorized erosion control structure as well as other erosion control devices that fronted Parcel 019 appears to have been removed by the landowners of Parcel 019. Due to concerns that there may still be erosion control devices and materials buried in the beach, OCCL has requested that the landowners of Parcel 019 continue to monitor the shoreline area and remove these materials as they may become exposed.

little to no progress had been made towards removal of these items. See pages 21-25 of **Exhibit 3**.

Conservation District Rules and Statutes

Exhibit 10 contains the relevant rules and statutes that will be cited in the recommendations.

Discussion

The stated purpose of the Conservation District law is to protect and conserve natural resources. HAR section 13-5-1.

The beaches of Hawaii are held in trust by the State for the benefit of present and future generations. The State should be consulted, and a land disposition obtained, when individuals seek to temporarily use beach areas for construction. There should be consequences when an individual unilaterally and willfully acts in such a way that endangers a public trust resource.

The beaches of Oahu are some of the State's most valued natural resources. These beaches serve as an attraction which brings residents and visitors to the area who support community economic activities that are key for the north and east communities of Oahu. In particular, the Pounders (Pahumo) Beach and Laie Beach Park are utilized at all times of the year by the public, both residents and visitors alike, and often offer the public a less crowded alternative to more well-known beaches.

Many of the shorefront homes in the area are built on the sand berm and are thus vulnerable to the effects of both chronic and seasonal coastal erosion. Coastal erosion occurs as a result of the following phenomena:

- (1) Seasonal changes in waves and currents that move sand alongshore or across the shore, adjusting the beach profile;
- (2) Long-term (chronic) deficiencies in natural sand supply and/or fluctuations in meteorological or oceanographic processes such as storms and sea level rise; and
- (3) Human impacts to sand availability through sand impoundment and supply disruption from development and coastal engineering.

During the last several years, beach erosion in this area appears to have intensified significantly. Although such erosion could be attributed to normal accretion and erosion cycles, it is more likely that the erosion has become a chronic and permanent result of acceleration in sea level rise this century. Over the past century, local tide gauges have measured approximately 0.5 ft of rise in sea levels among the islands such that it should be no surprise that resulting impacts are occurring.

Coastal armoring, such as seawalls and revetments, protect private land mauka of the armoring device while harming the public trust resources makai of the wall. Coastal armoring or shoreline hardening devices damage beaches by cutting the sand bank and impounding sand behind the structures; refracting waves creating a high-energy environment that impedes sand

accumulation; creating flanking that can increase adjacent erosion and damage neighboring properties; and impacting lateral transport thereby damaging downdrift beaches. Staff notes that many of the shoreline properties in the Laniloa Beach Lots have hardened their shorelines with seawalls and revetments, which has likely contributed to the landward retreat of the shoreline and exacerbated the problem in this area.

The Department has taken measures throughout the past two decades to address the progressively damaging chronic and seasonal erosion concerns on Oahu.

Sand pushing can be an effective but short-term measure to protect a property or infrastructure, provided that best management practices are followed and if there is a sufficient supply of dry sand in the area. The County Parks Department, for example, currently engages in seasonal sand pushing to shore up the sand around beach rights-of-way and lifeguard towers at various locations or beach parks on Oahu where there may be enough sand to push.

Due to long term trends of chronic and seasonal erosion, wave action, and nearshore currents, sand pushing or bypassing may increasingly no longer be a short-term option to mitigate the effects of continued erosion and sea level rise in the subject area.

Conservation District rules allow the Chairperson to issue emergency permits when there is an imminent threat to public health, safety, or welfare. This has been an important tool for the Department when addressing emergencies from natural hazards. Between 2017 and 2020, the Department authorized approximately 35 temporary erosion control structures fronting approximately 50 properties in the Koolauloa and Waialua Districts on Oahu.

The emergency authorizations that were issued by the Department were designed to allow shoreline property owners time to develop long-term plans to address the impacts of coastal hazards and more specifically erosion on their property. Few permit holders complied with permit conditions.

As noted above, the Greigs along with their neighbors and agent submitted options or alternatives for erosion management they were considering when they submitted their request for emergency authorization yet appear to have not utilized the time allowed under the emergency authorization to develop or pursue any of those options. With the absence of any long-range plan to address the impacts of coastal erosion and sea level rise, and with requests to either reauthorize these structures or failure to remove the temporary erosion control measures in accordance with previously issued authorizations, OCCL has concluded that these "temporary" structures appear to violate State policy and Coastal Zone Management rules against private shoreline hardening structures, as well as the Department's policy of not approving new private seawalls.

Staff notes that the landowner of the adjacent Parcel 019 and their agent(s) have indicated to OCCL an interest in potentially pursuing and submitting a proposed application for a beach nourishment or restoration project in the area and as identified as a potential option in the submitted "Muliwai Shoreline Erosion Alternatives" report. It is unclear to staff at this time if the Greigs have engaged in these conversations with their neighbor or are willing to participate in this potential project. Regardless and as identified in staff submittal, the Greigs have unauthorized erosion control devices in the shoreline area fronting Parcel 088 that need to be removed, and Conservation District rules prevent the Department and the Board from

entertaining or processing an application for proposed land uses until pending violations are resolved. See HAR sections 13-5-6(c) and 13-5-31(e).

Staff admits that the situation is challenging for homeowners, but the Department is also confronted by the lack of compliance and continued violations. Various staff site inspections of the subject area indicate the continued unauthorized installation of erosion control devices, and the continued presence of the alleged unauthorized materials discussed in the report on State land.

Based on the present evidence, the Greigs are in noncompliance with the conditions of Emerg. CDUP OA 18-04 for a temporary erosion control structure, including but not limited to failing to remove it from State land at the end of the authorization period as well as at the request of the Department after being issued Notices of Alleged Noncompliance and Violation. Based on previous submitted applications and correspondences with the Greigs, they are fully aware of the noncompliance, existing violation, and need to consult with the Department and obtain authorization(s) prior to conducting work in the shoreline area.

Staff is recommending that the Board issue the following fines and penalties allowed under its authority.

Findings and Conclusions

Based on the above-summarized information, OCCL staff have reached the following findings and conclusions regarding the alleged violation:

1. That the Greigs did in fact, cause, or allow the installation of an unauthorized erosion control structure on public land within the State Land Use Conservation District, Resource Subzone;
2. There is no land disposition for the occupation of public land by the erosion control structures;
3. That the Greigs have failed to remove past erosion control structures and devices and debris fronting Parcel 088 despite receiving notices from the Department to do so; and,
4. That the unauthorized land uses, and unauthorized occupation of public land, occurred upon submerged public land that lies within the State Land Use Conservation District, Resource Subzone.

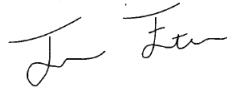
Staff Recommends

1. That the Board adopt the findings and conclusions set forth above and impose the following administrative fines:
 - a. Pursuant to HRS section 183C-7, the Greigs are fined \$15,000 for violating the provisions of HAR section 13-5-24, for installing an erosion control system consisting of sandbags and other erosion control devices (ENF: OA 25-29) on land within the Conservation District Resource Subzone;
 - b. Pursuant to HRS section 183C-7, the Greigs are fined \$15,000 for violating the provisions of HAR section 13-5-24, by failing to abide by the terms and conditions of Emergency CDUP OA 18-04 and to remove the temporary erosion control structure and measures at the end of the authorization period and at the Department's request;
 - c. Pursuant to HRS section 171-6(12), the Greigs may be fined up to \$1,000 per day for their failure to remove the encroachments upon public lands, accrual of such starting when they received notice on April 24, 2025, and therefore may total \$183,000;
 - d. Therefore, that the total fines and administrative costs that may be levied against the Greigs may be \$213,000, and that the Greigs shall pay all designated fines and administrative costs within ninety days from the date of the Board's action;
2. That the Board authorize the Department of the Attorney General to file a Notice of Pendency of Action with the deed or deed instrument of Parcel 088 at the Bureau of Conveyances pursuant to HRS sections 171-6.4(c), 501-151, and 634-51;
3. That the Greigs or a future landowner of Parcel 088 shall remove all unauthorized erosion control devices and materials and encroachments by February 1, 2026
4. That in the event that the Greigs, or a future landowner of Parcel 088, fail to restore the shoreline area to a more natural state and to the Department's satisfaction by February 1, 2026, the Greigs or a future landowner of Parcel 088 shall be liable for the costs of removal by the State or County;
5. That in the event of failure of the Greigs or a future landowner of Parcel 088, to comply with any order imposed in connection with this enforcement action, they shall be fined an additional \$16,000 per day, pursuant to HRS section 171-6(2) and HRS section 183C-7, until the order is complied with;
6. That in the event of failure of the Greigs or a future landowner of Parcel 088, to comply with any order herein, this matter shall be turned over to the Attorney General for disposition, including all administrative costs;
7. That the Board delegate authority to the Chairperson to effectuate the above recommendations, subject to such conditions as may be prescribed by the Chairperson

to best serve the interest of the State, without further consultation with the Board, subject to review and approval by the Department of the Attorney General; and

8. The above noted conditions of Enforcement file OA 25-29 shall be recorded with the deed instrument by the Greigs or a future landowner of Parcel 088 at the Bureau of Conveyances pursuant to HAR section 13-5-6(e).

Respectfully submitted,



Trevor Fitzpatrick, Staff Planner
Office of Conservation and Coastal Lands

rc

Approved for submittal:



Dawn N. S. Chang, Chairperson
Board of Land and Natural Resources



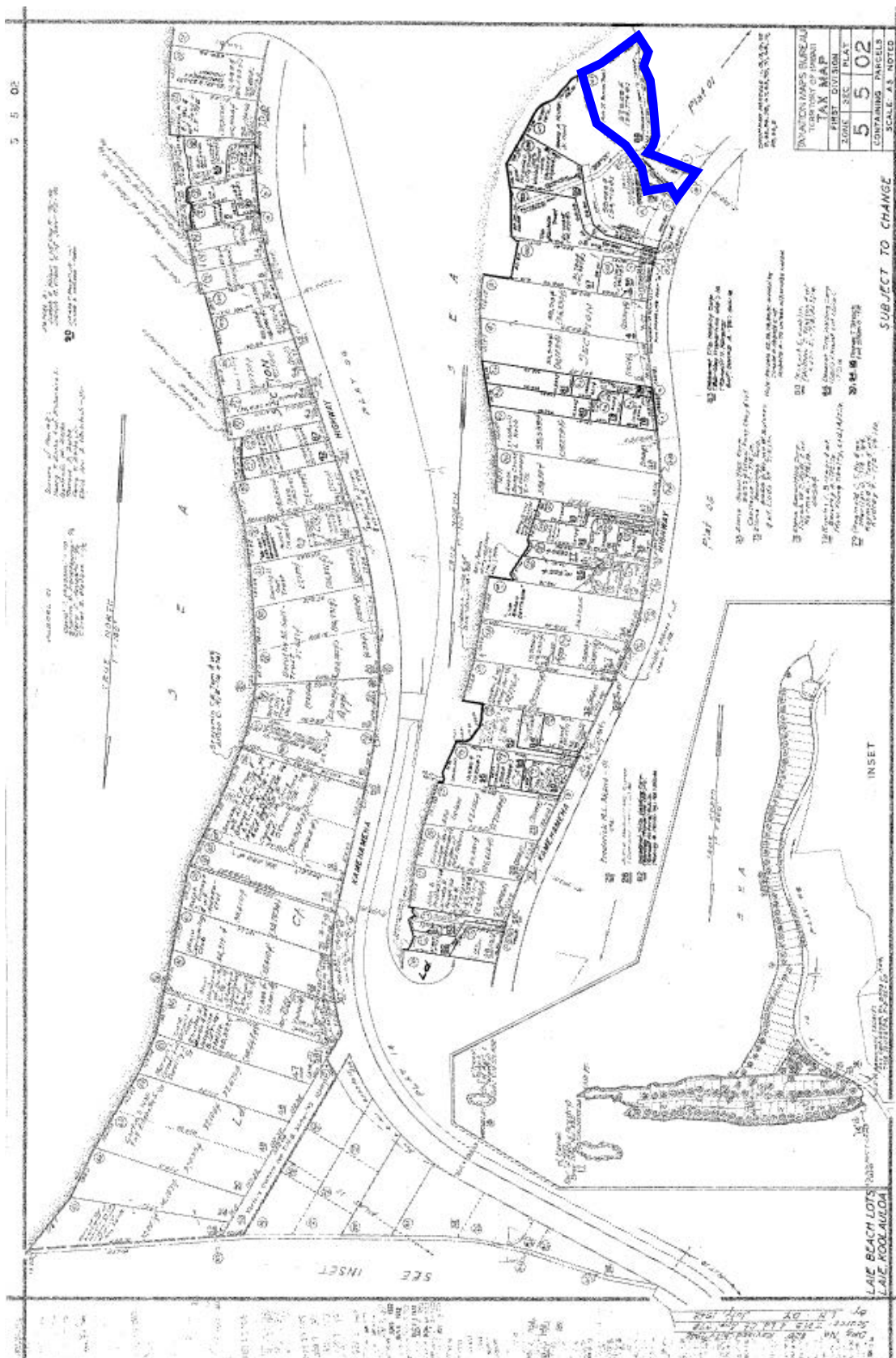
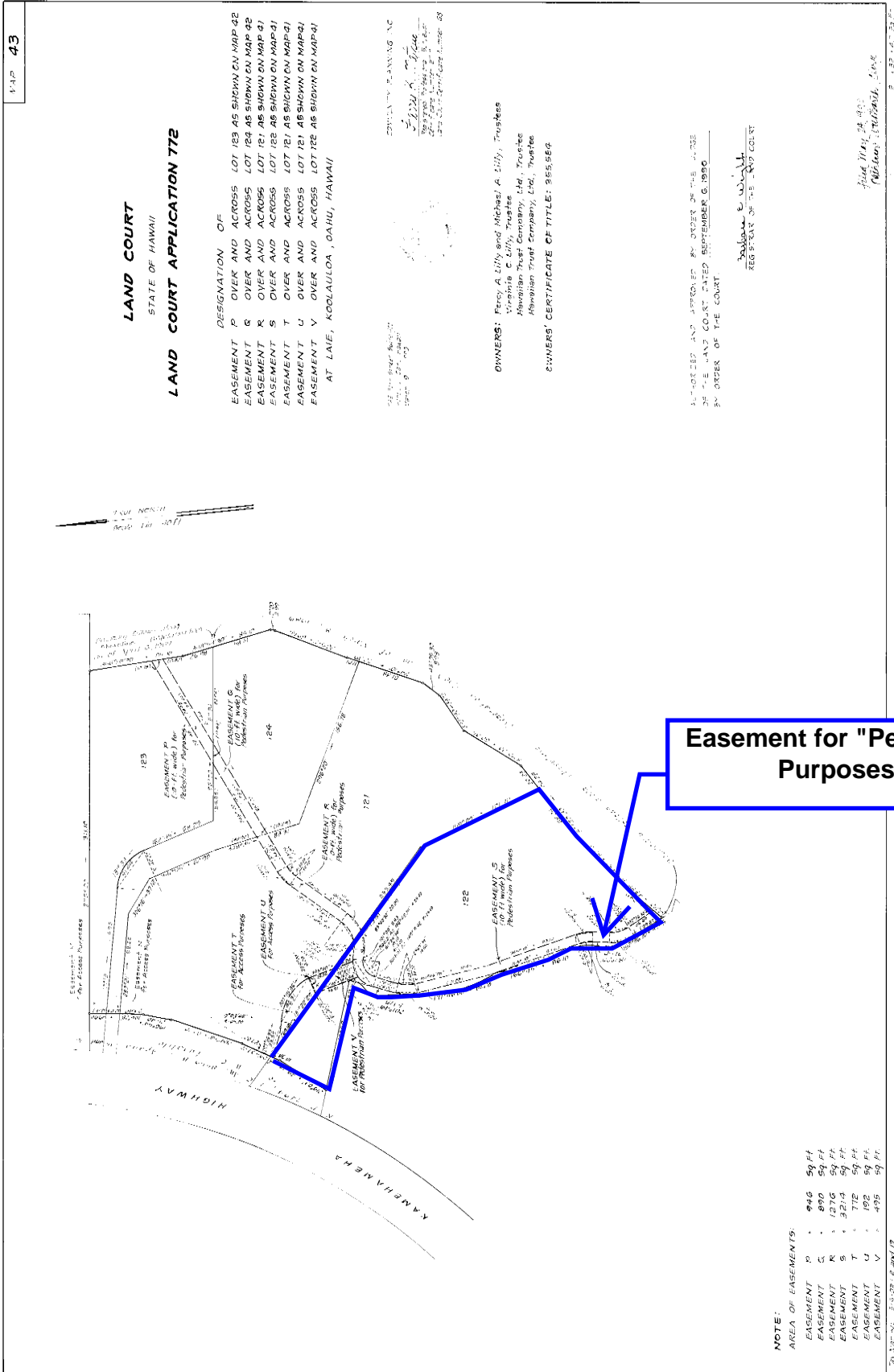


Exhibit 1 - Location Maps



MAP 43

LAND COURT
 STATE OF HAWAII
LAND COURT APPLICATION 772

DESIGNATION OF
 EASEMENT P OVER AND ACROSS LOT 123 AS SHOWN ON MAP 42
 EASEMENT Q OVER AND ACROSS LOT 124 AS SHOWN ON MAP 42
 EASEMENT R OVER AND ACROSS LOT 125 AS SHOWN ON MAP 42
 EASEMENT S OVER AND ACROSS LOT 126 AS SHOWN ON MAP 42
 EASEMENT T OVER AND ACROSS LOT 127 AS SHOWN ON MAP 42
 EASEMENT U OVER AND ACROSS LOT 128 AS SHOWN ON MAP 42
 EASEMENT V OVER AND ACROSS LOT 129 AS SHOWN ON MAP 42
 AT LAIE, KOOLAULOVA, OAHU, HAWAII

CONVEYING PLANNING, INC.
 1000 KALANIANA'OLUHIA DRIVE, SUITE 1000
 HONOLULU, HAWAII 96813
 TEL: (808) 551-1111
 FAX: (808) 551-1112

OWNERS: Percy A. Lily and Michael A. Lily, Trustees
 Virginia C. Lily, Trustee
 Hawaiian Trust Company, Ltd., Trustee
 Hawaiian Trust Company, Ltd., Trustee
 CHINEAS' CERTIFICATE OF TITLE: 855,564

APPROVED AND APPROVED BY ORDER OF THE COURT
 OF THE LAND COURT DATED SEPTEMBER 6, 1990
 BY ORDER OF THE COURT

Richard E. Wright
 REGISTERED OF THE LAND COURT

Richard E. Wright
 REGISTERED OF THE LAND COURT

Easement for "Pedestrian Purposes"

NOTE:
 AREA OF EASEMENTS:

EASEMENT P	946	59 FF
EASEMENT Q	890	59 FF
EASEMENT R	1276	59 FF
EASEMENT S	3214	59 FF
EASEMENT T	712	59 FF
EASEMENT U	495	59 FF



8/29/2017 OCCL Photo of Shoreline Area fronting Parcel 088



8/29/2017 OCCL Photo of Shoreline Area fronting Parcel 088



Figure 13 Greig single-family home 8.5 feet from the erosion scarp, TMK (1) 5-5-002:088

August 2017 Photo of Parcel 088 from Emergency CDUA OA 18-04



Figure 14 Collapsed trees and damaged water infrastructure, TMK (1) 5-5-002:019

August 2017 Photo of Parcel 088 (misabeled in Figure 14) from Emergency CDUA OA 18-04

9



10



11



12



5/18/2018 Department Photos of Shoreline Area fronting Parcel 088

13



14



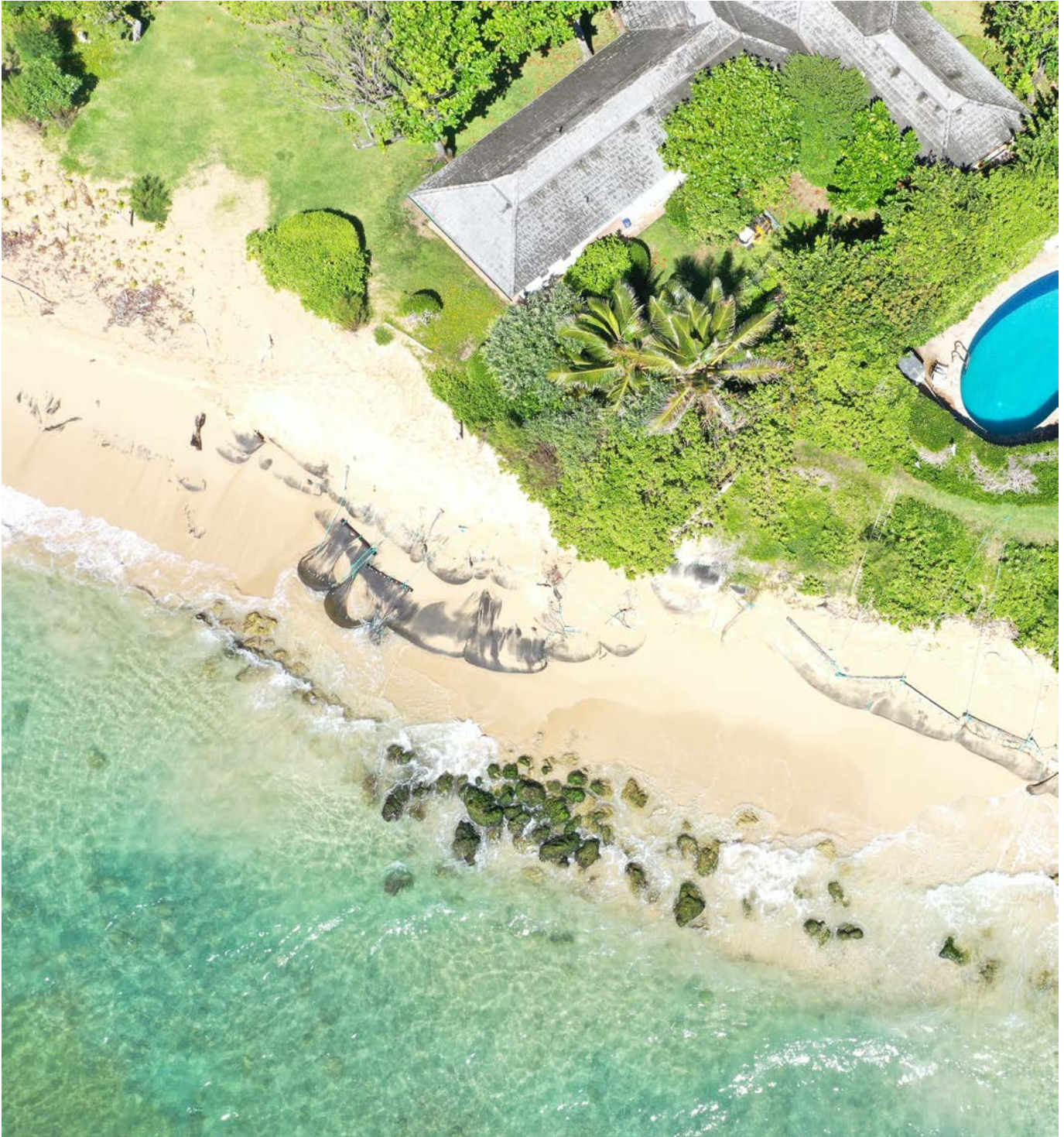
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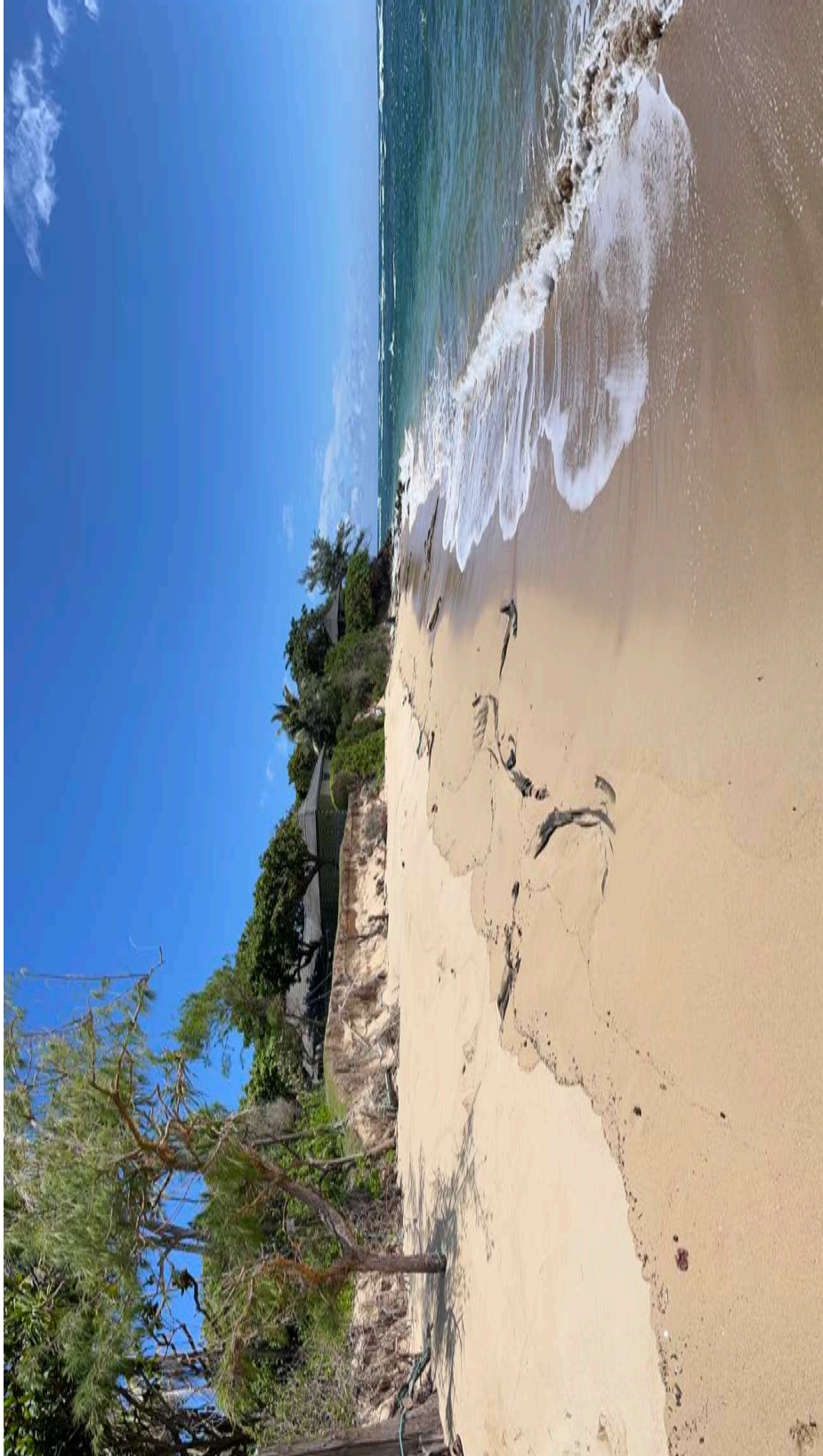
5/18/2018 Department Photos of Shoreline Area fronting Parcel 088



9/15/2021 OCCL Photo of Shoreline Area fronting Parcel 088



12/16/2021 OCCL Photos of Shoreline Area fronting Parcel 088



4/8/2025 OCCL Photo of Shoreline Area fronting Parcel 088



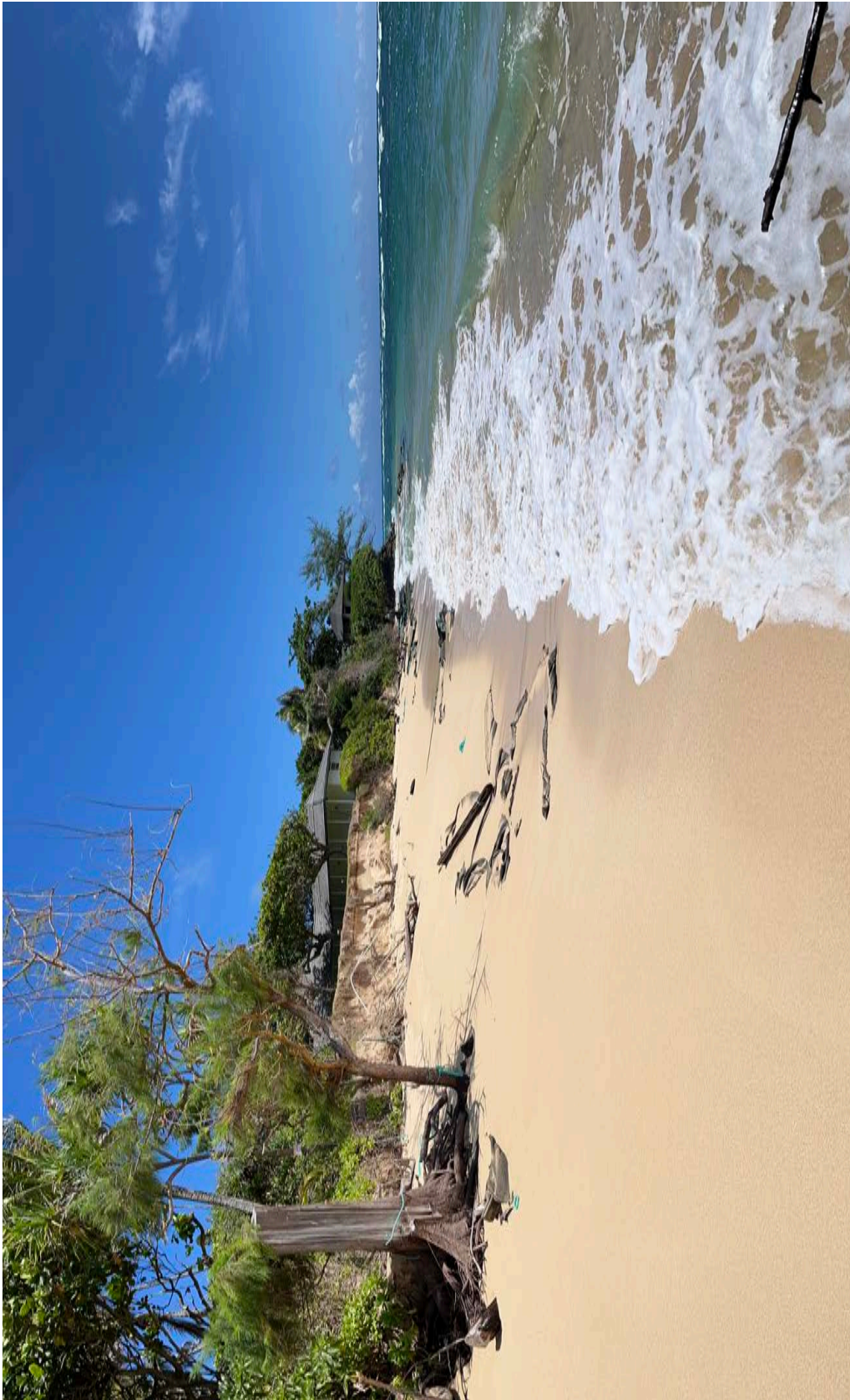
4/8/2025 OCCL Photo of Shoreline Area fronting Parcel 088



7/1/2025 OCCL Photo of Shoreline Area fronting Parcel 088



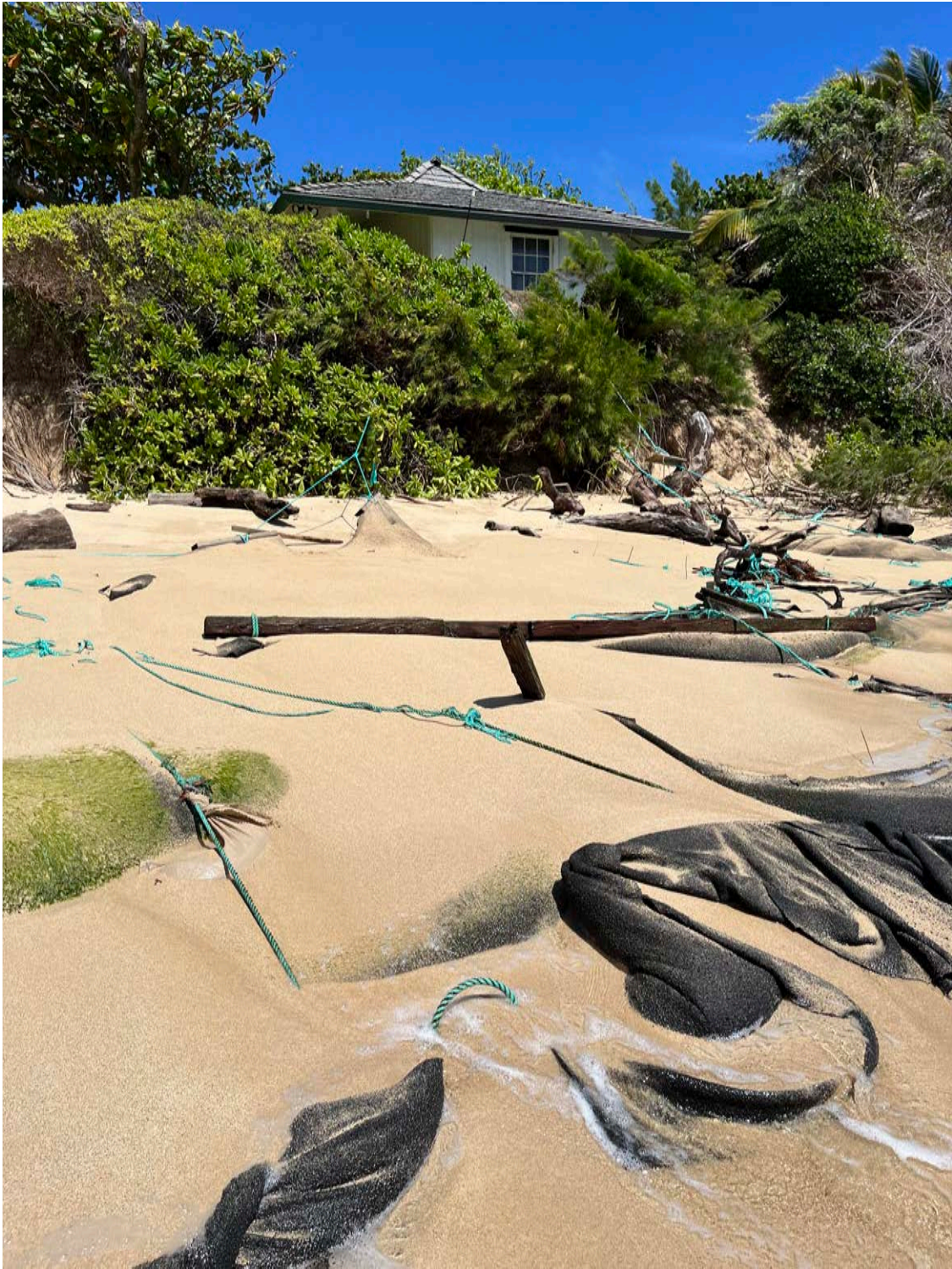
7/1/2025 OCCL Photo of "NO TRESPASSING" Sign posted on Parcel 088



9/11/2025 OCCL Photo of Shoreline Area Fronting Parcel 088



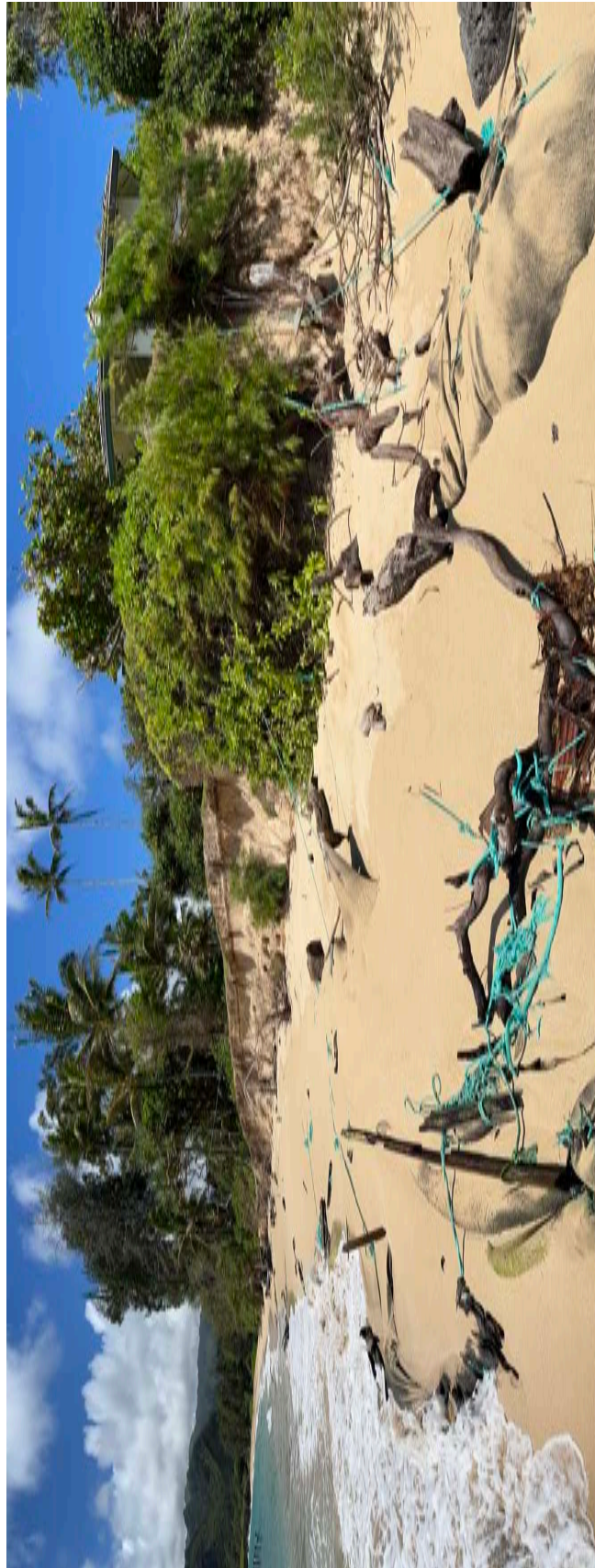
9/11/2025 OCCL Photo of Shoreline Area Fronting Parcel 088



9/11/2025 OCCL Photo of Shoreline Area Fronting Parcel 088



9/11/2025 OCCL Photo of Shoreline Area Fronting Parcel 088



9/11/2025 OCCL Photo of Shoreline Area Fronting Parcel 088

DAVID Y. IGE
GOVERNOR OF
HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

DLNR:OCCL:BR

Emer. CDUA OA-18-04

Mr. Andy Bohlander, Coastal Scientist
Sea Engineering, Inc.
Makai Research Pier
41-305 Kalaniana'ole Highway
Waimanalo, Hawaii 96795

SEP 14 2017

SUBJECT: Request for a Temporary Emergency Erosion Control Located at 55-273 Kamehameha Highway, Laie, Oahu; Tax Map Keys (1) 5-5-002:019 (owner: Susan Walker-Kowen) and 088 (owner: James D. Greig)

Dear Mr. Bohlander,

The Department of Land and Natural Resources (DLNR) received your August 2017 request to install temporary emergency erosion control measures along approximately 250 feet of shoreline at 55-273 Kamehameha Highway, Laie (Tax Map Keys (1) 5-5-002:019 and 088). Sea Engineering is acting as the permitting agent for the landowners (applicants) and providing construction oversight. Shoreline Restoration of Hawaii is acting as the design-build contractor.

According to your request, recent and on-going wave action coupled with extreme high tides has resulted in erosion of the shoreline fronting the subject properties. You note the erosion scarp is 12 to 15 high and within 5.5 feet of the house on the Walker-Kowen property and 6 to 10 feet high and within 8.5 feet of the house on the Greig property. The shoreline fronting the subject properties is undergoing long-term erosion between 0.5 to 1 feet per year according to the Laniloa to Kololio Beach, Oahu Shoreline Study Erosion Maps developed by the Coastal Geology Group at the University of Hawaii at Manoa, though it appears recent erosion rates have been substantially higher¹. The erosion has resulted in collapse of concrete stairs and exposed boulders extending from a rock revetment fronting a portion of the Walker-Kowen property.

Thank you for including a copy of your report "Muliwai Shoreline Erosion Alternatives," developed in August 2017 for Susan Walker-Kowen. The report notes that the Walker-Kowen property is the southernmost of 24 properties that are armored by a contiguous series of seawalls and other erosion control structures. The erosion at the subject properties is likely due in part to "end effects" or "flanking erosion" at the terminus of the shoreline structures. Laie Beach Park is south of the subject properties and is characterized by relatively stable shoreline. Your report evaluates advantages and disadvantages of a range of short-term erosion control alternatives: retreat, sand pushing, small-scale beach nourishment, slope stabilization with vegetation, erosion

¹ Oahu Shoreline Study Erosion Maps. University of Hawaii Coastal Geology Group. Hawaii Coastal Erosion Website: <http://www.soest.hawaii.edu/coasts/erosion/oahu/>

Walker-Kowen and Greig

Emer. CDUA OA-18-04

protection skirt, biodegradable sandbag revetment, and geotextile revetment; and long-term alternatives: beach nourishment with stabilizing structures, seawall, and rock revetment. Your report concludes that retreat (landward relocation or reconstruction of buildings) combined with slope stabilization with vegetation may provide the most cost-effective long-term option for mitigating the erosion hazard at the Walker-Kowen property.

The DLNR understands that the proposed activities will occur on State land, seaward of where the shoreline would likely be determined based on HAR §13-222 *Shoreline Certifications*. You intend to remove loose debris along the shoreline including the collapsed stairs prior to installing a temporary erosion control structure. Approximately 100 cubic yards of locally-sourced dune sand will be used to restore the dune face to a 1H:1V slope. Sand samples provided to the DLNR from the placement and extraction areas indicate an acceptable match based on visual inspection. The dune face will be stabilized along approximately 250 feet of shoreline fronting the subject properties using a "SEABlanket" anchored at the base by two rows of sand-filled "SEAtubes" constructed of Marafi® geotextile fabric and stitched together with polypropylene rope. Upper portions of the dune will be stabilized using biodegradable coconut fiber (coir) blankets. The materials will be anchored using steel pipes, earth anchors, polypropylene rope, and redwood boards. The total footprint of the structure will be approximately 4,500 square feet. The structure will be built by hand due to a lack of access for heavy equipment.

The DLNR authorizes the temporary emergency erosion control measures as described above for three (3) years along approximately 250 feet of the shoreline fronting the subject properties while the applicant develops long-term options in an effort to protect public health, welfare, and safety on the subject property under Hawaii Administrative Rules (HAR) §13-5-35, *Emergency Permits (a) "Notwithstanding any provision of this chapter, the chairperson or deputy director of the department in the absence of the chairperson may authorize through an emergency permit any land use deemed to be essential to alleviate any emergency that is a threat to public health, safety, and welfare, including natural resources, and for any land use that is imminently threatened by natural hazards. These actions shall be temporary in nature to the extent that the threat to public health, safety, and welfare, including natural resources, is alleviated (e.g., erosion control, rockfall mitigation). The emergency action shall include contingencies for removal methods, estimates for duration of the activity, and future response plans if required by the department."*

In addition, the temporary structure may be considered an exempt action under State environmental laws under HAR §11-200-8 and as provided in the approved Exemption List for the DLNR, *Exemption Class 1: 1. Mitigation of any hazardous conditions that present imminent danger as determined by the Department Director and that are necessary to protect public health, safety, welfare, or public trust resources; and 2. Upon determination by the Department Director that an emergency exists, emergency mitigation and restoration work to prevent damage from continuing to occur and to restore the topographical features and biological resources.* The Office of Conservation and Coastal Lands consulted with the Oahu District Land Office, who has concurred with the EA exemption for the proposed project.

The temporary erosion control measures are intended to provide temporary mitigation of the erosion problem and reduce hazards to the subject property while your client pursues a longer-term strategy. The Erosion Alternatives report included with your request letter indicates that

Walker-Kowen and Greig

Emer. CDUA OA-18-04

your clients are investigating long-term solutions for erosion management at the properties. This temporary authorization is contingent on their continued progress toward a long-term erosion management strategy.

Please review the following terms and conditions carefully.

Terms and Conditions

The DLNR has no objections to the Emergency Temporary Shoreline Protection as described above fronting the subject properties, at TMK (1) 5-5-002:019 and 088, provided that you adhere to the following Terms and Conditions:

1. It is understood that the Emergency Temporary Shoreline Protection is a temporary response to address a safety hazard to the existing single-family residences on the subject properties, which are threatened by both chronic and seasonal beach erosion. **The material is authorized as a temporary erosion control measure for three (3) years** from the date of issuance of this letter. Subsequent erosion control efforts that call for modification, other than maintenance of the proposed structure will require a new application. At the end of the authorization period, the materials shall be removed;
2. The permittees shall contact the DLNR Oahu Land Division Office at (808) 587-0419 to secure a Right of Entry Permit incorporating the most current terms and conditions for the use of State lands for this structure;
3. The permittees will submit a completion report for the project to the OCCL within ninety (90) days of completion of construction of the temporary structure. It will summarize the construction and detail any deviation from the proposed plans and provide a summary of the beach conditions since installation. The report will also include a photo summary of the temporary structure and beach conditions with documentation of any alterations or repairs;
4. The permittees shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;
5. The permittees, their successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit;
6. Unless otherwise authorized, any work or construction to be done on the land shall be completed within 180 days of the approval of such use. The permittees shall notify the department in writing at least 24 hours prior to initiating construction and when it is completed;
7. Work shall be conducted at low tide to the most practical extent possible and no work shall occur during high surf or ocean conditions that will create unsafe work or beach conditions;

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8. Sand use and placement shall meet the following State quality standards:
 - a) The proposed fill sand shall not contain more than six (6) percent fines, defined as the #200 sieve (0.074 mm);
 - b) The proposed beach fill sand shall not contain more than ten (10) percent coarse sediment, defined as the #4 sieve (4.76 mm) and shall be screened to remove any non-beach compatible material and rubble;
 - c) No more than 50 (fifty) percent of the fill sand shall have a grain diameter less than 0.125 mm as measured by #120 Standard Sieve Mesh;
 - d) Beach fill shall be dominantly composed of naturally occurring carbonate beach or dune sand. Crushed limestone or other man made or non-carbonate sands are unacceptable;
9. Appropriate safety and notification procedures shall be carried out. This shall include high visibility safety fencing, tape or barriers to keep people away from the active construction site and a notification to the public informing them of the project. All barriers shall be removed once the project is complete to allow full public access laterally along the beach and alongshore walkway;
10. The permittees shall implement standard Best Management Practices (BMPs), including the ability to contain and minimize silt in nearshore waters. If persistent turbidity or other unusual substances are observed in the water as a result of the proposed operation, all work must cease immediately to ascertain the source of the substance;
11. All placed material shall be free of contaminants of any kind including: excessive silt, sludge, anoxic or decaying organic matter, turbidity, temperature or abnormal water chemistry, clay, dirt, organic material, oil, floating debris, grease or foam or any other pollutant that would produce an undesirable condition to the beach or water quality;
12. The permittees understands and agrees that the permit does not convey any vested right(s) or exclusive privilege;
13. Transfer of ownership of the subject property includes the responsibility of the new owner to adhere to the terms and conditions of this authorization;
14. In issuing the permit, the Department and the Chairperson have relied on the information and data that the permittees have provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data prove to be false, incomplete, or inaccurate, this permit may be modified, suspended, or revoked, in whole or in part, and the department may, in addition, institute appropriate legal proceedings;
15. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;
16. Obstruction of public roads, trails, lateral shoreline access, and pathways shall be avoided or minimized. If obstruction is unavoidable, the permittee shall provide alternative roads, trails, lateral beach access, or pathways acceptable to the Department;

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17. For all landscaped areas, landscaping and irrigation shall be contained and maintained within the property, and shall under no circumstances extend seaward of the shoreline as defined in Hawaii Revised Statutes (HRS) §205A-1;
18. The activity shall not adversely affect a federally listed threatened or endangered species or a species proposed for such designation, or destroy or adversely modify its designated critical habitat;
19. The activity shall not substantially disrupt the movement of those species of aquatic life indigenous to the area, including those species, which normally migrate through the area;
20. No contamination of the marine or coastal environment (trash or debris) shall result from project-related activities authorized under this letter;
21. Artificial light from exterior lighting fixtures, including but not limited to floodlights, uplights, or spotlights used for decorative or aesthetic purposes, shall be prohibited if the light directly illuminates or is directed to project across property boundaries toward the shoreline and ocean waters, except as may be permitted pursuant to HRS §205A-71. All exterior lighting shall be shielded to protect the night sky;
22. The permittees acknowledge that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawaii, and by Hawaii statutory and case law;
23. Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary;
24. The DLNR reserves the right to impose additional terms and conditions on projects authorized under this letter, if it deems them necessary;
25. Failure to comply with any of these conditions shall render a permit void under the chapter, as determined by the Chairperson or BLNR.

Walker-Kowen and Greig

Emer. CDUA OA-18-04

Should you have any questions pertaining to this letter, please contact Brad Romine, University of Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or Bradley.M.Romine@Hawaii.gov.

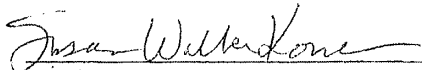
Sincerely,



Suzanna D. Case, Chairperson
Board of Land and Natural Resources

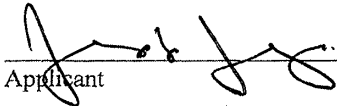
CC: Honolulu C&C Planning Department
ODLO

I concur with the conditions of this letter:



Applicant

Date 10/3/17



Applicant

Date 10/3/17

ATTACHMENT 3

MULIWAI SHORELINE EROSION ALTERNATIVES

KOWEN-GREIG EMERGENCY EROSION CONTROL
55-273 KAMEHAMEHA HIGHWAY
LAIE, OAHU, HAWAII 96762
TAX MAP KEYS (1) 5-5-002:019 AND (1) 5-5-002:088

Muliwai Shoreline Erosion Alternatives

Laie, Oahu, Hawaii

August 2017



Prepared for:

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1080 S. Beretania Street, PH2
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Job No. 25594



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1. INTRODUCTION

1.1 Background

The Muliwai property is located at 55-273 Kamehameha Highway, Laie, Oahu, Hawaii; Tax Map Key (1) 5-5-002:019 (Figure 1-1). The property has a history of beach and dune erosion. The erosion has caused an escarpment to form along the shoreline fronting the property. The escarpment is 12 to 15 feet high along approximately 125 feet of shoreline frontage. The erosion has caused the collapse of a concrete staircase and is threatening the northeast corner of the existing single-family home, which is less than 5 feet from the erosion scarp. Previous attempts to provide temporary erosion control have been unsuccessful.



Figure 1-1 Location map (Google Earth)

1.2 Scope of Work

Sea Engineering, Inc. (SEI) was hired to evaluate options to mitigate the ongoing erosion to preserve fast land, maintain habitability of the existing single-family home, and eliminate health and safety risk. SEI conducted a field survey to identify the location of the erosion scarp, the beach toe, and other relevant features. An alternatives analysis was performed to evaluate potential options to mitigate the erosion of the shoreline fronting the Muliwai property. Each alternative was evaluated based on the unique characteristics of the ongoing erosion at the Muliwai property. SEI is providing this information to inform decision-making and the selection of a preferred alternative to address the erosion.

2. SITE ASSESSMENT

2.1 Regional Shoreline Conditions

The Muliwai property is a residential property located along the Laie coastline south of Laie Point on the windward coast of Oahu. The Laie coast consists of a narrow coastal plain marked by embayments separated by prominent headlands. The embayments of Malaekahana and Laie Bay consist of relatively stable sandy beaches, while those farther south at Laie and Hauula have been severely altered by development and suffer from chronic erosion. This is a strong tradewind environment and aeolian (windblown) features are pervasive throughout the region (Fletcher et al., 2002). The surficial geology of the low-lying coastal plain is primarily unconsolidated Holocene carbonate beach and dune deposits and alluvium (Sherrod et al., 2007). The shoreline is characterized by an extensive fringing reef complex associated with a broad, shallow, and generally smooth reef flat. The fringing reef parallels most of the coastline, extending up to 2,000 feet offshore (Fletcher et al., 2002).

The Muliwai property is centrally-located along an approximately 4,000-foot length of shoreline. The shoreline can be divided into three reaches: *northern*, *central*, and *southern* (Figure 2-1). The Muliwai property is the last of twenty-four (24) properties that are armored by a contiguous series of seawalls, crib walls, rock revetments, and loose boulders (Figure 2-2).

The *northern reach* extends approximately 2,000 feet north of Kehukuuana Point. The area is fronted by a continuous beach rock outcrop that is partially-exposed even during high tides. The fringing reef along the northern reach extends up to 2,000 feet offshore. The beach in this area has experienced moderate to high erosion with average annual erosion rates ranging from 0.3 to 2.1 feet/year (Fletcher et al., 2012). The northern reach ends at a shore-perpendicular groin fronting parcel (1) 5-5-002:083. The groin appears to impound sand on the northern side, and the shoreline to the north of the groin is mostly unarmored.

The *central reach*, which includes the Muliwai property, consists of approximately 1,000 feet of shoreline fronting the sandy headland of Kehukuuana Point. The fringing reef along the central reach is slightly narrower, extending only 1,000 to 1,500 feet offshore, and continues to narrow to the south toward Laie Beach Park. The beach in this area has experienced moderate erosion with average annual erosion rates ranging from 0.9 to 1.6 feet/year (Fletcher et al., 2012). Both the beach rock outcrop and the continuous series of shoreline armoring terminates near the northern end of the Muliwai property. The shoreline to the south is unarmored (Figure 2-2).

The *southern reach* consists of a shallow embayment that extends approximately 2,000 feet south from Kehukuuana Point to the rocky headland at the southern end of Laie Beach Park. The fringing reef in this area is bisected by a wide, sand-filled channel at the confluence of three freshwater drainages. The beach in this area has experienced moderate erosion with average annual erosion rates ranging from 0.1 to 0.8 feet/year along the northern portion of the embayment. The southern portion of the embayment has been stable with average annual accretion rates of 0.0 to 0.1 feet/year (Fletcher et al., 2012). There is no shoreline armoring present along the southern reach (Figure 2-2).



Figure 2-1 Shoreline reaches: 1) northern, 2) central, and 3) southern

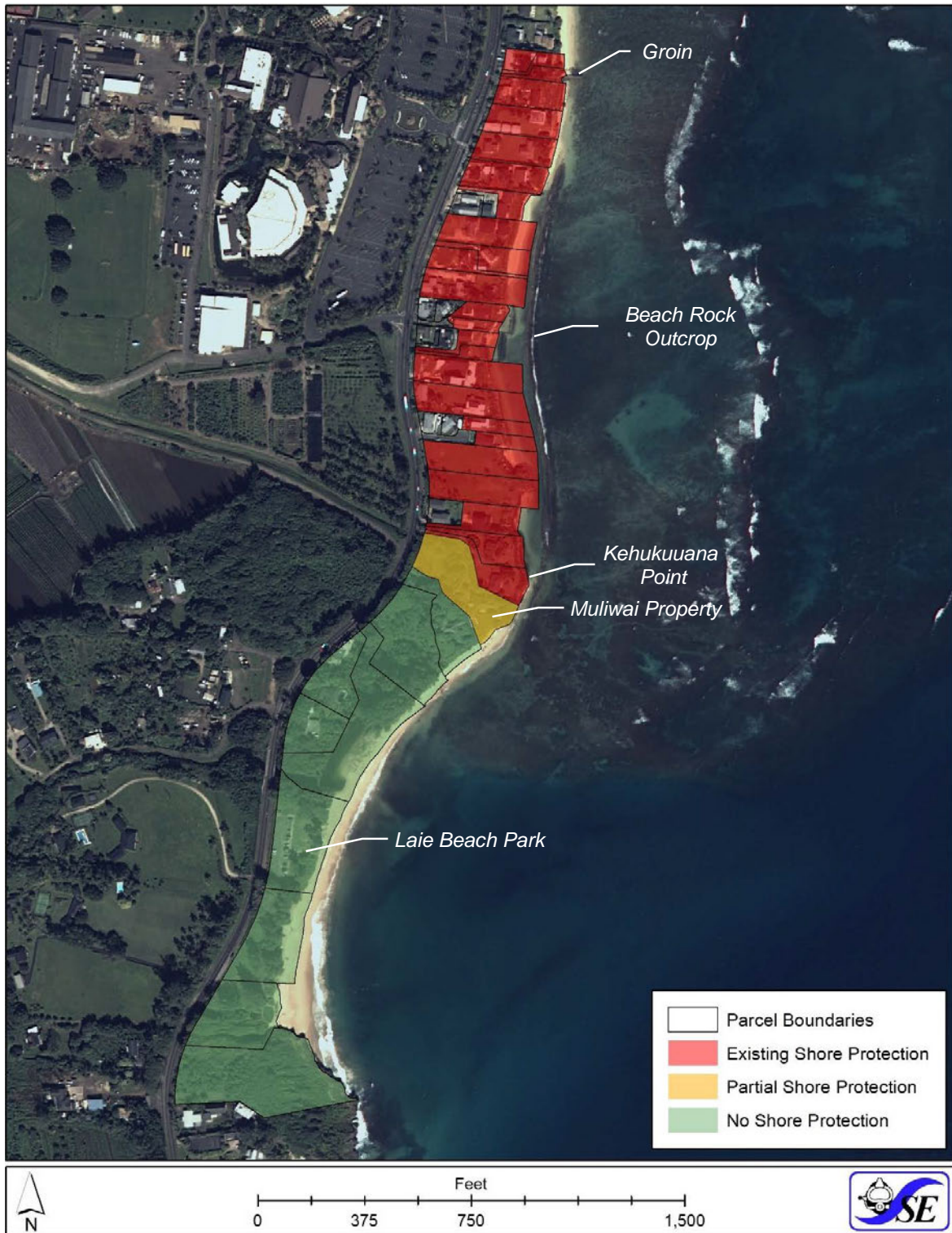


Figure 2-2 Existing shore protection

2.2 Muliwai Shoreline Conditions

SEI conducted a site visit at the Muliwai property on July 19, 2017. The purpose of the site visit was to assess existing conditions at the site, evaluate the erosion, identify the approximate location of the shoreline, and conduct a field survey to inform the evaluation of potential alternatives to mitigate the ongoing erosion.

The Muliwai shoreline is SE-facing and is exposed to tradewind waves and north swell, and partially exposed to south swell. The property is situated on an undulating frontal dune composed of unconsolidated Holocene carbonate dune sand (Sherrod et al., 2007). The backshore consists of a steep erosion scarp that is approximately 12 to 15 feet high spanning the entire length of the Muliwai property shoreline (approximately 125 linear feet of shoreline). The erosion scarp is active and unstable, and has recently receded several feet in just a few months. An overview map of the property is shown in Figure 2-3.

The foreshore consists of an ephemeral sand beach fronted by a series of loose boulders. The beach is extremely dynamic and beach width is highly variable. The northern portion of the property is fronted by a loose boulder revetment composed of limestone and basalt boulders (Figure 2-4). The boulder revetment does not appear to provide effective protection from erosion as the unconsolidated dune material is easily scoured and mobilized by wave action. The southern portion of the property is exposed with no shore protection (Figure 2-5). A series of loose boulders is strewn along the beach fronting the southern portion of the property. The loose boulders may have once been part of the boulder revetment and have since settled and been transported onto the lower beach.

Local sediment transport appears to be driven by waves and water levels. During periods of elevated water levels, the beach deflates and irregular currents form around the loose boulders along the beach toe. Wave-induced currents flow rapidly along the landward edge of the beach rock outcrop, which allows the beach sand to mobilize and move alongshore and offshore.

Observed water levels in Hawaii have been consistently 3 to 6 inches higher than predicted since early 2016. In April 2017, water levels peaked at more than 9 inches above predicted tides at the Honolulu Harbor tide gauge, resulting in the highest daily mean water level ever observed over the 112-year record. Record “king tides” were also recorded in May, June, and July 2017 (Figure 2-6). Persistent elevated water levels are likely contributing to the ongoing erosion and beach narrowing at the Muliwai property.

2.3 Topographic Survey and Beach Profiles

SEI conducted a topographic survey using a Leica Real-time Kinematic (RTK) survey system. Survey data was collected for all prominent features including structures (e.g., house, concrete stairs), elevations (e.g., topography), and morphologic features (e.g., erosion scarp, bottom bank, beach toe). Profiles were measured from the backshore to the beach toe. The location of the beach profile transects is shown in Figure 2-3. The beach profiles are shown in Figure 2-7. The profiles illustrate a nearly-vertical, 12 to 15-foot high erosion scarp cut into the backshore.



Figure 2-3 Overview map showing key features and beach profile transect locations



Figure 2-4 Northern portion of the Muliwai shoreline (6/13/2013)



Figure 2-5 Southern portion of the Muliwai shoreline (7/19/2017)

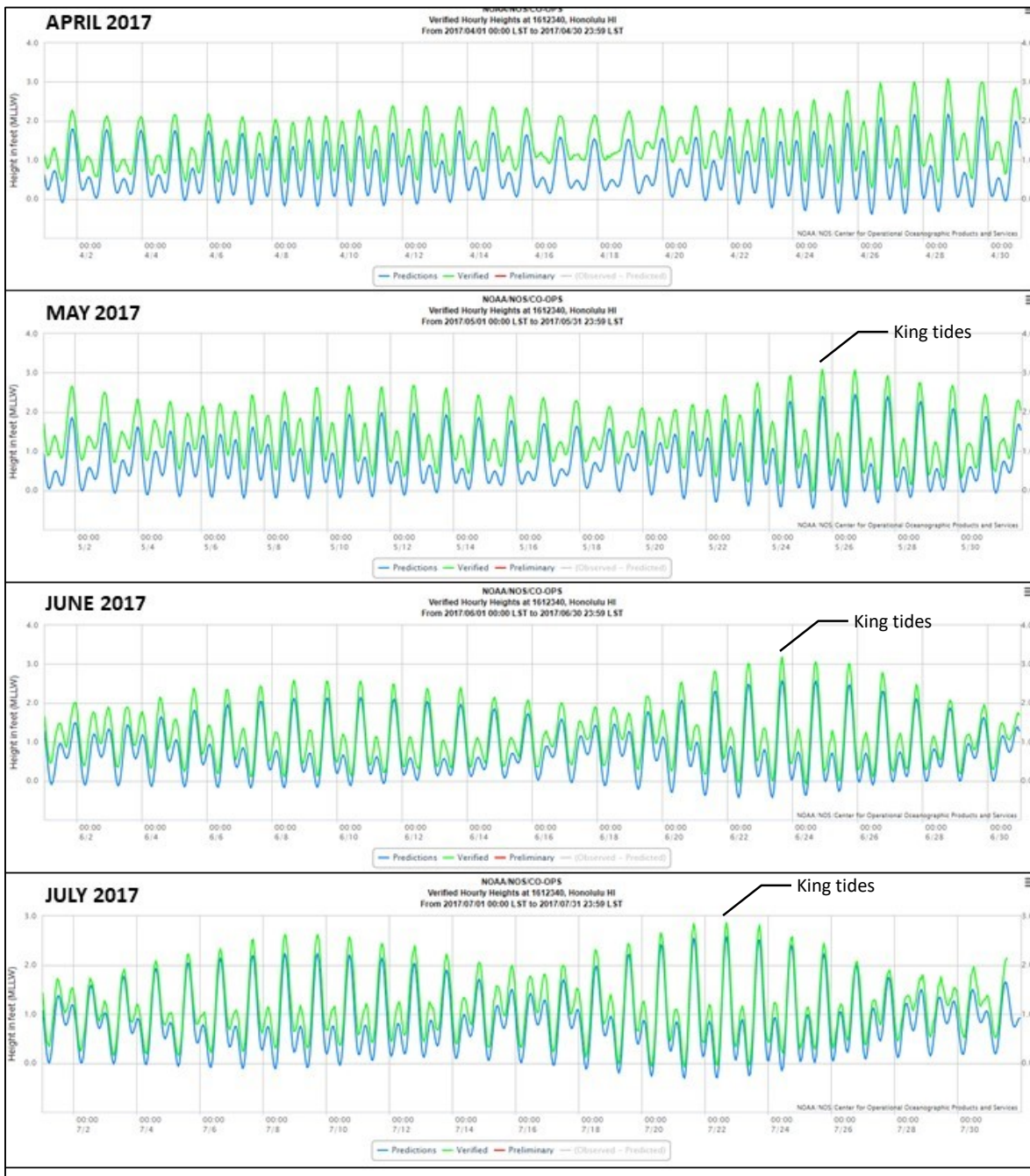


Figure 2-6 Elevated water levels at Honolulu Tide Station (April to July 2017)

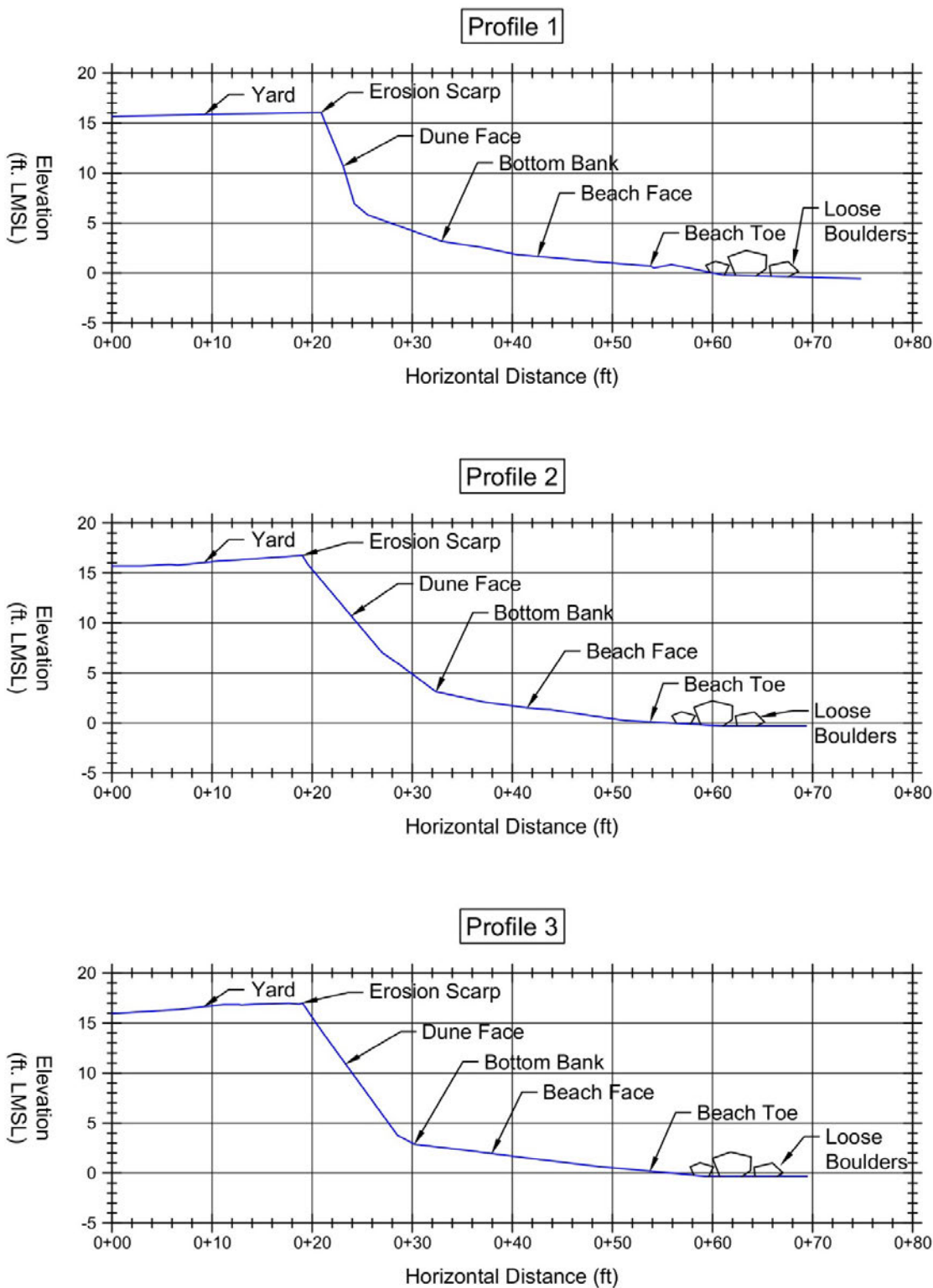


Figure 2-7 Beach profiles at the Muliwai property (7/19/2017)

2.4 Historical Shoreline Change

Coastal erosion along the Laie coastline was evaluated by the University of Hawaii Coastal Geology Group using historical aerial photographs from 1928 to 2006. The estimated historical average annual erosion rate for the Muliwai property is 0.8 to 0.9 feet/year (Fletcher et al., 2012). The Muliwai property is located on a sandy headland that is experiencing chronic erosion. A 2016 study found that, over the past century, headland beaches were significantly more erosional than embayed beaches along the Laie coastline. Headlands were found to be eroding at an average rate of 0.36 feet/year, while embayed beaches were found to be accreting at an average rate of 0.03 feet/year (Romine et al., 2016).

The ongoing erosion at the Muliwai property has resulted in the formation of a 12 to 15-foot high unstable erosion scarp along approximately 125 feet of shoreline. The erosion scarp is currently within 5 feet of the existing single-family home, which is now imminently threatened¹. The previous condition of the shoreline is shown in Figure 2-8 and Figure 2-10. The current condition of the shoreline is shown in Figure 2-9 and Figure 2-11.

The erosion has caused the Muliwai shoreline to migrate further landward, which has resulted in permanent land loss. The Muliwai property originally consisted of 60,799 square feet (1.4 acres). Based on the location of the 2009 certified shoreline (along the bottom bank), the property currently consists of 53,571 square feet (1.23 acres). From 1928 to 2009, approximately 12% of the property (7,228 square feet, 0.17 acres) has been lost to erosion (Table 2-1). The beach fronting the Muliwai property is dynamic and ephemeral, and may therefore have the capacity to recover naturally; however, the frontal dune is oversteepened and devoid of vegetation, and therefore has little or no capacity for natural recovery. Any loss of dune material can be considered permanent.

Table 2-1 History of erosion at the Muliwai property (1928 to 2009)

Year	Shoreline Boundary	Lot Size (sf)	Erosion (sf)
1928	High Water Mark	60,799	N/A
1989	Vegetation Line	56,029	4,770
1994	High Water Mark	54,715	1,314
2009	Bottom Bank	53,571	1,144

The ongoing erosion is likely to be exacerbated by rising sea levels. A 2015 study found that, due to increasing sea level rise, average shoreline recession in Hawaii is expected to be nearly twice the historical extrapolation by 2050, and nearly 2.5 times the historical extrapolation by 2100 (Anderson et al., 2015). These projections suggest that, without some form of erosion mitigation, the Muliwai property will likely continue to experience significant erosion and land loss in the future.

¹ Hawaii Administrative Rules §13-22-5



Figure 2-8 Previous condition of the shoreline, looking north (6/13/2013)



Figure 2-9 Current condition of the shoreline, looking north (7/19/2017)



Figure 2-10 Previous condition of the shoreline, looking south (6/13/2013)



Figure 2-11 Current condition of the shoreline, looking south (7/19/2017)

3. ALTERNATIVES ANALYSIS

Coastal protection engineering is generally divided into two basic types, soft solutions and hard solutions. Examples of soft solutions include retreat from the shoreline, sand pushing, and beach nourishment. Hard solutions involve the construction of rock or concrete structures, typically a revetment or seawall, to permanently fix the shoreline. Beach nourishment can be combined with structures, such as shore-perpendicular groins or offshore breakwaters, to stabilize the sand fill. In recent years, temporary emergency structures, typically geotextile or biodegradable sandbags and fabrics, have been used to protect the shoreline and allow sufficient time for design and permitting for a permanent solution.

SEI evaluated short-term alternatives and long-term alternatives to address the ongoing erosion (Table 3-1). Alternatives were evaluated based on the characteristics of the erosion at the Muliwai property. Evaluation criteria included

1. Design Considerations (i.e., effectiveness, design life, durability, and costs);
2. Feasibility (i.e., regulatory support, community support), and;
3. Potential impacts (i.e., shoreline, coastal processes, marine habitat, and shoreline access).

Table 3-1 Erosion control alternatives evaluated

Short-term Alternatives
Retreat
Sand Pushing
Small-scale Beach Nourishment
Slope Stabilization with Vegetation
Erosion Protection Skirt
Biodegradable Sandbag Revetment
Geotextile Sandbag Revetment
Long-term Alternatives
Beach Nourishment with Stabilizing Structures
Seawall
Rock Revetment

3.1 Short-term Alternatives

The purpose of short-term shore protection is to temporarily mitigate the erosion to allow sufficient time to develop a long-term solution and go through the environmental review and regulatory permitting process, which can take 3 to 5 years, or more. The design life for temporary shore protection measures is a function of the durability of the materials and the duration of the regulatory authorizations, which typically range from several months to several years. Temporary shore protection measures often require substantial capital investment for initial construction. Additional costs for maintenance, repair, and/or replacement can also be very high. Regulatory authorizations for temporary shore protection may include conditional requirements, such as preparation of a Draft Environmental Assessment (DEA) within a specified period of time, or the authorization will expire. Even under optimal conditions, options for temporary shore protection are costly and often ineffective.

3.1.1 Retreat

This approach would involve relocating some or all of the existing structures further inland and allowing the erosion to continue. Removal of the northeast corner of the existing single-family home would provide an additional 40-foot buffer between the home and the erosion scarp. There also appears to be adequate space to redevelop the inshore portion of the property, as approximately 50% of the property is currently undeveloped. Retreat would allow sediment to migrate naturally along the beach, which could facilitate beach recovery. Retreat would also avoid the costs associated with design, permitting, and construction of temporary or permanent shore protection measures.

Retreat would provide no protection from erosion. Without some form of erosion mitigation, it is likely that the existing single-family home will eventually become uninhabitable. Considering the erosion history of the area (Fletcher et al., 2012; Romine et al., 2016), and the projected future erosion with rising sea levels (Anderson et al., 2015), retreat may be the most cost-effective alternative; however, the decision to voluntarily allow the land to erode would understandably be very difficult.

Advantages

- + Eliminates the risk to backshore infrastructure.
- + Avoids costs and requirements associated with shore protection and/or beach restoration.
- + Could facilitate beach recovery.

Disadvantages

- Would not mitigate the loss of fast land.
- May diminish the value of the property.
- Requires the landowner to voluntarily give up surrender land to erosion.

3.1.2 Sand Pushing

Sand pushing is a form of passive erosion control that does not involve engineering structures. Sand pushing is a relatively simple concept that involves moving sand from the lower beach to the upper beach to reduce exposure of the backshore to wave action. An example of a sand pushing project at Sunset Beach, Oahu, is shown in Figure 3-1. Sand pushing would require an adequate supply of beach sand and may be limited to the beach immediately fronting the property. Sand pushing at the Muliwai property would only be possible when the beach is fully inflated and may not be feasible without the removal of the loose boulders along the shoreline. While sand pushing may improve the appearance of the dune face, the pushed sand would be expected to quickly mobilize and move alongshore and offshore.



Figure 3-1 Sand pushing (Sunset Beach, Oahu, Hawaii)

Advantages

- + Relatively low initial costs.
- + Low degree of environmental review and regulatory permitting.
- + Avoids costs associated with engineering structures and/or easements.

Disadvantages

- Only possible when the beach is completely inflated.
- Sand is unlikely to remain stable without additional engineered structures.
- Requires periodic maintenance, which can increase costs substantially.
-

The estimated time for permitting and construction for sand pushing would be **6 to 12 months**. The estimated cost for permitting and construction for sand pushing would be **\$10,000 to \$25,000**. Costs could be significantly greater depending on the need for repeated sand pushing.

3.1.3 Small-scale Beach Nourishment

The State of Hawaii supports beach nourishment as an alternative to shoreline armoring. DLNR-OCCL authorizes restoration of beaches and dunes through the Small-scale Beach Nourishment (SSBN) program, which allows placement of compatible beach sand within the Conservation District. There are two categories of authorizations: Category I (up to 500 cubic yards of sand), and Category II (up to 10,000 cubic yards of sand). SSBN permits authorize the placement of compatible beach sand landward of mean higher high water (mhhw). An example of a small-scale beach nourishment project at Sugar Cove, Maui, is shown in Figure 3-2.

The Muliwai shoreline is approximately 125 feet long. Assuming a placement volume of 12.5 cubic yards of sand per linear yard of shoreline, a Category I small scale beach nourishment consisting of up to 500 cubic yards of sand would be sufficient. Small scale beach nourishment could provide a short-term increase in beach volume and width at the Muliwai property. The replenished beach would provide recreational opportunities as well as a protective buffer for the backshore area and infrastructure. Beach nourishment has a positive perception among the regulatory agencies because it has minimal environmental impacts and is consistent with State and County shoreline policies that seek to preserve and enhance beach resources.

Beach nourishment requires a supply of sand that is similar in grain size to the native beach sand. While sand may seem like a plentiful commodity, the reality is that good quality beach sand is in short supply in Hawaii. Appropriate onshore sources of sand are limited in supply, and overseas sources have proven elusive. SEI is not aware of any available sound sources to support beach restoration projects on the windward coast of Oahu. An offshore sand source investigation may be required to identify an adequate supply of compatible beach quality sand. Offshore sand source investigations are technically challenging and can be very expensive.

If the shoreline fronting the Muliwai property were replenished with sand, it is unclear how stable the sand would be, once placed. Fill sand would be subject to local sediment transport dynamics and would likely be redistributed throughout the littoral cell through normal seasonal beach processes. The sand would quickly mobilize and move alongshore and offshore during seasonal shifts within the littoral cell and/or large wave events. The volume of sand would likely diminish over time, but with an unknown rate of attrition. Individual storm events or other weather conditions can cause rapid fluctuations in beach width, and dynamic areas such as the Muliwai shoreline can lose their beach in a short time even if it is widened with beach nourishment.



Figure 3-2 Small-scale beach nourishment (Sugar Cove, Maui, Hawaii)

Advantages

- + Moderately-low initial costs.
- + Regulatory agencies are supportive of beach restoration projects.
- + Avoids costs associated with engineering structures and/or easements.

Disadvantages

- Requires compatible beach quality sand.
- Beach quality sand is difficult to find and very expensive.
- May require offshore sand source investigation.
- Sand is unlikely to remain stable without additional engineered structures.
- Requires periodic maintenance.

The estimated time for design, permitting, and construction for a Category I small-scale beach nourishment would be **1 to 2 years**. The estimated cost for design, permitting, and construction for a Category I small-scale beach nourishment would be **\$100,000 to \$150,000**.

3.1.4 Slope Stabilization with Vegetation

Slope stability is generally a function of soil properties, the underlying soil and rock mechanics, and the controlling processes that affect the stability of the slope. It is important to determine the appropriate technique to be applied to reduce the influence of those processes. Common approaches include reducing the height of the slope, reducing the angle of the slope, strengthening the slope, and reinforcing the slope using synthetic materials and structures.

Vegetation is a common form of slope stabilization, often referred to as “bioengineering”. Research has been done on using plants to stabilize soil to prevent excessive erosion. In most cases, native grasses, shrubs, and trees are used as the vegetation in bioengineering stabilization. Vegetation has been used effectively for dune stabilization purposes on Maui. Low-growing native vegetation such as grasses (‘Aki‘aki), Beach Morning Glory (Pohuehue), and ‘Akulikuli can act as a protective mat to stabilize sandy substrate.

Vetiver is another type of grass that has worked very well in many different environments to stabilize slopes against erosion. Vetiver Grass has become popular for slope stabilization in tropical and subtropical areas, because of the fast growth and deep root penetration of this grass (Highland and Bobrowsky, 2008). Vetiver Grass has unique morphological and physiological characteristics that make it ideal for slope stabilization purposes including: fast growing (up to 3-4 meters/year), deep root systems, rapid regrowth, and high tolerance to climatic conditions and a wide range of soil pH (Truong and Loch, 2004).

Vetiver Grass is reportedly salt tolerant. Planting Vetiver grass hedgerows in 2-inch diameter holes at depths ≥ 2 feet filled with compost would allow the grass to grow very quickly in the clay-rich soils along the Muliwai shoreline. The Vetiver grass hedgerows would be designed to allow the first row to be sacrificial to saltwater.

Slope stabilization with vegetation at the Muliwai property would involve grading the exposed upper portion of the erosion scarp to reduce the angle of repose and provide space to plant vegetation. The exposed dune face would be stabilized using vegetation and a cellular confinement system, such as Geoweb². An example of slope stabilization with vegetation and Geoweb is shown in Figure 3-3.

SEI is unaware of any cases where vegetation has been effective in mitigating beach and dune erosion in Hawaii. While vegetation may reduce oversteepening and slow the release of unconsolidated sand from the dune face, it would provide no protection from wave scour. It would be also difficult to effectively anchor a cellular confinement system. This approach may provide some short-term relief but is unlikely to provide a lasting solution to the erosion.

² <http://www.prestogeo.com/products/soil-stabilization/geoweb-geocells/>



Figure 3-3 Slope stabilization with vegetation and GEOWEB

Advantages

- + Very low cost.
- + Low maintenance.
- + Work can be completed relatively quickly.

Disadvantages

- Regulatory agencies may object to using non-native vegetation, such as Vetiver grass.
- Regulatory agencies may object to using cellular confinement systems, such as Geoweb.
- May require excavation and grading of the erosion scarp to reduce the angle of the slope.

The estimated time for permitting and construction for slope stabilization with vegetation would be **3 to 6 months**. The estimated cost for slope stabilization would be **\$10,000 to \$15,000** for vegetation only, or **\$15,000 to \$25,000** for vegetation and a cellular confinement system.

3.1.5 Erosion Protection Skirt

An erosion protection skirt is designed to provide temporary, short-term erosion control. This approach would involve installing a layer of geotextile fabric (skirt) over the existing erosion scarp and dune face. An example of erosion protection skirt at Kaanapali, Maui, is shown in Figure 3-4. An erosion protection skirt is not an engineered erosion control measure and is consequently very vulnerable to displacement and failure due to wave action. Given the dynamic nature of the beach, the exposure to high wave energy, and the height and slope of the erosion scarp, it is unlikely that an erosion protection skirt would be effective at the Muliwai property.



Figure 3-4 Erosion protection skirt (Kaanapali, Maui, Hawaii)

Advantages

- + Low degree of environmental review and regulatory permitting.
- + Materials are readily available.
- + May provide temporary erosion control.

Disadvantages

- Moderate-high costs.
- Relatively large structural footprint.
- Requires periodic maintenance.
- Short life expectancy.

The estimated time for design, permitting, and construction for an erosion protection skirt would be **1 to 2 years**. The estimated costs for design, permitting, and construction for an erosion protection skirt would be **\$200,000 to \$300,000**. Costs could be significantly greater depending on the need for repair, maintenance, and/or replacement.

3.1.6 Biodegradable Sandbag Revetment

A revetment is a sloping structure constructed of wave-resistant material. This approach would involve construction of a revetment consisting of biodegradable sandbags. The typical material is coconut husk fiber, also referred to as ‘coir’. The primary advantage of coir is that it is biodegradable and is perceived to have a reduced impact on the environment. Coir is also readily available and somewhat less costly than geotextile materials. An example of a biodegradable sandbag revetment in Waimanalo, Oahu, is shown in Figure 3-5.

Coir solutions have limited durability and require frequent maintenance. The material is porous and easily damaged. Coir sandbags may last 6 to 12 months before biological and UV degradation will cause the material to break down. Another disadvantage of biodegradable sandbags is that regulatory agencies typically require that the sandbags be filled with compatible beach quality sand. A biodegradable sandbag revetment at the Muliwai property would require 100 to 200 cubic yards of compatible beach quality sand. Assuming a price of \$125 per cubic yard, the costs for sand alone could range from \$12,500 to \$25,000. This would not include costs for design, permitting, biodegradable sandbags, or construction

Biodegradable sandbag revetments placed on similar windward Oahu shorelines have previously failed, some in as little as 6 months. Failure can occur at any time, but often coincides with periods of high surf and/or elevated water levels, when shore protection is needed the most. Considering the substantial costs, limited durability of the materials, and the history of failed biodegradable structures in Hawaii, this solution is not recommended.



Figure 3-5 Biodegradable sandbag revetment (Waimanalo, Oahu, Hawaii)

Advantages

- + Biodegradable materials are readily available.
- + Regulatory agencies are generally supportive of the use of biodegradable materials.

Disadvantages

- Moderate-high costs.
- Requires compatible beach quality sand to fill the sandbags.
- Beach quality sand is difficult to find and very expensive.
- Large structural footprint.
- Requires periodic maintenance.

The estimated time for design, permitting, and construction for a biodegradable sandbag revetment would be **1 to 2 years**. The estimated costs for design, permitting, and construction for a biodegradable sandbag revetment would be **\$150,000 to \$250,000**. Costs could be significantly greater depending on the need for repair, maintenance, and/or replacement.

3.1.7 Geotextile Sandbag Revetment

This approach would involve construction of a sandbag revetment consisting of geotextile materials. The preferred material is ELCOROCK, which consists a highly-durable non-woven, geotextile fabric. Enhanced filtration combined with resistance to abrasion and UV damage makes this material ideal for coastal applications. An example of an ELCOROCK sandbag revetment at Kahana, Maui, is shown in Figure 3-6. An ELCOROCK sandbag revetment would provide an effective and durable solution at the Muliwai property.

ELCOROCK sandbags, while very durable, will require maintenance and occasional replacement, and are inferior to materials such as rock and concrete-rubble-masonry (CRM). Regulatory agencies may object to use of geotextile materials along the shoreline. Recent proposals for ELCOROCK revetments on Oahu and Maui have been denied due to concerns regarding the semi-permanent nature of the structures. While ELCOROCK presents the most effective and durable option for short-term erosion control, it may be difficult to obtain the necessary regulatory permits.



Figure 3-6 Geotextile sandbag revetment (Kahana, Maui, Hawaii)

Advantages

- + Materials are very durable.
- + Low maintenance.
- + Most effective method for temporary shore protection.

Disadvantages

- Moderate-high costs.
- Regulatory agencies may oppose the use of geotextile materials along the shoreline.
- Requires compatible beach quality sand to fill the sandbags.
- Beach quality sand is difficult to find and very expensive.
- Large structural footprint.

The estimated time for design, permitting, and construction for a geotextile sandbag revetment would be **1 to 2 years**. The estimated costs for design, permitting, and construction for a geotextile sandbag revetment would be **\$250,000 to \$500,000**. Costs could be significantly greater depending on the need for repair, maintenance, and/or replacement.

3.2 Long-term Alternatives

The purpose of long-term shore protection is to permanently mitigate the erosion. The design life for long-term shore protection is typically 30 or more years. Long-term shore protection requires substantial capital investment for initial construction; but costs for maintenance and repair are typically low. Regulatory permitting for permanent shore protection is very challenging. The State of Hawaii and the City & County of Honolulu have adopted policies that discourage the hardening of shorelines, particularly in areas with sandy beaches. Permanent coastal engineering solutions, while technically feasible, can be difficult to justify and are often prohibitively expensive for a single residential property.

3.2.1 Beach Nourishment with Stabilizing Structures

Beach nourishment is most effective at the regional (littoral cell) scale. Beach nourishment accompanied by construction of sand stabilization structures, such as groins, to minimize sand movement would be the most effective means for protecting both the beach resource and the backshore fast land and improvements. A series of groin structures accompanied by beach fill would create a stable beach cell within the groins, stable fillets on the outside of each groin, and would reduce the loss of sand. Similar projects utilizing tuned T-head groins have been shown to provide additional marine habitat in the nearshore, improved lateral shoreline access, stable beach forms, and backshore erosion protection. An example of beach nourishment with T-head groins at Iroquois Point, Oahu, is shown in Figure 3-7.

While this alternative could effectively address the erosion problems along the Muliwai shoreline, disruption of longshore sediment transport may negatively impact the shoreline at Laie Beach Park by reducing the volume of material being transported to the south. To resolve the issue at a littoral cell scale would require additional groins along the beach. The full length of coastline would need to be nourished, prograding the existing beach face offshore. The groins would have a very large structural footprint seaward of the shoreline on State-owned beach, which would constitute an encroachment onto State land. An easement may be required for the structures, which could substantially increase the overall cost.

SEI is not aware of any available sand sources to support beach restoration projects on the windward coast of Oahu. An offshore sand source investigation may be required to identify an adequate supply of compatible beach quality sand. Offshore sand source investigations are technically challenging and can be very expensive. If a suitable sand source were found, beach nourishment and construction of sand stabilizing structures along the entire littoral cell would benefit the regional community. A project of this scale should therefore be cost-shared by the entire community with assistance and project leadership from the State of Hawaii and City & County of Honolulu.

Construction costs and regional impacts to neighboring shorelines within the littoral cell may be prohibitive for a single residential property owner. Community support may also be limited. The properties to the north are armored, so landowners may be unmotivated to contribute funds to support beach restoration. The shoreline to the south is stable and fronting a public beach park. It is unlikely that the City & County of Honolulu would contribute to a regional scale beach restoration effort.



Figure 3-7 Beach nourishment with T-head groins (Iroquois Point, Oahu, Hawaii)

Advantages

- Regulatory agencies are supportive of large-scale regional beach restoration projects.
- Mitigates the erosion and maintains a stable beach.
- Low maintenance.

Disadvantages

- Extremely high cost.
- Extensive time required for design, permitting, and construction.
- Requires compatible beach quality sand.
- Beach quality sand is difficult to find and very expensive.
- May require offshore sand source investigation.
- Very large structural footprint.
- May require an easement.

The estimated time for design, permitting, and construction for regional beach nourishment with stabilizing structures would be **3 to 5 years**. The estimated cost for design, permitting, and construction for regional beach nourishment with stabilizing structures would be **\$2,500,000 to \$5,000,000**.

3.2.2 Seawall

A seawall is a vertical or sloping concrete, concrete-rubble-masonry (CRM), cement-masonry-unit (CMU), or sheet pile wall used to protect the land from wave damage and erosion. A seawall, if properly designed and constructed, is a proven, durable, and relatively low-maintenance shore protection method. Seawalls also have the advantage of having a relatively small footprint along the shoreline. An example of typical concrete and rock seawalls at Kahala, Oahu, is shown in Figure 3-8.

The impervious and vertical face of a seawall results in very little wave energy dissipation. Incident wave energy is deflected upward, downward, and seaward. The downward energy component can cause scour at the base of the wall. Therefore, the foundation of a seawall is critical for its stability, particularly on sandy and eroding shorelines. Ideally, a seawall should be constructed on solid, non-erodible substrate. Seawalls are not flexible structures, and their structural stability is dependent on the stability of their foundations. If the foundation of the seawall is breached, hydraulic action can erode fill material behind the wall. This can lead to collapse of the ground surface and the formation of sinkholes landward of the seawall. To avoid foundation problems, the seawall foundation should be well below the potential scour level, which typically requires extensive excavation.

One major advantage of a seawall is that, of the alternatives considered, it has the smallest structural footprint within the existing landscape. The seawall footprint would be narrow relative to the beach fronting the Muliwai property.

Though a seawall would protect the property from erosion and is an appropriate design solution for this scale of project, it may have negative impacts on beach resources. There may also be end scour effects associated with the terminations of the seawall along the coastline. Reflected wave energy can inhibit accretion of sand in front of the wall; therefore, seawalls are not generally considered a suitable option if maintaining a beach is desired. Furthermore, regulatory agencies tasked with beach and shoreline management are reluctant to permit the construction of seawalls due to concerns about potential impacts to beach resources.



Figure 3-8 Typical concrete and rock seawalls (Kahala, Oahu, Hawaii)

Advantages

- + Very effective at mitigating erosion.
- + Relatively small structural footprint.
- + May decrease potential for beach accretion seaward of the structure.
- + Low maintenance.

Disadvantages

- Very high cost.
- Extensive time required for design, permitting, and construction.
- Potential for flanking erosion of adjacent properties.
- Regulatory agencies are reluctant to permit new shoreline armoring.
- May require excavation of the backshore.
- May require an easement.

The estimated time for design, permitting, and construction of a seawall would be **3 to 5 years**. The estimated costs for design, permitting, and construction of a seawall would be **\$800,000 to \$1,000,000**.

3.2.3 Rock Revetment

A rock revetment is a common shore protection structure in this situation. A revetment is a sloping, un-cemented structure constructed of wave-resistant material. The most common method of revetment construction is to place a layer of armor stone, sized according to the design wave height, over an underlayer of smaller rock that sits atop filter fabric. The underlayer is designed to distribute the weight of the armor layer and to prevent loss of fine shoreline material through voids in the revetment. An example of a typical rock revetment at Kahului, Maui, is shown in Figure 3-9.

Revetments in Hawaii are typically built on a slope of 1.5 to 2 horizontal to 1 vertical to ensure stability. Toe scour protection can be provided by excavating to place the toe on solid substrate where possible, constructing the foundation as much as practical below the maximum depth of anticipated scour, or extending the toe to provide a scour apron of excess stone. It is important that the armor stone be properly sized and carefully-placed in a stable configuration to maximize interlocking, which increases the durability of the structure.

One major advantage of a revetment is that the rough porous rock surface and sloping face of the structure will tend to dissipate wave energy, reduce wave reflection, and may help to promote accretion of sand on a sandy beach when sufficient sand volume is available in the littoral environment. Additional advantages of revetments are that construction is relatively simple, construction material is readily available, and localized damage can be easily repaired by placement of additional armor stone. Properly designed and constructed rock revetments are durable, flexible, and highly resistant to wave damage.

One major disadvantage of a revetment is that, of the alternatives considered, it has the largest structural footprint within the existing landscape. The revetment footprint would be wide relative to the narrow beach fronting the Muliwai property. This situation is complex from a regulatory perspective. It is questionable whether a revetment would be permitted seaward of the shoreline on State-owned beach.

Constructing a rock revetment within the Conservation District may require a term, non-exclusive easement from the State of Hawaii. The easement cost would be determined based on the Fair Market Value per square foot of the subject property. Even if the structure were located landward of the current shoreline, the future certified shoreline would likely be located at or near the crest of the structure, so an easement would eventually be required. In either case, the costs associated with the easement are likely unavoidable.



Figure 3-9 Typical rock revetment (Kahului, Maui, Hawaii)

Advantages

- + Very effective at mitigating erosion.
- + May improve potential for beach accretion seaward of the structure.
- + Very low maintenance.

Disadvantages

- Very high cost.
- Extensive time required for design, permitting, and construction.
- Very large structural footprint.
- Potential for flanking erosion of adjacent properties.
- Regulatory agencies are reluctant to permit new shoreline armoring.
- May require excavation of the backshore.
- May require an easement.

The estimated time for design, permitting, and construction of a rock revetment would be **3 to 5 years**. The estimated costs for design, permitting, and construction of a rock revetment would be **\$1,000,000 to \$1,500,000**.

3.2.4 Hybrid Seawall-Revetment

Another potential long-term solution for the erosion at the Muliwai property would be a hybrid seawall-revetment that would combine a vertical seawall with a sloping rock revetment. The structure would be composed of two primary elements: a seawall (i.e., vinyl sheet pile, reinforced concrete, or cemented rock masonry), and a uniform armor rock rubble mound revetment. An example of a hybrid seawall-revetment at Kapaa, Kauai, is shown in Figure 3-10.

A hybrid seawall-revetment would be designed to withstand extreme wave conditions, be minimally reflective and may allow for beach sand accretion, provide lateral shoreline access, reduce turbidity in nearshore waters, and minimize the amount of material placed in navigable waters of the United States and the State Conservation District. A hybrid seawall-revetment would have a smaller footprint than a traditional rock revetment. The revetment provides toe protection for the seawall and reduces reflective wave energy, which is conducive to maintaining a sand beach.

Constructing a hybrid seawall-revetment within the Conservation District may require a term, non-exclusive easement from the State of Hawaii. The easement cost would be determined based on the Fair Market Value per square foot of the subject property. Even if the structure were located landward of the current shoreline, the future certified shoreline would likely be located at or near the crest of the structure, so an easement would eventually be required. In either case, the costs associated with the easement are likely unavoidable.



Figure 3-10 Hybrid Seawall-Revetment (Kapaa, Kauai, Hawaii)

Advantages

- + Very effective at mitigating erosion.
- + May improve potential for beach accretion seaward of the structure.
- + Very low maintenance.

Disadvantages

- Very high cost.
- Extensive time required for design, permitting, and construction.
- Large structural footprint.
- Potential for flanking erosion of adjacent properties.
- Regulatory agencies are reluctant to permit new shoreline armoring.
- May require excavation of the backshore.
- May require an easement.

The estimated time for design, permitting, and construction of a hybrid seawall-revetment would be **3 to 5 years**. The estimated costs for design, permitting, and construction of a hybrid seawall-revetment would be **\$1,000,000 to \$1,500,000**.

4. DISCUSSION

The short-term alternatives outlined above – *sand pushing*, *small-scale beach nourishment*, *erosion protection skirt*, and *biodegradable sandbag revetment* – have previously been authorized in Hawaii; however, these alternatives are unlikely to effectively mitigate the erosion because of the limited design life, lack of durability, and limited duration of regulatory authorizations. Costs can also be significant due to the need for recurring maintenance, repair, or replacement.

The long-term alternatives outlined above – *geotextile sandbag revetment*, *regional beach nourishment with stabilizing structures*, *seawall*, *rock revetment*, and *hybrid seawall-revetment* – could effectively mitigate the erosion; however, these alternatives can be extremely expensive and require extensive environmental and regulatory review. Regulatory agencies are typically reluctant to permit new shoreline armoring, and the likelihood of obtaining the necessary regulatory permits is uncertain.

Retreat combined with *slope stabilization with vegetation* may provide the most cost-effective means of mitigating risk to the backshore infrastructure, remediating some of the damage to the frontal dune, and allowing the beach to migrate naturally. This approach would avoid the costs associated with engineering design, environmental review, and regulatory permitting; however, should the erosion continue or accelerate, it is unlikely that slope stabilization with vegetation would be effective, in which case further property loss can be expected.

5. REFERENCES

- Anderson, T.R., Fletcher, C.H., Barbee, M.M., Fletcher, L.N. and Romine, B.M. (2015) “Doubling of coastal erosion under rising sea level by mid-century in Hawaii.” *Natural Hazards*, 78, 75–103
- Fletcher, C.H., Romine, B.M., Genz, A.S., Barbee, M.M., Dyer, M., Anderson, T.R., Lim, S.C., Vitousek, S., Bochicchio, C. and Richmond, B.M. (2012) *National Assessment of Shoreline Change: Historical Shoreline Changes in the Hawaiian Islands*. U.S. Geological Survey Open-File Report 2011-1051.
- Fletcher, C.H., Grossman, E.E., Richmond, B.M., and Gibbs, A.E. (2002) *Atlas of Natural Hazards in the Hawaiian Coastal Zone*. U.S. Geological Survey Geologic Investigations Series I-2761.
- Highland, L.M., and Bobrowsky, P. (2008) *The landslide handbook: A guide to understanding landslides*. Reston, Virginia, U.S. Geological Survey Circular 1325.
- Romine, B.M., Fletcher, C.H., Frazier, L.N., and Anderson, T.R. (2016) “Beach erosion under rising sea-level modulated by coastal geomorphology and sediment availability on carbonate reef-fringed island coasts.” *Sedimentology*, Volume 63, Issue 5, 1321-1332.
- Romine, B.M. and Fletcher, C.H. (2012) “A summary of historical shoreline changes on beaches of Kauai, Oahu, and Maui, Hawaii.” *Journal of Coastal Research*, 29, 605–614.
- Sherrod, D.R., Sinton, J.M., Watkins, S.E. and Brunt, K.M. (2007) *Geologic map of the State of Hawaii*. U.S. Geological Survey Open-File Report 2007-1089.
- Truong, P. and Loch, R. (2004) “*Vetiver System for erosion and sediment control*. *Proceedings of 13th Int. Soil Conservation Organization Conference*, Brisbane, Australia, July 2004.

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CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF: OCCL: TF

RE: Emergency CDUP OA 18-04

Oct 11, 2021

NOTIFICATION OF ALLEGED NONCOMPLIANCE

7020 2450 0000 0357 8115

CERTIFIED MAIL/RETURN RECEIPT

James D. & Rhodette R M Greig
5385 Manauwea Street
Honolulu, HI 96821

SUBJECT: Alleged noncompliance with permit conditions
Emergency Conservation District Use Permit (CDUP) OA 18-04 for
Temporary Erosion Control Measures.
Located at 55-271 Kamehameha Hwy
Laie Beach Lots, Laie, Koolauloa, Oahu
Tax Map Key (TMK): (1) 5-5-002:019 & 088 (seaward)

Dear Landowners:

NOTICE IS HEREBY GIVEN that your Emergency Conservation District Use Permit (CDUP) OA 18-04 no longer complies with its original terms and conditions.

1. On September 14, 2017, the Chair of the Board of Land and Natural Resources approved Emergency CDUP OA 18-04 for temporary erosion control measures fronting subject properties. The permit allowed for the placement of approximately 100 cubic yards of locally-sourced dune sand to restore the dune face to a 1H:1V slope, the placement of a SEAbanket anchored at its base by two (2) rows of sand-filled SEAtubes constructed of Marafi geotextile fabric stitched together with polypropylene rope along approximately 250 feet of shoreline fronting the subject properties to stabilize the dune face, and the placement of biodegradable coconut fiber (coir) blankets to stabilize the top of the dune. All materials were to be built by hand and anchored using steel pipes, earth anchors, polypropylene rope, and redwood boards.
2. The temporary erosion control structure and associated materials extended seaward of the erosion scarp fronting the subject properties, and were determined to be on State-owned submerged land;
3. Pages 2 and 3 of Emergency CDUP OA 18-04 states [The Erosion Alternatives report] concludes that retreat (landward relocation or reconstruction of buildings combined with slope stabilization with vegetation may provide the most cost-effective long-term option for mitigating the erosion hazard at the

REF: OCCL: TF

RE: Emergency CDUP OA 18-04

[subject properties] ... *The temporary erosion control measures are intended to provide temporary mitigation of the erosion problem and reduce hazards to the subject property while [the permittees/landowners] pursues a longer-term strategy. The Erosion Alternatives report included with your request letter indicates that [the permittees/landowners] are investigating long-term solutions for erosion management at the properties. This temporary authorization is contingent on [the permittees/landowners] continued progress toward a long-term erosion management strategy;*

4. Condition 1 of Emergency CDUP OA 18-04 states *It is understood that the Emergency Temporary Shoreline Protection is a temporary response to address a safety hazard to the existing residence on the subject properties, which is threatened by both chronic and seasonal beach erosion. The material is authorized as a temporary erosion control measure for three (3) years from the date of issuance of this letter. Subsequent erosion control efforts that call for modification, other than maintenance of the proposed structure will require a new application. At the end of the authorization period, the materials shall be removed;*
5. The authorization expired on September 14, 2020 and the OCCL does not have evidence of progress towards or a plan for your long-term erosion management strategy;
6. OCCL staff conducted a site visit on September 15, 2021 and observed that the temporary erosion control structure remains on State Land. Additionally, it appears that the erosion control structure is dilapidated and unmaintained with liberated materials posing a nuisance and hazard to the nearshore environment. It also appears that rocks have been placed seaward of the temporary erosion control structure. A photograph from the September 15, 2021 site visit can be found below as **Figure 1**;
7. Condition 2 of Emergency CDUP OA 18-04 states *The permittees shall contact the DLNR Oahu Land Division Office at (808) 587-0419 to secure a Right of Entry Permit incorporating the most current terms and conditions for the use of State lands for this structure;*
8. A cursory review of Department records indicate that a Right of Entry Permit was issued on September 15, 2017 and expired on September 30, 2020.;
9. Condition 15 of Emergency CDUP OA 18-04 states *Transfer of ownership of the subject property includes the responsibility of the new owner to adhere to the terms and conditions of this authorization; and,*
10. Condition 25 of the permit reads: *Failure to comply with any of these conditions shall render a permit void under the chapter, as determined by the Chairperson or BLNR.*

REF: OCCL: TF

RE: Emergency CDUP OA 18-04

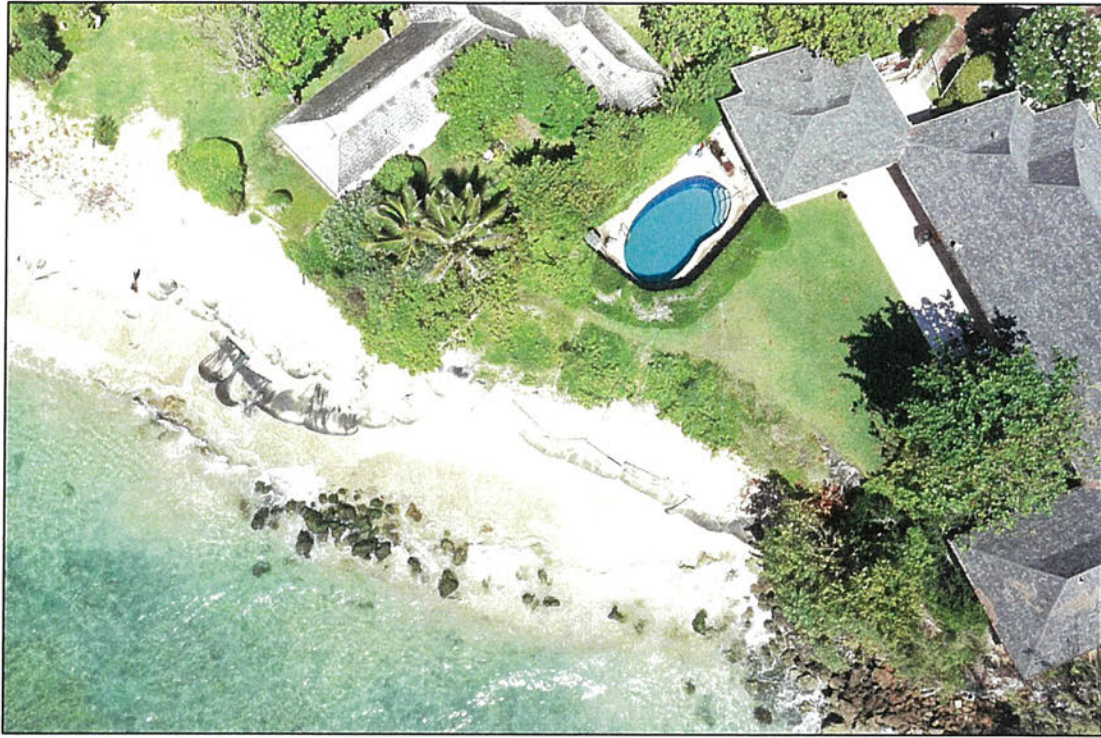


Figure 1: Aerial Image of TMKs: (1) 5-5-002:019 & 088, Taken September 15, 2021

DISCUSSION

Based upon the above, it appears that the subject erosion control structure is not in compliance with the terms and conditions of Emergency CDUP OA 18-04. Further, Emergency CDUP OA 18-04 expired on September 14, 2020 and the temporary erosion control structure and all its associated materials were to be removed. Based on OCCL's site visit to the area, the temporary erosion control structure still occupies State-owned lands without active authorization.

Additionally, the emergency situation for which the structure was originally authorized has existed over an extended period of time and appears likely to continue over an indefinite timeframe such that we now consider the situation an unmanaged hazardous condition. If you apply for a new emergency authorization, you will be required to demonstrate that a concerted effort is being undertaken to implement a long-term solution which will enable removal of the temporary erosion control measures.

For the purposes of such a requirement, "concerted effort" shall mean a bona fide planning effort involving the employment of professional planners, engineers, or consultants to develop and implement a long-term solution whether it involves relocation or abandonment, beach restoration, or some other form of shoreline management. A surety bond or other legal or financial assurance may also be required as part of any potential authorizations for a time extension to guarantee removal of temporary uses at the expiration of any permitted time extension that may be authorized.

REF: OCCL: TF

RE: Emergency CDUP OA 18-04

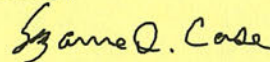
To summarize, the OCCL notes that the temporary erosion control structure approved by Emergency CDUP OA 18-04 is not in compliance nor appears to have active authorization to sit upon State-owned lands.

Please provide this office with a written report which describes how you intend to correct the situation. The report should be submitted to DLNR's Office of Conservation and Coastal Lands (OCCL) within thirty (30) days of the date of this letter. The report shall describe the current condition of the structure, how the structure has been altered over time, and the plans and intentions of the structure in the near future. The plans for the future of the structure shall include, but are not limited to, how and when you will either remove the structure in its entirety, if and when you will seek another emergency authorization, and/or your progress towards or an approximate timeline for implementing your long-term erosion management strategy identified in your Erosion Alternatives Report.

Failure to act promptly on these matters may result in this matter being forwarded to the Board of Land and Natural Resources for formal enforcement action.

Please submit all responses and reports in writing to Trevor Fitzpatrick at trevor.j.fitzpatrick@hawaii.gov. Please note that any information provided may be used in civil proceedings

Sincerely,



SUZANNE D. CASE Chair
Board of Land and Natural Resources



Copy: DLNR Land Division, O'ahu Office
C&C Honolulu: Dept. Planning & Permitting
DOCARE
Sea Engineering, Inc., c/o Andy Bohlander
Shoreline Restoration of Hawaii, c/o Joseph Correa
James E Halstrom Jr & Kathleen K Halstrom
55-273 Kamehameha Hwy, Laie, HI 96762

Attachment: Emergency CDUP OA 18-04

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

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



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

P.O. BOX 621
HONOLULU, HAWAII 96809

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

RYAN K.P. KANAKA'OLE
FIRST DEPUTY

CIARA W.K. KAHANE
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES
ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF: OCCL: TF

ENF: OA 25-28
ENF: OA 25-29

NOTICE OF ALLEGED VIOLATION

APR 14 2025

CERTIFIED MAIL/RETURN RECEIPT

9589 0710 5270 0920 0612 94

James E Hallstrom Jr. & Kathleen K Hallstrom
55-273 Kamehameha Highway
Laie, Hawaii 96762

And,

9589 0710 5270 0920 0612 87
James D Greig & Rhodette R M Greig
5385 Manauwea Street
Honolulu, Hawaii 96762

SUBJECT: Alleged Unauthorized Land Uses and Encroachments within the Conservation District
Located at 55-271 & 55-273 Kamehameha Highway
Laie Beach Lots, Laie, Koolauloa, Oahu
Tax Map Keys (TMKs): (1) 5-5-002:019 & 088 (seaward)

Dear Mr. & Mrs. Greig and Mr. & Mrs. Hallstrom:

It has come to the attention of the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) that there appears to be unauthorized materials within the Conservation District and encroachments in the shoreline area on public lands fronting the locations listed above. Photos of the alleged unauthorized erosion control devices and encroachments are attached as **Exhibit 1**.

Background

According to Department files, the Chair of the Board of Land and Natural Resources (BLNR) approved Emergency Conservation District Use Permit (CDUP) OA 18-04 for temporary erosion control measures fronting the subject locations on September 14, 2017, subject to 25 terms and conditions. The permit allowed for the placement of approximately 100 cubic yards of locally-

REF: OCCL: TF

ENF: OA 25-28
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sourced dune sand to restore the dune face to a 1H:1V slope, the placement of a SEA blanket anchored at its base by two (2) rows of sand-filled SEAtubes constructed of Marafi geotextile fabric stitched together with polypropylene rope along approximately 250 feet of shoreline fronting the subject properties to stabilize the dune face, and the placement of biodegradable coconut fiber (coir) blankets to stabilize the top of the dune. All materials were to be built by hand and anchored using steel pipes, earth anchors, polypropylene rope, and redwood boards.

Condition 1 of Emergency CDUP OA 18-04 stated: *It is understood that the Emergency Temporary Shoreline Protection is a temporary response to address a safety hazard to the existing residence on the subject properties, which is threatened by both chronic and seasonal beach erosion. The material is authorized as a temporary erosion control measure for three (3) years from the date of issuance of this letter. Subsequent erosion control efforts that call for modification, other than maintenance of the proposed structure will require a new application. At the end of the authorization period, the materials shall be removed.*

Emergency CDUP OA 18-04 expired on September 14, 2020, and all erosion control measures or devices were to be removed from the shoreline area fronting the subject locations.

On September 15, 2021, OCCL staff conducted a site visit to the area and observed that the temporary erosion structure remained on State Land. Additionally, staff observed that the temporary erosion control structure appeared to be dilapidated and unmaintained with liberated materials posing a nuisance and hazard to the nearshore environment.

On October 11, 2021, notifications of alleged noncompliance were sent stating and outlining, in part, that the temporary erosion control structure no longer complied with the terms and conditions of its authorization, Emergency CDUP OA 18-04 expired, OCCL did not have evidence of progress towards or plan for long-term erosion management, and that the expired temporary erosion control measures occupied State-owned lands without active authorization (**Exhibit 2**).

April 8, 2025 – Alleged Unauthorized Land Use(s) & Encroachment(s) on Public Lands

A site inspection on April 8, 2025, revealed the expired and alleged unauthorized temporary erosion control structure and devices still occupying the shoreline area fronting the subject locations. Staff observed that the temporary erosion control structure and devices continued to be dilapidated and unmaintained with liberated materials posing a nuisance and hazard to the nearshore environment (**Exhibit 1**).

Regarding the shoreline area fronting parcel 019, it also appeared that small polypropylene sandbags had been placed at the base of the erosion scarp and covered with sand. Additionally, staff observed that the upper portions of the erosion scarp had been landscaped with logs, soil material(s), and plantings as well as irrigation installed. A wooden ladder had also been placed against the erosion scarp. See **Exhibit 1**.

According to OCCL files, there are no existing authorizations for these land uses. Pursuant to Hawaii Administrative Rules (HAR) §13-5-2, "land use" is defined as (1) the placement or erection of any solid material on land if that material remains on the land more than thirty days, or which causes a permanent change in the land area on which it occurs; (2) the grading,

REF: OCCL: TF

ENF: OA 25-28
ENF: OA 25-29

removing, harvesting, dredging, mining, or extraction of any material or natural resource on land; (3) the subdivision of land; or (4) the construction, reconstruction, demolition, or alteration of any structure, building, or facility on land.

Pursuant to HAR §13-5-2, the "Shoreline" is defined as *the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves, or as otherwise defined in section 205A-1, Hawaii Revised Statutes (HRS).* Lands makai of the shoreline are under the jurisdiction of the State of Hawaii DLNR.

NOTICE IS HEREBY GIVEN that you may be in violation of Hawaii Administrative Rules (HAR) Title 13, Chapter 5, entitled Conservation District providing for land uses within the Conservation District, enacted pursuant to the HRS, Chapter 183C.

The Department of Land and Natural Resources (DLNR) has reason to believe that:

1. The unauthorized erosion control device(s) or structure and encroachments are located seaward of TMKs: (1) 5-5-002:019 & 088 within the State Land Use Conservation District, Resource Subzone as well as the beach transit corridor;
2. Pursuant to HAR §13-5-22 P-15 (D-1), "Shoreline Erosion Control" is a regulated land use as stated below:
 - a. *Seawall, revetment, groin, or other coastal erosion control structure or device, including sand placement, to control erosion of land or inland area by coastal waters, provided that the applicant shows that (1) the applicant would be deprived of all reasonable use of the land or building without the permit; (2) the use would not adversely affect beach processes or lateral public access along the shoreline, without adequately compensating the State for its loss; or (3) public facilities (e.g., public roads) critical to public health, safety, and welfare would be severely damaged or destroyed without a shoreline erosion control structure, and there are no reasonable alternatives (e.g., relocation). Requires a shoreline certification;*
3. The Department of Land and Natural Resources issued the landowners of parcels 019 and 088 previous notices regarding the expired and alleged unauthorized erosion control devices in the shoreline area fronting the subject properties;
4. These land uses are no longer and were not authorized by the Department of Land and Natural Resources under HAR Chapter 13-5, and;
5. The land uses have occurred on public land without authorization or permission from the State as landowner.

We recommend that you stop all work and remove the erosion control structures and devices, dilapidated materials, and encroachments located within the shoreline area

REF: OCCL: TF

ENF: OA 25-28
ENF: OA 25-29

within 30 days of receipt of this notice. Please submit evidence of their removal to OCCL and note that staff will conduct a site inspection to confirm removal.

Pursuant to HRS 171-6, the Board of Land and Natural Resources may bring such actions as may be necessary to remove or remedy encroachments upon public lands. Any person causing an encroachment upon public land shall: (a) Be fined not more than \$1,000 a day for the first offense; (b) Be fined not less than \$1,000 nor more than \$4,000 per day upon the second offense and thereafter; (c) If required by the board, restore the land to its original condition if altered and assume the costs thereof; (d) Assume such costs as may result from adverse effects from such restoration; and (e) Be liable for administrative costs incurred by the Department and for payment of damages.

With regards to alleged unauthorized land use(s) in the State Land Use Conservation District, pursuant to HRS 183C-7(b), the Board of Land and Natural Resources (Board) may subject you to fines of up to \$15,000.00 per violation in addition to administrative costs and costs associated with land or habitat restoration, or both, if required, and damages to state land. Should you fail to immediately cease such activity after written or verbal notification from the department, willful violation may incur an additional fine of up to \$15,000.00 per day per violation for each day in which the violation persists. Failure to comply with any part of the letter mentioned above will result in the matter being forwarded to the Board for formal action.

Please respond to this letter in writing within 14 days of issuance of this letter. Please note any information provided may be used in civil proceedings.

Your response can either be mailed or hand delivered to OCCL at 1151 Punchbowl Street Room 131, Honolulu, Hawai'i 96813. If we do not receive a response within 14 days and the alleged unauthorized erosion control devices, structures, and encroachments are not removed within 30 days, we will proceed with enforcement actions.

Should you have any questions regarding this matter, contact Trevor Fitzpatrick of our Office at trevor.j.fitzpatrick@hawaii.gov.

Sincerely,



Dawn N.S. Chang, Chairperson
Board of Land and Natural Resources

Attachment:
Notifications of Alleged Noncompliance regarding Emerg. CDUP OA 18-04

CC: ODLO
City & County of Honolulu Department of Planning & Permitting
Sea Engineering

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

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA



STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
OFFICE OF CONSERVATION AND COASTAL LANDS
P.O. BOX 621
HONOLULU, HAWAII 96809

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF: OCCL: TF

ENF: OA 25-29

James D Greig & Rhodette R M Greig
5385 Manauwea Street
Honolulu, Hawaii 96821

08/11/2025

SUBJECT: Alleged Unauthorized Land Uses and Encroachments within the Conservation District
Located at 55-271 Kamehameha Highway
Laie Beach Lots, Laie, Koolauloa, Oahu
Tax Map Keys (TMKs): (1) 5-5-002:088 (seaward)

Dear James D Greig & Rhodette R M Greig:

The Office of Conservation and Coastal Lands (OCCL) has reviewed the file for ENF: OA 25-29 regarding the subject matter. On May 5, 2025, OCCL had a meeting with James Greig and Joshua Greig regarding the Notice of Alleged Violation issued to you on April 14, 2025.

Additionally, OCCL conducted a site inspection to the subject area on July 1, 2025. Staff notes that it appears that the beach in this area appears to have reinflated some since the previous site visit to the area conducted on April 8, 2025. Photos of OCCL's July 1, 2025, site inspection are attached as **Exhibit 1**.

Based on the lack of information and communications from you as well as OCCL's site inspection to the area, it appears you have made little to no progress on remediating alleged violations, and removal of the alleged unauthorized erosion control structure and devices and encroachments from the shoreline area fronting parcel 088.

The OCCL requests that you remove the alleged unauthorized erosion control structure and devices from the shoreline area fronting parcel 088 within 30-days from the date of this letter. Additionally, we request that you submit evidence, including but not limited to photos, of removal activities to OCCL within this timeframe.

If the alleged unauthorized erosion control structure and devices are not removed and we do not receive evidence of removal within 30-days, we will most likely proceed with further enforcement actions. Please note that any information provided may be used in civil proceedings.

REF: OCCL: TF

ENF: OA 25-29

Should you have any questions, feel free to contact Trevor Fitzpatrick of our Office of Conservation and Coastal Lands at trevor.j.fitzpatrick@hawaii.gov.

Sincerely,

S Michael Cain

Michael Cain, Administrator
Office of Conservation and Coastal Lands

CC: *Chairperson*
ODLO
City & County of Honolulu Department of Planning & Permitting
Sea Engineering

REF: OCCL: TF

ENF: OA 25-29

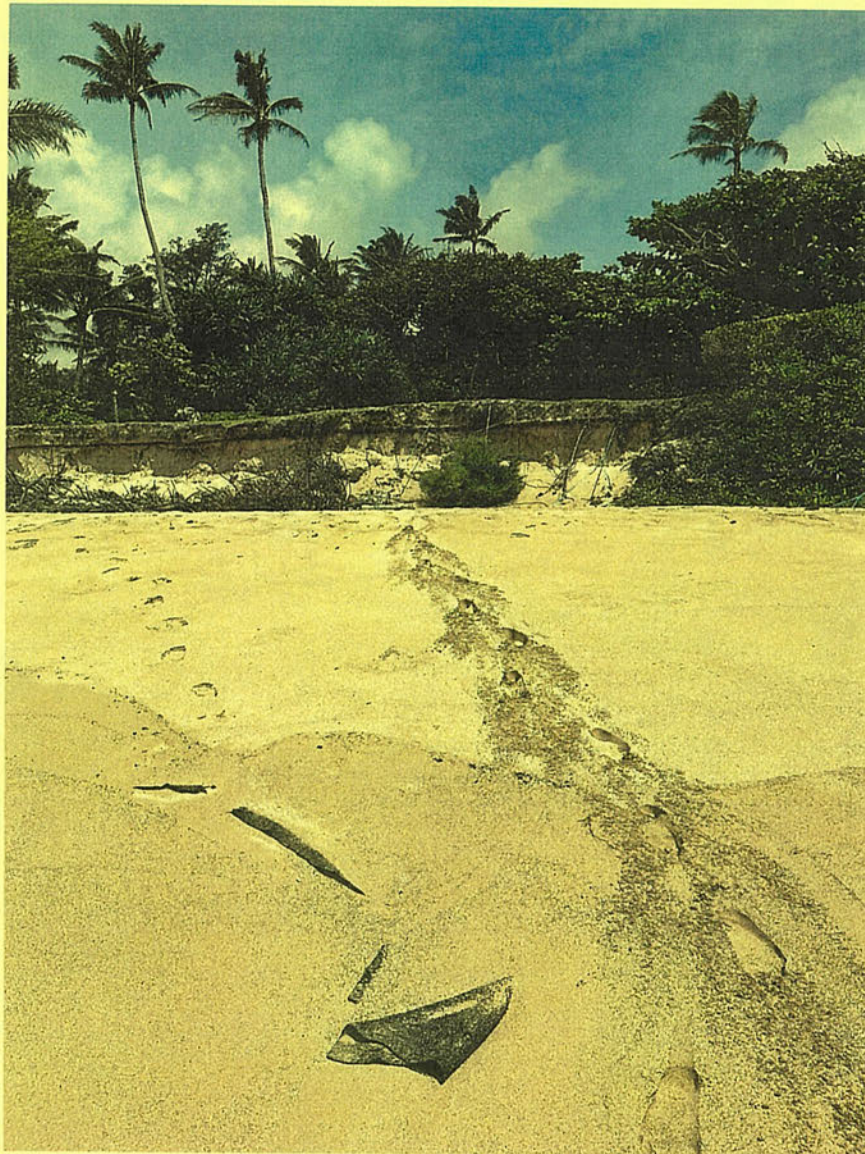


Exhibit 1

REF: OCCL: TF

ENF: OA 25-29



Exhibit 1



FW: [EXTERNAL] Laie Erosion at 55-271 Kam Hwy

From Cain, Michael <michael.cain@hawaii.gov>
Date Thu 9/11/2025 2:39 PM
To Fitzpatrick, Trevor J <trevor.j.fitzpatrick@hawaii.gov>

Michael Cain, Administrator
Office of Conservation and Coastal Lands
1151 Punchbowl St. #131
Honolulu HI 96813
808.587.0377



Please refer to our website at <https://dlnr.hawaii.gov/occl/> for instructions on submitting applications.

From: Joshua Greig [REDACTED]
Sent: Wednesday, September 10, 2025 9:34 PM
To: Cain, Michael <michael.cain@hawaii.gov>
Cc: James Greig [REDACTED]
Subject: [EXTERNAL] Laie Erosion at 55-271 Kam Hwy

Dear Mr. Michael Cain,

We are writing to acknowledge receipt of your letter dated 8/11/25. Currently we are still in the process of removing the failed sandbags and other alleged encroachments from the beach as they become visible (see attached image of one of our "hauls").

We are also actively working on our plan and we think we will be able to submit it to you within the next two to three weeks for your review.

James D. Greig MD & Joshua D. Greig



Conservation District Rules and Statutes

Shorelines and Public Lands

In Hawai'i, the shoreline is defined, pursuant to HRS §205A-1, as *the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves.* Most lands in the State of Hawai'i that are seaward of the shoreline are in the Resource Subzone of the State Land Use Conservation District, and are owned by the State.

It is the uniform law of every coastal state that land below, or makai, of the shoreline is owned by the State and is held in public trust for the people of the State.¹ In Hawai'i County v. Sotomura, 55 Haw. 176, 517 P.2d 57 (1973), the Court made clear that the dividing line between public and private property with respect to oceanfront property is fluid and, specifically, that it changes with erosion.²

The Court based its ruling on the common law principle that loss of land by erosion is an inherent aspect of littoral property:

*The loss of lands by the permanent encroachment of waters is one of the hazards incident to littoral or riparian ownership... (W)hen the sea, lake or navigable stream gradually and imperceptibly encroaches upon the land, the loss falls upon the owner, and the land thus lost by erosion returns to the ownership of the state.*³

In determining that the dividing line between public and private property with respect to oceanfront property may change with erosion, the Court also based its ruling on the public trust doctrine, citing to King v. O'ahu Ry. And Land Co., 11 Haw. 717, 723-24 (1899), for the proposition that:

*The control of the state for the purposes of the trust can never be lost, except as to such parcels as are used in promoting the interests of the public therein, or can be disposed of without any substantial impairment of the public interest in the lands and waters remaining.*⁴

Therefore, public policy "favors extending to public use and ownership as much of Hawai'i's shoreline as is reasonably possible."⁵

¹ See Margaret E. Peloso and Margaret R. Caldwell, Dynamic Property Rights: The Public Trust Doctrine and Takings in a Changing Climate, 30 Stan. Envtl. L.J. 52, 57 (2011) ("In nearly all cases, the lines for defining the limits of private title and public access are the mean high water and mean low water marks.").

² 55 Haw. At 180, 517 P.2d at 61.

³ In re City of Buffalo, 206 N.Y. 319, 325, 99 N.E. 850, 852 (1912).

⁴ Hawai'i County v. Sotomura, 55 Haw. At 184, 517 P.2d at 63.

⁵ Hawai'i County v. Sotomura, 55. Haw. At 182, 517 P.2d 61-62; see Application of Banning, 73 Haw. 297, 309-10, 832 P.2d 724, 731 (1992); Diamond v. Dobbin, 132 Haw. 9, 26, 319 P.3d 1017, 1034 (2014); Gold Coast Neighborhood Ass'n. v. State, 140 Haw. 437, 458, 403 P.3d 214, 235 (2017).

Hawai'i Administrative Rules (HAR) Chapter 13-5: Conservation District

Land uses in the Conservation District are regulated under HAR Chapter 13-5, which identifies land uses that may be applied for within the Conservation. Chapter 13-5 also contains the administrative rules relating to penalties, collection of administrative costs, and monetary damages that may be sought against persons responsible for unauthorized land uses within the Conservation District.

HAR § 13-5-2, defines "land use" as follows:

- (1) the placement or erection of any solid material on land if that material remains on the land more than thirty days, or which causes a permanent change in the land area on which it occurs;
- (2) the grading, removing, harvesting, dredging, mining, or extraction of any material or natural resource on land;
- (3) the subdivision of land; or
- (4) the construction, reconstruction, demolition, or alteration of any structure, building, or facility on land.

Pursuant to HAR §13-5-6 Penalty, any person, firm, government agency, or corporation violating any of the provisions of chapter 13-5, or permits issued pursuant thereto, shall be punished as provided in chapter 183C, HRS.

HAR § 13-5-6(d) provides that "no land use(s) shall be conducted in the conservation district unless a permit or approval is first obtained from the department or board."

One of the allowed uses is for shoreline erosion control. HAR § 13-5-22 P-15(D-1) allows for a:

Seawall, revetment, groin, or other coastal erosion control structure or device, including sand placement, to control erosion of land or inland area by coastal waters, provided that the applicant shows that (1) the applicant would be deprived of all reasonable use of the land or building without the permit;(2) the use would not adversely affect beach processes or lateral public access along the shoreline, without adequately compensating the State for its loss; or (3) public facilities (e.g., public roads) critical to public health, safety, and welfare would be severely damaged or destroyed without a shoreline erosion control structure, and there are no reasonable alternatives (e.g., relocation). Requires a shoreline certification.

HAR § 13-5-35 Emergency permits (d) provides that "Repair and reconstruction of any structure or land use being investigated for possible violation of this chapter, or in situations in which fines for a violation have not been collected, shall not be processed until the violation is resolved."

Hawai'i Revised Statutes Chapter 183C Conservation District

HRS §183C-7 (Penalty for violation) provides the statutory penalty for violations of Chapter 13-5, HAR, and provides, in relevant part:

- (a) The department shall prescribe administrative procedures as it deems necessary for the enforcement of this chapter.
- (b) Any person violating this chapter, or any rule adopted in accordance with this chapter shall be fined not more than \$15,000 per violation in addition to administrative costs, costs associated with land or habitat restoration, and damages to public land or natural resources, or any combination thereof. After written or verbal notification from the department, willful violation of this chapter or any rule adopted in accordance with this chapter may incur an additional fine of up to \$15,000 per day per violation for each day in which the violation persists.
- (c) The board may set, charge, and collect the fine based on the value of the natural resource that is damaged, the market value of the natural resource damaged, and any other factor it deems appropriate, such as the loss of the natural resource to its natural habitat and environment and the cost of restoration or replacement. The remedies provided for in this subsection are cumulative and in addition to any other remedies allowed by law.

Hawai'i Revised Statutes Chapter 171: Management and Disposition of Public Lands

Pursuant to HRS §171-6 the Board may:

- (12) Bring actions as may be necessary to remove or remedy encroachments upon public lands. Any person causing an encroachment upon public land shall:
 - (A) Be fined not more than \$1,000 a day for the first offense;
 - (B) Be fined not less than \$1,000 nor more than \$4,000 per day upon the second offense and thereafter;
 - (C) If required by the board, restore the land to its original condition if altered and assume the costs thereof;
 - (D) Assume such costs as may result from adverse effects from such restoration; and
 - (E) Be liable for administrative costs incurred by the department and for payment of damages..."

HRS §171-6 further allows the Board to assess the following fines for a violation on Chapter 171 or any rule adopted thereunder:

- (15) Set, charge, and collect reasonable fines for violation of this chapter or any rule adopted thereunder. Any person engaging in any prohibited use of public lands or conducting any prohibited activity on public lands, or violating any of the other provisions of this chapter or any rule adopted thereunder, for which violation a penalty is not otherwise provided, shall be:

- (A) Fined no more than \$5,000 per violation for a first violation or a violation beyond five years of the last violation; provided that, after written or verbal notification from the department, an additional \$1,000 per day per violation may be assessed for each day in which the violation persists;
- (B) Fined no more than \$10,000 per violation for a second violation within five years of the last violation; provided that, after written or verbal notification from the department, an additional \$2,000 per day per violation may be assessed for each day in which the violation persists;
- (C) Fined no more than \$20,000 per violation for a third or subsequent violation within five years of the last violation; provided that, after written or verbal notification from the department, an additional \$4,000 per day per violation may be assessed for each day in which the violation persists; and
- (D) Liable for administrative costs and expenses incurred by the department and for payment for damages, including but not limited to natural resource damages.

In addition to the fines, administrative costs, and damages provided for hereinabove, for damage to or theft of natural resources, the board may also set, charge, and collect a fine that, in its discretion, is appropriate considering the value of the natural resource that is damaged or the subject of the theft. In arriving at an appropriate fine, the board may consider the market value of the natural resource damaged or taken and any other factor it deems appropriate, such as the loss of the natural resource to its natural habitat and environment and the cost of restoration or replacement. The remedies provided for in this paragraph are cumulative and in addition to any other remedies allowed by law.

No person shall be sanctioned pursuant to this section for the exercise of native Hawaiian gathering rights and traditional cultural practices as authorized by law or as permitted by the department pursuant to article XII, section 7, of the Hawai'i state constitution.

HRS § 171-6.4 states, in relevant part:

- (c) Noncompliance with administrative enforcement against a landowner for a land use, as defined in section 183C-2, that violates the law or for a currently unauthorized structure encroaching on public lands, including but not limited to submerged lands or lands within the shoreline, that falls, slides, or comes onto public land, or arises from or benefits an adjoining or abutting private land shall affect title pursuant to section 501-151 and result in a lien attaching to the adjoining or abutting private land.

Hawai'i Revised Statutes Chapter 205A: Coastal Zone Management

Pursuant to Chapter 205A-2 Coastal Zone Management Program, (c) (9) Beaches Protection, it is State policy to (A) *Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion*, and (B) *Prohibit construction of private shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.*