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October 27, 2021

Mary Alice Evans
Director
Environmental Review Program (ERP)
Office of Planning and Sustainable Development
Department of Business, Economic Development and Tourism
235 South Beretania Street, Room 702
Honolulu, HI 96813

SUBJECT: SECOND Draft Environmental Impact Statement (DEIS) Filing for Publication
Kahana Bay Erosion Mitigation Project
Lahaina District, Maui, Hawaiʻi
Tax Map Keys: Fronting and seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Ms. Evans,

On behalf of the Kahana Bay Steering Committee, Oceanit is submitting the enclosed SECOND Draft Environmental Impact Statement (DEIS) package for the Kahana Bay Erosion Mitigation Project. The First DEIS on this project was published in the April 23, 2021 edition of *The Environmental Notice*.

This SECOND DEIS is being submitted to correct a production error related to consultation during the preparation of the DEIS. We contacted 25 agencies during the preparation of the DEIS and received comments from seven agencies. We responded to these agencies and incorporated their comments and our responses in the preparation of the DEIS. While we listed consulted agencies in the DEIS, we did not include reproductions of agency consultation comments and our responses, as required by § 11-200-17 (p). A table summarizing the changes to correct this omission in the SECOND DEIS is provided at the end of this letter.

We respectfully request publication of the SECOND DEIS in the November 8, 2021 edition of *The Environmental Notice*. The following documents are included in the enclosed package: 1) online submittal form; 2) four electronic (pdf) copies of the SECOND DEIS; 3) one electronic (pdf) copy of the distribution list for verification by ERP pursuant to Section 11-200-20, Hawaiʻi Administrative Rules; and 4) this transmittal letter.

Upon receiving verification from ERP, we will notify contacts identified on the distribution list so that they have the full 45-day period to review and comment on the SECOND DEIS. Simultaneously with this submittal, a copy of the SECOND DEIS is being transmitted to Approving Agency: the State of Hawaiʻi Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL).

The following table specifies changes made to the first DEIS and reflected in the SECOND DEIS.

Changes Made to the First DEIS Published on April 23, 2021, as Contained in the SECOND DEIS Attached to This Letter	
Volume 1	Cover sheets 1 and 3 have been revised to indicate that this is the SECOND DEIS with a preparation date of October 2021.
	Table of Contents has been updated to add Appendix J: DEIS Consultation Comments and Responses.
	Section 1.4, Scope and Authority, has been revised to indicate submittal of SECOND DEIS.
	Section 8.2.2, Agency Consultation has been revised to add "Agency consultation and responses are included in Appendix J."
Volume 2	Added: Appendix J: DEIS Consultation Comments and Responses

Should you have any questions, please contact me at (808) 531-3017 or kahana@oceanit.com.

Sincerely,

Ken Cheung

Ken Cheung, PhD, PE
Director of Science and Engineering

CC: Samuel Lemmo, Administrator – DLNR OCCL
Michael Cain, Acting Administrator - DLNR OCCL
Tiger Mills, Acting Administrator – DLNR OCCL
Shellie Habel – DLNR OCCL
Kahana Bay Steering Committee

From: webmaster@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Wednesday, October 27, 2021 12:20:05 PM

Action Name

SECOND DEIS Kahana Bay Erosion Mitigation

Type of Document/Determination

Draft environmental impact statement (DEIS)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district
- (3) Propose any use within a shoreline area

Judicial district

Kauaʻi - multiple districts

Tax Map Key(s) (TMK(s))

(2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Action type

Applicant

Other required permits and approvals

numerous

Discretionary consent required

CDUA/Easement (approval from BLNR)

Approving agency

State of Hawaii Department of Land and Natural Resources, Office of Conservation and Coastal Lands

Agency contact name

Samuel Lemmo

Agency contact email (for info about the action)

sam.j.lemmo@hawaii.gov

Email address or URL for receiving comments

kahana@oceanit.com

Agency contact phone

(808) 587-0377

Agency address

1151 Punchbowl Street #131

Honolulu, HI 96813
United States
Map It

Accepting authority

State of Hawaii Department of Land and Natural Resources, Office of Conservation and Coastal Lands

Applicant

Kahana Bay Steering Committee

Applicant contact name

Sterling Honea

Applicant contact email

sterlinghonea@gmail.com

Applicant contact phone

(530) 559-2606

Applicant address

10 Hoohui Road, Suite 201
Honolulu, HI 96813
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Map It

Was this submittal prepared by a consultant?

Yes

Consultant

Oceanit

Consultant contact name

Ken Cheung

Consultant contact email

kahana@oceanit.com

Consultant contact phone

(808) 531-3017

Consultant address

828 Fort Street Mall, Suite 600
Honolulu, HI 96813
United States
Map It

Action summary

Kahana Bay on Maui is imminently threatened by severe coastal erosion and plagued by natural hazard risks to public safety and infrastructure. Approximately 1,200 feet of this shoreline, located between Kahana Stream and Pōhaku Park, is protected by temporary emergency structures. The Proposed Action presents a resilient solution to mitigate regional shoreline erosion using sand transported from offshore for beach nourishment and berm enhancement. The beach will be restored to the approximate width that existed in 1975 and about 65 feet wider on average than current. Seven rock T-groins and one rock headland structure will be constructed to stabilize the beach. The DEIS is being published a second time to include reproductions of agency pre-consultation and responses in Appendix J, DEIS Consultation Comments and Responses. The scope of work proposed, alternatives, and technical content are unchanged from the first publication.

Attached documents (signed agency letter & EA/EIS)

- SECOND-DEIS_Kahana-Bay-Erosion-Mitigation_Oct-2021-4.pdf
- SECOND-DEIS_Kahana-Bay-Erosion-Mitigation_Oct-2021-3.pdf
- SECOND-DEIS_Kahana-Bay-Erosion-Mitigation_Oct-2021-2.pdf
- SECOND-DEIS_Kahana-Bay-Erosion-Mitigation_Oct-2021-1.pdf
- Kahana-Bay-Erosion-Mitigation-Project-Transmittal-Letter-to-ERP.Second-DEIS.pdf
- SECOND-DEIS_Distribution-list.pdf

Shapefile

- The location map for this Draft EIS is the same as the location map for the associated EIS Preparation Notice.

Authorized individual

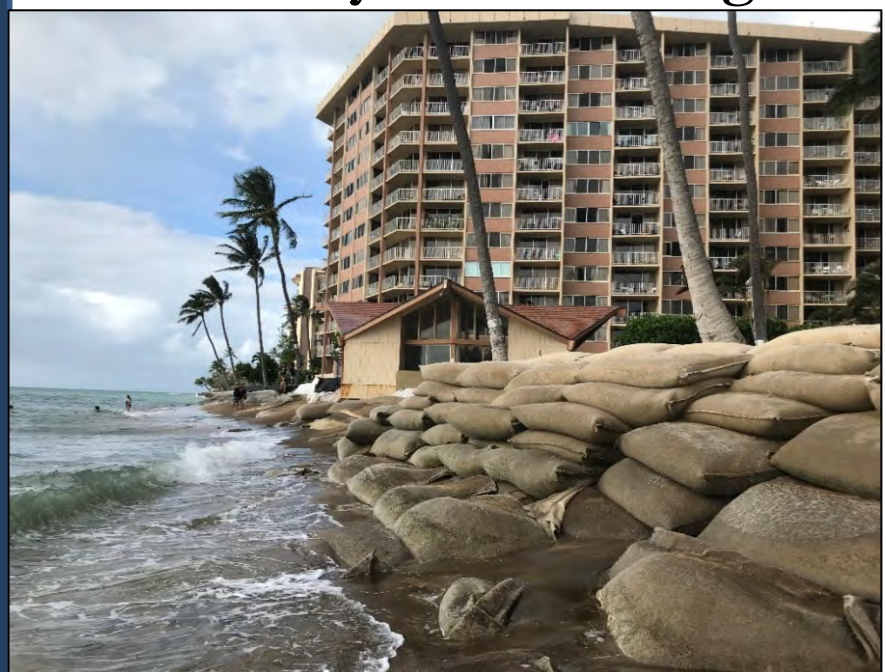
Ken Cheung

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

SECOND Draft
Environmental Impact Statement

Kahana Bay Erosion Mitigation



Approving Agency:

State of Hawaiʻi
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Suite 131
Honolulu, HI 96813

Applicant:

The Kahana Bay Steering Committee
10 Hoʻohui Road, Suite 201
Lahaina, HI 96761

October 2021

SECOND Draft
Environmental Impact Statement

Kahana Bay Erosion Mitigation

Applicant:
The Kahana Bay Steering Committee
10 Ho'ohui Road, Suite 201
Lahaina, HI 96761

Approving Agency:
State of Hawai'i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Suite 131
Honolulu, HI 96813

Consultant:
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

October 2021

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CONTENT CHECKLIST

		HAR § 11-200-17 EIS Content Requirements	Draft EIS Compliance
(a)		The draft EIS, at a minimum, shall contain the information required in this section (HAR § 11-200-17)	
(b)		Summary sheet	Summary Sheet
	(1)	Brief description of the Proposed Action	Executive Summary
	(2)	Significant beneficial and adverse impacts (including cumulative and secondary impacts)	Executive Summary
	(3)	Proposed mitigation measures	Executive Summary
	(4)	Alternatives considered	Executive Summary
	(5)	Unresolved issues	Executive Summary
	(6)	Compatibility with land use plans and policies; list of permits and approvals	Executive Summary
(c)		Table of Contents	Table of Contents
(d)		Statement of purpose and need	Chapter 1
(e)		Project description	Section 2.2
	(1)	Detailed map (USGS topo, FIRM, or Floodway Boundary maps)	Figure 3-10 FIRM
	(2)	Statement of objectives	Section 2.1
	(3)	General description of action's characteristics	Section 2.2
	(4)	Use of public funds or lands for the action	Section 2.3.2.2
	(5)	Phasing and timing of action	Section 2.2.5
	(6)	Summary technical data, diagrams, and other information for impact evaluation	Section 2.2 Chapter 3 Appendices A, B, C
	(7)	Historic perspective	Section 1.1.1 Section 3.4.3 Section 3.4.4
(f)		Rigorous exploration and objective evaluation of alternatives	Chapter 3
	(1)	No action	Section 2.5.4 Chapter 3
	(2)	Alternatives of significantly different nature that would provide similar benefits with different environmental impacts	Section 2.4 Section 2.6
	(3)	Alternatives with different designs or details that would provide different environmental impacts	Section 2.5 Section 2.6
	(4)	Alternative of postponing the action	Section 2.5.4
	(5)	Alternative locations	Section 2.5.1
(g)		Description of environmental setting	Chapter 3
	•	Description of environment in the local and regional vicinity before action	Chapter 3
	•	Rare or unique environment resources	Section 3.1 and 3.3
	•	Related projects in the area that may be part of cumulative impacts of the action	Section 3.7

	HAR § 11-200-17 EIS Content Requirements	Draft EIS Compliance
	• Population and growth and assumptions used to justify the action	Section 3.4.1
	• Secondary population and growth impacts	Section 3.4.1 Section 3.7
(h)	Relationship of the Proposed Action to land use plans, policies and controls	Chapter 4
	• For conflicts, extent to which conflict has been reconciled and reasons for processing	Chapter 4
	• List of necessary approvals and status of each	Section 4.4
(i)	Statement of probable impacts on natural and human environment	Section 3.1 Section 3.3 Section 3.4
	• Consideration of all phases of Proposed Action	Chapter 3 Chapter 4
	• Direct and indirect impacts	Chapter 3 Section 3.7
(i)	• Interrelationships and cumulative environmental impacts and other related projects	Section 3.7 Chapter 5
	• Secondary effects	Section 3.7
	• Estimated population impacts	Section 3.4.1.1
	• Direct or indirect sources of pollution	Section 3.1
(j)	Relationship between local short-term uses of humanity's environment and the maintenance and enhancement of long-term productivity	Chapter 5
	• Trade-offs among short-term and long-term gains and losses	Section 5.1
	• Extent to which Proposed Action forecloses future options	Section 5.2
	• Narrows the range of beneficial uses	Section 5.3
	• Poses long-terms risks to health and safety	Section 5.4
(k)	Irreversible and irretrievable commitments of resources	Chapter 6
	• Unavoidable impact	Section 6.1
	• Use of non-renewable resources	Section 6.2
	• Curtails the range of potential environmental uses	Section 6.3
	• Possibility of environmental accidents	Section 6.4
(l)	Probable adverse environmental impacts that cannot be avoided	Section 6.1
	• Rationale for proceeding with Proposed Action, notwithstanding adverse effects	Chapter 1 Chapter 3
	• Other public policies that offset adverse environmental effects of the Proposed Action	Section 1.3 Chapter 4
	• Ability of reasonable alternatives to achieve countervailing benefits to avoid adverse effects	Section 2.4 Section 2.5
(m)	Mitigation measures	Chapter 3

	HAR § 11-200-17 EIS Content Requirements	Draft EIS Compliance
	• Description of mitigation measures in action plan to reduce significant, unavoidable, adverse impacts to insignificant levels and basis for considering these levels are acceptable	Section 2.2.5 Chapter 3
	• Timing of each mitigation step to assuring mitigation	Section 2.2.5
(n)	Summarize unresolved issues	Chapter 7
	• How unresolved issues will be resolved prior to commencement of Proposed Action	Chapter 7
(o)	• List of all government agencies, other organizations and private individuals consulted in preparing this statement	Chapter 8
(p)	• Separate and distinct section that contains all substantive comments and responses made during the consultation process • List of agencies who were consulted and had no comment	Appendix J Section 8.2

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LIST OF FIGURES

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APPENDICES

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ACRONYMS AND ABBREVIATIONS

<	Less Than
%	Percent
§	Section
˚F	Degrees Fahrenheit
AIS	Archaeological Inventory Study
AMAP	Applicable Monitoring and Assessment Plan
AMP	Archeological Monitoring Plan
AMR	American Medical Response
AOAO	Association of Apartment Owners
bgs	Below Ground Surface
BLNR	Board of Land and Natural Resources
BMP	Best Management Practice
BOSZ	Bossinesq Ocean and Surf Zone
BRIC	Building Resilient Infrastructure and Communities
CDP	Census Designated Place
CDUA	Conservation District Use Application
CDUP	Conservation District Use Permit
CFD	Community Facilities District
CFR	Code of Federal Regulations
CIA	Cultural Impact Assessment
CO	Carbon Monoxide
COEMAP	Coastal Erosion Management Plan
CWA	Clean Water Act
cy	Cubic Yard
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act of 1977
DAGS	Department of Accounting and General Services
DAR	Department of Aquatic Resources
dBA	Decibels
DBEDT	State of Hawaiʻi Department of Business, Economic Development, and Tourism
DEIS	Draft Environmental Impact Statement
DLNR	State of Hawaiʻi Department of Land and Natural Resources
DO	Dissolved Oxygen
DOE	State of Hawaiʻi Department of Education
DOH	State of Hawaiʻi Department of Health
DOH-CWB	State of Hawaiʻi Department of Health, Clean Water Branch
DPW	Department of Public Works
DU	Decision Unit
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EISPN	EIS Preparation Notice
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency

FEP	Hawaiʻi Fishery Ecosystem Plan
FIRM	Flood Insurance Rate Map
FR	Final Rule
ft	Foot or feet
ft/yr	Feet per Year
FWCA	Fish and Wildlife Coordination Act
GMSL	Global Mean Sea Level
GPS	Global Positioning System
HAR	Hawaiʻi Administrative Rules
HDPE	High-Density Polyethylene
HEPA	Hawaiʻi Environmental Policy Act
HIEMA	Hawaiʻi Emergency Management Agency
HRS	Hawaiʻi Revised Statutes
HSBPA	Hawaiʻi Shore and Beach Preservation Association
HUI	Hui O Ka Wai Ola
IPCC	Intergovernmental Panel on Climate Change
KBSC	Kahana Bay Steering Committee
LCA	Land Commission Award
m	Meter(s)
MBTA	Migratory Bird Treaty Act
MCC	Maui County Code
mgd	Million Gallons per Day
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
mm	Millimeters
MMPA	Marine Mammal Protection Act
mph	Miles per Hour
MSA	Magnuson-Stevens Conservation Act
MSL	Mean Sea Level
MUS	Management Unit Species
mya	Million Years Ago
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTU	Nephelometric Turbidity Units
NWP	Nationwide Permit
O_3	Ozone
OCCL	Office of Conservation and Coastal Lands
OEQC	Office of Environmental Quality Control
ORMP	Ocean Resources Management Plan

PacIOOS	The Pacific Islands Ocean Observing System
PIRO	Pacific Islands Regional Office
PM	Particulate Matter
ROE	Right-of-Entry
RTE	Rare, Threatened, and Endangered
SFHA	Special Flood Hazard Area
SLR	Sea Level Rise
SLR-XA	Sea Level Rise Exposure Area
SLUD	State Land Use District
SMA	Special Management Area
SO_2	Sulfur Dioxide
SOEST	School of Ocean and Earth Science and Technology
SSA	Shoreline Setback Approval
SWAN	Simulating Waves Nearshore
TMDL	Total Maximum Daily Load
TMK	Tax Map Key
TSS	Total Suspended Solids
UH	University of Hawaiʻi
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
WQC	Water Quality Certification
WQS	Water Quality Standards
WRF	Wastewater Reclamation Facility

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SUMMARY SHEET

Type of Document:	Draft Environmental Impact Statement (DEIS)
Project Name:	Kahana Bay Erosion Mitigation Project
Accepting Agency:	State of Hawai‘i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) 1151 Punchbowl Street, Suite 131 Honolulu, HI, 96813
Applicant:	Kahana Bay Steering Committee (KBSC) 10 Ho‘ohui Road, Suite 201 Lahaina, Maui, Hawai‘i, 96761
Consultant:	Oceanit 828 Fort Street Mall, Suite 600 Honolulu, Hawai‘i, 96813
Comments and Information:	Please direct all questions and comments to kahana@oceanit.com
Project Location:	Kahana Bay, Maui, Hawai‘i
Tax Map Key (TMK):	Fronting and seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001.
Land Area:	Roughly 4 acres (175,000 square feet [ft]) comprised of a approximately 3,700 ft long by 65 ft wide beach filled with sand, attendant retaining structures, and offshore submerged sand borrow sites.
State Land Use District (SLUD):	Urban (U) and Conservation (C)
Maui Island Plan:	Within the Urban Growth Boundary
Community Plan Designation:	Hotel (H), Open Space (OS), Multi-Family (MF), Public/Quasi-Public (P), Park (PK)
County of Maui Zoning Designation:	Hotel (H-2), Residential (R-3), and Apartment (A-1 and A-2)

Project Summary:	For decades, Kahana Bay on Maui has experienced severe coastal erosion from sea level rise, storm events, and shoreline development. This has resulted in natural hazard risks to public safety and infrastructure. Approximately 1,200 feet of this shoreline is protected by temporary emergency structures. The Kahana Bay Steering Committee (KBSC) represents nine condominiums and one kuleana parcel along the coastline between Kahana Stream and Pōhaku Park. The Proposed Action presents a sustainable and resilient solution to mitigate regional shoreline erosion using sand transported from offshore for beach nourishment and berm enhancement. Seven rock T-groins and one reinforced rock headland structure will be constructed to stabilize the beach. The beach will be restored to the approximate width that existed in 1975 and about 65 feet wider on average than current. Other benefits include six coves created in the nearshore area, addition of hard substrate and niche space for marine species, and preserving long-term water quality.
Regulatory Context:	EIS (Chapters 343/344, Hawaiʻi Revised Statutes [HRS] and Title 11 Section (§) 200 (11-200), Hawaiʻi Administrative Rules [HAR]) Note that the DEIS is being prepared under the Chapter 11-200 HAR (2008) and not Chapter 11-200.1 HAR (2019).
Triggers for the EIS:	Use of State or County Lands; use of State or County Funds Use of State Conservation District Lands Use of the Shoreline Area
Estimated Cost:	$26M - $40M
Time Frame:	Construction will begin after all permits and government approvals are obtained. The best-case scenario for the construction period is estimated at six to nine months.

EXECUTIVE SUMMARY

Brief Description of the Proposed Action

Kahana Bay, Maui, is currently at a turning point for managing natural hazard risks to public safety and developed infrastructure. For decades, sea level rise (SLR), strong wave action, coastal flooding, and shoreline development have transported sand and soils away from the Kahana coast. This chronic and episodic coastal erosion has resulted in shoreline recession, beach narrowing, loss of sandy beach area, continuous beach system, and sand dunes, a reduction in public access, and increased risk of natural hazards to people, oceanfront resources, buildings, infrastructure, and amenities.

In response to the increased risk of coastal flooding, property owners along the Kahana shoreline between Kaʻea Point and Kapua Beach have installed a variety of shoreline protection structures ranging from stone and concrete seawalls to vegetated sand berms and temporary sandbag revetments. Currently approximately 1,200 feet (ft) of shoreline has been permitted for emergency shoreline protection measures and little of the shoreline is in its natural condition. The beach erosion trend is expected to accelerate within Kahana Bay as global SLR worsens, and existing shoreline armoring prevents inland sand reserves from replenishing the beach naturally.

The adjacent community is now seeking ways to manage its coastal resources for generations to come. The Kahana Bay Steering Committee, or KBSC, represents nine condominium complexes and one residential kuleana parcel. The nine condominiums are, from north to south, Kahana Village, Kahana Outrigger, Kahana Reef, Pohailani, Hololani, Royal Kahana, Valley Isle Resort, Sands of Kahana, and the Kahana Beach Resort. The single-family kuleana parcel is located between the Kahana Outrigger and Kahana Reef.

The overall purpose of the project is to develop a sustainable and resilient approach to mitigate regional erosion along the Kahana shoreline on Maui. The project objectives are to:

- Explore, develop, and encourage a cost-effective, regional erosion mitigation solution for the Kahana shoreline that will minimize impacts to the sensitive coastal environment and enhancing nearshore habitat while protecting existing habitable structures;
- Restore and preserve the sandy beach and offshore resources for cultural, social, and recreational uses, including ocean sports, food gathering, and passive enjoyment;
- Encourage shoreline protection that is compatible with natural and existing site conditions;
- Establish a design based on accepted engineering principles and best management practices (BMPs);
- Propose a project that is compatible and consistent with Federal, State, and County regulations, policies, and plans; and
- Develop a sustainable and resilient solution that withstands projected SLR while minimizing environmental impacts of required maintenance.

To meet these objectives the Proposed Action comprises three components, as follows:

- ***Beach nourishment*** activities will include dredging, transporting, and placing between approximately 50,000 and 100,000 cubic yards (cy) of sand from identified offshore borrow areas. These activities are designed to restore the beach to a 1975 target beach width.
- ***A berm enhancement*** using dredged sand and planted with native coastal flora along the backshore of the beach profile will help provide wave run-up protection and serve as a sand reservoir to the beach system.
- To keep the restored sand in place, ***seven beach stabilizing composite T-groins*** will extend perpendicularly from the shoreline to about 215 ft offshore, each with approximately 200 ft-wide breakwater sections. In addition, the ***headland*** at the north end of the project area will be reinforced with imported boulder stones.

Significant Beneficial Impacts

The Proposed Action is anticipated to generate several significant beneficial impacts, all of which are long-term in nature. They are as follows:

- *Protection of Adjacent Properties:* As demonstrated throughout this DEIS, the Proposed Action will provide a significant beneficial impact for adjacent properties and infrastructure by widening the beach. The T-groins will reduce sand movement and retain beach width over their 50-year lifespan.
- *Rare, Threatened, and Endangered (RTE) Species:* In the Proposed Action, the nourished beach would provide a wider sandy beach area that could be used by sea turtles and monk seals as additional haul out areas. If green sea turtle nests are observed in the new beach area, proper agencies will be notified and the area will be properly protected. Effluent discharge and soil runoff will be reduced as a result of the Proposed Action. The improved water quality will have positive effects on RTE species' habitat and food sources.

  Frequently, projects that alter the natural beach profile (e.g., stabilizing structures that extend offshore) reduce the suitability of onshore habitat for sea turtles. However, given projected SLR estimates, increases in storm surge intensity, and other climate change-related factors, it is anticipated that beach erosion will continue, as will the need for mitigation.
- *Marine Biological Resources:* The Proposed Action is anticipated to improve shoreline conditions, restore a recreational beach at the site, improve water quality by eliminating erosion of terrigenous fill, and increase potential biological habitat in a relatively barren reef flat area. The stabilization structures would add hard substratum and provide vertical relief for corals, algae, and other invertebrates. Submerged portions of beach stabilization structures can be designed to incorporate topographical relief and structural complexity to increase niche spaces for fish. Additional habitat for fishes will likely increase fish species richness, biomass, and abundance.

- *Kahana Bay Character and Experience:* The Proposed Action will significantly alter the existing character by widening the beach, adding stabilizing structures and vegetated berms, and creating six separate areas, or coves, each of which would be framed by the beach and T-groin stems to the north and south. The widened beach and vegetated berm would have positive impacts on the existing character by improving the beach recreational experience with a larger sandy area and a protective shoreline environment. The vegetated berms will cover existing shoreline hardening structures that are permitted to remain in place.

  Further, the potential for increased benthic habitat created by the T-groins may increase fishing and food gathering opportunities. While the presence of T-groins may be considered visually and aesthetically obtrusive, the stabilization structures nevertheless will help to protect the shoreline and stabilize the Kahana Bay beach over a long-term time frame.

- *Visitor Industry:* The Proposed Action would result in a long-term significant positive impact on Kahana Bay's ability to attract visitors. With a beach widened to 1975 conditions, Kahana Bay is expected to once again draw island visitors as the tourism industry revives and society adapts to post-pandemic conditions. Economic conditions are anticipated to be improved by higher occupancy in Kahana Bay condominiums and increased patronage of nearby shops and businesses. Though some visitors may not appreciate the visual aspects of the T-groins, the six new coves, or partially enclosed bodies of water, may be considered a unique and enjoyable recreational resource along the West Maui coast.

- *Scenic and Open Space Resources:* The Proposed Action will result in permanent changes to scenic and open space resources along the Kahana shoreline. The nourished beach would have a positive impact on the appearance of the widened shoreline, and the vegetated berm will cover existing shoreline hardening structures that will be permitted to stay in place. The stabilization structures would have a permanent impact on the view of and from the shoreline. To mitigate the visual effects of the structures, they will be designed to occupy a low elevation and profile.

- *Recreation:* The Proposed Action will help to stabilize the beach with T-groins that will reduce sand movement and retain beach width over the 50-year lifespan of these stabilizing structures. Once the beach is renourished and T-groins are constructed, the widened beach area would serve as an area for numerous recreational and beach activities. The stretch of beach along the entire bay would be widened, made contiguous, and be available for public use. Significantly increased beach area would allow for more beach use activities such as sunbathing, lateral shoreline walking, and general enjoyment. In addition, the six beach coves created between the stabilizing structures will allow conditions calmer than the open ocean while popular surf sites in the area (i.e., S-Turns and Mushrooms) will not be affected by dredging or stabilizing structure construction.

Significant Adverse Impacts and Proposed Mitigation Measures

Significant adverse impacts resulting from the Proposed Action are hereby summarized, and related proposed mitigation measures, if any, are presented.

- *Marine Biological Resources:* Placement of the T-groins will result in the permanent loss of coral and benthic habitat within that footprint. Marine biological resources, including coral cover, are low in the project area. Coral settlement and growth are limited by wave action, sand and rubble scour, turbid water and reduced light conditions, and burial with fine sediment. Further, the project area supports a low abundance of fish and a marginal coral community due to the mainly limestone/sand bottom type with limited topographical relief and structural complexity.

While adverse project impact cannot be avoided, a mitigating factor is that, over the long-term time frame, the T-groins may provide opportunities for marine habitat. The stabilization structures would add hard substratum and provide vertical relief for corals, algae, and other invertebrates. Submerged portions of beach stabilization structures can be designed to incorporate topographical relief and structural complexity to increase niche spaces for fish. Additional habitat for fishes will likely increase fish species richness, biomass, and abundance. If needed, other efforts for compensatory mitigation will be explored.

- *Loss of Continuous Lateral Shoreline Access:* The Proposed Action will result in a loss of continuous lateral nearshore access. This may be considered an adverse impact for those who enjoy swimming, wading, snorkeling, stand-up paddle boarding, and other such activities along the length of the Kahana shoreline. For continuous nearshore access parallel to the shoreline, individuals would need to go beyond the end of the T-groins to approximately 200 ft offshore, which may not be as comfortable or appealing as the nearshore traverse.

Alternatives Considered

The following alternatives were considered in developing the Proposed Action:

- *Beach Nourishment Without Stabilizing Structures:* This alternative, hereafter referred to as the Secondary Alternative, is considered a viable option for Kahana and is evaluated throughout this DEIS. The Secondary Alternative is similar to the Proposed Action in that it entails sand dredging, beach widening, and a vegetated berm. Its major difference with the Proposed Action is two-fold. First, it does not include T-groins as stabilizing structures. Second, its shoreline stabilization method is buried toe protection, which would provide backshore protection should the nourished beach continue towards the properties. The toe protection may be a short sloping rubblemound structure installed below the beach elevation. It is noted that, without stabilization structures, beach nourishment would be needed in estimated nine-year intervals, rather than after 30 years of construction as with the Proposed Action.

- *Types of Offshore Stabilizing Structures:* Typical beach stabilization structures used to reduce the rates of sand loss include geotubes, straight groins, offshore breakwaters, and groins. The following were considered for this project:
    - Geotubes are specialized geotextile fabric tubes that are pumped full of sand and are used as sand stabilization structures. Generally, geotubes are used as temporary structures as a way of demonstrating design effectiveness before being replaced with a permanent stone or concrete structure but can be converted into the core of the permanent structure by placing layers of armor over them. Although geotubes are effective as temporary measures, they do not provide the long-term shoreline protection needed at Kahana Bay. In addition, Kahana Bay is sand-limited, so a new source of material would be needed to fill geotubes. Since a more permanent solution is sought for Kahana, geotubes were eliminated in the evaluation of alternatives.
    - Straight groins are generally constructed perpendicular to the existing shoreline. These structures intercept the longshore littoral drift of sand, resulting in a beach build up against one side of the groin, which is called the updrift side. The resulting beach is asymmetric and

segmented, roughly oriented with the incoming wave direction. The water is diverted offshore at the groin. Straight groins do not fulfill the project objectives to mitigate erosion because they would not diminish wave forces on the shoreline that cause erosion. Based on current modeling results of the area that show cross shore sand movement, straight groins alone would not be effective at stabilizing Kahana Beach and were therefore eliminated as a viable alternative.

  - Offshore or detached breakwaters are constructed approximately parallel to the shoreline. These are located a distance offshore from the shoreline and modify nearshore circulation by deforming incoming waves. The seaward side is armored to dissipate wave energy, thus reducing part of the wave energy that erodes the beach. The wave wraps around the two ends of the breakwater and moves sand to the area sheltered by the structure, resulting in sediment deposition and retainment in the lee of the structure. In evaluating this option for Kahana, it was determined that detached breakwaters would not be able to change the wave direction enough to reverse the longshore sand drift in the area and therefore would not stabilize the sand nourishment. In addition, seasonal high waves during the winter months could overtop the breakwater and continue to erode the sand-nourished shoreline. Therefore, detached breakwaters were not considered further for the Proposed Action.

- *Shoreline Armoring:* The shoreline armoring alternative would involve the construction of a hardened structure along the 3,700 ft of Kahana shoreline. The structure may consist of a vertical seawall, a sloping revetment, or a combination of both types of structures. Alternatives for shoreline armoring considered in the DEIS are as follows:

  - Rock Revetment: A revetment is a sloping structure designed to absorb wave energy, prevent erosion of the backshore, and reduce wave runup. Rock revetments typically consist of large armor stones placed above filter layers. Due to the sloping design, rock revetments have a larger footprint than vertical structures. For this reason, construction of a wide revetment in a sensitive environment may not be appropriate. Although revetments absorb a large portion of the incoming wave energy, the impact of wave reflections and end-wall effects on adjacent shorelines may still be of concern. Hence, this alternative shoreline armoring method was not selected for further study.

  - Seawalls: Seawalls are hardened shoreline protection structures that stand vertically along the shoreline. They are designed to resist incoming wave forces and prevent wave overtopping. Seawalls can be constructed by a variety of methods and materials, such as poured concrete or driven sheet piles. Concrete seawalls already exist at Kahana fronting the Kahana Beach, Hololani, Pohailani, and Kahana Reef properties. Unlike revetments, seawalls are generally impermeable. Since they do not absorb wave energy, the impact of wave reflections and end-wall effects on beach loss and adjacent properties can cause unwanted accelerated erosion to neighboring properties. The smooth surface of traditional seawalls also does not provide opportunities for environmental habitat enhancement. Because shoreline hardening can have severe effects on neighboring properties by exacerbating shoreline erosion and beach loss, this alternative was not further evaluated in the DEIS.

- *Managed Retreat*: Managed retreat is essentially shifting development inland from the coast either by the physical movement of structures or changing restrictions and management of Hawai‘i’s coastal areas. It involves establishing thresholds to trigger the demolition and relocation of structures threatened by coastal hazards or SLR. Managed retreat is a complex and controversial issue and has of yet no definitive approach in Hawaiʻi public policies. Foremost, residents would be displaced from their homes. The financial burden from high-valued beachfront land acquisition and redevelopment would be significant. Development zones would need to be shifted inland and would require re-zoning and reallocation of resources, which may have cascading effects on many other issues.

A cohesive policy for managed retreat for the state and county needs to be developed in coordination with all branches of government and the community. Devising and putting policies and plans in place for managed retreat in the area requires discussion, funds, and decision-making beyond the objectives and scope of this DEIS, and therefore are not further explored in this DEIS.

- *Accommodation*: Accommodation involves adapting existing structures and systems to allow them to better withstand changing conditions. An example of accommodation is elevating a structure on piles to tolerate more extreme wave inundation. Accommodation of condominiums, homes, and structures on the adjacent properties would require a detailed evaluation of each parcel's structures and features to determine which modifications would be appropriate for each situation. Each parcel would need to be considered individually. Accommodation would require significant maintenance and may eventually fail. Although living areas may be elevated and located above and beyond the SLR Exposure Area (SLR-XA), existing underground utilities and roads would continue to be inundated and flooded. Repeated inundations with salt water could corrode metal components of utility infrastructure, while backrush from flooding could heavily damage roads and foundations of structures. Condominium foundations would remain unprotected and could be undermined by rising water levels and repeated flooding.

  The efforts and cost to buy out floors and parking levels, relocate buildings, pools, and other features, and put plans in place to protect or reinforce existing underground utilities are extensive and require coordinated and cohesive efforts between condominium owners and associations, Maui County, utility companies, regulatory agencies, and other stakeholders. Accommodation for Kahana cannot be done unless Maui County is directly involved as a proposing agency. Public utilities and roadways would need to be accommodated along with existing buildings and infrastructure. Since Maui County is not a proposing party for the current DEIS, accommodation is not viable alternative for additional consideration.

Unresolved Issues

At the time of this writing, the following are unresolved.

- *Financing and the Use of Public Funds:* There are two possibilities for public funding of the project, including Maui County Community Facilities District (CFD) and Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC). These two options are currently being pursued.

- *Stabilizing Structures Ownership and Maintenance:* If the project is funded by Maui County CFD, Maui County would own the stabilizing structures per CFD regulations. While maintenance could be the responsibility of the appropriate County agency, there is also an option for a public-private partnership with KBSC that may include funding and outsourcing to conduct maintenance. Resolving these issues will depend on whether CFD funds will be used in project implementation.

- *Permits, Easement and Right-of-Entry (ROE) Approval:* In addition to various Federal, State, and Maui County permits and approvals, DLNR would need to issue a CDUP and an easement and ROE approval to conduct project activities seaward of the certified shoreline. The applicant for CDUP, easement, and ROE will depend on the ownership entity at the time of implementation.

- *Construction Time Frame:* Time constraints related to weather conditions and coral spawning seasons will ultimately determine whether construction can occur within a best-case scenario of six to nine months, or over two periods in two consecutive years.

- *Stabilizing Structures Liability and Management of Public Access:* In Hawaiʻi, stabilizing structures located in the ocean are popular recreational and fishing venues for residents and visitors alike. While there is often signage warning of safety hazards or prohibiting access, these signs are often ignored. Stabilizing structures in the Proposed Action are anticipated to be similarly popular. The T-groins in the Proposed Action are designed for their primary function as stabilization structures and not for pedestrian access. Future considerations to determine access include ownership, liability, and management responsibility.

List of Permit and Approvals

<u>*Federal*</u>
Section 10, Work in Navigable Waters of the U.S. (USACE)
Section 404, Clean Water Act, for Fill in Waters of the U.S. (USACE)
Other Federal laws that may affect the project, including:

- Archaeological and Historic Preservation Act (16 United States Code [USC] §469(A) (1))
- National Historic Preservation Act (NHPA) of 1966 (Section 106) (16 USC §470(F))
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC §3001)
- Clean Air Act (42 USC §7506(C))
- Clean Water Act (33 USC §1251-1387)
- Coastal Zone Management Act (16 USC §1456(C) (1))
- Endangered Species Act (16 USC §1536(A) (2) and (4))
- EO 13089, Coral Reef Protection (63 FR 32701)
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (16 USC §703-711 (66 FR 3853))
- EO 12898, Environmental Justice
- Fish and Wildlife Coordination Act (FWCA) of 1934, as amended (16 USC §661-666(C) et seq.)
- Magnuson-Stevens Fishery Conservation and Management Act (16 USC §1801 et seq.)
- Marine Mammal Protection Act (MMPA) of 1972, as amended (16 USC §1361-1421(H) et seq.)
- Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC §703-712 et seq.)
- Rivers and Harbors Act (33 USC §403)

<u>*State of Hawaiʻi*</u>
Conservation District Use Permit (CDUP) (DLNR-OCCL)
DLNR Beach Nourishment Regulations (DLNR-OCCL)
Shoreline Certification (DLNR-Land Division)
Easement and Right-of-Entry (ROE) Applications and associated Revocable Permits (DLNR Land Division)
National Pollutant Discharge Elimination System (NPDES) (DOH-CWB)

Section 401 Water Quality Certification (WQC) (DOH-CWB)
Coastal Zone Management Consistency Determination (Office of Planning)

County of Maui
Special Management Area
Shoreline Setback Variance
Stockpile Permit
Grading Permit

List of relevant EAs and EISs considered in the preparation of the DEIS

In the course of preparing this DEIS, the following environmental documents were reviewed for context and relevance.

- 2020-08-23-MA-DEIS-Kaanapali-Beach-Restoration
- 2019-08-23-OA-FEIS-Ala-Moana-Regional-Park-Improvements
- 2018-06-08-MA-FEIS-Hana-Pier-Deck-Removal
- 2018-11-08-OA-DEIS-Waikiki-War-Memorial-Complex
- 2017-06-23-OA-FEIS-Kalaeloa-Barbers-Point-Harbor-Fuel-Pier
- 2012-10-08-OA-DEA-Stable-Road-Beach-Groins-on-Submerged-Land-in-Spreckelsville
- 2012-08-23-MA-DEIS-Wailuku-Kahului-Wastewater-Reclamation-Facility-Shoreline-Protection-Extension
- 2012-01-08-OA-NEPA-FEA-Iroquois-Point-Beach

1 STATEMENT OF PURPOSE AND NEED

On behalf of the Kahana Bay Steering Committee (KBSC), Oceanit prepared this Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project in accordance with Hawaiʻi Revised Statutes (HRS), Chapter 343 and Hawaiʻi Administrative Rules (HAR) Title 11, Chapter 200. Requirements under HAR Title 11, Chapter 200.1 were also incorporated. An Environmental Impact Statement Preparation Notice (EISPN) for the project was published in the Office of Environmental Quality Control (OEQC)'s *The Environmental Notice* on March 8, 2019 and again on July 23, 2019. The EISPN was published a second time to add a Community Facilities District (CFD) under Maui County Ordinance 4947 as a potential funding option for the project. The KBSC, which represents nine condominiums and one kuleana parcel along Kahana Bay, was formed to collaborate on and coordinate this holistic regional project.

1.1 Background and Purpose

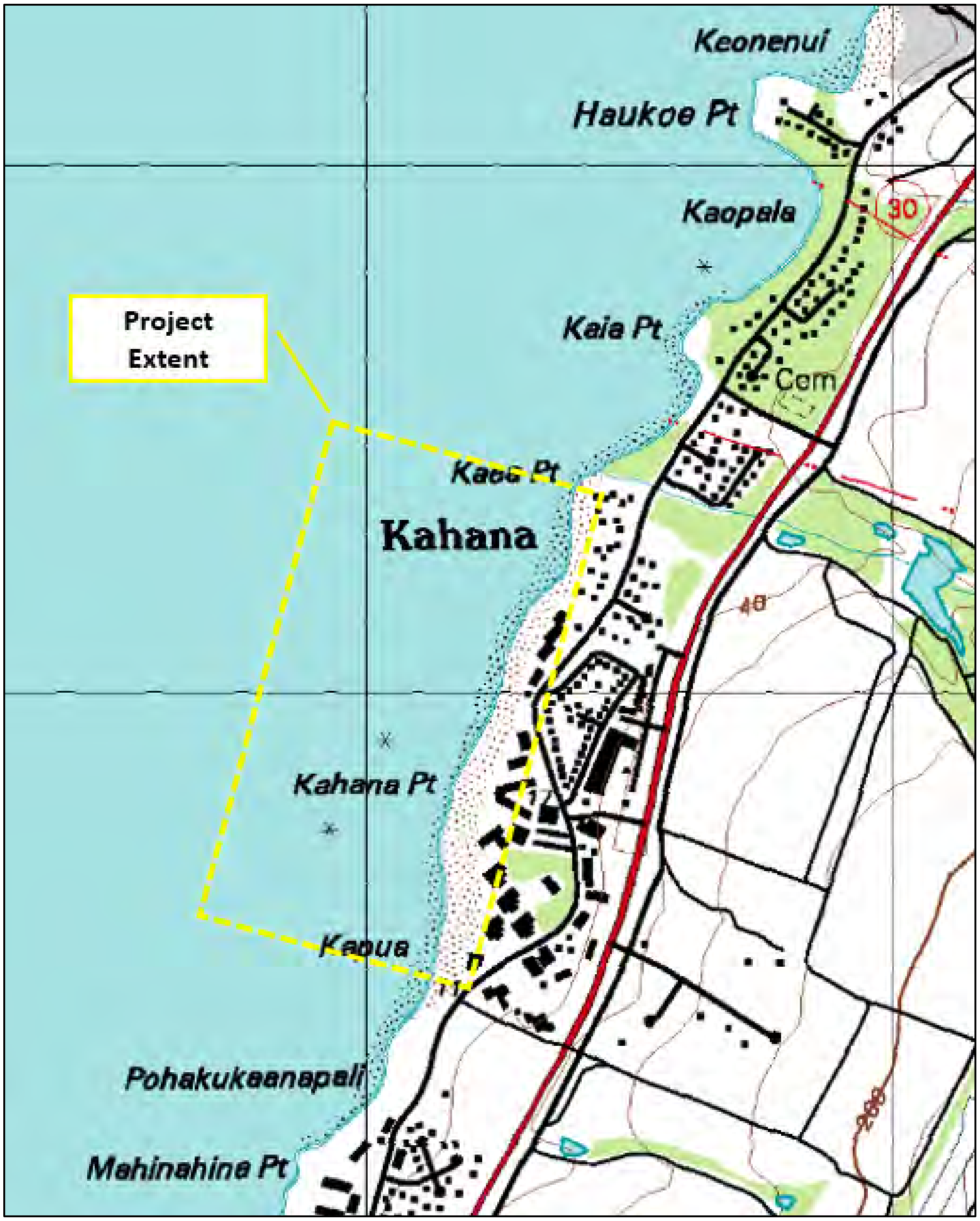
1.1.1 Background

Kahana is the name of a land division (ahupuaʻa), camp, point, and stream in the Honolua quadrangle on Maui. Limited sources provide a meaning to the name Kahana, but no further explanation of the meaning or its relevance to the area. One meaning from Soehren's (2002) collection translates Kahana to "cutting"; another meaning says, "turning point" (Clark 2002:135). North of Honokōwai and south of Nāpili, Kahana is located in Kāʻanapali moku and the Lāhainā District as designated by Maui County.

Although not officially designated on any known maps, the coastal area within the Kahana Ahupuaʻa is referred to by some as "Kahana Bay," and this name is used throughout this DEIS. Within the area considered Kahana Bay, Kahana Beach rests south of Kaʻea Point and north of Kahana Point; Kapua Beach rests south of Kahana Point and north of Pōhakukāʻanapali; and Pōhakukāʻanapali, or Pōhaku for short, is the name of the beach, park, and surf break that sits between Kapua Beach and Māhinahina Point (Figure 1-1). For the purposes of this DEIS, geographic references to the project area interchangeably include Kahana, Kahana Bay, and Kahana Bay beach.

Native Hawaiian people have lived in Kahana for generations. Many of these families still reside along Kahana's coastline where they continue to actively fish, dive, gather, surf, sail, paddle canoes, beach lounge, observe nature, and perform a variety of other activities as part of their traditional lifestyle. Kahana's marine wildlife area supports important habitats for ocean food resources, such as ulua, pāpio, ʻōmilu, moano, schools of ʻōʻio, moi, kala, heʻe, opihi, wana, limu, ʻōpelu, and ahi. Surfing is also popular at the "S-Turns" break located off Pōhaku Beach, the "Mushrooms" surf break located just north of S-Turns fronting Kahana Beach Resort, and at other breaks along the fringing reef of Kahana Bay.

The offshore ecosystem is alive with a variety of coral, algae, macroinvertebrates, and fishes. Government protected species that live in Kahana Bay include sea turtles, monk seals, and invertebrates, such as coral and ʻopihi. Pods of dolphins and humpback whales are known to migrate through the waters off of Kahana Bay.



Source: Untied States Geological Survey, 2020

Figure 1-1: Project Extent Map

The cultural and environmental resources in and around Kahana Bay were changed by the development of multi-story residential structures, which were mainly constructed in the 1970s and 1980s. Just 15 minutes from Lahaina, Kahana has been a popular tourist destination since the 1970s, when its first condominiums and hotels were built along the shorefront. Kahana is a quiet coastal community with a mix of dense and single-family dwellings. Unlike the nearby resort areas of Kāʻanapali and Kapalua, however, Kahana maintains an intimate neighborhood atmosphere despite the large tourism influence.

Kahana Bay is currently at a turning point regarding the management of natural hazard risks to public safety and developed infrastructure. For decades, sea level rise (SLR), strong wave action, coastal flooding, and shoreline development have caused transport of soils and sands away from the Kahana coast. This chronic and episodic coastal erosion has resulted in shoreline recession, beach narrowing, loss of sandy beach area, fractioning of a continuous beach system, diminished sand dunes, reduction in public access, and increased risk of natural hazards to people, oceanfront resources, buildings, infrastructure, and amenities.

In response to the increased risk of coastal flooding, property owners along the Kahana shoreline have installed a variety of shoreline protection structures ranging from stone and concrete seawalls to vegetated sand berms and temporary sandbag revetments. Today, little of the shoreline between Kaiʻa Point and Pōhakukaʻanapali is in its natural condition. The beach erosion trend is expected to accelerate within Kahana Bay as global SLR worsens, and existing shoreline armoring prevents inland sand reserves from replenishing the beach naturally. With about 1,200 feet (ft) of shoreline currently permitted for emergency shoreline protection, a line has been drawn in the sands of Kahana Bay. The community is now seeking ways to manage its important coastal resources for generations to come.

1.1.2 Purpose

The purpose of the Proposed Acton is to design and implement a sustainable and resilient approach to mitigate the regional erosion hazard along the Kahana shoreline in West Maui. Chronic and episodic coastal erosion have caused a long-term trend of beach narrowing, resulting in reduced coastal access and risk to public safety, threats to environmental quality, and damage to property and infrastructure. While aging seawalls and temporary erosion control measures (e.g., sandbags) have been installed along most of the project shoreline, a permanent solution is needed to proactively address regional erosion hazard and SLR for the coming decades.

The Proposed Action was developed with extensive input from a wide cross-section of the community. The project is envisioned as a holistic approach to widen the beach, mitigate future erosion, and stabilize onshore and benthic conditions over a long-term time frame.

1.2 Project Site and Adjacent Properties

The project site encompasses beach and ocean areas seaward of the applicants' properties and stretches approximately 3,700 ft, or 0.7 miles, from Kahana Stream at the north to Pōhaku Park at the south end. The project site includes three offshore sand areas that will serve as beach nourishment sources. Figure 1-2 illustrates the project extent, offshore sand sources, and adjacent properties.

Bounded by the Pacific Ocean on the west and Lower Honoapiʻilani Road to the east, the adjacent shoreline properties comprise nine condominium complexes and one single-family kuleana parcel. The nine condominiums are, from north to south, Kahana Village, Kahana Outrigger, Kahana Reef, Pohailani, Hololani, Royal Kahana, Valley Isle Resort, Sands of Kahana, and the Kahana Beach Resort. The kuleana parcel is located between the Kahana Outrigger and Kahana Reef. The adjacent shoreline properties have formed the KBSC to explore the range of possible alternatives for erosion mitigation, design a proposed project, and comply with environmental requirements according to HRS Chapter 343, and HAR Title 11, Chapters 200 and 200.1.

Except for the kuleana parcel, this portion of Kahana Bay was developed between the early 1970s and early 1980s and was intended to accommodate a combination of apartment and hotel complexes. Three of the condominiums are zoned for apartment uses and six for hotel uses. The parcels range from one to eight acres, and building heights are between two to twelve stories. Table 1-1 provides a profile of the properties comprising the KBSC.

While these properties were developed in the general timeframe of the enactment of the Hawaiʻi's Coastal Zone Management Act (CZMA) in 1977 (Chapter 205A, HRS), their development occurred prior to the enforcement of Maui County Special Management Area (SMA) requirements in September 1990, when setback requirements changed to a minimum of 40 ft inland for lots with average lot depths between 100 ft to 160 ft. The proximity of buildings to the shoreline, combined with projected SLR and coastal erosion, has put the condominiums at great risk of damage and destruction from wave action. All of these properties are located in the Maui County Flood Zone.

At the time of this DEIS preparation, the Maui County Planning Department is currently proposing new shoreline setback rules that incorporate SLR data for future developments (The Maui News, September 27, 2018). Although the risk to condominiums is now recognized and regulations are in place to prevent building within the shoreline setback area, existing buildings that were built prior to enforcement of current shoreline rules and regulations, such as those along Kahana Bay, face severe coastal threats.

The surrounding area is a popular urbanized tourist destination and includes residential, hotel, and various recreational uses associated with coastal areas. Many residents and tourists participate in a variety of recreational activities along the beach and nearshore areas seaward (makai) of the condominiums. In addition, fishing, tako hunting, snorkeling, diving, and gathering activities occur from the shore as well as offshore in boats and canoes.

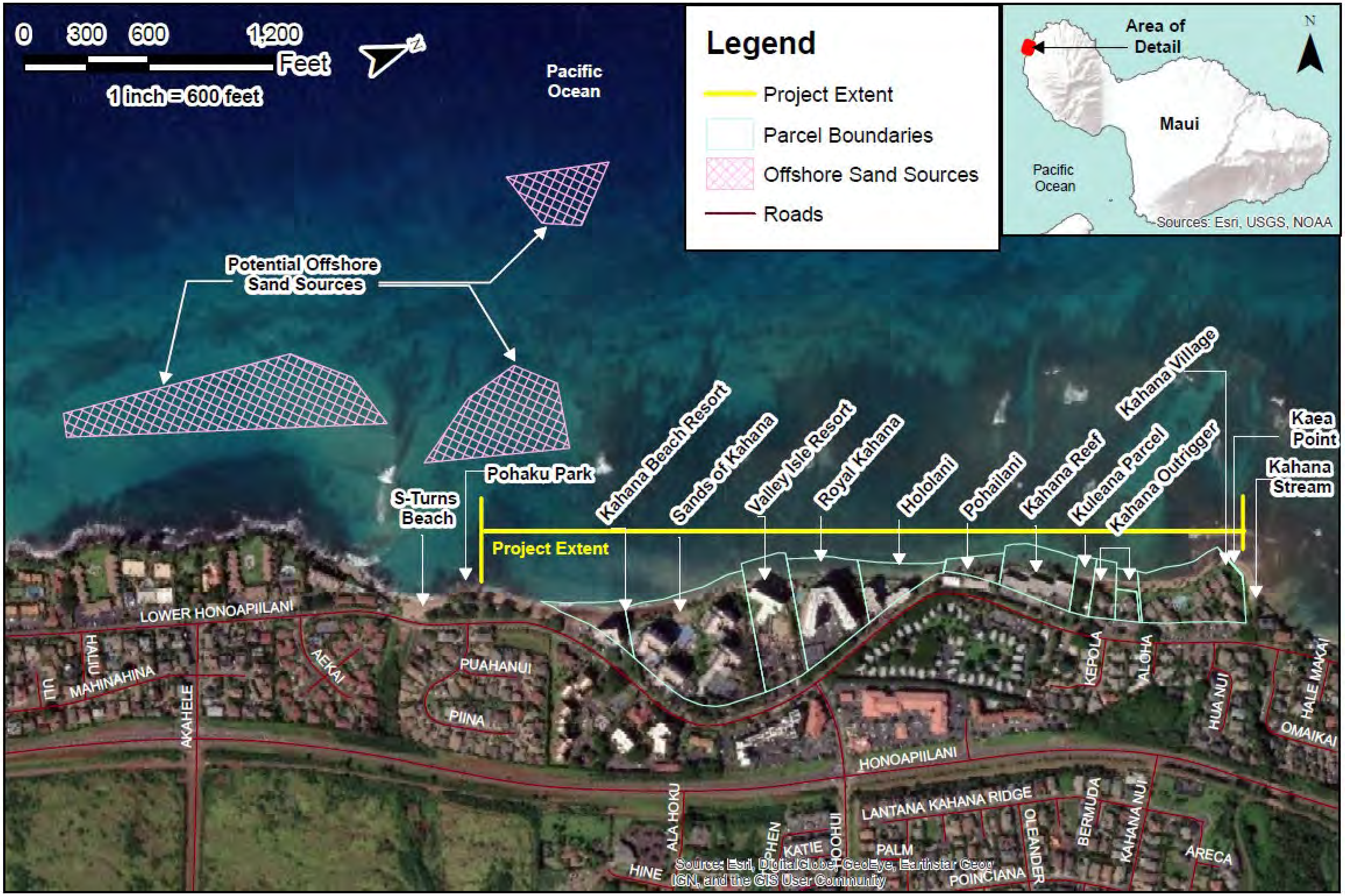


Figure 1-2: Site Location Map

Table 1-1: Profile of Adjacent Properties

Property	Tax Map Key	Year Completed	Lot size (acres)	Structures	Number of Units	Zoning*	Flood Zone
Kahana Village	2 4-3-005:029	1978	3.2	7 two-story buildings	42	A-1	Yes
Kahana Outrigger	2 4-3-005:020	1981	1.2	4 two-story buildings	16	A-1	Yes
Kahana Reef	2 4-3-005:009	1973	2.0	1 four-story building	88	A-2	Yes
Pohailani	2 4-6-005:008	1976	8.1	46 two-story and three-story buildings	114	H-1	Yes
Hololani	2 4-3-010:009	1974	1.4	2 eight-story buildings	64	H-2	Yes
Royal Kahana	2 4-3-010:007	1975	3.5	1 twelve-story building	236	H-2	Yes
Valley Isle Resort	2-4-3-010:004, 5 and 6	1975	3.1	1 twelve-story building	120	H-2	Yes
Sands of Kahana	2-4-3-010:002	1982	7.3	2 eight-story and 2 nine-story buildings	196	H-2	Yes
Kahana Beach Resort	2-4-3-010:001	1973	1.0	1 twelve-story building	84	H-2	Yes
Single-Family Parcel	2 4-3-005:019	1949	0.61	1 building	1	R-3	Yes

*County Zoning for the Island of Maui as of October 2018.
Source: Island of Maui Land Use Zoning Designations, Maui County Code, Chapter 19, Zoning. Available at geodata.hawaii.gov.

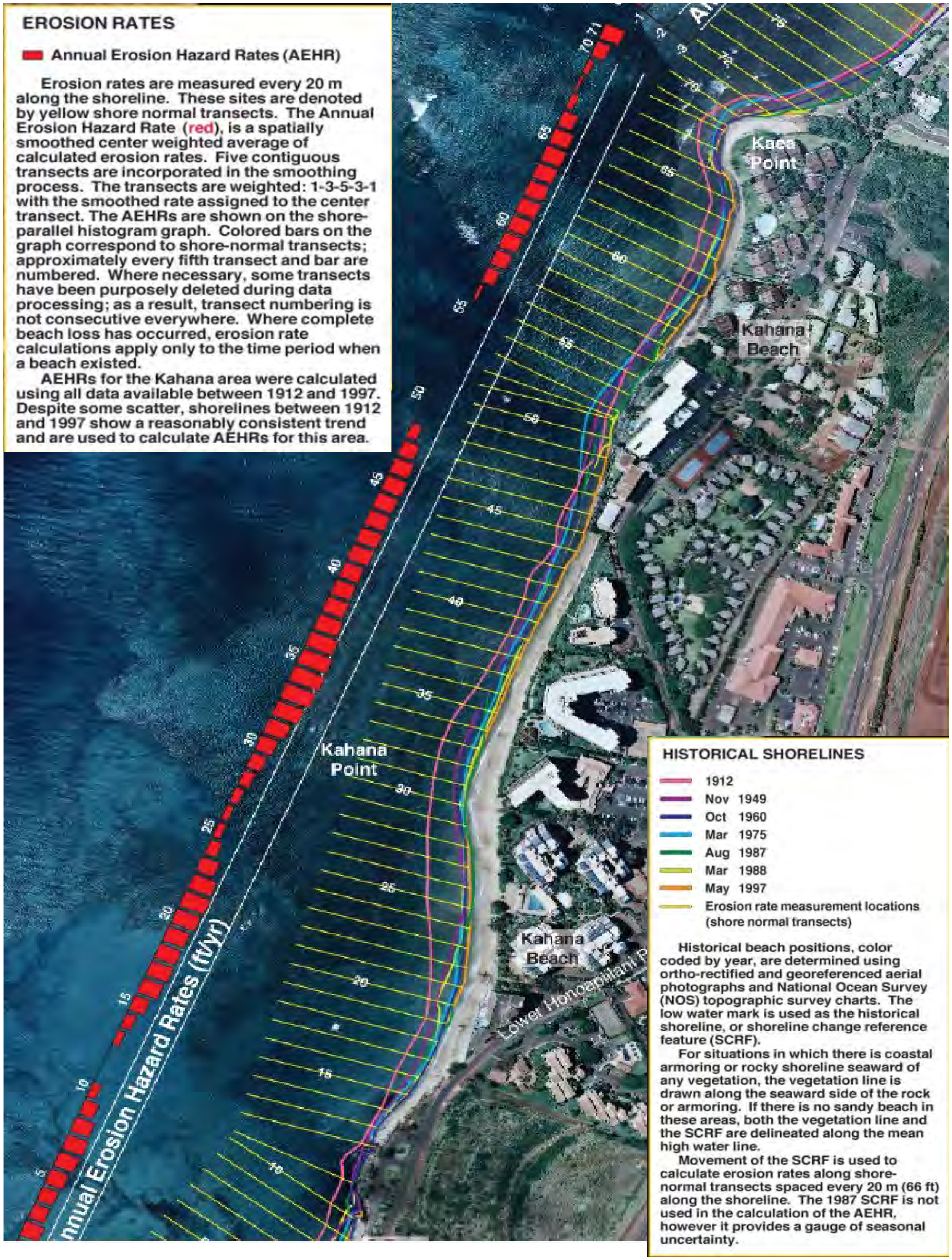
1.3 Chronic and Episodic Coastal Erosion and Existing Shoreline Protection Structures

Coastal erosion is the process by which local SLR, strong wave action, and coastal flooding wear down or carry away rocks, soils, and/or sands along the coast. Coastal erosion includes beach erosion, which is the loss of usable sandy beach, and shoreline erosion, or the loss of land. Chronic coastal erosion has led to shoreline retreat and narrowing of Maui's beaches, the island's most valuable natural assets (The Maui News, 2018). This erosion constrains beach access to and along the shoreline, threatens buildings and infrastructure built close to shore, jeopardizes safety, and risks damage to property. Approximately 85 percent (%) of Maui's sandy shorelines are experiencing long-term erosion trends. The University of Hawaiʻi (UH) Coastal Geology Group examined nearly 100 years of shoreline data and calculated that Maui has the highest percentage of beach loss, at 11%, of all of the Hawaiian Islands, due in part, to land use development patterns, storm events, shoreline armoring, and locally higher rates of SLR (Fletcher et al., 2012).

Historic chronic and episodic coastal erosion at Kahana Beach have resulted in shoreline recession, beach narrowing, shoreline hardening, reduced coastal access, and increased risk of natural hazards to oceanfront resources, buildings, infrastructure, and amenities. Historical imagery and indicators of shoreline change document shoreline erosion rates along the coast ranging between 0.5 to 1.9 ft/year (average of ~1 ft/year) at Kahana (Fletcher et al., 2003; County of Maui, 2016). Figure 1-3 depicts historic shorelines from 1912 and annual erosion hazard rates based on historical data. The long-term coastal erosion trend is caused by a multitude of factors, including tropical storm and hurricane events, land subsidence, changes in sediment supply, prevalent wind and wave patterns, runoff drainage in the area, and rising sea levels. Episodes of rapid erosion caused by severe wave and current conditions have led to the use of a variety of coastal protective structures including sandbag revetments, seawalls, sand dune restoration, and sheet-pile structures along almost the entirety of the shoreline.

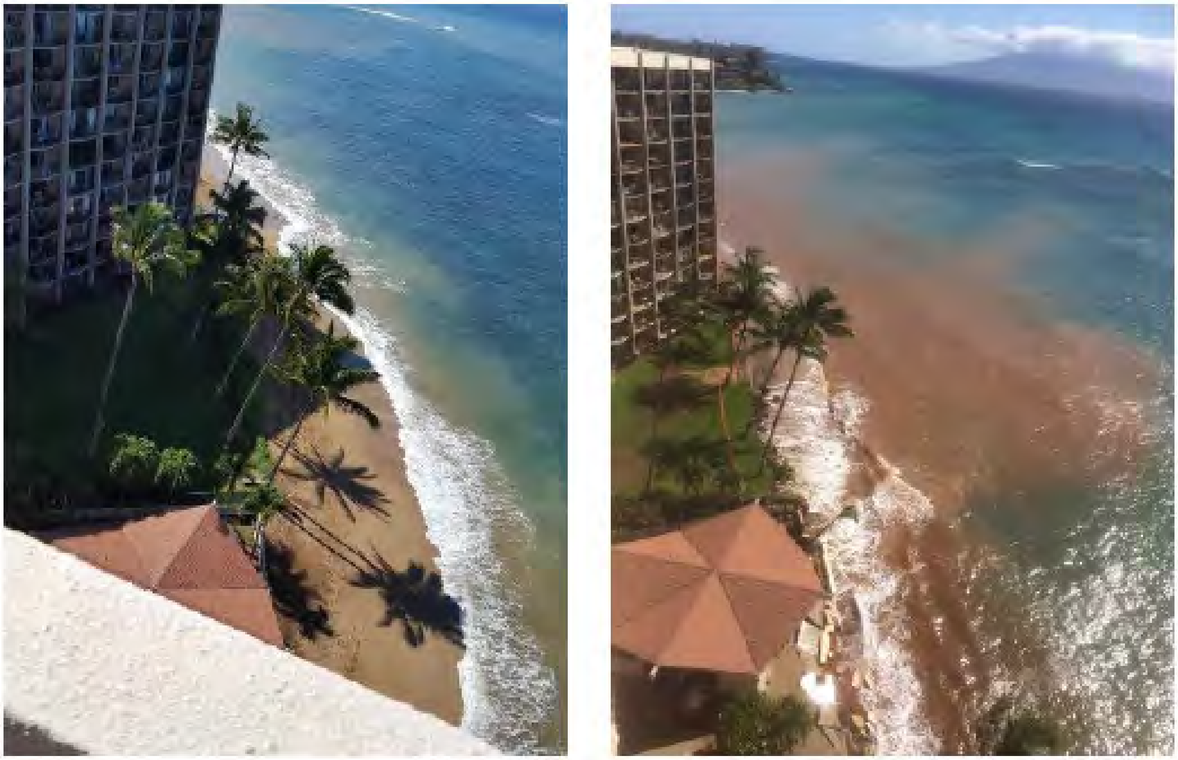
Sand deficiency caused by currents is a major cause of beach erosion. Sand may be naturally transported away from a beach by currents that develop from waves spilling over the fringing reef shelf. The direction of these currents depends on local winds, waves, and tides. In and around the project site, once sand is driven offshore into deep water, the currents in the nearby Pailolo Channel may significantly influence sediment transport away from the beach.

While coastal erosion is a chronic problem, event-based phenomena can also contribute significantly to beach erosion. Episodic erosion from large storm waves, combined with elevated water levels, can transport large quantities of sediment offshore over the course of days to weeks. Figure 1-4 depicts the beach fronting the Valley Isle before and in the aftermath of one such storm event in 2016. The figure shows how rapidly the shoreline buffer can be lost and how land erosion of terrigenous soils can impair water quality.



Source: UH, 2016

Figure 1-3: Map showing shoreline erosion rates (ft/yr)



Source: County of Maui, 2016

Figure 1-4: Pre-storm (February 2016, left) and post-storm (May 2016, right) beach conditions in front of the Valley Isle Resort

1.3.1 Existing Built Shoreline Protection Structures

Almost all the coastal properties in Kahana Bay have some form of shoreline erosion control, as shown in Table 1-2. These shoreline protection measures vary in design, construction materials, top elevation, condition, and effectiveness. As depicted on Figure 1-5, the erosion control schemes along the beach are non-contiguous. Some of these structures may not have been originally constructed to serve as seawalls, which are in direct contact with ocean forces. As the chronic shoreline erosion has progressed over the years, however, retaining walls may eventually serve as coastal protection features and the structures may be modified to better provide this function.

Shoreline hardening can risk exacerbating erosion in the immediate beach area and along neighboring properties, thereby reducing beach stability in the area. A 2006 study found that beaches on Maui fronting seawalls were 50-70% narrower (DBEDT, 2006). Widespread shoreline hardening has contributed to the narrowing and loss of chronically eroding beaches in Hawaiʻi (Fletcher et al., 1997; Romine and Fletcher, 2012). It is estimated that over 13 miles of Hawaiʻi beaches were completely lost to erosion over the past century, nearly all of which fronted coastal armoring (Fletcher et al., 2012). Depending on their design, high waves and water levels can still overtop existing seawalls and endanger people and property, as illustrated in Figure 1-6.

Table 1-2: Existing Shoreline Protection Structures on Adjacent Properties

Property	Shoreline Protection
Kahana Village	Vegetated Sand Berm
Kahana Outrigger	Rock Revetment and Rock
Single-Family Parcel	Rock and Concrete
Kahana Reef	Seawall
Pohailani Maui	Seawall
Hololani	Sand Bag Revetment with Seawall Backstop
Royal Kahana	Sand Bag Revetment
Valley Isle Resort	Sand Bag Revetment
Sands of Kahana	Not Armored (fronting southern building) and Sand Bag Revetment (fronting northern building)
Kahana Beach Resort	Seawall

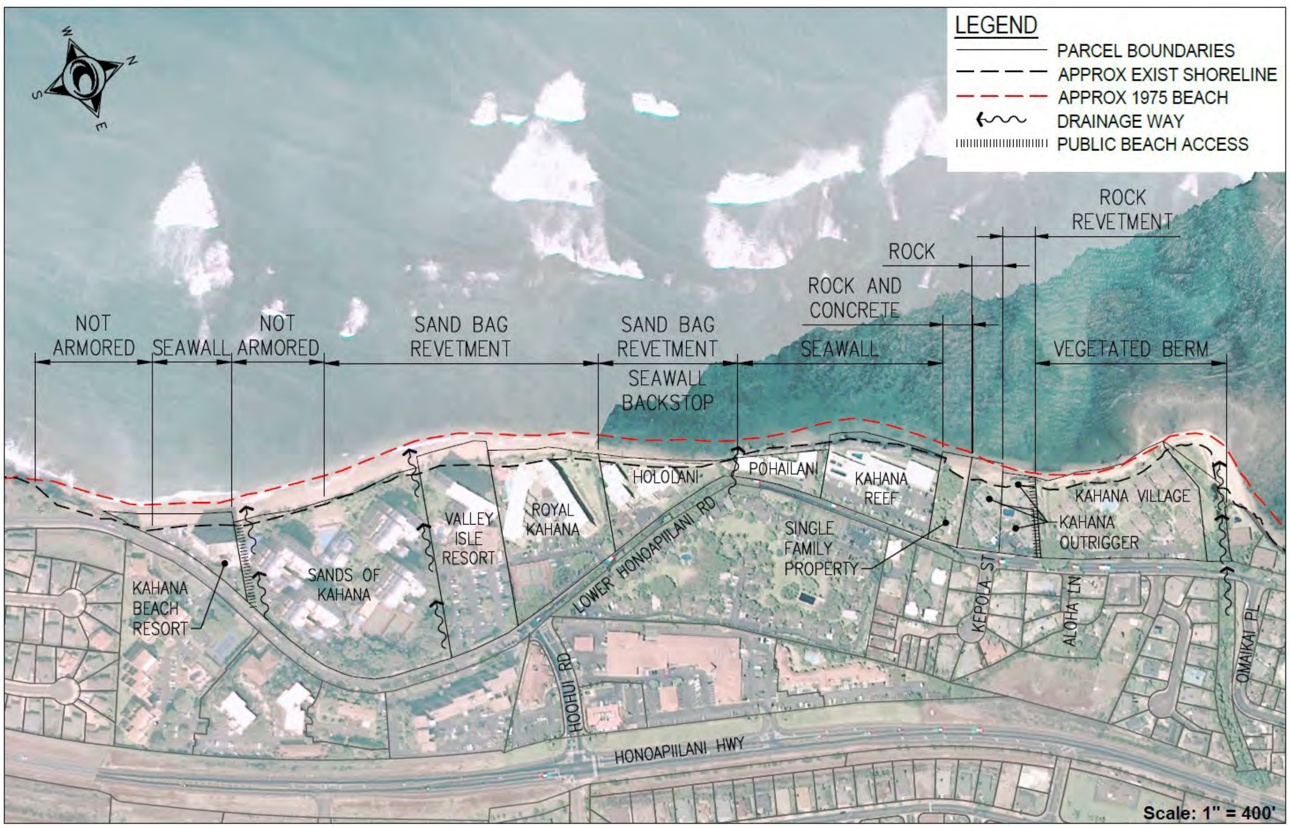


Figure 1-5: Exisiting Site Shoreline Conditions

Source: a) County of Maui Planning Department, Tara Owens, b) Oceanit

Figure 1-6: a) Wave overtopping a seawall fronting the Pohailani Condominium in 2013; b) Emergency geotextile structures along the Royal Kahana and Hololani shorelines, photo taken June 2019

1.3.2 Anticipated Effects of Sea Level Rise and Climate Change

Shorelines are among the most vulnerable and affected areas by SLR. At Kahana, 3.2 ft of SLR is expected by the mid-to latter-half of this century, with chronic flooding, land erosion, displaced residents and businesses, economic loss, and loss of urban land being just a few of the foreseen effects in the upcoming century (see Section 3.2.5, *Sea Level Rise*). Compounding the effects of SLR, stronger and more frequent El Niño events and tropical storms in Hawai'i are also anticipated by climate models (Hawai'i Climate Change Mitigation and Adaptation Commission, 2017). As a result of these multiple factors, it is estimated that shoreline erosion rates may double on average compared to historical rates (Anderson et al., 2015).

According to the State of Hawai'i SLR Report (Hawai'i Climate Change Mitigation and Adaptation Commission, 2017), the Kahana Bay area is projected to be permanently lost if no intervention is taken. The Pacific Islands Ocean Observing System (PacIOOS) offers a Hawai'i SLR Viewer projection of the exposure of a selected area under four different SLR scenarios (0.5, 1.1, 2.0 and 3.2 ft) (PacIOOS, 2019). These scenarios are based on Intergovernmental Panel on Climate Change (IPCC) AR5 "business-as-usual" greenhouse gas emissions scenarios, the worst-case of which assumes greenhouse gas emissions continue to increase at their current rate and predicts up to 3.2 ft of global mean sea level (GMSL) rise by the year 2100 (IPCC, 2014). However, more recent studies by National Oceanic and Atmospheric Administration (NOAA) suggest that this magnitude of SLR could occur as early as the year 2060 under extreme scenarios. Under intermediate scenarios, however, NOAA predicts 1.5 ft of GMSL in as early as the 2060s and 3.3 ft of GMSL rise by 2100 (Sweet et al. 2017).

With uncertainties on the exact projections of GMSL rise associated with greenhouse emission trajectories and the future behavior of Earth's cryosphere, the State of Hawai'i SLR Report recommends the State to begin planning now for 3.2 ft of SLR.

The SLR Exposure Area (SLR-XA) is a combination of three hazards including passive flooding, annual high wave flooding, and coastal erosion. Passive flooding modeling evaluates low-lying areas susceptible to flooding through elevation of ocean water level or groundwater level by SLR. Annual high wave flooding captures the distance that wave runup and over wash will travel across the shoreline under high wave conditions. With SLR and higher water levels, offshore reefs will be less effective at dissipating incoming wave energy, which in turn results in greater wave heights at the shoreline. Finally, coastal erosion modeling depicts the areas threatened by landward recession of the shoreline based on historical shoreline data. The rate of coastal erosion in the project area is represented in Figure 1-3. The footprint of SLR-XA is depicted in Figure 1-7 under four SLR scenarios (i.e., 0.5 ft, 1.1 ft, 2.0 ft and 3.2 ft SLR). Under even the lowest 0.5 ft SLR scenario, the entire beach front and most seaward portions of the condominiums are vulnerable.

The Hawai'i SLR Vulnerability and Adaptation Report provides recommendations to prepare for and adapt to the effects of SLR and climate change. This project seeks to fulfill three of these recommendations:

#1: Support sustainable and resilient land use and community development;

#4: Enable legacy beaches to persist with SLR; and

#6: Protect nearshore water quality from SLR impacts (Hawai'i Climate Change Mitigation and Adaptation Commission, 2017).

1.4 Scope and Authority

Both the first and second DEISs were prepared in accordance with HRS Chapter 343 as prescribed in the HAR Title 11, Chapters 200 and 200.1. HRS Chapter 343 applies because the applicant's actions are relevant to three triggers, as identified by §HRS 343-5 and include 1) use of state or county lands or use of state or county funds, 2) use of lands classified as a conservation district, and 3) use within a shoreline area.

An EISPN was first published in the March 8, 2019 *Environmental Notice*. The EISPN was republished on July 8, 2019 to incorporate a CFD under Maui County Ordinance 4947 as a potential funding option for the project. The EISPN was published under HAR §11-200 and complies with processing requirements under the former rules. Comments on both EISPNs assisted in defining specific issues and level of the analysis in this DEIS.

In terms of content, the first and second DEIS meet requirements identified in HAR §11-200 and HAR §11-200.1. The first DEIS was published in the April 23, 2021 *Environmental Notice*. While the first DEIS met requirements related to consultation during the preparation of the DEIS, including responding to and incorporating comments received during DEIS preparation, a separate and distinct section containing reproductions of agency consultation comments and responses were not included, as required by § 11-200-17 (p). This Second DEIS includes a new appendix (Appendix J) that contains reproductions of agency comments and responses.

Source: PacIOOS Sea Level Rise viewer (PacIOOS, 2018)

Figure 1-7: Sea Level Rise Exposure Area (SLR-XA) for various SLR scenarios

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2. PROPOSED ACTION AND PROJECT ALTERNATIVES

2.1 Project Objectives

The overall purpose of the project is to develop a sustainable and resilient approach to mitigate the regional erosion along the Kahana shoreline on Maui. The project objectives are to:

- Explore, develop, and encourage a cost-effective, regional erosion mitigation solution for the Kahana shoreline that will minimize impacts to the sensitive coastal environment and enhance nearshore habitat while protecting existing habitable structures;
- Restore and preserve the sandy beach and offshore resources for cultural, social, and recreational uses, including ocean sports, food gathering, and passive enjoyment;
- Encourage shoreline protection that is compatible with natural and existing site conditions;
- Establish a design based on accepted engineering principles and best management practices (BMPs);
- Propose a project that is compatible and consistent with Federal, State, and County regulations, policies, and plans; and
- Develop a sustainable and resilient solution that withstands projected SLR while minimizing environmental impacts of required maintenance.

2.2 Proposed Action – Beach Nourishment with Stabilizing Structures

The Proposed Action was developed to meet the project objectives and contain three elements, including beach nourishment, construction of a vegetated sand berm, and construction of beach stabilizing coastal structures, and is illustrated in Figure 2-1. The following describes each component:

- **Beach nourishment** activities will include dredging, transporting, and placing between approximately 50,000 and 100,000 cubic yards (cy) of sand from identified offshore borrow areas. These activities are designed to restore the beach to a 1975 target beach width;

- **A berm enhancement** using dredged sand and planted with native coastal flora along the backshore of the beach profile will help provide wave run-up protection and serve as a sand reservoir for the beach system; and

- To keep the restored sand in place, **seven beach stabilizing composite T-groins** will extend perpendicularly from the shoreline to about 215 ft offshore, each with approximately 200 ft-wide breakwater sections. In addition, the **headland** at the north end of the project area will be reinforced with imported boulder stones.

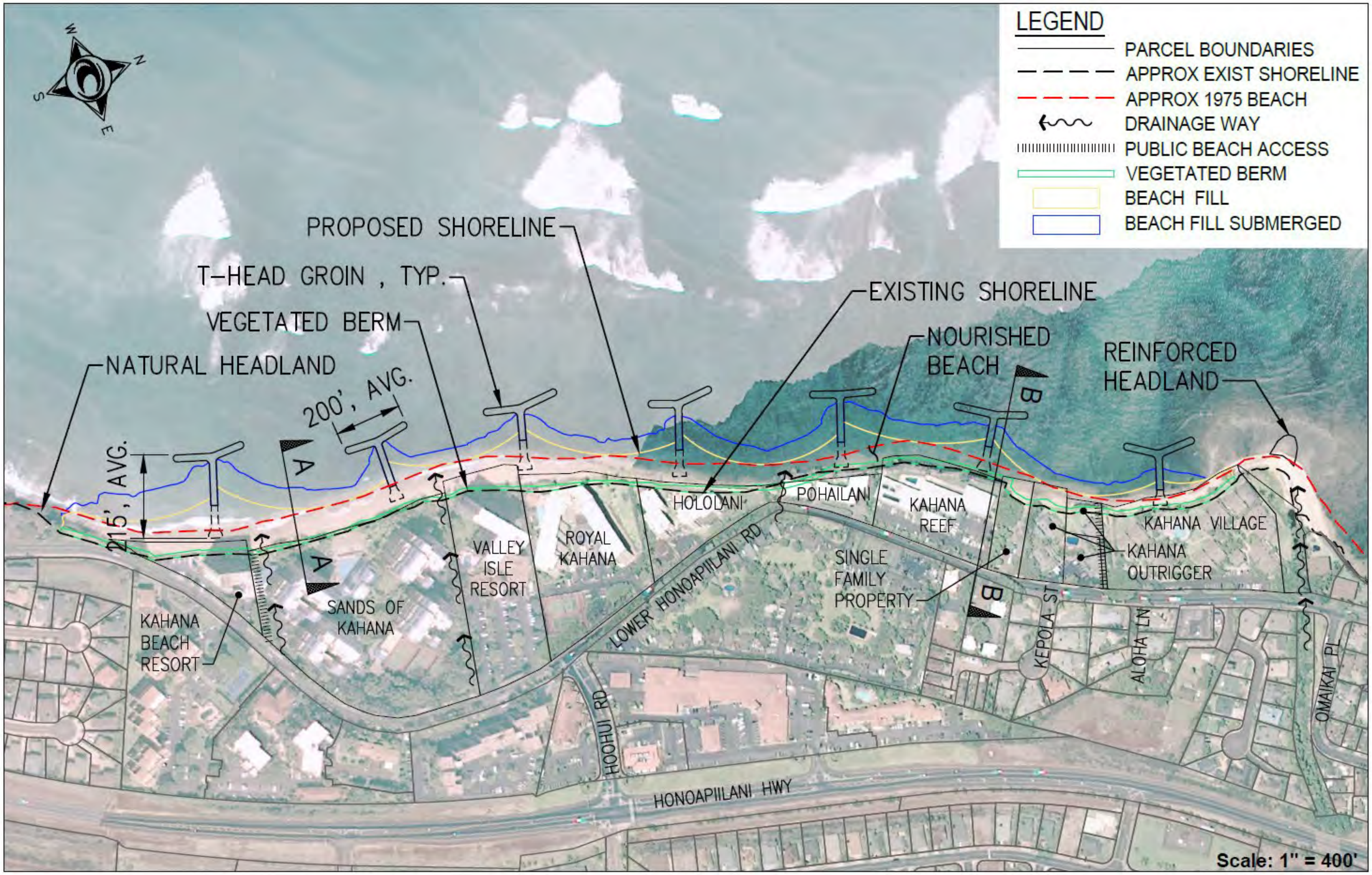

Figure 2-1: Proposed Action: Beach Nourishment with Stabilizing Structures

2.2.1 Beach Nourishment

The beach along a shoreline erodes when more sand is lost to erosion than it receives from adjacent areas. The difference in the supply and loss is referred to as the littoral balance and negative for an eroding beach. If this difference can be supplied continuously from an outside source, then the beach and the shoreline will be stable. Offshore movement of beach material generally occurs during high wave climates. Longshore movement is termed littoral drift and occurs when sand is moved parallel to the shoreline by currents, until it is eventually moved out of the littoral cell. Currents produced by these oblique waves are relatively small, but they can move large amounts of sand agitated by breaking waves. Along this stretch of Kahana Beach, there are three weakly defined littoral cells. However, nearshore circulation is highly dependent on the fragmented, shore-parallel reef structures and nearshore wave and tide conditions.

Eroding beaches can be restored with beach nourishment, a nature-based alternative for mitigating beach erosion that places compatible sand on a beach to maintain or widen the beach. Nourishment is an alternative to hardened shoreline protection structures and a long-term investment into the public beach resource. Beach nourishment is a widely implemented "soft" approach especially suitable to urban areas such as Waikiki Beach on O'ahu. Figure 2-2 illustrates the difference between existing versus nourished beach area at Waikiki Beach.

Source: State of Hawai'i, Department of Land and Natural Resources, 2011

Figure 2-2: Existing vs. Nourished Beach Comparison at Waikiki Beach on O'ahu

Beach nourishment is the first component of the Proposed Action. The goal of beach nourishment at Kahana Beach is to restore the sandy beach area to a documented historical 1975 width restoration benchmark (Figure 2-1). While the minimum beach width would match the historical position, the beach footprint would widen near coastal structures as sand is retained in their intended purpose. This approach would involve transporting and placing between 50,000 and 100,000 cy of sand from the offshore borrow areas along approximately 3,700 lineal ft of the coastline. The average beach width is projected to increase to approximately 65 ft on average and will vary from 50 - 80 ft depending on the location. Beaches will generally be widest at the sand retaining structures and narrowest in between them.

Benefits: A restored beach at Kahana will provide natural shoreline protection along with social, cultural, and economic benefits to the community. Residents and visitors alike would once again be able to enjoy a wider beach for active and passive recreational activities. Further, the nourished beach would have positive visual impacts for nearby residents, visitors, and users.

Challenges: Although widened beaches may mitigate erosion for some time, the nourished beach without retaining structures will likely continue to erode due to the existing wave, current, and wind patterns. At Kahana, it is estimated that an annual nourishment of approximately 2,000 cy is needed on average. Using this annual rate of sand loss, periodic sand nourishment events can be planned to ensure beach stability. Due to the limited offshore and inland sand resources and costs associated with importing large quantities of compatible beach sand, relatively frequent planning, and implementation of regular nourishment events, renourishment events present many challenges. In addition, renourishment activities may impact benthic resources in the nearshore area (e.g., tako habitat, coral colonies) that could be covered by the sand fill. Section 3.3.4 *Marine Biological Resources* discusses potential impacts and recommended mitigation measures related to benthic resources.

If beach nourishment were implemented without the proposed T-groins, renourishment is estimated to occur in intervals of nine years. The longevity of the restored beach could be extended with the expansion of a vegetated berm and the installation of stabilizing structures as described in Sections 2.2.2, *Vegetated Berm,* and 2.2.3, *Stabilizing Structures*, respectively. With stabilizing structures, the sand loss rate is expected to be reduced from approximately 2,000 cy to 500 cy per year with a series of properly designed T-groins. Renourishment events would be needed more than three times as frequently if T-groins are not in place.

2.2.2 Vegetated Berm

The second component of the Proposed Action is installing a vegetated berm on the makai edge of the adjacent properties, which would stockpile sand along the backshore to augment the current sediment system. A vegetated berm may be created by placing sand to form a ridge parallel to the shore in the backshore area of the beach and planting native salt-tolerant coastal flora, such as naupaka, ʻakulikuli, ʻakiʻaki, or pohuehue to stabilize the sand berm. The vegetated berm of the Proposed Action would be approximately three ft tall, with its crest at elevations ranging from +10 ft to +15 ft mean lower low water (MLLW), which will reduce coastal flood risk to the properties. A sand berm is already in place along the Kahana Village property and is shown in Figure 2-3.

The vegetated berm along the backshore will be located seaward of the certified shoreline, as defined by HAR §13-222, when possible. However, the beach width may be too narrow in some areas, so the berm will be constructed inland of the SMA and shoreline setback. Positioning of the berm will be dependent on existing beach width and grading needed for each section of beach. Beach quality sand will be used to construct the berm as it will serve as a stockpile of beach sand.

Figure 2-3: Photograph of a sand berm at Kahana Village (June 2019). A vegetated berm is a mound of sand at the backshore of the beach that is stabilized with vegetation.

Benefits: A vegetated berm serves as a reservoir of sand to help the beach restore naturally after an erosional event and acts as a natural buffer against wave swash that protects the backshore area. A vegetated berm is a natural soft shoreline protection scheme that blends into the coastal landscape. The coastal plantings that grow on the berm will help to stabilize the sand against wind and wave erosion while also serving to capture windblown sand from the beach.

Challenges: A vegetated berm requires periodic maintenance to replenish sand and restore vegetation after erosion events. As with beach nourishment, sources of suitable sand for berm maintenance are limited on Maui. Maintenance of sand berms could also require heavy equipment along the shoreline, which may temporarily disrupt recreational activities.

2.2.3 Stabilizing Structures

2.2.3.1 Types of Offshore Stabilizing Structures

Stabilizing structures retain sand on the beach by modifying currents and changing the nearshore wave patterns that lead to beach loss. Typical beach stabilizing structures used to reduce the rates of sand loss include geotubes, straight groins, offshore breakwaters, and T-groins. The following provides an overview of each.

- Geotubes are specialized geotextile fabric tubes that are pumped full of sand and are used as sand stabilizing structures. Geotubes are mainly used during hydraulic dredging sand retrieval but can cause significant water quality issues when sand in the tube is dewatered into the ocean. Generally, geotubes are used as temporary structures as a way of demonstrating design effectiveness before being replaced with a permanent stone or concrete structure. A geotube can also be converted into the core of the permanent structure by placing layers of armor over the tubes. Geotubes were installed as a test solution at the Stable Road Beach located adjacent to the Kahului Airport on Maui. The beach was undergoing seasonal erosion, and landowners were interested in developing a beach erosion protection system for the area. The proposed groin system was first constructed with geotubes. After the temporary protection showed good results, geotubes were replaced with rock structures.

- Straight groins are generally constructed perpendicular to the existing shoreline. These structures intercept the longshore littoral drift of sand, resulting in a beach build up against one side of the groin, which is called the up drift side. The resulting beach is asymmetric and segmented, roughly oriented with the incoming wave direction. The water is diverted offshore at the groin. A single straight groin would build the beach on the up drift side of the groin and erode it on the down drift side. Groin fields consist of a series of groins that collect sand between them. The last groin is generally placed at an erosion resistant headland or a stream outlet that brings sand to the beach. The length of the groins and the spacing between them are designed to optimize sand retention. Straight groins can be constructed out of lumber, rock, or precast concrete blocks.

- Offshore or detached breakwaters are constructed approximately parallel to the shoreline. These are located a distance offshore from the shoreline and modify nearshore circulation by deforming incoming waves. The seaward side is armored to dissipate wave energy, thus reducing part of the wave energy that erodes the beach. The wave wraps around the two ends of the breakwater and moves sand to the area sheltered by the structure, resulting in sediment deposition and retainment in the lee of the structure. The resulting accretion is called a cuspate spit, salient, or tombolo, which grows from the shoreline; an example of which is shown in Figure 2-4. The modification to the nearshore circulation by a series of these offshore breakwaters provides the erosion protection and deposition of sand in a new configuration. The length of the structures, distance from the shoreline, and the separation between adjacent structures are the parameters used in designing a cluster of them along a stretch of shoreline.

- "T" or "Y" shaped groins combine a straight groin "stem" with an offshore breakwater "head" to prevent horizontal sand movement from longshore drift parallel to the shoreline while also reducing the intensity of incoming waves (Figure 2-5). If designed correctly, T-groins provide the most effective beach stabilization solution as they combine the benefits of straight groins and detached breakwaters. To optimize their efficacy, the structures are designed according to the annual extreme wave conditions in the project area.

Source: Google Earth, 2018

Figure 2-4: Offshore breakwater field off the west coast of Sri Lanka

2.2.3.2 Evaluation of Stabilizing Structures Not in Proposed Action

Stabilizing structures considered at Kahana Beach included geotubes, straight groins, detached breakwaters, or combinations of straight groins and breakwaters in T-head configurations. Ultimately, T-groin structures were selected for the Proposed Action because the shore parallel breakwater "heads" of T-head structures would dissipate a portion of the incoming wave energy impacting the shoreline and modify circulation between adjacent structures. This creates relatively stable segmented beaches as shown in Figure 2-5. The following summarizes why the other three alternative stabilizing structures are not being considered as part of the Proposed Action.

- Although geotubes are effective as temporary measures, they do not provide long-term shoreline protection needed at Kahana Bay. In addition, Kahana Bay is sand-limited, so a new source of material would be needed to fill geotubes. Since a more permanent solution is sought for Kahana Bay, geotubes were eliminated in the evaluation of alternatives.

- Straight groins do not fulfill the project objectives to mitigate erosion because they would not diminish wave forces on the shoreline that cause erosion. Based on current modelling results of the area that show cross shore sand movement, straight groins alone would not be effective at stabilizing Kahana Beach.

- Based on the current analyses at the project site, it was determined that detached breakwaters would not be able to change the wave direction enough to reverse the longshore sand drift in the area and therefore would not stabilize the sand nourishment. In addition, seasonal high waves present Kahana Bay during the winter months could overtop the breakwaters and continue to erode the shoreline placed sand. Therefore, detached breakwaters were not considered further for the Proposed Action.

2.2.3.3 T-Groin Design in Proposed Action

The T-groin design was selected as the ideal stabilizing structures for Kahana Bay because it combines the benefits of a straight groin "stem" with an offshore breakwater "head" to prevent horizontal sand movement from longshore drift parallel to the shoreline while also reducing the intensity of incoming waves. Modeling results of the current in the area and historical erosion trends indicate that strong wave forces at Kahana Bay will continue to erode the beach over time, so a high level of sand stabilization is needed. T-groins provide the highest level of beach stabilization of the stabilization alternatives considered. The sand loss rate is expected to be reduced from 2,000 cy to 500 cy a year with a series of properly designed T- groins. Re-nourishment events are generally needed at 50% beach loss. Without stabilizing structures, beach nourishment events would be needed every nine years, or five times total over the project's 50-year lifespan. With T-groins, only one nourishment event is anticipated after 30 years over the project's life span.

Iroquois Point on O'ahu, located between Pearl Harbor and 'Ewa Beach, provides an example of a beach nourishment project with T-groins. The project, which spanned approximately 4,200 ft of shoreline, involved 85,000 cy of beach nourishment stabilized with nine T-groins that were constructed in May 2013 (Figure 2-5). The aerial photograph below was taken approximately five years after construction and illustrates how sand fill has remained on the beach. The project included compensatory mitigation actions and marine monitoring designed to reduce and measure short- and long-term environmental impacts, respectively. Rock groins were designed to serve as substrate and habitat for reef fish and marine life. One year after completion of the project, the basalt boulders comprising the groins were found to support more fish, fish species richness, and biodiversity compared to the sand and rubble reef flat that existed prior to their construction. In addition, the boulders offered microhabitats and substrate for sessile marine organisms (AECOS, 2014). The project's success in Hawai'i is encouraging evidence that a similar beach nourishment and sand stabilization construction project at Kahana Bay would also be effective.

Source: Google Earth, 2018

Figure 2-5: T-groins and Nourished Sand at Iroquois Point, O'ahu, Hawai'i

Development of the T-groin design for Kahana was a multi-year process that included numerical modeling of wave conditions, evaluations of marine resources, cultural considerations, SLR predictions, recreational use considerations, empirical site visits, and incorporated community feedback. The proposed T-groins and headland feature were designed according to coastal engineering guidance for beach fill stabilization against severe erosion stress. The dimensions and orientation of the structures were designed to create six beach cells that could exist in static equilibrium, meaning that long-term erosion or accretion would be minimized under predominate wave conditions. Numerical wave assessment and modeling were used to optimize structure design.

A wave assessment study was conducted to model local wave conditions at the project site using two numerical models: SWAN (Simulating Waves Nearshore), a phase-averaged spectral wave model, and BOSZ (Bossinesq Ocean and Surf Zone), a deterministic wave model. Four characteristic swell events were analyzed for Kahana Beach: three typical one-year return swells (from the NW, N, and S) and one 50-year extreme swell event. Historical wave records at buoys off Maui and Lanaʻi were used to determine design wave conditions to input into the SWAN model. With these input data, the SWAN model transformed deep water waves to near shore region and captured the processes of wave shoaling and refraction around West Maui, creating wave spectra boundaries for the site. Using these wave spectra, the nearshore wave field was computed using the BOSZ model. Outputs from the BOSZ model indicated wave height, wave direction, flow mean velocity, and wave setup for the area. These numerical modelling efforts provided a clear understanding of existing wave conditions at the site, which could then be manipulated to evaluate the effectiveness of sand stabilizing structures at Kahana Bay. The full wave assessment study report is included in Appendix A, and coastal processes are further described in Section 3.2.1, *Coastal Processes*. Based on these modeling efforts and parameters, the sand stabilizing structures were designed as hereafter described.

Stabilizing structures at Kahana were designed for a 50-year lifespan, taking into account approximately one foot of SLR, coastal design guidelines, and current wave models. The dimensions of the structures and the alignment of the T-heads were designed using wave modeling results previously described and following the guidelines from Bodge (2003) and Coastal Engineering Manual (USACE, 2011). The T-head gap length for each cell and the stem length reaching offshore were optimized to maintain the nourished beach shoreline at the desired location. Based on the model, the T-head directions were tuned and aligned to be perpendicular to incoming waves, which is effective at reducing the current inside each groin cell. Although wave forces within each cell were minimized to reduce sand movement within each cell, some water movement is still needed to promote healthy water circulation and quality. Thus, the T-heads were spaced accordingly to provide sufficient circulation and water exchange in between structures while still providing protection to the shoreline.

Figure 2-1 depicts the proposed design layout of the T-groins and beach nourishment. The concept design involves a reinforced headland at the northernmost end of the project site and seven T-groins, as previously described in Section 2.2.3.1, *Types of Offshore Stabilizing Structures*. Groins would span the Kahana shoreline, from Kahana Beach Resort at the south to Kahana Village at the north end are spaced between 400 and 500 ft on center (i.e., between groin stem centerlines). Figures 2-6 and 2-7 show a typical groin profile and typical cross-sections respectively, while Figure 2-8 shows existing and proposed beach profiles at two specific locations, one in between two groins at Sands of Kahana and one slightly offset from one groin at Kahana Reef.

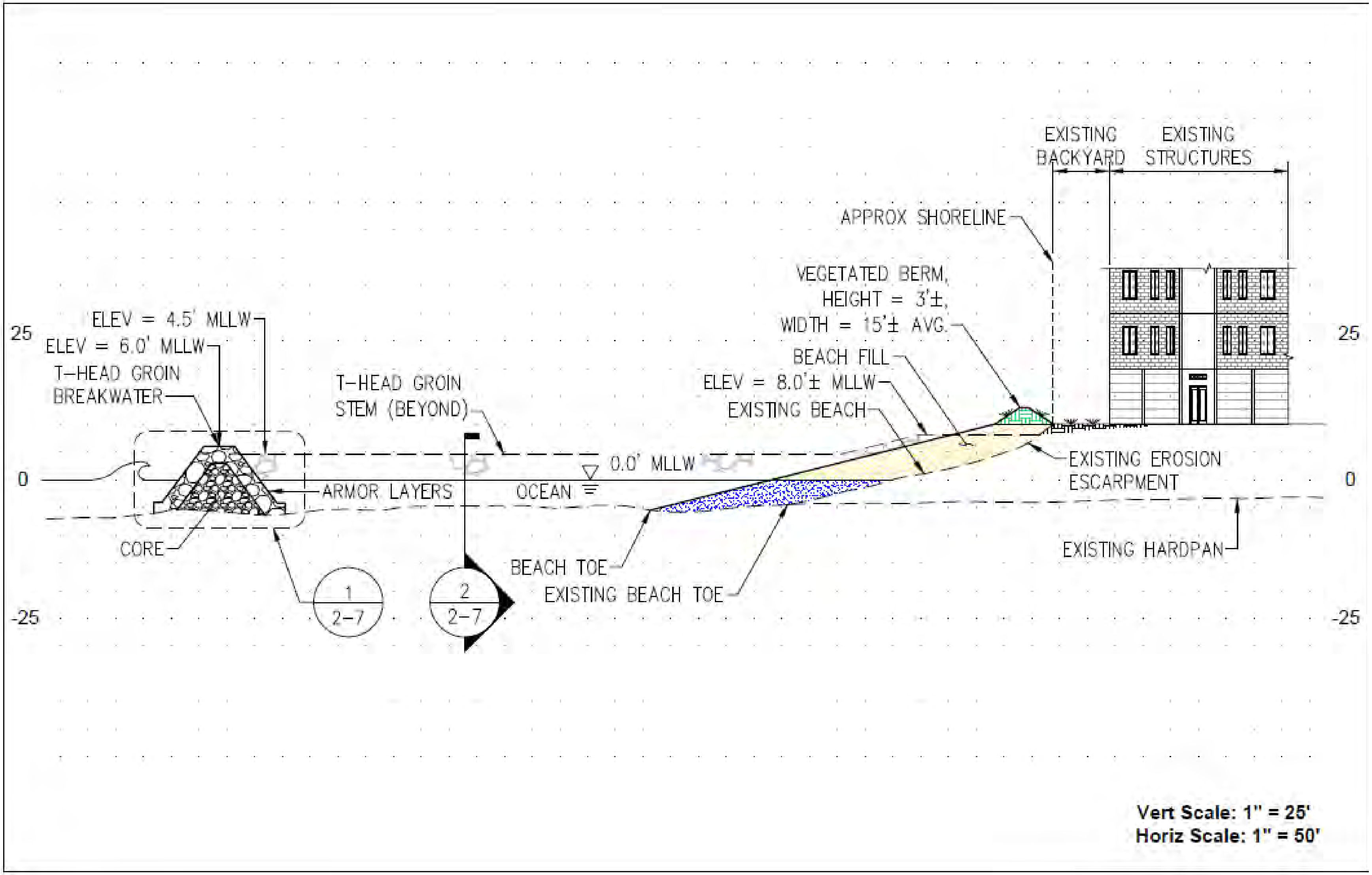

Figure 2-6: Typical Profile of Proposed Action: Beach Nourishment with Stabilizing Structures

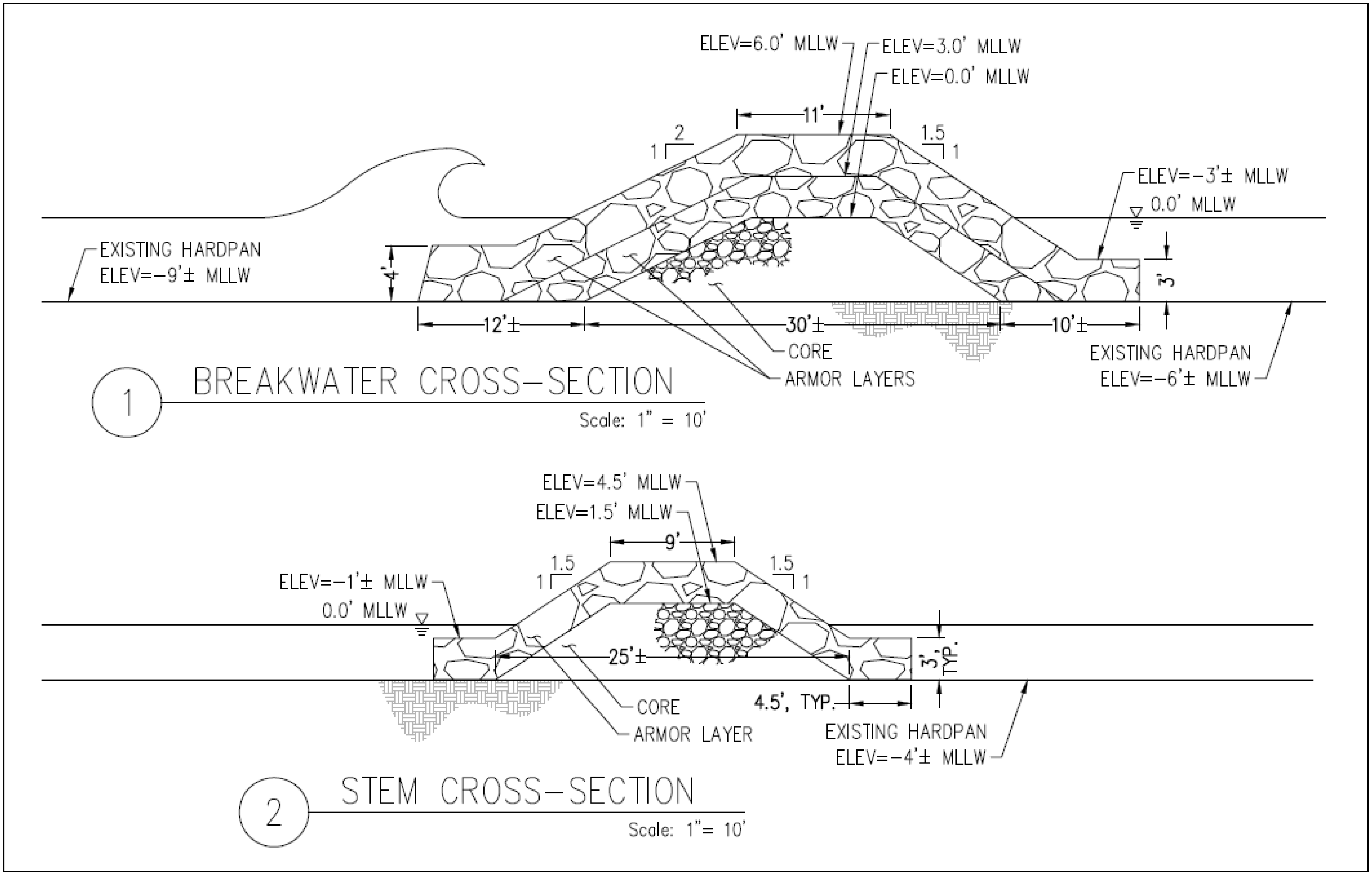

Figure 2-7: Typical Sections of Proposed Action: Beach Nourishment with Stabilizing Structures

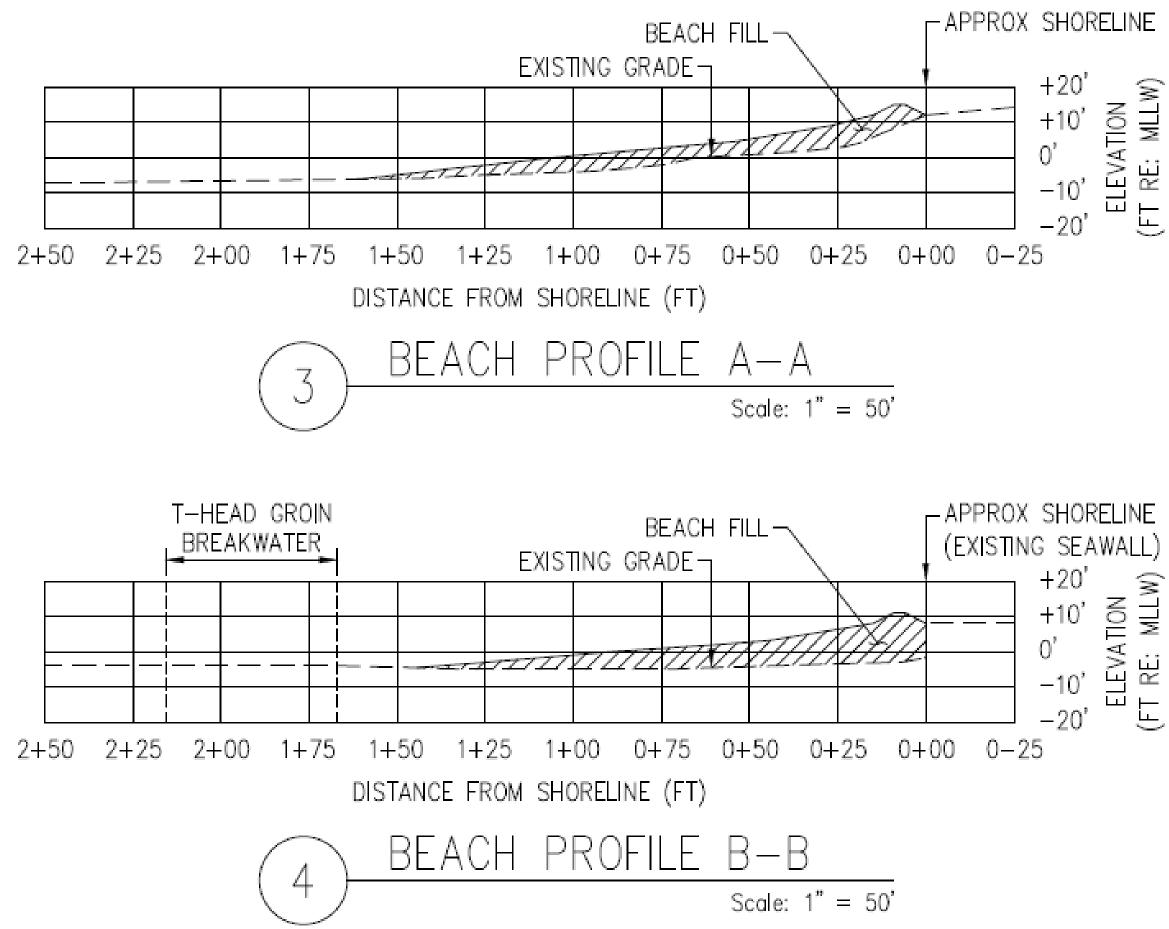

Figure 2-8: Special Profiles of Proposed Action: Beach Nourishment with Stabilizing Structures

T-groins in the Proposed Action were designed to reduce overtopping with a breakwater crest elevation of +6 ft above MLLW, equivalent to 4.9 ft above mean sea level (MSL) and 2.5 ft above the highest ocean level recorded on Maui in 2020. The crest elevation of the groin stem may be lower than the head at +4.5 ft. MLLW on the ocean end of the structure. At the landward end, the groin elevation steps up to the design elevation of the beach crest, which varies between approximately +7 to +12 ft MLLW along the length of the project area. The recommended groin elevations account for extreme high tides (i.e., "king tides"), typical wave conditions, and about one foot of future SLR (Figures 2-6 and 2-7).

The design criteria for the structures' 50-year life cycle included a 2% annual exceedance probability, meaning that approximately 5% of the stabilizing structures would need to be replaced over the 50-year life span. The groins should be inspected yearly for damage.

The stabilizing structures proposed would be constructed primarily of rock. The rock rubblemound design makes use of heavy armor stones keyed and fit in one or two layers over smaller underlayer stones. This construction technique is common for similar coastal structures in Hawaiʻi. Compared to the alternatives such as sand-filled geotextile bags, cast concrete, and lumber, the rubblemound methodology would offer the following advantages.

- Rock rubblemounds allow for some differential settling which minimizes required repairs and maintenance. This is important for structure longevity in the dynamic coastal zone.
- The design allows for repairs and maintenance by adding or replacing individual armor stones and/or rock layers displaced by wave action.
- Aesthetically, the natural rock surface of the structures may blend into the volcanic landscape of Kahana Bay better than other construction material options. The spaces between the stacked armor stones may provide opportunities for marine wildlife habitat. This benefit could be further enhanced by intermittently adding specially designed "artificial reef" armor units to the final design.

Benefits: Compared to other stabilizing structures analyzed, T-groins are the most effective at retaining beach sand at Kahana Bay and would reduce the frequency of nourishment maintenance at Kahana Bay. Submerged portions of the groins could be designed to mimic the structure and function of natural reef formations and to compensate and enhance marine habitat for a variety of species. For example, shapes, materials, and textures that are conducive to creating new marine habitat can be incorporated into the design. By providing habitat for fish and substrate for sessile organisms, the submerged portions of the structure can have the environmental and recreational benefits of an "artificial reef." In addition, the structures can serve as a causeway to the ocean. They may be utilized by the public for ocean access, fishing, and recreational enjoyment.

Challenges: Built beach stabilizing structures can disrupt the aesthetics of the natural landscape and alter existing current and wave patterns. Potential impacts to nearby surf breaks, fishing areas, neighboring properties, and water quality in the sheltered areas formed between structures are additional concerns. Anticipated challenges and proposed mitigation efforts related to beach stabilization efforts in the short- and long-term are discussed throughout Chapter 3. The results of wave and current modeling studies will help design structures that maximize sand retention while minimizing potential negative impacts (see Section 3.2.1, *Coastal Processes*).

2.2.4 Sand Sources for Sand Nourishment and Vegetated Berm

A key component to the success of the proposed beach nourishment and restoration process is the availability of suitable sand for placement. Placed sand needs to closely match the grain size distribution, color composition, and density of the native beach sand and comply with applicable State DOH requirements for sand nourishment. Section 3.1.4, *Soils and Sand Quality*, contains additional information about the sand sources. Departure from any of these characteristics could affect the result of the beach nourishment and restoration effort.

Sand for the Proposed Action would be obtained from offshore sand sources identified as Sites 18, 19, and 22 in the County of Maui 2016 Kahana Beach Regional Beach Nourishment Study (Figure 2-9) (County of Maui, 2016). The study assessed the technical feasibility of a regional beach nourishment at Kahana Bay using a review of existing studies and data, identification of potential sand sources, and proposing preliminary dredging, construction methods, and concept development. Grain size analyses of sand from these sites were performed and found to be compatible with native beach sand.

An additional sand study as part of the DEIS process was conducted in June 2019 to evaluate and confirm sand quality and quantity from the three identified offshore sources (i.e., Sites 18, 19, and 22). Randomly spaced multi-incremental sand core samples were taken from each site and analyzed for sand grain size distribution and calcium carbonate composition. Sand compatibility for each site was evaluated using the DLNR regulations outlined for "Small Scale Beach Nourishments" (DLNR, 2005). Organochlorine pesticides (including heptachlor) and arsenic analyses were also performed to ensure that the sand is free of contaminants prior to being placed on the beach. Quantities of sand available at each source site are summarized below. Grain size and sand characteristics from each of the sites are described in more detail in Section 3.1.4, *Soils and Sand Quality*, and Appendix B (Kahana Bay Sand Study).

Site 22: Site 22 is located approximately 400 ft from the shore and is 6 - 20 ft in depth. It is the closest to shore of three source sites and contains approximately 96,500 cy of sand. Figure 2-10 shows sand from Site 22.

Site 19: Site 19 is located approximately 500 ft offshore and contains approximately 25,000 cy of sand at approximately 5 - 20 ft water depth. Figure 2-11 shows sand from this site.

Site 18: Site 18 is the furthest offshore sand deposit located approximately 2,000 ft offshore and estimated to contain 8,100 cy of sand at 25 - 36 ft water depth. Figure 2-12 displays sand from this site. The sand is finer than the existing beach sand and therefore may be moved away from the beach relatively quickly by wave action. However, the sand could be used to construct the vegetated berm in the backshore area and out of reach of waves.

Figure 2-9: Offshore Sand Sources and Dredge Limits

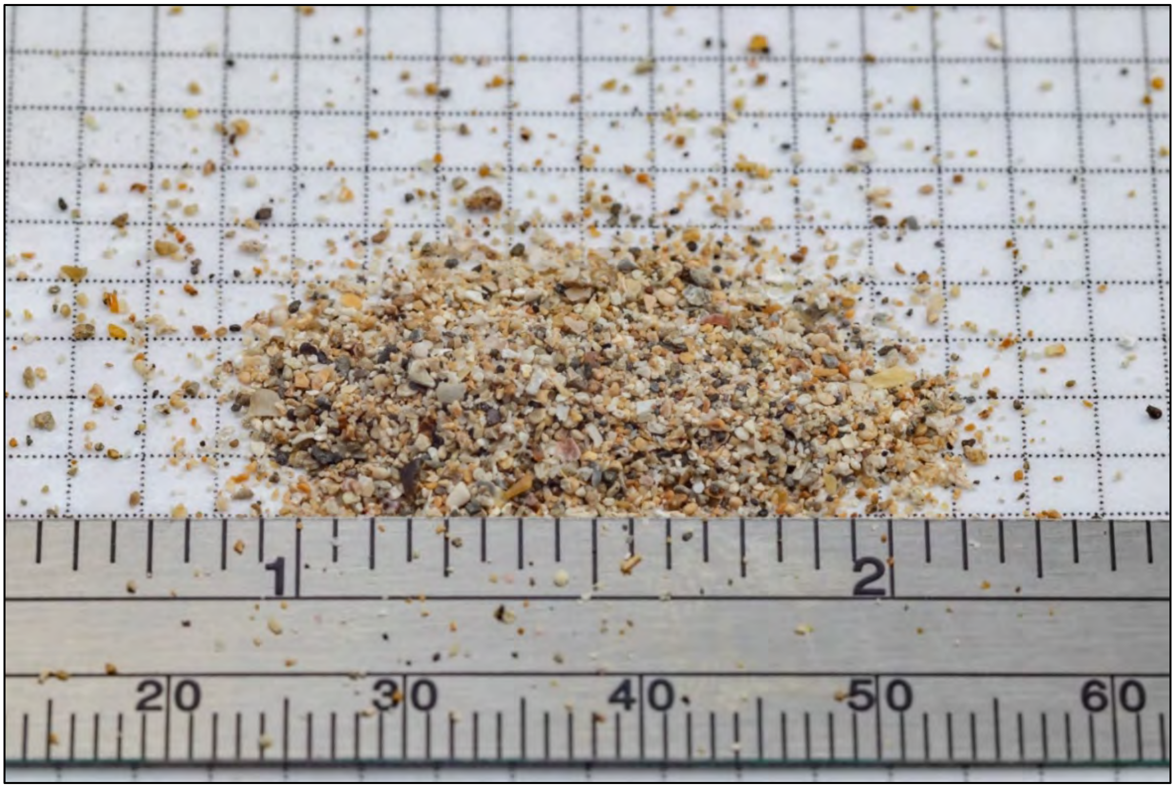

Figure 2-10: Sand from Site 22

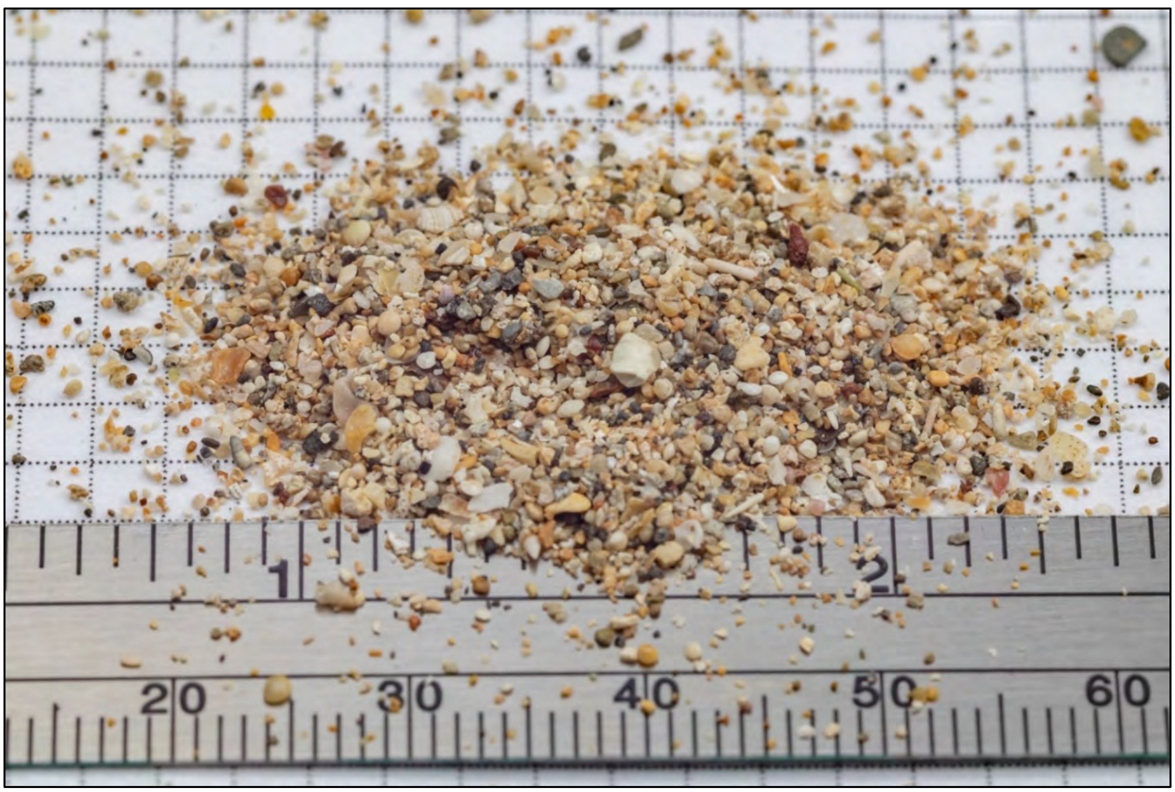

Figure 2-11: Sand from Site 19

Figure 2-12: Sand from Site 18

2.2.5 Construction

This section provides information on the proposed construction methodology for the Proposed Action. Major construction activities for the project include:

- Dredging sand from offshore deposits;
- Transporting the dredged sand to shore;
- Dewatering dredged sand;
- Distributing the sand along the shoreline;
- Grading the restored beach to its designed shape; and
- Construction of T-groins from the beach.

Construction of the stabilizing structures is ideally coordinated with nourishment, as the nourished beach will erode until the groins are constructed around each beach cove. Due to environmental limitations, however, it might not be possible for the contactor to coordinate the construction of the coastal structures with the dredging and placement of beach sand. The time frame for dredging, sand nourishment, and coastal structure construction is primarily limited by weather and periods of coral spawning. The following sections discuss construction time frame constraints plus preliminary details on the means and methods the contractor may use for the dredging operation, sand placement, and coastal structure construction.

2.2.5.1 Weather Constraints

Dredging operations at the identified sand borrow areas cannot be conducted when wave heights and weather conditions are unsafe. In general, high-energy northerly swells most frequently impact Hawaiian waters during the winter season while less frequent, large northerly swells are common throughout the fall and spring seasons. Events with peak significant wave heights more than 20 ft can be expected during northerly swells.

High-energy swells approaching Hawaiʻi from the southern hemisphere are most common during the summer months. Significant wave heights are generally lower for southerly swell events, but they may exceed 10 ft. Both northerly and southerly swell events may result in severely hazardous conditions along the Kahana coastal zone and are important considerations for timing construction operations.

Lower energy, but higher frequency waves generated from local winds should also be considered when timing construction operations. Maui's landmass consistently generates thermal wind patterns, which commonly result in windspeeds greater than 25 miles per hour (mph) in the coastal area. These winds occur throughout the year but are most prevalent during the summer months and during peak hours of the day.

Tidal patterns are also important to consider for construction operations. During both winter and summer months, extreme tide elevations can slow or shut down construction operations. Higher tides allow more wave energy to impact the coastal work area, so generally lower tides are favorable for beach and groin construction. Low water levels will especially aid in constructing coastal structure foundations. The contractor may consider performing some work at night if tide elevations are favorable then.

The contractor will be responsible for scheduling the dredging and construction operations, which should cease during high wave and storm conditions. Due to significant mobilization and demobilization efforts needed for dredging and construction equipment, the contractor should select a window for dredging, nourishment, and construction from late spring to early fall, although some operations during the winter months may be possible.

2.2.5.2 Coral Spawning Constraints

The timing of construction activities, especially dredging operations, are constrained by coral spawning periods. According to the benthic survey that was conducted, Kahana Bay is populated with several coral species including *Montipora flabellata, Montipora patula*, *Porites compressa,* and *Porites lobata* (AECOS, 2021; Appendix C). *Montipora flabellata* and *Montipora patula* generally spawn from July to September. *Porites compressa* and *Porites lobata* generally spawn from June to September and June to August, respectively. To avoid an impact on coral spawning, construction operations should not be conducted during these months.

The potential for adverse impacts can be minimized by selecting dredging and other construction means and methods that minimize the risk of disturbance. To keep polyps out of the physically dredging area, for example, a silt curtain with sufficiently fine mesh size can be used to isolate the dredging and construction areas from the ocean surface to sea floor. The silt curtain would also prevent turbidity pollution in the adjacent areas.

2.2.5.3 Dredging Options

Mechanical dredging and suction dredging methods were evaluated based on the oceanographic conditions, operational time frame, potential impacts on spawning corals, impacts on the transportation route, dewatering area needs, and potential nearshore water quality impacts. Each of these dredging methods are hereafter described. Oceanit recommends mechanical dredging over suction dredging for this project, but both methods should be available to the contractor if appropriate environmental controls, including BMPs, are in place to minimize risks to water quality and biological systems.

2.2.5.3.1 Mechanical Dredging (Recommended Methodology)

Mechanical dredging is done by mounting an excavator or crane atop a derrick barge (Figure 2-13) and scooping and lifting sand from the seafloor with the excavator bucket or a clamshell bucket attached to the crane. Bucket sizes can vary from one to 20 cy and are left open to dewater as the bucket is lifted out of the water (Figure 2-14). Environmental buckets, attached to a crane or excavator, may also be used for scooping and lifting sand. Environmental buckets decrease the amount of turbidity created when compared to a typical clamshell bucket by allowing water to escape the bucket while it is lifted through the water column. The end result is less water captured with each bucket grab. One or more scows, or bin barges, may be used to collect and transport the dredged material to the desired offloading location. A trestle or temporary offloading platform will need to be constructed to use to offload the material from the scow.

Figure 2-13: Crane Mounted to a Barge

Figure 2-14: Mechanical Dredging using a Clamshell bucket at Mala Wharf on Maui

The size of barges and equipment used by the contractor varies based on total dredge material quantity, site conditions, and bathymetry. The Kahana nearshore is a typical fringing reef environment with a depth of 7 ft or less, which poses a challenge to transport the sand ashore. Barges working in 7 ft of water would be limited to a 5 ft draft or less, which will exclude the use of larger barges at this site. The size of the preferred barge for large dredging projects drafts 13 ft when full. This would not likely be a feasible option for this site and there are no nearby wharfs at which a large barge could dock to offload sand. A smaller barge with a smaller carrying capacity will be required at this site. A likely method for this project is for the contractor to use an offloading trestle connected to one of the partially constructed groin stems. The dredged sand will be delivered to the trestle with smaller bin barges carrying loads of between 100 cy to 400 cy of sand per trip.

When mechanical dredging is conducted, silt curtains will be installed to isolate the dredging area to minimize impacts on coral polyps and help prevent turbid water from polluting adjacent areas. Silt curtains will be installed within the boundary of the sand sources and isolate the area used by dredging equipment and transport barges from the water surface to the seafloor. The excavated material will be deposited on a second barge, which will transport the sand to the shore. When the barge docks, the sand will be loaded into dump trucks to transport the material to the desired location. The sand offloading barge could dock at many potential locations. A temporary trestle may be constructed in the location of a stabilization structure, or alternatively, a landing craft may be used to directly offload sand to the beach.

Mechanical dredging offers several advantages over suction dredging, as it does not require pipelines and onshore dewatering areas. This reduces possible impacts on marine benthos, as well as the construction footprint in the nearshore area where a dewatering/receiving pit would be placed. Turbidity from dredging can be reduced by using an environmental clamshell bucket; an industry best practice that has been used to minimize turbidity during harbor channel dredging projects in Hawai‘i. Environmental clamshell buckets typically have tighter seals and overlapping sides. These buckets are designed to minimize sediment loss from within the bucket, re-suspension at the dredge site, and water entrainment with each grab. Channels with sufficient depth need to be identified to accommodate the second sand-holding barge’s path to the shoreline. The proposed construction methods are depicted in Figures 2-15 and 2-16.

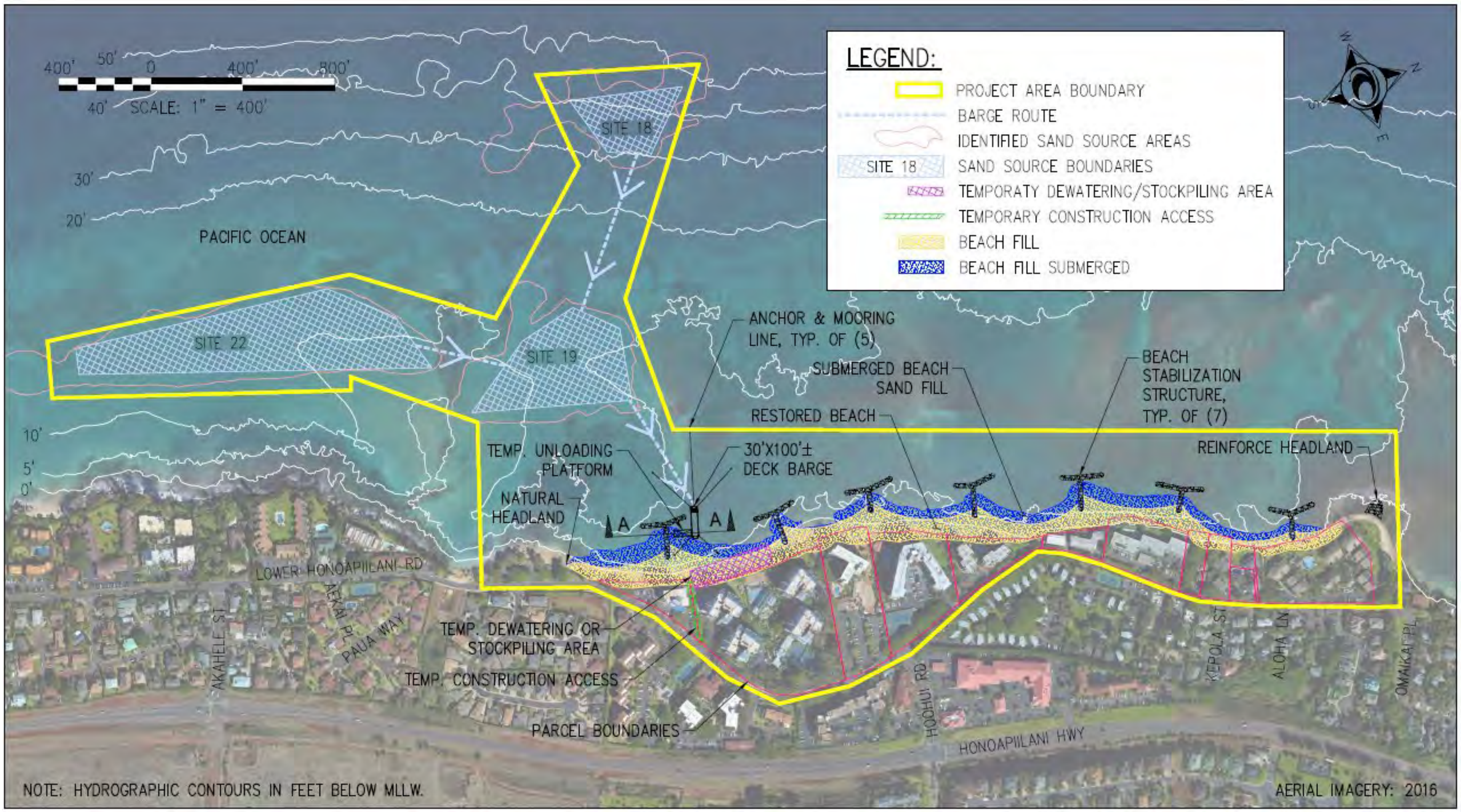

Figure 2-15: Proposed Construction Methods – Barge Route for Mechanical Dredging

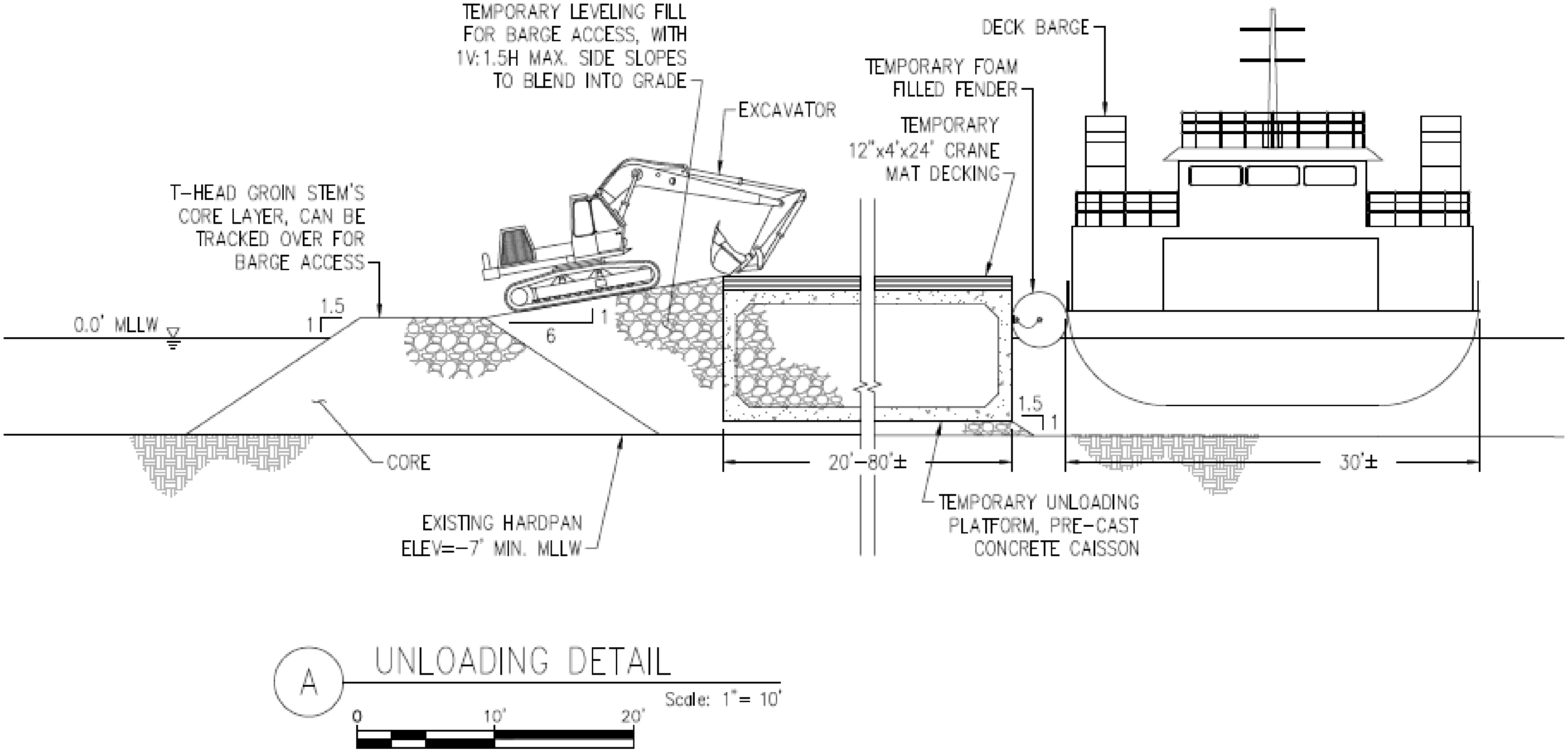

Figure 2-16: Proposed Construction Method - Detail of Barge Route

2.2.5.3.2 Hydraulic Suction Dredging (Alternate Methodology)

Hydraulic suction dredging is often used for offshore sand recovery due to its time and cost efficiencies compared to mechanical dredging. In hydraulic suction dredging, the contractor lowers a dredge pump from the barge and suspends it above the seafloor. A small barge and small crane or excavator arm are used to position the dredge pump. The barge is positioned using mooring lines and spuds, and the pipeline and hydraulic lines must be maneuvered with each positioning. A water jet ring is sometimes attached to the pump inlet to increase the proportion of sand in the slurry.

A potential hydraulic dredging scheme for this project uses a hydraulic pump system on a barge anchored above the sand deposit and a booster pump with a downsized hose to maintain adequate pressure and flow velocities. The sand slurry is pumped to the shore through a pipeline, which is typically constructed of high-density polyethylene (HDPE) pipe and may be used in a floating or submerged configuration. If a submerged configuration is used, a pathway free of live coral will be identified for the pipeline track prior to construction. Like mechanical dredging, the precision of the hydraulic operation can be enhanced by using an excavator or crane arm that is equipped with a Global Positioning System (GPS).

A disadvantage of hydraulic dredging is the large amount of water required to create a slurry to remove and transport the material via pipeline. Additional space on shore is required to accommodate the pump equipment and subsequent dewatering. NOAA National Marine Fisheries Service (NMFS) expressed concerns that a hydraulic operation may impact floating coral larva during spawning periods during project pre-consultation (Appendix I).

A barge route/pipeline corridor between Sites 18-19, Sites 22-19, and Site 19 to the dewatering location at the shoreline was surveyed in the 2019 marine benthic survey prepared for the project (Figure 2-15; Appendix C). The routes were surveyed for benthic composition, coral abundance and size class distribution, macro-invertebrates, bottom complexity, and fish assemblage. The dewatering basin will be constructed of temporary materials, including geotextile fabrics, sand, and untreated lumber. Once dewatered, sand would be stockpiled until there is sufficient quantity to transport it along the beach to the placement site.

2.2.5.4 Construction Sequence

Construction equipment and vehicles, such as dump trucks, backhoes, excavators, or similar machines, will access the beach from the roadway through public or private accessways. Construction will be phased and sequenced to optimize groin construction and beach nourishment elements and minimize ecological and human disturbance. Work will begin at the dewatering location at the southern end of the project area and move north, utilizing sliding work zones and BMPs.

To comply with all permit conditions, prior to, during, or after the construction of the proposed beach restoration, existing erosion control structures may be removed or modified by each property within the project area, as required by the regulatory agencies. The timeline and the details for the actions involving existing shoreline structures have not been determined as of this writing. Existing structure removal may include temporary sandbag revetments and other shoreline hardening.

The overall construction sequence is dependent on the beach width available, as beach access and area to stockpile armor stone and maneuver construction equipment are necessary. Therefore, as the beach is nourished and stabilized, more dry land area for staging and stockpiling is created and the work will extend north in phases along the length of the bay. Construction equipment will primarily be limited to the nourished portions of the beach and the staging access and routes will be clearly identified to ensure public safety. Temporary wave barriers built of geotextile fabrics, sand, and untreated lumber may be installed by the contractor to protect the construction corridor along the shoreline while the coastal structures and the beach features are constructed. The temporary barrier structure may be placed within the footprint of the fill area to avoid any impacts.

Prior to dredging operations, Oceanit recommends that the contractor construct the two southernmost groins to be used as the initial sand receiving and stockpiling area. The core of the southernmost groin stem can double as an unloading access path. An area between two groins will be isolated with a temporary cofferdam to receive sand from the barges. The barge carrying sand will moor at the unloading structure, depicted in Figure 2-16, and a loader will offload the sand into trucks. The trucks will move the sand from the barge to the receiving area and initial sand stockpiling and drying area. Sand from this area will be moved to the nourishment areas as groin construction moves northwards. The dredging machinery and barges will move sand onshore continuously using the receiving area to stockpile and dry sand. Each section of the beach and sand berm (i.e., groin to groin) would be constructed in a step wise progression from south to north until the entire shoreline project area is nourished with sand held in place by retaining structures. Best Management Practices will be implemented as described in Section 2.2.5.5 to prevent adverse impacts on nearshore water quality.

2.2.5.5 Construction Best Management Practices

A construction BMP plan will be prepared prior to construction to reduce the risk to the environment. The plan will include notes on local, federal, and state regulatory compliance. Construction BMPs will be in place for the entire duration of the project to isolate the active work area and to protect water quality from potential contaminants. Each of these activities could affect nearshore and/or offshore water quality by releasing fine sediment into water. Degradation of quality of waters of the United States is a violation of the Clean Water Act (CWA) and must be minimized to acceptable levels using BMPs.

At the offshore dredging sites, seabed disturbances will agitate sediments and threaten ambient water quality. The dredging will create turbidity plumes from seabed disturbance and from moving sediment into barges. A silt curtain around the dredger and the barges will be deployed to contain the suspension of sediments to the work area. The effectiveness of the BMPs will be checked during in-water work by monitoring turbidity within the area contained by the BMP and immediately outside the work area. The BMPs will be inspected and repaired as needed when there are exceedances of water quality standards outside the work area during construction or if they become damaged.

The dredged materials will be transported to the shore either using a barge in mechanical dredging or a pipeline in hydraulic suction dredging. Movement of sand with a barge may cause water pollution by spillage. To minimize this, the barges will be filled only to a level that reduces risk of spills.

During beach nourishment and groin construction, potential pollutants will be mostly turbidity and total suspended solids (TSS) from the nourishment materials placed after dewatering, and potential dirt from the rocks that will be brought from outside sources for groin construction. The contractor should make sure that the rocks and other materials brought from offsite are free from any contaminants. The materials shall be hosed down at the source site to rid them of pollutants.

With hydraulic suction dredging, the submerged pipeline is made of sections of HDPE pipe welded to form the pipe. No leaks are expected from this type of fabrication. At the landward end, however, portions of the sand/water slurry have the potential to pollute the nearshore water. The pipeline will be inspected periodically to check for damage, and a silt curtain will be deployed makai of the receiving pit to isolate the discharge point of slurry to contain turbidity within the area protected by the BMPs.

The dredged material will be dewatered at the shoreline to get rid of the water and to prepare for transport by trucks. The dewatering pit will be a low area on or next to the beach with temporary berms constructed around it. Sand dredged from the offshore sites will be discharged into the dewatering pit. The water will seep through the bottom of the pit and the sandbag berms keeping sediments within the dewatering area. The dewatering pit and berms will be inspected daily to ensure they are functioning properly. Water quality monitoring will be conducted as required to avoid water quality violations.

The dredged sand will initially be placed above the mean higher high water (MHHW) line to dewater and dry. Once dewatered, the dried sand will be distributed on the beach using grading equipment. A silt curtain or a barrier made of sand filled bags will be deployed as a BMP during this placement to avoid water pollution. During in-water work, water quality samples will be collected and analyzed for turbidity and TSS to ensure BMPs are properly functioning and protecting water quality. An Applicable Monitoring and Assessment Plan (AMAP) will be prepared as a part of the Section 401 Water Quality Certification (WQC) to guide the construction contractor to avoid water pollution. This plan will include comprehensive water quality monitoring pre-, during, and post-construction. The AMAP plan will be approved by the State Department of Health, Clean Water Branch (DOH-CWB) to ensure conditions of the WQC are satisfied. More detailed mitigative measures, including BMPs, are discussed in Chapter 3.

Phasing of construction operations will avoid closing the entire 3,700 ft stretch of beach and ensure practical BMP maintenance. As work progresses along the beach, the BMPs will be relocated to contain the active area of the project.

2.3 Estimated Timing, Cost, Phasing, and Duration

2.3.1 Construction Cost and Time Frame

Construction costs for the project are estimated to be in the range of $19 million - $30 million. Maintenance costs over the 50-year lifecycle are estimated to be $7 million - $10 million. The total project cost for the Proposed Action is estimated to be between $26 million - $40 million, including construction and maintenance costs over 50 years.

There are two possible construction time frames to accommodate both the coral spawning period and annual high surf conditions. One scenario assumes that environmental conditions and selected contractor qualifications will support simultaneous sand dredging and T-groin construction. Under a best-case scenario, construction could be completed in six to nine months. The other scenario assumes that environmental conditions would reduce opportunities to complete construction in one consecutive time-period. Under this scenario, construction would need to be conducted over two years. For example, partial beach nourishment and T-groin construction would occur in Year 1, and remaining beach nourishment and groin construction completed in Year 2. Scheduling dredging and construction will depend on permit requirements, current environmental conditions at that time, and the contractor's judgement in developing work and safety plans compliant with appropriate rules, regulations and BMPs.

2.3.2 Project Funding

The KBSC has developed a cost-sharing agreement among the nine condominium properties and one kuleana property owner. This agreement includes retention of consultants for the DEIS process and studies. The parties are not bound to the costs and expenses of project implementation and construction.

Three options are being explored for implementation of the Proposed Action, including private funding, Maui County CFD, and Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC).

2.3.2.1 Private Funding

If private funding of the project implementation and management is selected as the preferred option, KBSC would need to develop a Cost Sharing Agreement to cover these expenses on the short-term and long-term time frames. If the project were to be completely privately funded, KBSC would need to obtain an easement for the stabilizing structures from the State of Hawaiʻi, which has jurisdiction over offshore uses. Further, future maintenance and public safety liability issues would be the responsibility of KBSC.

2.3.2.2 Use of Public Lands and Funds

Maui County Community Facilities District (CFD)

Maui County has enacted the CFD, pursuant to Ordinance Number 4947, Bill 153, and Maui County Code (MCC) Chapter 3.75 that went into effect on December 26, 2018. CFD is intended to fund public improvements and is a relatively new funding source. In Hawaiʻi, CFD has been applied only once, for the Kukuiʻula project on Kauaʻi. CFD is currently being considered for the Waikapū development on Maui.

Through CFD, Maui County Council can create special taxing districts to finance "special improvements" that will have a lifetime of at least five years, as determined by the council (MCC, 2018). Examples of special improvements that could be paid for by a CFD include shoreline restoration and beach nourishment, bikeways, cultural facilities, traffic signals, and pedestrian malls. Property owners can create petitions requesting the County to form a CFD. The formation of a CFD would only affect owners of properties defined in the district, who would be subject to the special tax. If there is not a consensus of the CFD between of the owners within the proposed CFD, opposed owners would have the right to protest the tax. Although no CFD has yet been formed for Kahana, it could potentially serve as a financing mechanism at some future juncture for the applicant and its owners to pay for the erosion mitigation project proposed. However, CFD funds cannot used for project maintenance.

If a CFD is successfully formed, the Real Property Tax Division of Maui County would collect this special tax along with its regular semi-annual property tax assessment bills from the specified properties. It would place the special tax collected in a designated CFD improvement fund or CFD debt service fund if bonds are issued. The monies collected, or bonds issued against their collection, would be used to pay for the specific improvements approved and authorized under the CFD formation documents. Although a CFD special tax is only levied against benefiting property owners and is used to finance specific public improvements identified in the CFD formation documents that benefit the property owners, it could be considered a "use of county funds" and thus a trigger for environmental review pursuant to the HRS 343-5(a)(1) and HAR 11-200-6(b)(2)(B).

A key requirement for projects funded by CFD is that they need to be public improvements or government owned. Two options would establish public improvement status of this project and facilitate the use of CFD.

- Maui County could take over project management, planning, and construction either after the DEIS is published and before the Final EIS (FEIS), or after the FEIS is approved. If the County assumes the project after the DEIS, it would be the preparer of the FEIS.

- KBSC could plan, obtain permits, manage, and implement the project through construction. If the County deems that the completed project meets requirements, and if the County desires to own the project, KBSC can deed improvements to the County. At that point, the County would reimburse KBSC using CFD funds.

While maintenance could be the responsibility of the appropriate County agency, there is also an option for a public-private partnership with KBSC that may include funding and outsourcing to conduct maintenance.

At the time of this writing, Maui County has begun discussion about funding the Proposed Action with CFD funds. The Proposed Action was discussed in the Maui County Water Infrastructure Transportation Committee on October 4, 2020 and December 3, 2020. In the latter session, the committee chair deferred the Kahana Bay project for the 2021 Maui County Council Water Infrastructure Transportation Committee. At the time of writing this DEIS, the use of CFD funds for the Proposed Action remains unresolved.

Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC) Program

The FEMA BRIC program supports states, local communities, tribes, and territories in hazard mitigation projects to reduce the risks from disasters and natural hazards. Its guiding principles include supporting communities through capability and capacity building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

FEMA-BRIC is a new program. The first application period was initiated on September 30, 2020 and applications were received in January 2021. KBSC prepared a BRIC application in consultation with the Hawaiʻi Emergency Management Agency (HIEMA) and the Maui County Planning Department to prepare an application for scoping activities leading up to actual construction. As of this writing, HIEMA included an application for the Proposed Action in its package of Hawaiʻi-based projects.

2.4 Secondary Alternative – Beach Nourishment without Stabilizing Structures

The Secondary Alternative, which is Beach Nourishment without Stabilizing Structures, is similar to the Proposed Action and also meets the project objectives stated in Section 2.1. Although the Proposed Action is the preferred solution, the Secondary Alternative is considered a viable option for Kahana and is evaluated throughout this DEIS. The Secondary Alternative includes: 1) beach nourishment, 2) vegetated berm, and 3) buried toe protection, all of which are depicted in Figure 2-17. Construction of the beach nourishment and vegetated berm would be similar to those described in Sections 2.2.1 and 2.2.2, respectively.

The significant difference between the Proposed Action and Secondary Alternative is the method of shoreline stabilization. Whereas the Proposed Action includes T-groins, shoreline stabilization in the Secondary Alternative would be accomplished with buried toe protection. A buried toe protection structure would provide backshore protection should the erosion of the nourished beach continue towards the properties, as shown in Figure 2-18. The toe protection may be a short sloping rubblemound structure installed below the beach elevation. The height of the structure would be approximately 4 ft above MLLW, while its depth may extend several feet below water level.

Alternatives for construction of toe protection may include retaining wall structures that consist of pre-cast concrete masonry units anchored with geogrid or steel sheet-pile tied-back with a concrete deadman or helical anchors. Should the protective beach recede and the buried toe protection be exposed, wave action in the toe vicinity would be smaller with a sloped rubblemound structure compared to vertical retaining walls. A porous rubblemound structure can also provide better habitat value and ecological function as compared to flat-faced retaining walls. On the other hand, since both sheet-pile and helical anchors can easily be driven into the ground, there would little to no excavation disturbance required for installation compared other retaining wall alternatives, including a rubblemound. Design of toe protection shall consider the close proximity of existing structures and its impact on constructability and other factors including cost, maintenance, and aesthetics.

Since no stabilizing structures are included, the nourished beach footprint would follow the 1975 restoration benchmark more closely than the Proposed Action. Up to 75,000 cy of sand would be dredged and transported from the offshore borrow areas along approximately 3,700 lineal ft of the coastline for the initial construction. As with the Proposed Action, sand for the Secondary Alternative would be obtained from offshore sand sources identified as Sites 18, 19, and 22. Nourishment events would be needed approximately every nine years, or five times over a 50-year time frame.

Should the protective beach recede, the buried toe protection structure would stabilize the shoreline and help prevent erosion of terrigenous materials until the beach is nourished again. Existing seawalls in good condition may remain and provide backstop protection.

Benefits: Since no beach stabilizing structures are included in this concept, any changes to nearshore current patterns and neighboring properties would be minimized. Further, nearshore lateral access and natural aesthetics may be preserved. The buried toe protection would not normally be visible underneath the beach sand, but the structure would provide some shoreline protection should the nourished beach be depleted, such as during an extreme storm event.

Challenges: Without offshore beach stabilizing structures, the nourished beach would continue to erode at the current erosion rates and return to a depleted condition if no maintenance and continued nourishments are done. Further, the identified offshore sand sources may not contain sufficient sand volume to replenish the beach again. The Secondary Alternative would require nourishment events approximately every nine years, which would result in more frequent environmental disturbance. The reduced efficacy of this alternative compared to the longevity of the beach with structures rendered this alternative secondary to the Proposed Action.

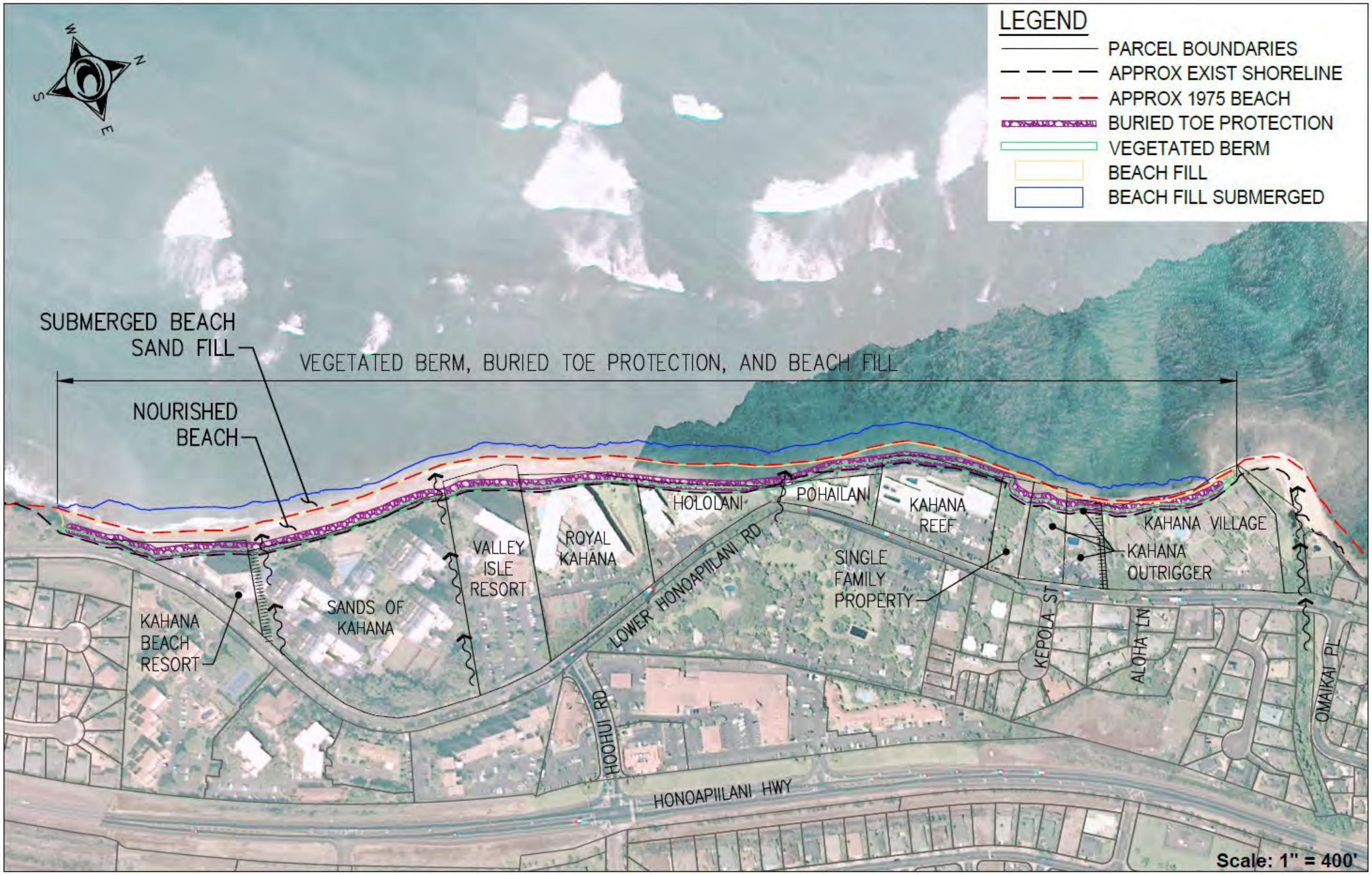

Figure 2-17: Secondary Alternative: Beach Nourishment without Stabilizing Structures

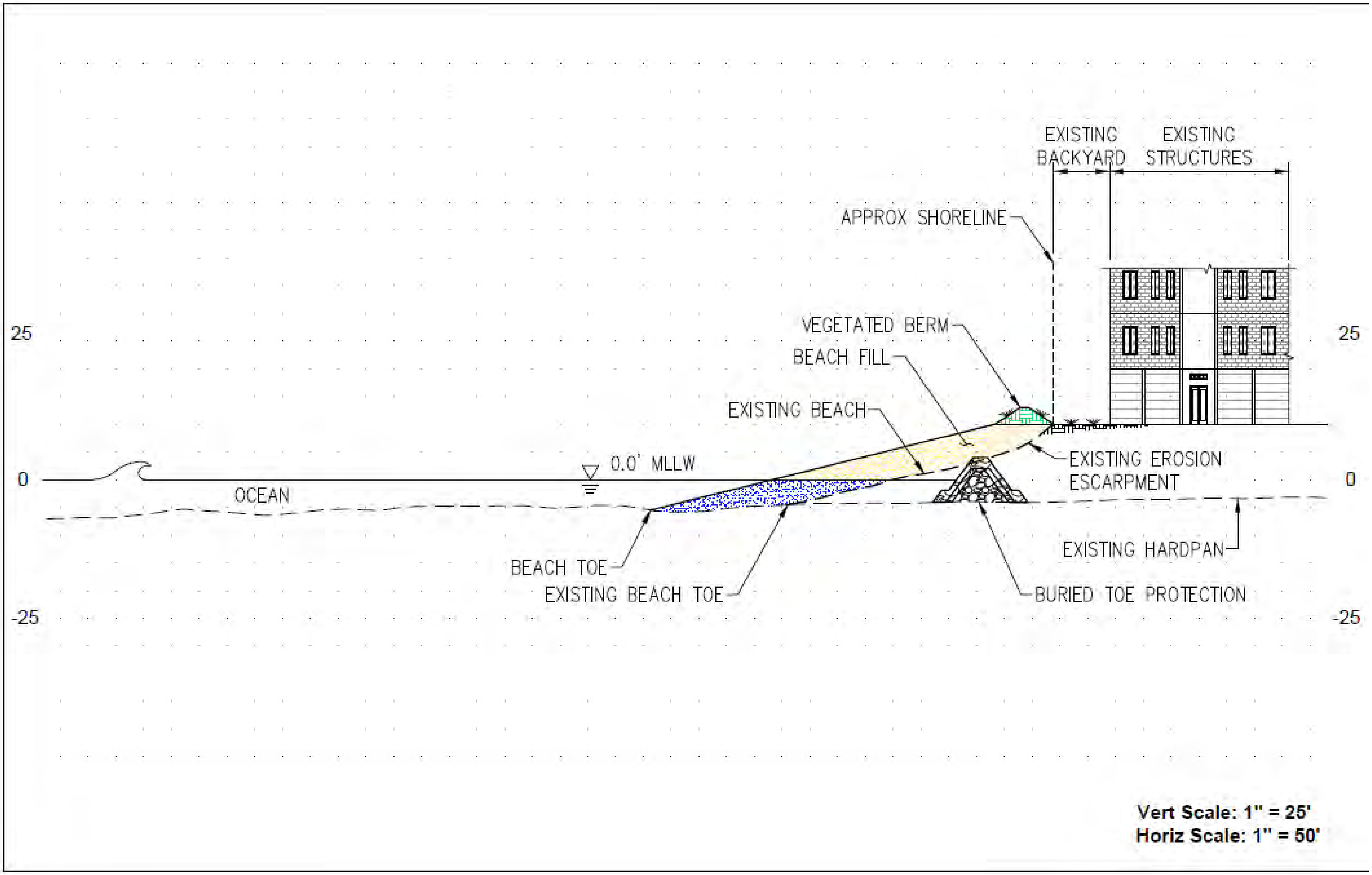

Figure 2-18: Typical Profile of Secondary Alternative: Beach Nourishment Without Stabilizing Structures

2.5 Alternatives Considered but not Further Evaluated in the EIS

Four other alternatives to the Proposed Action and the Secondary Alternative were considered and evaluated based on their feasibility and ability to accomplish project objectives. The alternatives included:

- Shoreline Protection Methods;
- Managed Retreat;
- Accommodation; and
- No Action.

In evaluating project alternatives, three main strategies for shorelines in response to climate change - protection/resistance, accommodation, and managed retreat - were considered. These strategies are summarized as follows:

1. **Protection/resistance** protects an area in its existing location using engineering controls. The Proposed Action (beach nourishment with stabilizing structures), Secondary Alternative (beach nourishment without stabilizing structures), and the shoreline armoring alternative are examples of protection/resistance;
2. **Managed retreat** is defined by relocating structures out of vulnerable areas (e.g., SLR-XA) and prohibiting new development in these areas (Codiga and Wagner, 2011; CZM, 2019); and
3. **Accommodation** involves adapting existing areas and structures to allow them to better withstand SLR, increased flooding, and other conditions associated with climate change by relocating critical equipment and dwellings to a safe place but leaving the existing structure in place.

2.5.1 Shoreline Armoring Methods

The shoreline armoring alternative would involve construction of a hardened structure along 3,700 ft of Kahana shoreline. The structure may consist of a vertical seawall, a sloping revetment, or a combination of both types of structures. The concept shown in Figures 2-19 and 2-20 is a hybrid seawall-revetment installed along the existing shoreline location. Seaward of the wall, a buried sloping toe protection structure (as described in Section 2.4, *Secondary Alternative*) may be constructed. Any existing seawalls that are in good condition may be retained rather than constructing replacements. Two types of shoreline armoring, including rock revetments and seawalls, are hereafter described.

Figure 2-19: Alternative 3: Hybrid Seawall and Revetment

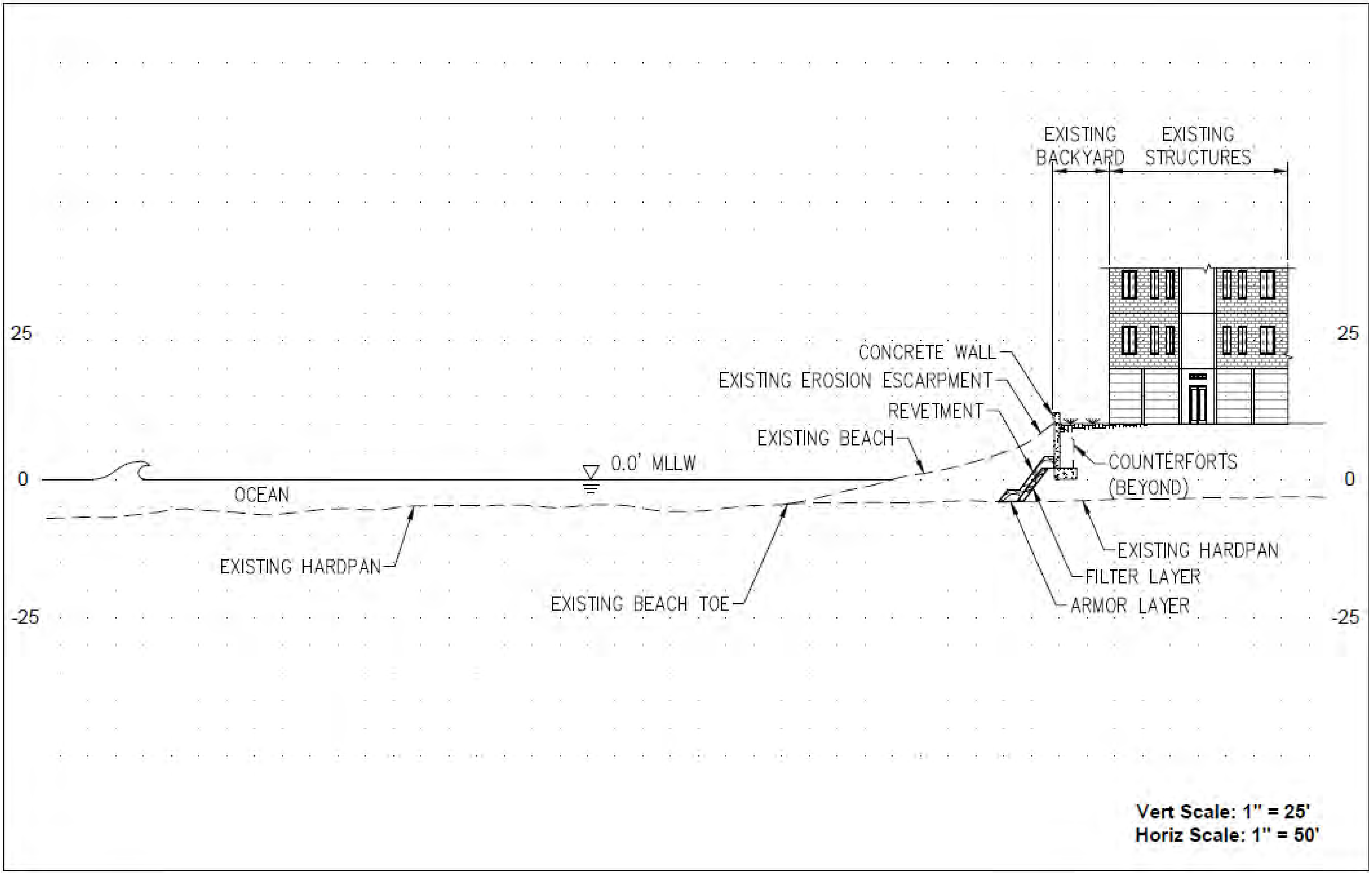

Figure 2-20: Typical Profile of Alternative 3: Hybrid Seawall and Revetment

2.5.1.1 Rock Revetment

A revetment is a sloping structure designed to absorb wave energy, prevent erosion of the backshore and reduce wave runup. Rock revetments typically consist of large armor stone placed above filter layers. Figure 2-21 shows an example of a revetement. This type of construction is often referred to as a rubblemound.

Benefits: By absorbing a large portion of the impacting wave energy, rock revetments may have less impacts to adjacent properties compared to seawalls. The rubblemound construction looks more natural along the coastline than vertical walls and can produce interstitial spaces that may provide habitat niche spaces in the nearshore area. This ecosystem enhancement may help to compensate for the biological impacts caused by the construction of the structures. The top shelf of a revetment can allow for shoreline access by fisherman and other public users. Once installed, rock revetments require little long-term maintenance and have minimal operational costs.

Challenges: Due to the sloping design, rock revetments have a larger footprint than vertical structures. For this reason, construction of a wide revetment in a sensitive environment may not be appropriate. Although revetments absorb a large portion of the incoming wave energy, the impact of wave reflections and end-wall effects on adjacent shorelines may still be of concern. Hence, this alternative shoreline armoring method was not selected for further study.

Photograph taken August 2019

Figure 2-21: Rock Revetment at Kaka‘ako Waterfront Park, Honolulu, O‘ahu, Hawai‘i

2.5.1.2 Seawalls

Seawalls are hardened shoreline protection structures that stand vertically along the shoreline. They are designed to resist incoming wave forces and prevent wave overtopping. Seawalls can be constructed by a variety of methods and materials, such as poured concrete or driven sheet piles. Concrete seawalls already exist at the project site fronting the Kahana Beach, Hololani, Pohailani, and Kahana Reef properties, as shown in Figure 2-22.

Benefits: Seawalls are commonly used for shoreline protection. Seawalls occupy smaller footprints compared to revetments, making them especially suitable when space is limited. They also require less material for construction compared to a revetment. If properly designed and constructed, a seawall can provide a long design life.

Challenges: Unlike revetments, seawalls are generally impermeable and do not absorb wave energy. The impact of wave reflections and end-wall effects on beach loss and adjacent properties can cause unwanted accelerated erosion to neighboring properties. Widespread shoreline hardening in Hawaiʻi has contributed to the narrowing and loss of chronically eroding beaches throughout the state (Fletcher et al., 1997; Romine and Fletcher, 2012). It is estimated that over 13 miles of Hawaiʻi's beaches were completely lost to erosion over the past century, nearly all of which fronted coastal armoring (Fletcher et al., 2012). In addition, the smooth surface of traditional seawalls does not provide opportunity for environmental habitat enhancement. Because shoreline hardening can have severe effects on neighboring properties by exacerbating shoreline erosion and beach loss, this alternative was not further evaluated in the DEIS.

Figure 2-22: Seawall fronting the Kahana Beach Resort (June 2019)

2.5.2 Managed Retreat

Managed retreat is essentially shifting development inland from the coast either by the physical movement of structures or changing the restrictions and management of Hawaiʻi's coastal areas. It involves establishing thresholds to trigger the demolition and relocation of structures threatened by coastal hazards or SLR. This approach is often part of a larger context that includes other planning and regulatory techniques such as:

- Shoreline planning to identify high-risk areas where this type of policy would be the only cost-effective, long-term solution;
- Regulating the type of structure allowed near the shore to ensure that buildings are small enough and constructed in a way to facilitate relocation when needed; and
- Instituting a relocation assistance and/or buy-back program to help with relocation costs or compensate property owners when their property becomes unusable.

Managed retreat is a complex issue with contradictory and socially conflicting perspectives (CZM, 2019). A variety of managed retreat approaches may be used. The planned obsolescence approach, for example, requires the incremental removal of structures as they reach the end of their useful lifespan. Other approaches include eminent domain, voluntary buyouts and relocation, and transfer of development rights (CZM, 2019).

Managed retreat needs to be coupled with other planning and regulatory techniques to identify high-risk areas where it would be the only cost-effective, long-term solution. For example, policies may include regulating the type of structures allowed near the shore to ensure that buildings are constructed in a way to facilitate relocation when needed and instituting relocation assistance and/or buy-back programs to help with relocation costs or compensate property owners when their property becomes unusable. There are no formal managed retreat master plans in place in Hawaiʻi or standardized strategies for conducting managed retreat. The managed retreat strategy evaluated below represents one possible managed retreat strategy but is by no means a comprehensive and complete evaluation of all managed retreat strategies for the Kahana Bay area as this is beyond the scope of this DEIS.

For the purpose of this DEIS, the managed retreat strategy involves voluntary fair market value buyouts of all private property that is within the footprint of the 1.1 ft SLR-XA and preventing new construction or major improvements within the footprint of the 3.2 ft SLR-XA (Figures 2-23 and 2-24). The SLR-XAs are based on the predicted combined impacts of three coastal hazards, including: passive flooding, annual high wave flooding, and coastal erosion (PacIOOS, 2019). The concept involves the purchase of all land and structures that fall within the 1.1 ft SLR-XA. The structures within the 1.1 ft SLR-XA footprint would be removed and the area returned to a natural landscape. Within the 3.2 ft SLR-XA, no new construction or major improvements would be permitted and a plan for the eventual purchase and removal of structures from this area would be developed.

The impact of this managed retreat strategy was evaluated for each of the parcels along Kahana Bay. The area and percent of the total land impacted by actively removing structures within the 1.1 ft SLR-XA and essentially abandoning existing structures within the 3.2 ft SLR-XA were calculated for each parcel and are shown in Table 2-1. This effort was a simplified proxy to represent the amount of each parcel that would be affected by this management technique.

Table 2-1: Summary of each percent of each parcel within the 1.1 ft SLR-XA and within the 3.2 ft SLR-XA

Parcel	Total Parcel (acres)	Land within 1.1 ft SLR-XA (acres)	% of parcel to be demolished	Land within 3.2 ft SLR-XA (acres)	% of parcel within shoreline setback (no new construction)	Amount of parcel outside of the SLR-XA (acres)
Kahana Beach	1.018	0.84	83	1.018	100	0
Sands of Kahana	6.788	1.36	20	2.5	37	4.288
Valley Isle	3.054	0.75	25	1.3	43	1.754
Royal Kahana	3.457	0.94	27	1.67	48	1.787
Hololani	1.431	0.93	65	1.23	86	0.201
Pohailani	8.058	0.75	9	1.76	22	6.298
Kahana Reef	1.96	1.3	66	1.87	95	0.09
Single-Family Parcel	0.61	0.34	56	0.61	100	0
Kahana Outrigger	1.168	0.71	61	1.168	100	0
Kahana Village	3.198	1.22	38	2.65	83	0.548
TOTAL	***30.7***	***9.14***		***15.8***		***15.0***
AVERAGE	***3.1***	***0.91***	***45***	***1.6***	***71***	***1.5***

Nine to 83% of the parcels, or an average of 45%, would be demolished within the 1.1 ft SLR-XA, while 22 – 100%, or 71% on average, of the parcels could not be developed within the 3.2 SLR-XA. The Pohailani is the largest parcel and has the most area to retreat, while Kahana Beach, Kahana Outrigger, and the single-family parcels are entirely within the 3.2 ft SLR-XA and would need to relocate completely. Below are descriptions of how the proposed managed retreat policy would affect each property along Kahana Bay:

Kahana Beach Resort: Kahana Beach Resort encompasses 1.018 acres. Approximately 83% of the property, about 0.84 acres, is within the demolition 1.1 ft SLR-XA and the entire parcel lies within the shoreline setback 3.2 ft SLR-XA.

Sands of Kahana: Sands of Kahana covers 6.788 acres. Approximately 20% of the parcel, or 1.36 acres, is within the demolition 1.1 ft SLR-XA and approximately 37% of the parcel, or about 2.5 acres, is within the shoreline setback 3.2 ft SLR-XA.

Valley Isle Resort: Valley Isle Resort comprises 3.054 acres. Approximately 25% of the parcel, about 0.75 acres, lies within the demolition 1.1 ft SLR-XA and approximately 43% of the parcel, or approximately 1.3 acres, is within the shoreline setback 3.2 ft SLR-XA.

Royal Kahana: Royal Kahana contains 3.457 acres. Approximately 27% of the parcel, about 0.94 acres, is within the demolition 1.1 ft SLR-XA and approximately 48% of the parcel, or approximately 1.67 acres, is within the shoreline setback 3.2 ft SLR-XA.

Hololani: Hololani covers 1.431 acres. Approximately 65% of the parcel, about 0.93 acres, is within the demolition 1.1 ft SLR-XA and approximately 86% of the parcel, about 1.23 acres, is within the shoreline setback 3.2 ft SLR-XA.

Pohailani: Pohailani encompasses 8.058 acres, of which approximately 0.6 acres are located makai of Lower Honoapiʻilani Road and 7.4 acres are situated mauka of the road. Approximately 9% of the parcel, about 0.75 acres, lies within the demolition 1.1 ft SLR-XA and approximately 22% of the parcel, about 1.76 acres, are within the shoreline setback 3.2 ft SLR-XA.

Kahana Reef: Kahana Reef comprises 1.96 acres. Approximately 66% of the parcel, about 1.3 acres, is within the demolition 1.1 ft SLR-XA and approximately 95%, about 1.87 acres, is within the shoreline setback 3.2 ft SLR-XA.

Single-Family Parcel: This is a 0.61-acre property. Approximately 56% of the property, about 0.34 acres, lies within the demolition 1.1 ft SLR-XA and the entire parcel lies within the shoreline setback 3.2 ft SLR-XA.

Kahana Outrigger: Kahana Outrigger encompasses 1.168 acres. Approximately 61% of the parcel, about 0.71 acres, is within the demolition 1.1 ft SLR-XA and the entire parcel is within the shoreline setback 3.2 ft SLR-XA.

Kahana Village: Kahana Village covers 3.198 acres. Approximately 38% of the parcel, about 1.22 acres, is within the demolition 1.1 ft SLR-XA and approximately 83% of the parcel, about 2.65 acres, is within the shoreline setback 3.2 ft SLR-XA.

Benefits: Managed retreat is an effective long-term solution to ensure public safety, health, and welfare by removing at-risk critical infrastructure and dwellings from hazardous coastal areas and allow the natural shoreline processes to continue without disruption from a built environment. This will provide opportunity to restore traditional cultural uses such as fishing, food gathering, and surfing. The managed retreat framework directs new investment and construction to areas inland, outside, and above flood or erosion hazard areas.

Once built structures are removed, the beach area will return to a more natural ecosystem for wildlife habitat. Managed retreat from the shoreline can be an effective long-term strategy to adjust to SLR and eroding coastlines, which allows for natural shoreline revolution in changing environmental conditions. Infrastructure moved away from the shoreline establishes a buffer between the land and sea and allows for natural water infiltration treatment, which would improve water quality in the nearshore area. Of all the alternatives considered, managed retreat would have the longest lifetime.

Challenges: Managed retreat is a complex and controversial issue. Foremost, residents would be displaced from their homes. The financial burden from high-valued beachfront land acquisition and redevelopment would be significant. Development zones would need to be shifted inland and would require re-zoning and reallocation of resources, which may have cascading effects on many other issues.

A cohesive policy for managed retreat for the state and county has yet to be developed in coordination with all branches of government and the community. There are no formal managed retreat master plans in place in Hawaiʻi or standardized strategies for conducting managed retreat. At this time, it is unclear how managed retreat would be implemented, but the need for erosion control measures is immediate. Community plans would need to be altered to address housing and infrastructure shortages, while sources and mechanisms for funding buyouts of costly coastal properties need to be identified.

Kahana Bay is a dense urbanized environment and given that coastal erosion is a widespread issue in Hawaiʻi, the financial and other challenges of managed retreat, and limited resources to implement such a policy, Kahana is unlikely to be the top candidate for any resources to implement managed retreat in the State or County. In the meantime, the environmental costs of waiting for managed retreat funding/policy are clear (beach loss, financial costs of temporary erosion control, property values, etc.) as documented in the No Action Alternative evaluation. Devising and putting policies and plans in place for managed retreat in the area requires discussion, funds, and decision-making beyond the objectives and scope of this DEIS and therefore are not further discussed.

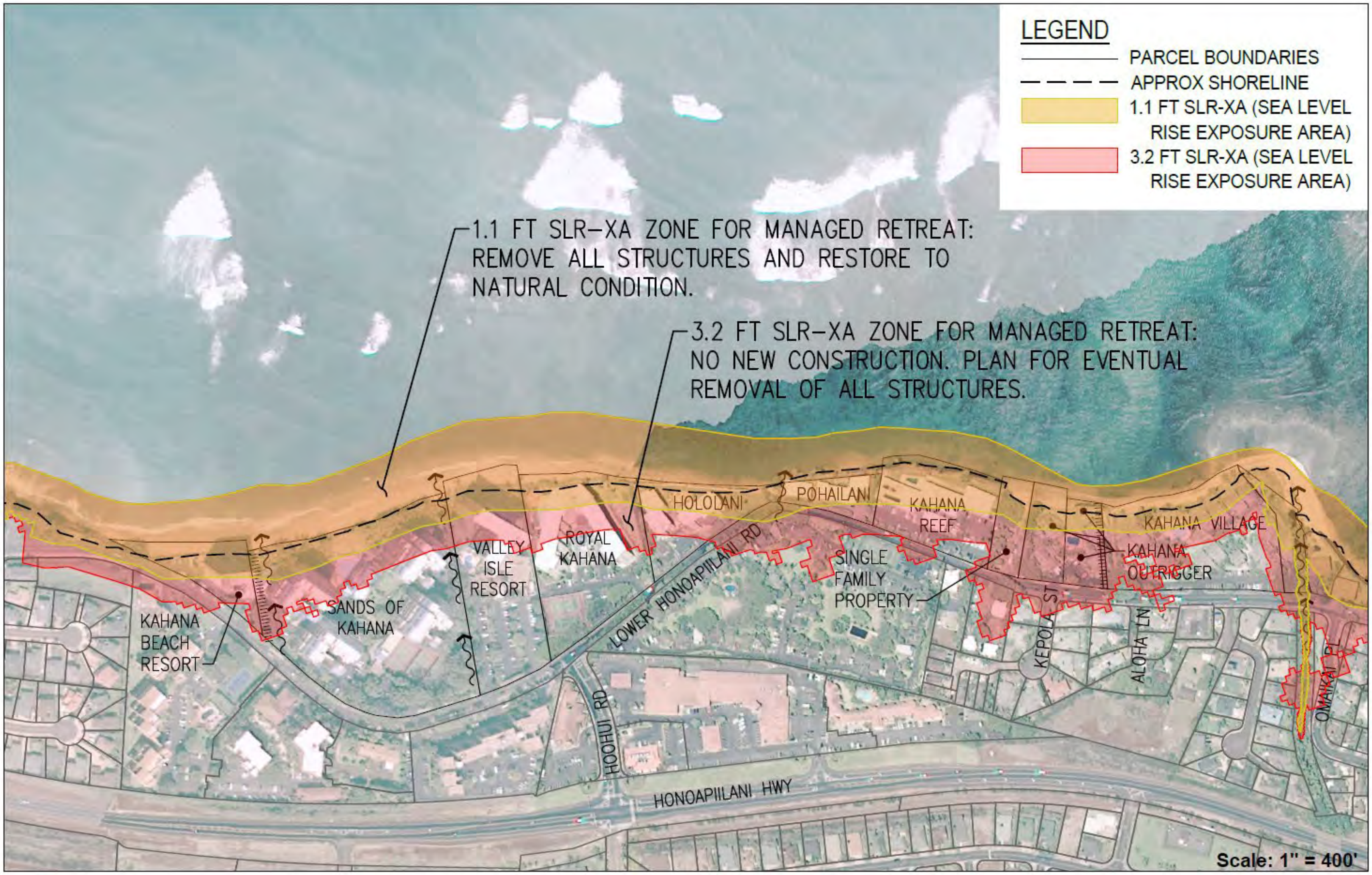

Figure 2-23: Alternative 4: Managed Retreat

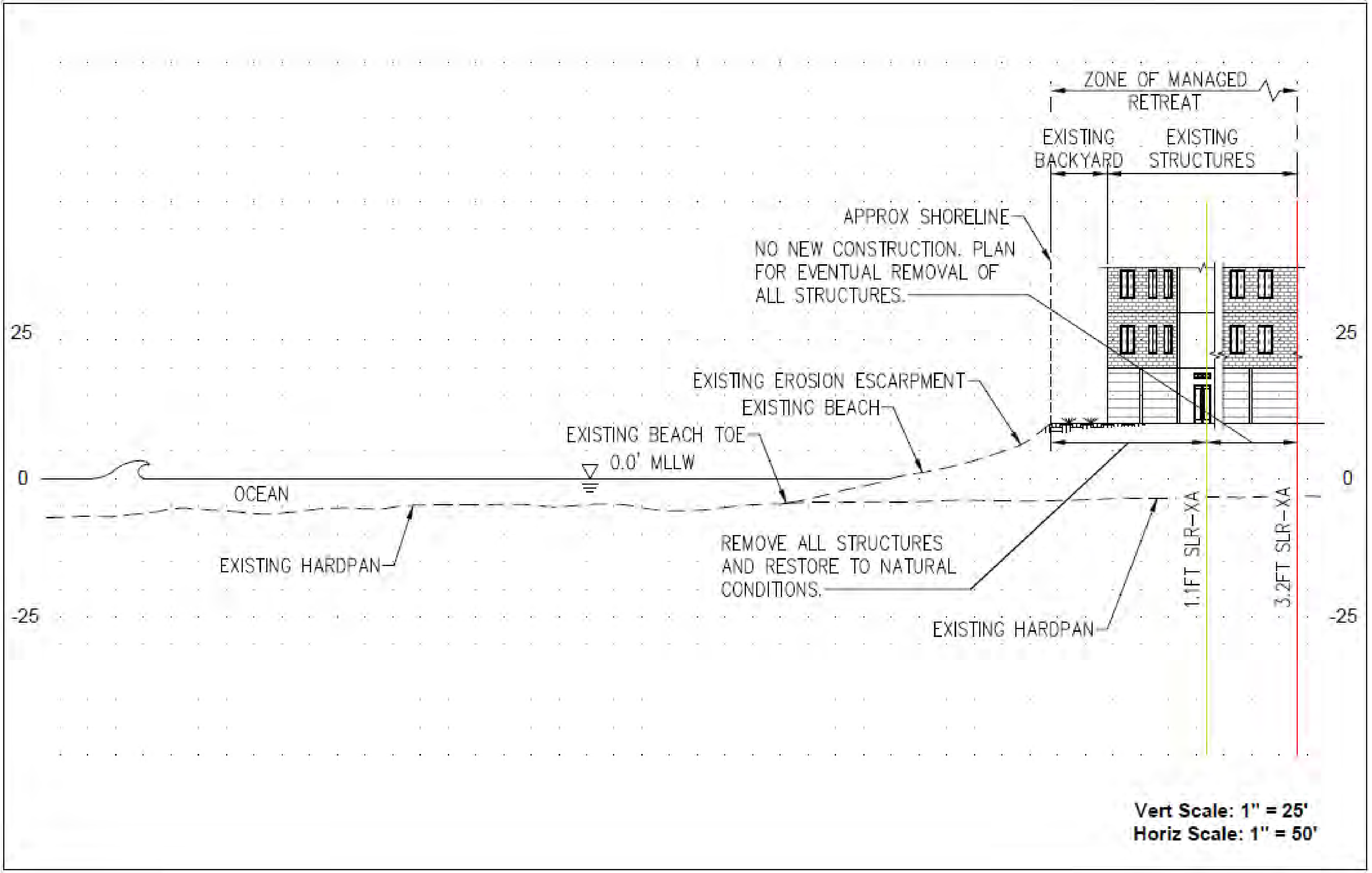

Figure 2-24: Typical Profile of Alternative 4: Managed Retreat

2.5.3 Accommodation

Accommodation involves adapting existing structures and systems to allow them to better withstand changing conditions. An example of accommodation is elevating a structure on piles to greater tolerate more extreme wave inundation.

Accommodation of condominiums, homes, and structures on the adjacent properties would require a detailed evaluation of each parcel's structures and features to determine which modifications would be appropriate for each situation. Each parcel would need to be considered individually. Generally, a preliminary coastal hazard evaluation to determine the relative impacts from the three individual contributors to SLR-XA, including passive flooding, coastal erosion, and annual high wave flooding, would be completed first. Questions to be assessed during the coastal hazard evaluation would include but are not limited to:

- Which areas of the property would be inundated from passive flooding (e.g., pool area, basement, parking garage, first floor)?
- What is the ability of the parcel's shoreline's protection, such as hardened seawall or unprotected condition, to resist coastal erosion?
- How will the property be affected by annual high wave flooding given larger incoming swells and SLR? What will be the frequency of these events over the lifetime and use of the structures?

Once the coastal hazard evaluation and a thorough evaluation of existing conditions are complete, specific recommendations can be made. For example, a brief SLR-XA planning evaluation for potential remedies of SLR for the Kahana Reef (TMK (2) 4-3-009:009) was done to fulfill compliance with Condition 3 of Shoreline Setback Assessment Permit (SSA 2017-0038) with input from the Maui County Planning Department. Some of the conclusions from the SLR-XA hazard evaluation were:

- There is no difference in risk to the building from passive flooding whether SLR is 0.5 or 3.2 ft as the elevation of the property is 9 ft above MSL.
- The current seawall protecting the property effectively resists coastal erosion and was recently repaired and outfitted with an over wash lip. If the seawall remains intact, predicted erosion across the property would not be applicable.
- Annual high wave flooding is the largest threat to the property. Flooding will be most prevalent during seasonal winter swells and storms that will become more frequent in the future. With SLR, less wave energy will be dissipated as offshore reefs will be further under water, resulting in more wave energy toward the shore. These events could inundate the condominium at least once per year. Seasonal flooding could extend further inland as SLR increases and coastal storms and waves become more frequent.
- The rear yard and pool area would flood under 0.5 and 1.1 ft SLR scenarios, requiring more frequent maintenance to remove debris. Under the 2.0 ft SLR scenario, the makai side of the building would be flooded during seasonal wave flooding each year. The 3.2 ft SLR scenario could occur by the year 2060 and would result in permanent inundation of the makai portion of the condominium buildings. Most of the parking lot on the mauka side of the property would not be inundated. By 2060, the condominium will be about 90 years old and nearing the end of its life

span. At this time, a planned obsolescence/managed retreat strategy may be more feasible to be considered.

Based on the SLR-XA hazard evaluation, the following accommodation and managed retreat measures were suggested for Kahana Reef:

- Convert the first floor of the condominium to parking to allow flood events to pass below the condominium units; and
- Rebuild one or two new buildings in the existing parking area, which is mauka of the 3.2 ft SLR-XA. Kahana Reef currently has three four-story buildings, which accommodate 88 total units and occupy nearly 29,880 square feet of the property. The lot is zoned as A-2, which requires 20% of open space. Therefore, one or two new 6-story buildings could be built and accommodate the same total number of units (88), with each unit up to 873 square feet, while still abiding with County zoning and setback requirements.

Several accommodation strategies gleaned from the Kahana Reef example presented above can be applied to other parcels and include:

- Convert the bottom floor(s) of buildings which are within the 3.2 ft SLR-XA into parking that would allow flooding; and
- Relocate pools, showers, and other features that would be inundated by intermittent flooding mauka to beyond the predicted flood zone area.

Under this alternative, similar hazard and accommodation analyses to the Kahana Reef example presented above would be done for each parcel along the Kahana project area. Accommodation actions would need to be coordinated and involve cohesive efforts between condominium owners and associations, Maui County, utility companies, and other stakeholders.

Benefits: The benefits of an accommodation approach would be that the buildings along the Kahana project area would be allowed to reside in the same place with minimal relocation and buyouts with rising water levels and intermittent flood events, while still abiding with existing County and shoreline requirements. Accommodation itself does not harden the shoreline and is much more cost effective than managed retreat and completely relocating buildings and properties. Population density would remain similar to its present amount but building height and quantity may change.

Challenges: Accommodation would require significant maintenance and may eventually fail. Although living areas may be elevated and located above and beyond the SLR-XA, existing underground utilities and roads would continue to be inundated and flooded. Repeated inundations with salt water could corrode metal components of utility infrastructure, while backrush from flooding could heavily damage roads and foundation of the structures. Condominium foundations would remain unprotected and could be undermined by rising water levels and repeated flooding. The efforts and cost to buy out floors and parking levels, relocate buildings, pools, and other features, and put plans in place to protect or reinforce existing underground utilities are extensive and require the coordinated and cohesive efforts between condominium owners and associations, Maui County, utility companies, regulatory agencies, and other stakeholders.

The Kahana Reef Accommodation example is only the surface of analyses that would need to be done to implement accommodation planning and actions for the entire Kahana Bay area. Unlike managed retreat, accommodation for Kahana cannot be done unless Maui County is directly involved as a proposing agency. Public utilities and roadways would need to be accommodated along with the private buildings and other improvements. Since Maui County is not a proposing party on the current DEIS, accommodation is not viable alternative for additional consideration.

2.5.4 No Action

The No Action Alternative is a baseline to evaluate the impacts anticipated by the "action" alternatives. Under the No Action Alternative, a regional approach to erosion mitigation along the Kahana coastline would not be implemented. Currently, all ten properties have some form of armoring, and the type of shoreline protection varies from property to property. They include a vegetated sand berm, rock revetment and rock, rock and concrete, four sandbag revetments (one of which has a seawall backstop), and three seawalls, and are shown in Figure 1-5. In the No Action Alternative, the current forms of shoreline protection will be allowed to continue. Individual properties may choose to continue to pursue localized erosion mitigation projects, but it is uncertain what future actions may be taken.

Benefits: Under the No Action Alternative, the shoreline will remain in its existing condition. There will be no addition of regional coastal structures and the anticipated impacts to the scenic view planes, nearshore currents, waves, and benthic resources would be avoided. No costs from implementing a regional erosion mitigation solution would be incurred.

Challenges: If No Action is taken, no organized and concerted efforts to solve current conditions would occur and the Kahana shoreline will not be improved. Properties would continue to have their own form of shoreline armoring, if any, and difficulty to coordinate mitigative measures along the length of the beach will persist.

Hence, the risk of coastal hazards to public safety, existing buildings, and infrastructure along the shoreline will remain, and none of the project objectives would be fulfilled. It is unclear what actions may be taken should a regional solution fail to be implemented, but it is likely to be a continuation of status quo. Installation of emergency sandbag revetments and continued repairs of seawalls and other aging structures will likely continue. Eventually, much of the remaining beach may be lost in Kahana. The continued threat to public safety and structures with this alternative would remain, and therefore this alternative was not further analyzed in the DEIS.

2.6 Alternatives Analyses and Summary

A step-wise procedure was used to evaluate each of the six alternatives. The alternatives were critiqued against the project goals and objectives, reasonability, and environmental, social, technical, and economic criteria to suggest a preferred alternative(s) that will be brought forth and evaluated throughout the remainder of this DEIS. The procedure for this evaluation is described below:

1) Each alternative was evaluated against 11 weighted categories related to environmental, social, technical, and economic criteria. Categories were selected to reflect the most important areas of interest to project stakeholders and were weighted by importance. The alternatives were evaluated against the following weighted categories: performance, community impacts, regulatory compliance, aesthetics, resilience to SLR, biological and water quality impacts, cultural and archeological impacts, impacts to adjacent properties, constructability, construction cost, and maintenance cost. The sum of the weighted scores for each of the

alternatives reflected the overall best alternative, with Alternative 1 (i.e., Proposed Action) coming out as the highest-ranking alternative and Alternative 2 (i.e., Secondary Alternative) coming in second.

2) Each alternative was evaluated against the project goals and objectives described in Section 1.4. Any alternative that did not meet all the project goals and objectives was removed from consideration. The two alternatives that met all project goals and objectives were Alternatives 1 and 2.

3) The alternatives were then evaluated against reasonability criteria to confirm that the preferred alternative(s) are reasonable solution(s) that can be readily implemented. Any alternatives that did not meet all the reasonability criteria were removed from consideration. The two alternatives that met all reasonability criteria were Alternatives 1 and 2.

4) Estimated costs for each alternative were prepared and shown in Table 2-2.

Based on the comparison process described above, both Alternatives 1 and 2 were recommended for evaluation throughout this DEIS since they both meet the project goals, objectives, and reasonability criteria. Alternative 1 ranked the highest in the evaluation and would be preferred to Alternative 2 since it has greater anticipated positive long-term environmental impacts and would cost less over the project's 50-year life span. Table 2-3 summarizes the comparison of the pros and cons of each alternatives.

Table 2-2: Costs Associated with each Alternative

Alternative	Planning Level Construction Cost	NPV* of Maintenance	NPV* of Construction and Maintenance
1 – Beach Nourishment with Stabilizing Structures	\$19M - \$30M	\$7M - \$10M	\$26M - \$40M
2 - Beach Nourishment without Stabilizing Structures	\$12M - \$19M	\$18M - \$26M	\$30M - \$45M
3 – Shoreline Armoring	\$15M - \$18M	\$3M - \$4M	\$18M - \$22M
4 - Managed Retreat	\$503M - \$614M	\$5M - \$6M	\$508M - \$620M
5 – Accommodation	unknown	unknown	unknown
6 – No Action	unknown	unknown	unknown

*NPV = Net Present Value

Table 2-3: Comparison of Alternatives

Alternative	Rating	Pros	Cons
1 – Beach Nourishment with Stabilizing Structures	Preferred	• Prevent terrigenous soils from causing water quality issues • Stabilize shoreline and natural wave runup protection • Can be designed to enhance habitat • Restore sandy beach area used for public recreation	• Nearshore habitat loss from fill (e.g., tako) • Permanent loss of benthic habitat within structure footprint • May change ocean currents
2 - Beach Nourishment without Stabilizing Structures	Second Preferred	• Prevent terrigenous soils from causing water quality issues • Will not include man-made structures extending from or offshore • Restore sandy beach area used for recreation	• Nearshore habitat loss from fill • Sand nourishment maintenance will be required more frequently, resulting in higher overall costs • Sand without stabilization can be carried away and impact reef offshore • Buried toe protection may be considered a form a shoreline hardening
3 – Shoreline Armoring	Not Recommended	• Prevent terrigenous soils from causing water quality issues • Maximum erosion protection • Rugged, adaptable, and versatile • Minimal coastal footprint, limited to shoreline area	• Increased erosion and scouring on neighboring unprotected properties • Little to no sandy beach habitat will be left • Negative impacts on public recreation
4 - Managed Retreat	Not Recommended	• Land is restored to its "natural" state • Resilient to SLR • No additional structures required	• Will allow coastal erosion and likely water quality impacts • Involves a much larger scope (political, social, regulatory, economic) than that of this project • Very high cost • Relocation of structures, buried utilities, transit corridor, people.

5 - Accommodation	Not Recommended	• Remove people and infrastructure out of harm's way • No disruption to currents, habitat	• Continued coastal hazards • Possible compromise of foundations • Water quality concern from shoreline erosion • Little to no sandy beach habitat will be left
6 - No Action	Not Recommended	• No disruption to currents, habitat	• Threats to public safety and habitable structures • Continued costal hazards and temporary emergency structures • Water quality concern from shoreline erosion • Little to no sandy beach habitat will be left

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3. EXISITING ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This section discusses existing conditions, impacts and possible mitigation measures related to the physical and natural environment (Section 3.1), natural hazards (Section 3.2), ecological resources (Section 3.3) and the human environment (Section 3.4). Impacts and mitigation measures related to public services and public infrastructure are discussed in Sections 3.5 and 3.6, respectively. Section 3.7 summarizes secondary and cumulative impacts.

The analyses were conducted for the Proposed Action and Secondary Alternative, and the No Action Alternative provides the baseline.

3.1 Physical and Natural Environment

3.1.1 Climate

3.1.1.1 Existing Conditions

The main Hawaiian Island chain in the Pacific Ocean is one of the most remote land masses on Earth. A large eastern Pacific semi-permanent high-pressure cell to the north of the islands dictates much of air circulation patterns and climate in the region. This high-pressure cell produces northeasterly winds called trade winds over the Hawaiian Islands. Average temperatures in Kahana are 71.1 degrees Fahrenheit (˚F) (January and February) and 78.6˚F (August) (Giambelluca et al., 2014). The average annual rainfall in Kahana is approximately 30 inches per year (Giambelluca et al., 2013), and humidity in Kahana is usually about 70% (Giambelluca et al., 2014).

During the summer months, trade winds occur 80-95% of the time with average speeds of 10-20 mph. The West Maui Mountains influence local wind patterns in the Kahana area. During the winter months, trade winds decrease to 50-60% of the time and are replaced by southerly or "Kona" winds, which occur about 10% of the time. Although infrequent, hurricanes can also affect the island chain with heavy rains and strong winds.

3.1.1.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

The Proposed Action will not impact climate but will be designed to adapt and withstand predicted changes in climate-related phenomena over a 50-year lifespan, taking into account approximately one ft SLR (see Sections 1.3.2*, Anticipated Effects of Sea Level Rise and Climate Change* and 3.2.5, *Sea Level Rise*). No mitigation measures would be required.

Secondary Alternative

The Secondary Alternative will not impact climate. The design would be less adapted to withstand the effects of SLR.

No Action

The No Action Alternative would not impact climate.

3.1.2 Land Use

3.1.2.1 Existing Conditions

The beach and nearshore areas are used for recreational, cultural, tourism, and residential purposes. The sandy beach area is utilized for recreational purposes by beachgoers for surfing, snorkeling, diving, fishing and stand up paddle boarding. The shoreline landward of the sandy beach is completely developed and densely populated. Land across the street from and mauka of the adjacent properties is primarily used for multifamily, residential, and commercial purposes. Pōhaku "S-Turns" Park bounds the southern end of the project site and is a popular place for people to gather and surf.

The beach area at Kahana is designated as Open Space (OS) in the West Maui Community Plan (1996). Open space is intended to be free of obstructions such as buildings or walls more than four feet in height (Maui County Council, 1996). Adjacent uses include resorts, condominiums, and residential. The state land use district (SLUD) designation on the terrestrial portion is "Urban" (Figure 3-1), and the project area is zoned as "Hotel (H-2)," "Duplex (D-1)," "Residential (R-3)," and "Apartment (A-2), (A-1)" under the County of Maui Zoning (Figure 3-2), and as "Hotel (H)," "Multi-Family Residential (MF)," "Public/Quasi-Public (P)," and "Open Space (OS)" under the West Maui Community Designation (Figure 3-3). The properties are located entirely within the SMA (Figure 3-4). Seaward of the MHHW is defined as a SLUD "Conservation – Resource Subzone" (Figure 3-1.

While no change in land use designations is required by the Proposed Action or the Secondary Alternative, various permits will be needed prior to conducting work in some of these land use designations and are identified in Section 4.4, *List of Required Permits and Approvals*.

3.1.2.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: During the construction phase, equipment staging and work areas may hinder access and/or disrupt normal recreational use on the beach as heavy equipment will be used to construct the stabilizing structures and grade beach fill along the shoreline and in the nearshore area. Offshore dredging areas will also be unavailable for fishing and recreational use during construction. Construction BMPs may include temporary fencing, in-water silt curtains, and other measures to protect public safety and water quality but will temporarily limit in-water use.

Construction onshore will be conducted in stages from the south end of the beach moving north. BMPs will be implemented to ensure that construction activities and housekeeping are performed in an orderly manner and contained to minimize impacts to the surrounding areas. The offshore sand sources will be extracted in sequence rather than simultaneously.

Long-Term Impacts: The Proposed Action is intended to restore and widen the beach fronting the properties to protect backshore infrastructure, perpetuate recreational land use, and encourage visitors to visit the sandy beach area. The widened beach area would likely enhance land use and have negligible impacts on surrounding land use. Offshore, the beach stabilizing structures may be used as fishing posts or for other cultural and recreational activities. However, public usage will depend on the structures' ownership and management, which remain unresolved issues at the time of this DEIS preparation.

Secondary Alternative

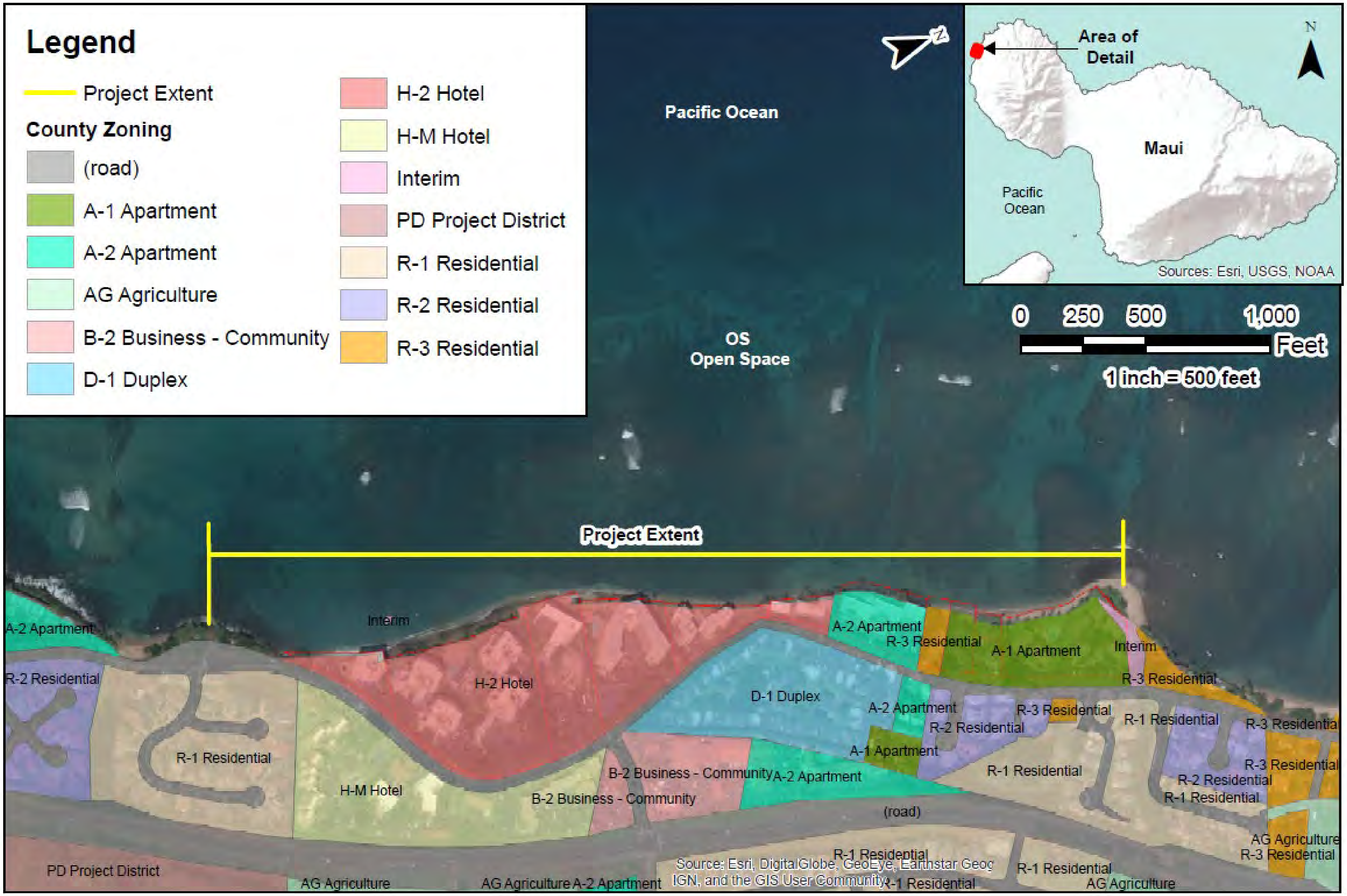
Short-Term Impacts: Beach nourishment without stabilizing structures would have similar effects on land use during construction; however, in-water impacts would be less as work would be limited to the dredge and beach fill areas only. More frequent maintenance events would be needed in the absence of stabilizing structures and cause repeated restrictions to land use during these times.

Long-Term Impacts: Similar to the Proposed Action, the Secondary Alternative would promote recreational land use and protect land use inland. Without stabilizing structures however, the longevity of the widened beach would be shorter than the that of Proposed Action and require more frequent maintenance.

No Action

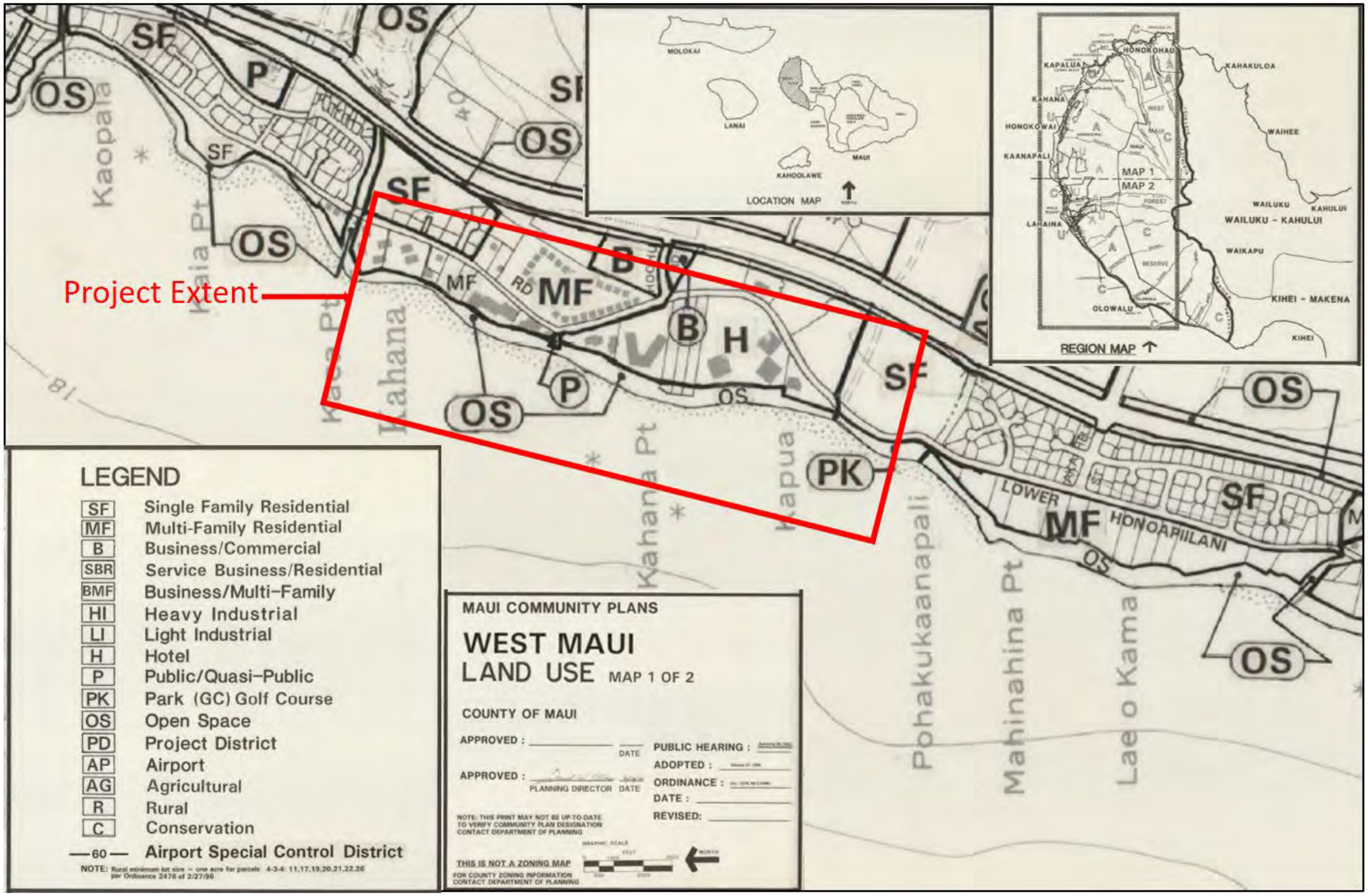
The No Action Alternative may result in nearshore areas being inundated as predicted by SLR-XA models (Sections 1.3.2 and 3.2.5). If the sandy beach is lost completely and buildings along the shoreline are damaged, urban use of the Kahana Beach area and structures as they exist will cease. No mitigation measures to preserve or enhance land use are included in the No Action Alternative.

Figure 3-1: State Land Use Districts Map



Source: County of Maui Department of Planning, 2018

Figure 3-2: County of Maui Zoning Map



Source: County of Maui Department of Planning, 1996

Figure 3-3: West Maui Community Plan Designations Map

Figure 3-4: Special Management Area Map

3.1.3 Geology, Topography, and Bathymetry

3.1.3.1 Existing Conditions

The project site is situated along the coastline on the southwestern slope of the West Maui Mountains, or Mauna Kahālāwai. Three volcanic series comprise the shield volcano that creates the West Maui Mountains: The Wailuku Volcanic Series (oldest, age dating between 1.27 and 1.30 million years ago [mya]), Honolua Volcanic Series (dating between 1.15 and 1.17 mya), and the Lahaina Volcanic Series (youngest, dating approximately 1.03 mya) (Macdonald, Abbot, and Peterson, 1983). The deep valleys of the West Maui Mountains were formed by a series of volcanic eruptions followed by periods of erosion from streams and wind. Alluvial fans stretch along the side of the mountain range, including the area along Kahana Stream.

The topography of the properties adjacent to the bay are generally flat, sloping down in the makai direction. Elevation from MSL to the vegetation line at the site ranges from 0 ft to approximately +10 ft above MSL. Where seawalls exist, such as in front of the Hololani and Pohailani parcels, the drop-off is vertical.

The topography of the ocean bottom in the nearshore is represented by bathymetry, a measurement of water depth in the ocean. The reef shows strong variations alongshore with deep channels in the bathymetry that focuses the nearshore waves into distinct energy beams toward the shore. Further discussion of existing bathymetry is explained in detail in Parts I and II of the Wave Assessment Study (Appendix A). A map of the nearshore bathymetry in the project area is shown in Figure 3-5.

Across the stretch of Kahana Beach, dry beach (defined as the distance between the beach crest and vegetation line, outside of the limit of the high tide storm run up) width varies substantially between parcels. No dry sand is present in front of the Pohailani, Hololani, and Kahana Reef parcels (where seawalls exist) at any point of the year, in contrast to the Sands of Kahana and Kahana Bay Resort parcels where the beach can widen to 60 ft. The shape of the beach profile can vary substantially throughout the year with seasonal current patterns (EMA, 2019; Appendix B). In general, more sand along the shoreline is present in the summer but can be swept away over the course of days or weeks with winter swell and weather patterns. In 2015, a fixed camera was installed fronting the Royal Kahana Condominiums. Selected images from this vantage point over the last four years during the winter and summer months depict the seasonal accretion and loss of the beach in that area (Figure 3-6) (EMA, 2019; Appendix B).

Groundwater across the site is estimated to be 10 ft below ground surface (bgs) or less. Measured groundwater levels at the Hololani parcel, approximately at the midpoint of the project area, were encountered at 8.1 to 8.7 ft bgs (Sea Engineering, 2013).

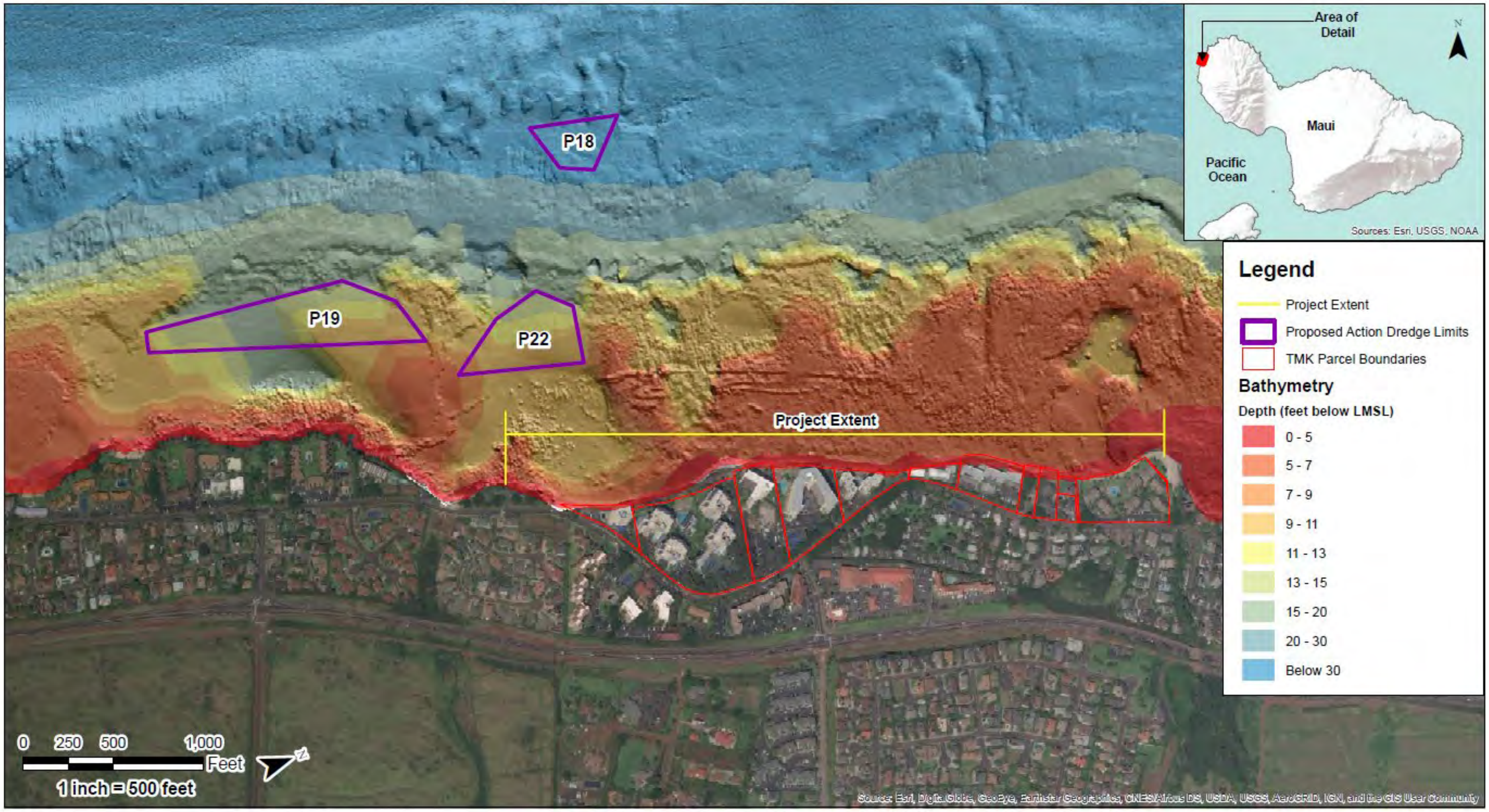
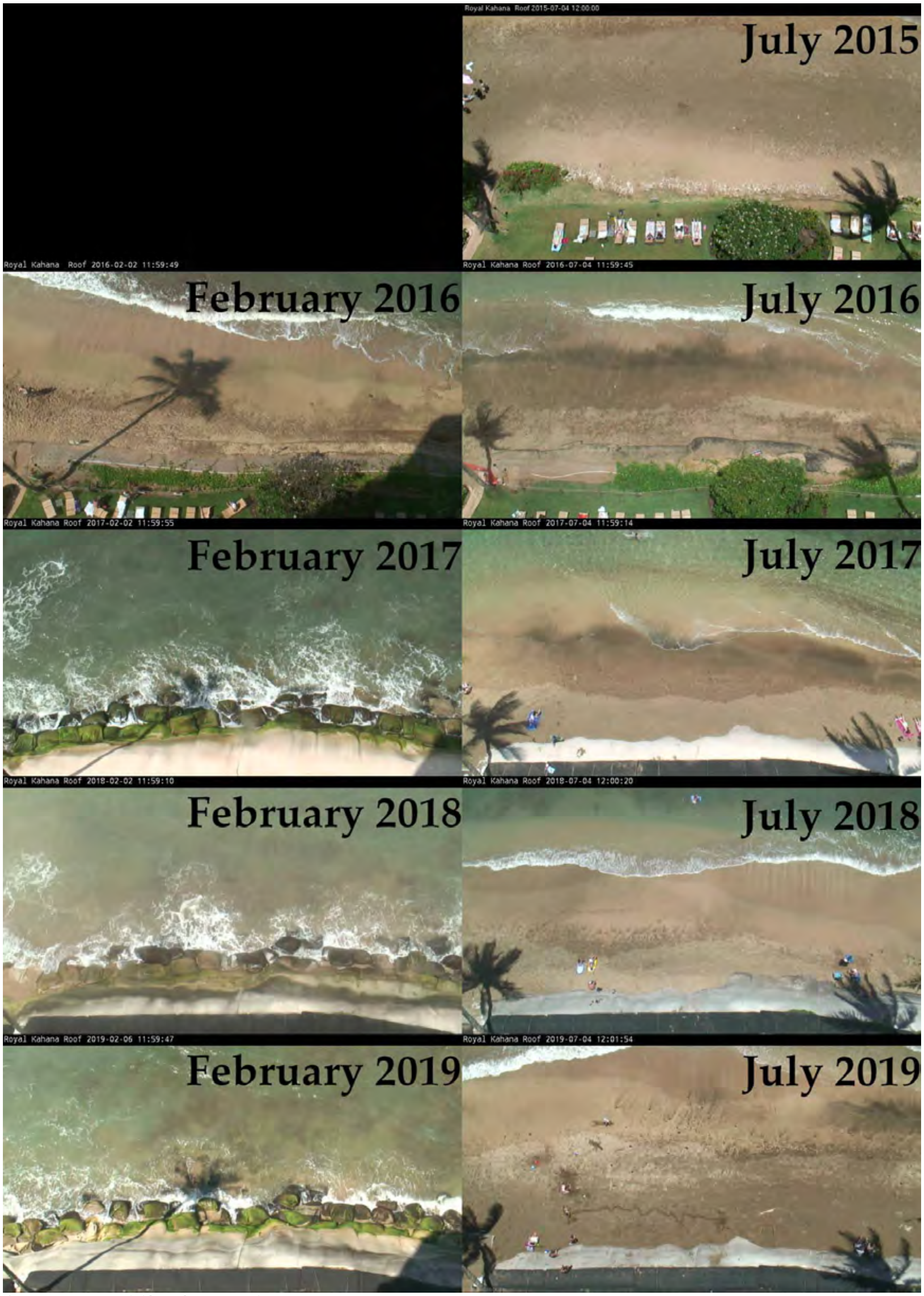


Figure 3-5: Bathymetry Map



Source: Images provided by Kyle Aveni-Deforge

Figure 3-6: Fixed camera photographs showing general pattern of annual winter beach erosion and spring and summer beach depostion at the beach fronting the Royal Kahana

3.1.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Short-term changes to topography from stockpiling beach material and grading may occur during construction. Stockpiles and grading activities will be conducted in accordance with all applicable County regulations to minimize impacts to public and environmental safety.

Long-Term Impacts: The Proposed Action would restore the sandy beach front to a historical width from MSL to approximately 8 ft in elevation. The vegetated berm would further elevate the backshore area by an additional 3 ft (~11 ft above MSL) (Figure 2-6). The stabilizing structures would rise 6 ft above MLLW out of the water, with a 9 to 11 ft-wide crest (Figure 2-7). Long-term impacts to the sea floor and bathymetry occur within the footprint of the stabilizing structures and in-water sand fill areas, as these areas will be covered. Wave modeling shows that a slight change in bathymetry would slightly slow the flow pattern locally at the dredging site, but no significant change in the overall current condition is shown over the adjacent reef area (see Section 3.2.1, *Coastal Processes* and Appendix A for further detail).

Secondary Alternative

The Secondary Alternative would have similar impacts to topography on the beach and on the bathymetry in the nearshore sand fill area and dredging areas. The bathymetry in the nearshore area would not be affected by stabilizing structures.

No Action

While no anthropogenic-induced changes to the topography of the area would occur in the No Action Alternative, SLR and inundation may permanently alter the existing Kahana Beach front topography through coastal erosion.

3.1.4 Soils and Sand Quality

3.1.4.1 Existing Conditions

Terrestrial Soils: Soils along the beach coast consist of Pulehu clay loam, 0-3% slopes (PsA) on the northern half of the project site, and Jaucas sand, 0-15% slopes (JaC) and Lahaina silty clay, 3-7% slopes (LaB) on the southern half according to Web Soil Survey maps (NRCS, 2018). PsA soils are characterized as well-drained soils with low runoff on alluvial fans and stream terraces with origins from alluvium parent material derived from igneous rock. JaC soils are excessively drained, calcareous soils with low runoff, from sand-sized coral and seashell marine deposits derived from sedimentary rock. LaB soils are characterized as well-drained, upland soils with moderate runoff weather from igneous rock (Foote et al., 1972; Figure 3-7). According to the United States Geological Survey (USGS) Geologic Map of the State of Hawaiʻi, the area under the project site is comprised of older sand dune deposits. Upland of the southern edge of the site past the Lower Honoapiʻilani Highway, Wailuku volcanic material is present. Upland of the northern half of the project site, alluvium accumulated from the Kahana stream underlies the area (Sherrod et al., 2008) (Figure 3-8).

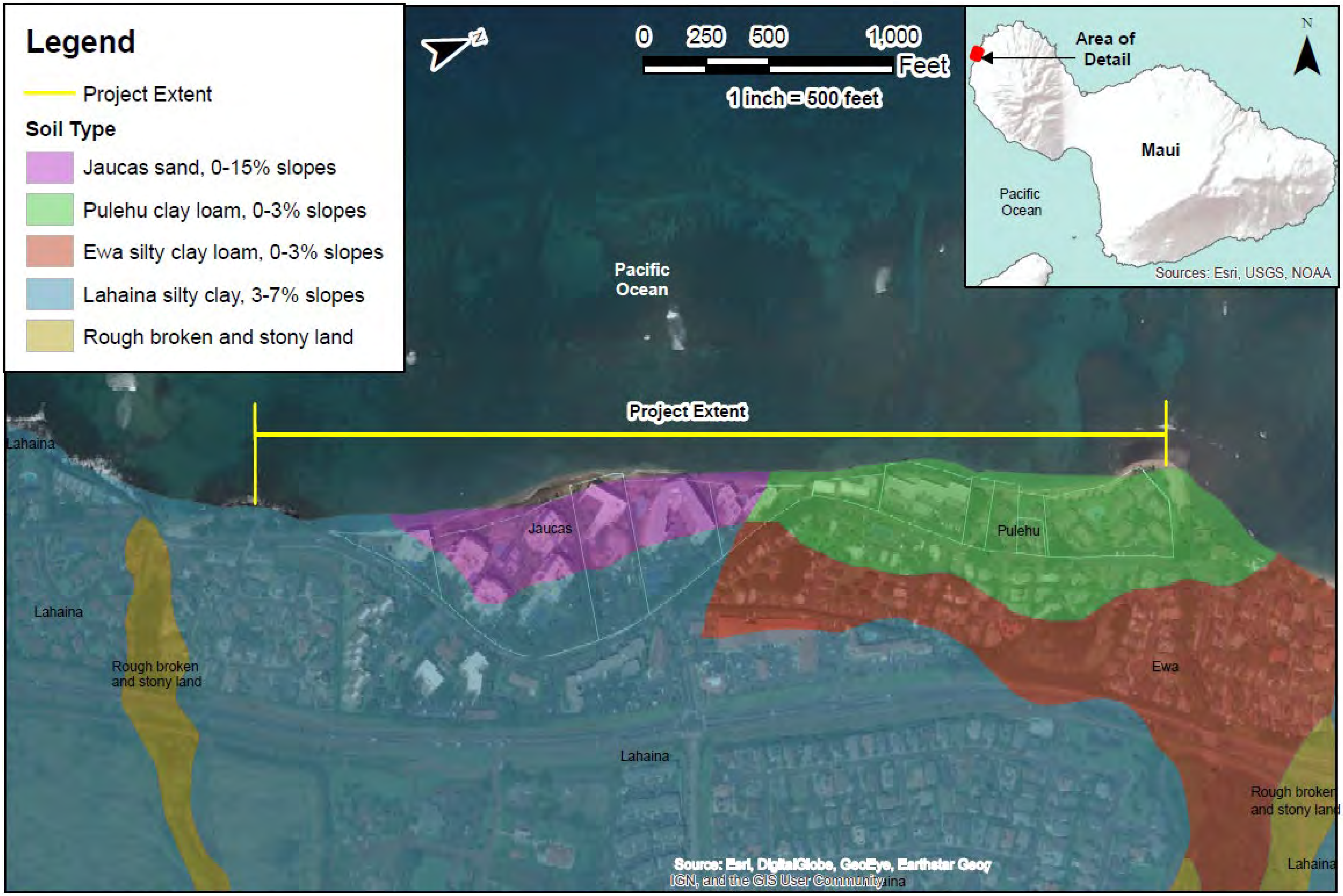


Figure 3-7: Soils Map

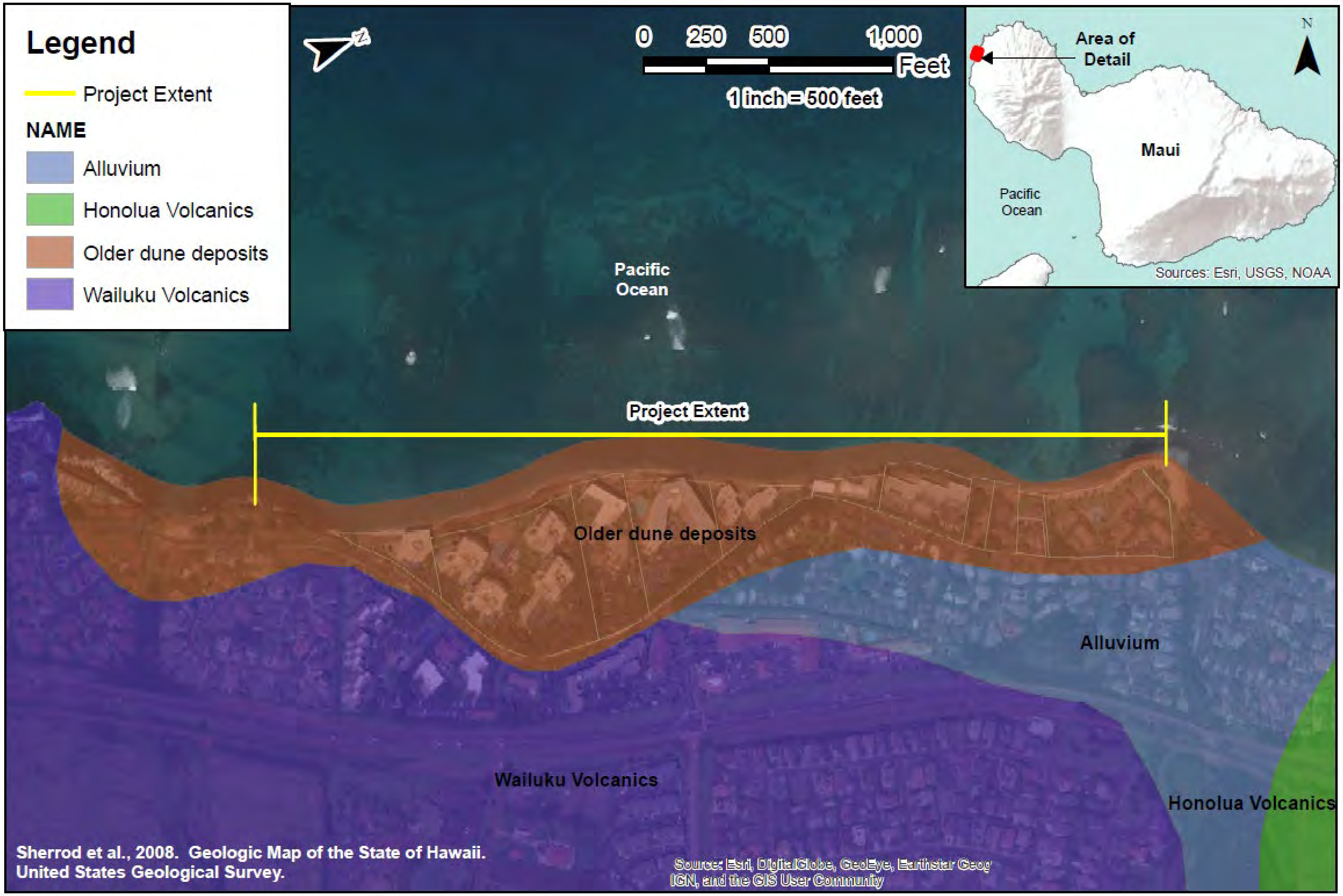


Figure 3-8: USGS Geologic Map of the State of Hawai'i

In 2013, a soil investigation was conducted at Hololani, located approximately in the center of the current project site, as part of the Hololani Rock Revetment Environmental Assessment. Five test borings were drilled to depths between 17.5 to 21.5 ft bgs. The results of the borings revealed mixtures of silt, sand, and gravel down to approximately 18 ft bgs, after which depth only hard rock was encountered (Sea Engineering, 2013).

Kahana Bay Beach Sand: The Kahana Bay project area has a seasonal, dynamic, non-contiguous beach that is broken up by seawalls, sandbag revetments, and other shoreline protection structures. The amount and type of sand on the beach is highly variable and depends on the local wave climate and season. Waves from the south during the summer tend to bring sand from the more southern reaches of Kahana Beach, while waves from the north and northeast tend to strip the sand away during the winter (DLNR, 2013) (Section 3.1.3, *Soils and Sand Quality*).

A 2015 Royal Kahana Sediment Survey took approximately 2.5-ft core samples (composites of berm, middle, and toe) from four beach profiles fronting the Royal Kahana Condominiums. Results from the 2015 study were compared to composite beach samples collected in June 2019 as part of the Sand Quality Confirmation Study performed for this DEIS. The average grain size of the 2015 beach sand samples was similar to that of the 2019 samples. The 2019 samples were collected using a multi-incremental composite sampling approach (DOH, 2018a) taken from the berm, mid, and toe of the beach profile across the lateral extent of the north and south extents of the beach in June 2019 (EMA and Oceanit, 2020; Appendix B). Sand on the north end of the beach was found to be coarse (mean 0.857 millimeters [mm] in diameter) and 55% calcium carbonate, while sand on the south end of the beach was very coarse (mean 1.153 mm in diameter) and only 19% calcium carbonate with dark grains which were likely basalt. The low amount of calcium carbonate on the south end of the beach may be due to nearby weathering sources of basalt.

Marine soils/sand: Two sand search studies were conducted to characterize the available volume and suitability of nearshore sand for placement on the beach at Kahana Bay. In 2015, the Royal Kahana Condominiums conducted a sediment search to explore five sand deposits (P15 through P19) in the immediate vicinity fronting the Royal Kahana. Surface grab samples from each offshore sand site and from the beach were collected using 2-inch core tubes from four beach profiles (Rising Tide Engineering, 2015). The results from this study were superseded by the 2016 County of Maui Sand Study. The more extensive Kahana Bay Regional Sediment Survey (performed by Moffat and Nichol) characterized sand availability for a regional sand nourishment. The investigation involved a sub-bottom profiler, Vibracore sampler, and diver-operated jet-probing. The 2016 study identified four possible offshore sand donor sites (P18, P19, P22, and P23). Sand grain size from P22 was analyzed. From the 2016 study, P18, P19, and P22 were identified as priority sand deposits for the present DEIS study (County of Maui, 2016).

As part of this DEIS, a sand quality confirmation study was conducted in June 2019 to evaluate the volume and suitability (using physical and chemical parameters) of offshore sand for potential use in a regional scale beach restoration project at Kahana Bay. The investigation used diver-operated jet-probing to measure depth and Vibracore-collected sand cores to implement a multi-incremental approach to explore sediment grain size distribution and calcium carbonate composition from three identified sand sources (i.e., Sites 18, 19, and 22). Each sand source was split into 50 m^2 sampling decision units (DUs) overlaid on each sand source area, each of which were delineated by the horizontal extent of a simplified polygon that could be feasibly extracted under standard dredging conditions. A total of 21 DU sand core samples were taken: four DUs in Site 18, eight in Site 19, and nine in Site 22. Composite samples from the surface and lowest depth from each DU was combined for each sand source using a multi-incremental approach (DOH TGM, 2018). Sand from Sites 19 and 22 were closer in grain size distribution (profile within 20%) to the existing beach sand compared to Site 18, which contained finer grain size on average. The percent composition of calcium carbonate at each of the three borrow sites was 83% (Site 18), 86% (Site 19), and 94% (Site 22) (EMA and Oceanit, 2020; Appendix B).

To test for contaminants, a sediment sample was taken from Site 19 at the point fronting the large drainage outfall at Pōhaku Park (where sediment and surface water travel from the West Maui Mountains down to the ocean) and tested for arsenic and organochlorine pesticides, the contaminants of potential concern (COPCs). These COPCs were selected based on past land use according to the Department of Health Technical Guidance Manual guidance (DOH, 2018a), as the upland areas of the project site were former sugar cane fields. Results of the contaminant analyses revealed that the offshore sand samples are free of contaminants and suitable to be placed on the beach. Total organochlorine pesticides were not detected, and arsenic was detected within background levels defined by the State of Hawaiʻi Department of Health (DOH, 2017) (EMA and Oceanit, 2020; Appendix B).

3.1.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

The Proposed Action will add sand fill from offshore sources to the beach. Sand used to replenish the beach must be of similar color, composition, and grain size and lack fine sediment that could pollute nearshore marine waters. Beach fill placed on the Kahana shoreline will be required to comply with State DLNR regulations for sand, which include:

1. Beach fill sands shall not contain more than 6% fines, defined as the #200 sieve (0.074 mm);
2. No more than 50% of the fill sand shall have a grain size diameter less than 0.125 mm, as measured by the #120 sieve;
3. Beach fill sands shall not exceed 10% coarse sediment, defined as the #4 sieve (4.76mm);
4. The size distribution for the proposed fill sand shall fall within 20% of the existing beach sediment, as measured by cumulative percent finer-than or coarser-than values;
5. In cases where the beach fill grain size distribution curve is uniformly finer than the existing beach, the overall ratio of fill to existing sediment shall not exceed 1.5;
6. Beach fill shall be dominantly composed of naturally occurring carbonate beach or dune sand; and
7. Beach fill shall be free of contaminants of any kind, including: excessive silt, sludge, organics, turbidity, 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.

Sand “as is” from offshore Sites 19 and 22 is suitable to be placed on Kahana Beach as they fulfill DLNR requirements for sand grain size, quality, color, contaminants, and calcium carbonate composition (EMA and Oceanit, 2020; Appendix B). Although sand grain size from Site 18 is not within 20% of the existing beach sediment profile, if this sand source is mixed with sand from Sites

19 and 22, the profile of the mixture may be of acceptable quality. Compliance with DLNR and DOH regulations will ensure that sand quality is acceptable and minimal environmental impacts will occur as a result of the Proposed Action.

One unexpected anecdotal consequence noticed in beach nourishment events in Waikiki was that sand became compacted along truck haul routes, creating a hardened berm (Coastal Geology Group, 2013). Although further research is necessary to confirm that the truck route was the sole cause of compaction, to mitigate possible compaction, BMPs such as steel plates or temporary gravel could be laid along the truck haul routes and under storage areas to distribute weight load and reduce compaction.

Secondary Alternative

Similar impacts to soils and sand quality during construction and operation are expected in the Secondary Alternative. The same standards for sand fill quality to mitigate impacts described above would be applied to the Secondary Alternative to mitigate effects from dredging and sand fill.

No Action

No impacts to soils or sand quality would occur as a result of the No Action Alternative. Accordingly, no mitigation efforts would be implemented.

3.1.5 Air Quality

3.1.5.1 Existing Conditions

The United States Environmental Protection Agency (EPA) has national ambient air quality standards (NAAQS) for ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), 2.5-micron and 10-micron particulate matter (PM) ($PM_{2.5}$ and PM_{10}), and airborne lead. These ambient air quality standards establish the maximum concentrations of pollution considered acceptable for public health and welfare. The State of Hawai‘i also has ambient air quality standards for some pollutants. At the present, the State has set standards for five of the six criteria pollutants (excluding $PM_{2.5}$) and hydrogen sulfide, which is not included in NAAQS (DOH, 2016).

The project area is in EPA attainment zones for CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, SO_2, and lead (EPA, 2014). In 2015, Hawai‘i was in attainment with NAAQS annual averages of PM_{10}, $PM_{2.5}$, O_3, CO, and SO_2, based upon three-year averages of annual mean values from 12 air quality stations, including four on O‘ahu, three on Maui, six on Hawai‘i Island, and one on Kaua‘i. The air quality station closest to the project site is located approximately 15 miles to the southeast and on the opposite side of the West Maui mountain range in Kahului. The station only measures $PM_{2.5}$. The annual averages from this air quality station from 2013-2015 indicated that annual average of $PM_{2.5}$ levels in ambient air were well below their federal (40 Code of Federal Regulations [CFR] Part 50) standards (DOH, 2016). There are no current Hawai‘i State Standards for $PM_{2.5}$.

During winter months when trade winds are absent and "Kona" winds blow form the southeast, vog from Hawai‘i Island can bring increased levels of SO_2 and $PM_{2.5}$. Hawai‘i's advisories for volcanic SO_2 and $PM_{2.5}$ have been customized for local conditions. Air monitoring stations in communities near Kīlauea Volcano on Hawai‘i Island often exceed the NAAQS for SO_2 and occasionally $PM_{2.5}$. The EPA considers activities from the volcano a natural, uncontrollable event, and therefore the state requests exclusion from these NAAQS exceedances for attainment/non-attainment determination

(DOH, 2016). Shorter exposure time intervals have also been adopted due to variable wind conditions, which can cause volcanic gas concentrations to change rapidly.

DOH regulates fugitive dust, which can be released during earth-moving activities including removal of earth, excavation and fill, debris clearing, and vegetation grubbing. Maui County also regulates dust through its grading ordinance (MCC Chapter 20.08) and requires the implementation of specific BMPs during ground altering activities to ensure that dust, dirt, and debris do not enter the ocean, waterways, or neighboring properties nor create airborne pollution.

3.1.5.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Potential impacts to air quality are construction-related and no long-term impacts are anticipated. During construction, the Proposed Action can potentially generate fugitive dust during earth moving activities. On-site soil disturbance that could result in particulate emissions is expected to be limited to sand dredging and movement. Temporary degradation in air quality (e.g., increased levels of CO, nitrogen oxides, volatile organic compounds (VOCs), and $PM_{2.5}$ and PM_{10}) in the immediate project area may occur because of emissions from construction equipment and personal vehicles. A site-specific BMP plan will be written for the project, and construction BMPs will be employed throughout the project. The contractor will comply with the provisions of HAR §11-60.1-33 on Fugitive Dust to keep dust to the lowest levels practicable. These include but are not limited to:

- Planning different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
- Providing an adequate water source at the site prior to start-up of construction activities;
- Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
- Minimizing airborne, visible fugitive dust from shoulders and access roads;
- Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
- Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

Additional BMPs that may be implemented to minimize impacts to air quality include:

- Properly tuning and maintaining construction equipment and vehicles;
- Limiting size and extent of exposed areas;
- Covering mounds of soil or fill;
- Watering work areas and unpaved work roads;
- Using wind screens;
- Establishing a routine road cleaning and/or tire washing program; and

- Monitoring dust at the project boundary if significant dust generation is anticipated.

Secondary Alternative

Because the Secondary Alternative would require more frequent nourishment than the Proposed Action, short-term air quality impacts related to construction would occur in approximately nine-year intervals in the long-term, compared to a renourishment event 30 years after construction as estimated with the Proposed Action. Proposed mitigation measures are similar to those recommended for short-term air quality impacts.

No Action

No short- or long-term impacts to air quality are anticipated in the No Action Alternative.

3.1.6 Water Quality

3.1.6.1 Existing Conditions

The DOH Water Quality Standards (WQS) classify the waters of Kahana Bay area as “open coastal” and Marine Class A waters (DOH, 2014). Class A waters are defined by their objective that “their use for recreational purposes and aesthetic enjoyment be protected. Other uses are permitted as long as they are compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and out on these waters” (HAR §11-54-3). The nearshore marine waters in the project area are included on the DOH list of impaired waters in Hawaiʻi prepared under CWA §303 (DOH, 2018b) for ammonia, nitrate+nitrite, turbidity, and chlorophyll a. The project area is listed as a “Category 2” defined as “some uses attained” and “Category 5” defined as “at least one use not attained” and a Total Maximum Daily Load (TMDL) is needed (AECOS, 2021; Appendix C).

Nearshore waters cannot be degraded by the addition of a specific point source of water pollution, such as an outfall pipe, without obtaining a National Pollutant Discharge Elimination System (NPDES) permit. Overall, the purpose of the NPDES is to ensure that anthropogenic inputs do not exceed the natural assimilative capacity of the environment.

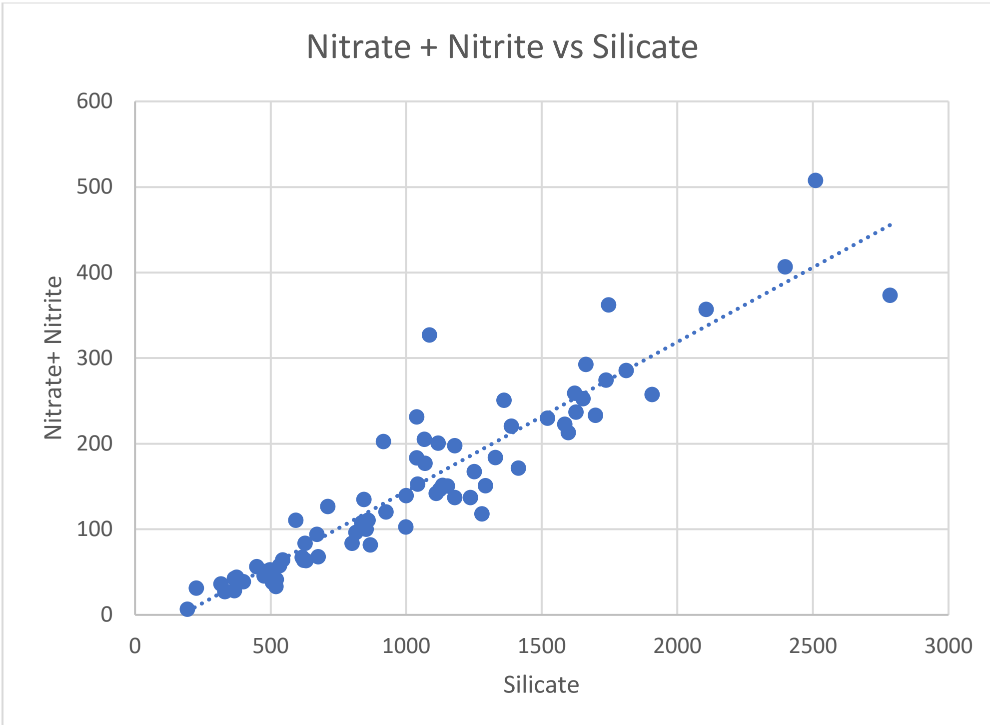
Water quality field data were collected from the area between June 21-June 23, 2019 as part of the marine biological and water quality surveys (AECOS, 2021; Appendix C). Physical parameters of temperature, salinity, pH, and dissolved oxygen (DO) were measured *in situ* while nutrient parameters of turbidity, ammonia, nitrate+nitrite, total nitrogen (total N), total phosphorus (total P), and chlorophyll a were collected to be analyzed in the laboratory. Sampling locations were collected from three transects perpendicular to the shore at 2 meters (m) and 10m, as well as once at the borrow sites. All physical parameters, except for DO saturation, tended to increase in a northerly direction along the transects.

All measured physical water quality parameters (i.e., salinity, temperature, pH, DO), except turbidity, met DOH criteria for “dry” conditions during the survey. Turbidity in the nearshore waters were high, approximately ten times higher (5.77 nephelometric turbidity units [NTU]) than the state “wet” criterion of 0.50 NTU. Ammonia, nitrate+nitrite, and chlorophyll a all exceeded DOH criteria. Elevated turbidity is common in nearshore coastal waters due to wind and wave action stirring up shallow bottom sediments. A gradient of nitrate+nitrite values decreased from south to north across the project area. A significant inverse relationship between salinity and nitrate+nitrite values suggest that terrestrial runoff or groundwater is the primary source of nitrate+nitrite in these nearshore waters, likely from the fallow agricultural fields upland of the project, which account of 32% of the Kahana watershed. Other nitrogen inputs may occasionally come from Kahana Stream, which only flows directly into the ocean during major storm events (see Section 3.3.2, *Streams)*. Total N exceeded the state criterion at one transect (out of three total) and total P met the state criterion at all three transects. For more details about the water quality sampling conducted during July 2019, refer to Appendix C.

The DOH – WQS specify two main standards depending on the freshwater input rate at the shoreline. Dry water quality limitations apply to areas where the input rate is less than three million gallons per day per mile of shoreline. When the rate exceeds this amount, wet water quality limitations apply. The standards specify limits on the geometric mean that should not be exceeded 50% of the time, 90% of the time, and 98% of the time. This approach ensures that compliance with WQS requires multiple sampling.

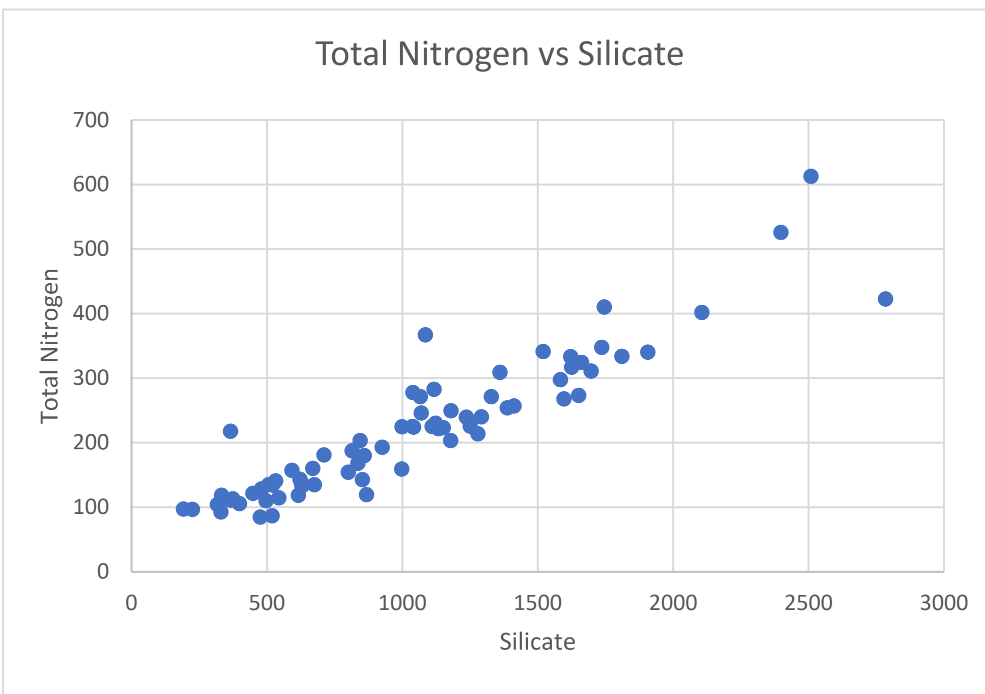
In addition to groundwater discharge into the Kahana Bay coastal waters, there are several discharge locations from streams and manmade drainage outlets in the project area that affect water quality in the area. Several drainage outlets that drain water from Lower Honoapiʻilani Road are maintained by the Maui County Department of Public Works (refer to Section 3.6.4, *Drainage System*). Runoff from these drainage outlets may impact water quality during times of heavy rain. Kahana Stream discharges at the northern border of the project site. Water quality impacts and elevated turbidity may be evident around the mouth of the stream, especially after upcountry rainstorms, where the stream discharges into a naturally cut channel offshore of the stream.

There are two nearby long-term water quality monitoring stations near outfalls with historic and ongoing monitoring programs that flank the project site, located at the mouth of Kahana Stream on the northern end of the project site and at the outlet fronting Pōhaku Park on the south end of the project site. Water quality sampling at the Pōhaku Park location was performed by the State between February 2015 and October 2016. Hui O Ka Wai Ola (HUI), a non-profit organization, took over sampling at this site in October 2017 and continues to collect water samples approximately every three weeks. Since July 2017, HUI has also taken monitoring data the Kahana Stream location. Monitoring data collected include, temperature, salinity, dissolved oxygen, pH, turbidity, total nitrogen, nitrate plus nitrite nitrogen, ammonia nitrogen, total phosphorus, ortho phosphorus and silicate. These monitoring data show consistent elevated nitrate+nitrite and turbidity values (Falinski et al., 2017; AECOS, 2021) similar to trends observed in the June 2019 sampling. These data also show a consistent relationship between nitrate+nitrite and silicate concentrations. Figures 3-9 and 3-10 show this relationship for data collected over several months. Average water quality measurements taken from both sites by HUI over the past few years are summarized in Table 3-1.



Source of data: Hui O Ka Wai Ola, 2020

Figure 3-9: Relationship between Nitrate + Nitrate and Silicate concentrations collected from Kahana Stream and Pōhaku Park Long Term Monitoring Stations



Source of data: Hui O Ka Wai Ola, 2020

Figure 3-10: Relationship between Total Nitrate and Silicate concentrations collected from Kahana Stream and Pōhaku Park Long Term Monitoring Stations

Table 3-1: Average Water Quality Parameters at Kahana Village and Pōhaku Park Sampling Sites (Hui O Ka Wai Ola, 2020)

Monitoring Site	Kahana Village[a]	Pōhaku Park[a]
Location (Lat, Long)	20.976561, -156678000	20.967083, -156.681390
Temp (°C)	26.2 ± 1.4	25.5 ± 1.4
Salinity (ppt)	34.5 ±0.84	33.5 ± 1.4
DO (mg/L)	6.6 ± 0.5	6.6 ± 0.3
DO sat (%)	99.6 ± 7.1	97.4 ± 3.1
pH	8.2 ± 0.06	8.1 ± 0.06
Turbidity (NTU)	11.9 ± 12.3	7.7 ± 7.6
Total N (µg/L)	105.7 ± 46.1	222.1 ± 105.2
Total P (µg/L)	11.0 ±3.1	17.6 ± 5.5
Phosphate (µg/L)	7.5 ± 2.2	14.0 ± 4.5
Silicate (µg/L)	462.8 ± 216.1	1042.2 ± 559.1
NNN (µg/L)	24.9 ± 16.1	152.0 ± 104.6
NH_4 (µg/L)	4.0 ± 4.0	4.5 ± 2.5

[a] Near to outfalls

Overall trends comparing long-term and more recent water quality data in the area demonstrate a significant inverse relationship between salinity and nitrate+nitrite in the nearshore waters, suggesting that groundwater is the primary source of nitrate+nitrite in the nearshore waters. Nitrate+nitrite and Total N are highest by Pōhaku Park and decrease moving north toward Kahana Stream. This is likely due to the residual fertilizer runoff from agricultural fields upland of the project area, which comprise approximately 32% of the Kahana watershed (AECOS, 2021). Other sources could include nutrients moved by longshore currents and occasional inputs from Kahana Stream, which only flows into the ocean during major storm events (Cheng, 2014). Turbidity levels in the project area are consistently ten times higher than the state wet criterion (5.77 NTU vs. 0.5 NTU). Elevated turbidity in nearshore waters is typically elevated due to wave and wind action stirring up shallow bottom sediments (AECOS, 2021). All water quality parameters can vary significantly with storm events due to runoff and terrigenous erosion. Terrestrial inputs during heavy rain events are discharged from drainage outlets, Kahana Stream, and the large concrete outlet by Pōhaku Park.

3.1.6.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Potential impacts to water quality in the short term include increased turbidity levels at the sand source areas during sand extraction operations, at groin construction sites, and during sand replenishment operations. These impacts will be limited to relatively small areas close to the activity and will be controlled with construction BMPs such as anchored silt curtains surrounding both sand source and beach nourishment structures. Construction equipment, fuel, and introducing treated materials such as concrete into the marine environment can also result in nutrient and chemical contamination but can be avoided and mitigated with proper BMPs. For example, concrete can be poured and cured on land and set in place in the water. Mechanical fueling practices shall be conducted away from the water and in secondary containment to prevent spills.

Dredging will increase turbidity close to the sand source areas due to bottom disturbance. The level of seabed disturbance and the amount of water moved will be minimized by using an environmental clamshell bucket and mechanical dredging in place of suction dredging. Environmental clamshell buckets typically have tighter seals and overlapping sides and are designed to minimize sediment loss from within the bucket, re-suspension at the dredge site, and water entrainment with each grab. In addition to selecting an environmentally less impacting dredging method, the dredging area with the dredger and the sand receiving barge will be isolated with a silt curtain extending from the water surface to the bottom. The silt curtain will prevent increased turbidity impacting surrounding water. The barges will be sediment tight and will be filled with sand to an appropriate level to prevent silt contamination along the path from the dredger to the sand unloading site at the shoreline. Sand will be unloaded at a trestle nearshore and loaded into trucks. Silt curtains and other BMPs will be utilized at the unloading sites to prevent water pollution.

Dewatered sand from the stockpiling sites will be moved to the shore and graded to the design shape using equipment. The sand may contain some silt which could impact water quality. Silt curtains anchored to the bottom or shore, depending on the location, will be used to contain and control turbidity.

T-groin construction will disturb beach sand and require some excavation. Silt curtain or sandbag berms will be used to isolate the work areas to prevent water quality impacts from construction. Construction equipment will be kept clean and operated responsibly to prevent potential oil contamination of nearshore waters.

Average fine sediment content in the proposed nourishment sand is required by DLNR to be less than (<) 6%. The placed sand is expected to equilibrate and fine sediment will be suspended in wave action until it moves offshore. During beach nourishment projects, turbidity fluctuates the most during construction and post-construction operations as compared to pre-construction values. This could be due to wave action and the resuspension of the fine-grained sand fraction in the sand fill (Coastal Geology Group, 2013). To mitigate the amount of fines, source sand will need to be beach quality sand with a grain size distribution and characteristics detailed in Section 3.1.4, *Soils and Sand Quality*. Post-construction monitoring would be necessary, as micritic calcium carbonate and sediment-bound nutrients and chemical contaminants may be leached.

As part of the 401 WQC process, detailed AMAP and BMP plans will be prepared and then approved by the DOH CWB. The BMP plan will clearly define the necessary best management practices to contain and minimize pollution to nearshore waters using silt curtains, temporary sandbags, filter socks or other barriers in the water and on land. The AMAP plan will include procedures for water quality analyses pre- during, and post-construction, as well as thresholds defining stop work criteria should project construction activities pollute nearshore waters. Water quality parameters that should be tested for include pH, turbidity, salinity, temperature, dissolved oxygen, any other analyses required by the DOH CWB. Monitoring frequency will be determined by DOH CWB. A long-term water quality monitoring plan that extends beyond the post-construction monitoring could be developed and implemented to ensure that project activities do not further degrade water quality, perhaps done concurrently with long-term marine resources surveys.

NMFS Pacific Islands Regional Office (PIRO) suggests the following to mitigate sedimentation and turbidity effects during construction activities in their EISPN consultation (Appendix I):

- Conduct intertidal work at low or slack tide;
- Conduct work during calm sea states; stop work during high surf, winds, and currents;
- Perform work outside of the main coral spawning period in the summer (May to August) to minimize sedimentation and turbidity effects to coral eggs and larvae in the area;
- Install sediment and turbidity curtains and use real-time monitoring (automatic or manual) for barges and dredge vessels to detect failure and stop work conditions based on CWA 401 WQC;
- Use soft and/or natural engineering solutions to maintain/restore natural flow volumes and velocity;
- Minimize disturbance to stream banks, and place abutments outside of the floodplain whenever possible. Seek to maintain baseline water flow volume and velocity within the system;
- Utilize environmental clamshell buckets for mechanical dredging;
- Design nourishment activities to maintain or replicate natural stream channel flow and flow conditions;
- Fully stabilize disturbed upland areas prior to removing silt fences and erosion prevention measures.

To mitigate nutrient and chemical contamination, the following measures will be implemented:

- Conduct work during the dry season, stop work during storms or heavy rains;
- Inspect all equipment prior to beginning work each day to ensure that the equipment is in good condition and there are no leaks;
- All equipment will be kept in good condition or removed from service until repaired if they are found leaking;
- All fueling or repairs to equipment will be done in a location with appropriate controls;
- Prevent discharges of chemicals and other fluids besides sea water into the water column;

- Use materials that are nontoxic to aquatic organisms, such as untreated wood, concrete, or stainless steel;
- Use diffused on the end of subtidal discharge pipes to minimize impacts from discharges; and
- Prevent bentonite drilling fluid from contacting live benthic organisms.

Long-Term Impacts: The Proposed Project impact will significantly reduce beach erosion, and possibly reduce turbidity levels in nearshore waters, which will benefit water quality. In addition, the headland at the north end of the project area (Ka‘ea Point) where Kahana Stream discharges, will be stabilized. Any adjunct project that reduces the amount of sediment discharge from the stream into marine waters will improve coral growth conditions (AECOS, 2021; Appendix C). A long-term water quality monitoring plan after post-construction activities, similar to that conducted for the Waikiki Beach Nourishment activities on O‘ahu, should be implemented. The long-term water quality monitoring should include sampling between groins.

The nearshore water within the interspaces between groins may have a slight increased resident time from reduced mean wave velocity in the nearshore area (Figure 3-11). This may be expressed by slightly elevated water temperature, DO saturation levels, and pH during daylight hours, and slightly lower salinity and higher nitrate+nitrite concentrations from groundwater seepage. Waves and tidal flushing will naturally minimize these potential impacts. To determine anticipated impacts on the breaker zone currents and nearshore circulation, the mathematical BOSZ model was run under conditions before and after project construction. The in-place groin system moved nearshore currents slightly offshore but did not have an impact on their strength. The currents and circulation within the cells between groins were found to be sufficiently strong enough to prevent stagnation and water quality degradation (see Section 3.2.1, *Coastal Processes*).

Periodic turbidity associated with equilibration of the beach profile may occur as sand moves along the beach and cross-shore. Larger sand size grains are currently stable along the coastline and make up the existing beach face; however, finer material will likely remain suspended until it has moved offshore. Longer term impacts may include leaching of micritic calcium carbonate of beach fill for several weeks or months but would result in reduced shoreline erosion and turbidity in the nearshore waters, preventing or reducing plumes from terrigenous soil. Sand with a higher fraction of the fines will be placed above the highwater mark to develop a protective berm that further minimizes sand suspension in the nearshore water.

Implementation of storm water BMPs that improve water quality could possibly offset adverse impacts on coral reef communities from development projects and be used as a compensatory mitigation action.

Secondary Alternative

The Secondary Alternative proposes beach nourishment with 75,000 cy of sand placed along Kahana Bay beach without the stabilizing structures. Interspaces between groin structures would not be formed, so water movement would be maintained in the nearshore area. Wave and circulation processes over the reef flat will be minimally changed from the existing conditions. However, the added large volume of sand will be exposed to wave actions, which could possibly increase sediment transport over the nearshore area and have impacts on water quality. Similar mitigation measures described above would be applied to this alternative.

No Action

The No Action Alternative may result in further shoreline erosion and increase turbidity and TSS in the nearshore area. Mitigation to erosion may continue by individual properties in the form of temporary and permanent shoreline protection schemes that could help to preserve water quality.

3.1.7 Noise

3.1.7.1 Existing Conditions

Existing ambient noise levels include vehicle traffic, aircraft, ongoing maintenance, construction equipment, surf, boats, and wind. In the vicinity of significant construction activity, noise levels can intermittently reach 80 decibels (dBA). The DOH regulates noise per HAR §11-46, "Community Noise Control," which establishes maximum permissible sound levels (Table 3-2). The rules provide for the prevention, control, and abatement of noise pollution from stationary noise sources and from equipment related to agricultural, construction, and industrial activities. The standards are intended to protect public health and welfare and to prevent the significant degradation of the environment and quality of life. DOH establishes acceptable levels of noise based on the ambient conditions (Class A-C) that would be anticipated in differing land uses situations (i.e., Zoning Districts) ranging from residential and business/resort, to industrial conditions.

The project site is in a Class B zoning district, as defined by HAR §11-46. HAR §11-46-7 grants the Director of the DOH the authority to issue permits to operate a noise source which emits sound in excess of the maximum permissible levels specified in Table 3-2 if it is in the public interest and subject to any reasonable conditions. Those conditions can include requirements to employ the best available noise control technology.

Table 3-2: Maximum Permissible Sound Levels in dBA

Zoning Districts	Daytime (7am – 10pm)	Nighttime (10pm-7am)
Class A	55	45
Class B	60	50
Class C	70	70

Notes:
1) Class A zoning districts include all areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.
2) Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.
3) Class C zoning districts include all areas equivalent to lands zoned agriculture, country, industrial, or similar type.
4) The maximum permissible sound levels apply to any excessive noise source emanating within the specified zoning district, and at any point at or beyond (past) the property line of the premises. Noise levels may exceed the limit up to 10% of the time within any 20-minute period. Higher noise levels are allowed only by permit or variance issued under HAR §11-46-7 and §11-46-8.
5) For mixed zoning districts, the primary land use designation is used to determine the applicable zoning district class and the maximum permissible sound level.
6) The maximum permissible sound level for impulsive noise is 10 dBA (as measured by the "Fast" meter response) above the maximum permissible sound levels shown.

3.1.7.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Short-term noise impacts associated with construction are anticipated with the Proposed Action. Project activities would involve dredging, grading, moving heavy equipment and materials, and other typical construction activities. To mitigate noise emissions and community effects of noise emissions from construction activities, BMPs such as the following will be employed:

- Equipment operation on the shoreline will be limited between 7:00 AM and 7:00 PM. More noisy operations such as truck hauling could be limited to minimize disruption to beach users and condominium occupants;
- Broadband noise backup alarms in lieu of higher frequency beepers will be required for construction vehicle equipment;
- Equipment substitution will be used to ensure that the quietest locally available equipment is used (e.g, high insertion loss mufflers, fully enclosed engines, and rubber-tired equipment, if possible);
- The use of horns will be prohibited; and
- The nearby community will be informed about construction occurrences and activities for any noise disruptions that may be associated with the project.

Further, the existing condominium buildings would tend to dampen and screen project noise from the neighboring community as most project activities would be on the seaward side of the buildings. Construction of T-groin structures would involve more equipment operation time than sand placement only and result in a longer period of short-term noise impacts. If needed, a DOH-approved Community Noise permit will be obtained.

No in-water noise during construction that may affect marine mammal hearing, such as drilling, is expected to occur. In-water construction methods will be screened using the Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts (NMFS, 2018) to assess whether the noise would affect marine mammals.

Long-Term Impacts: No long-term noise related to the Proposed Action is anticipated. No permanent threshold shifts that may threaten marine mammal hearing will occur with the Proposed Action (NMFS, 2018). Proposed mitigation measures are similar to those recommended for short-term air quality impacts.

Secondary Alternative

The Secondary Alternative is expected to have similar short-term noise impacts during construction and operation as the Primary Alternative. Mitigation measures described in the Proposed Action would be applied to this alternative. Long-term impacts from noise would be related to construction activities associated with re-nourishment events, which are estimated to occur every nine years, and mitigation measures described in short-term impacts would be applied at each event.

No Action

The No Action Alternative would not generate noise other than what already exists at the project site.

3.1.8 Artificial Lights

3.1.8.1 Existing Conditions

Artificial lights associated with a dense urban area currently exist along the Kahana shoreline to brighten condominiums, decorations, walkways, and parking lots. Light pollution can have serious impacts on coastal marine animals as many life history traits such as mating are adapted to follow moon cycles. Artificial light can adversely affect sea birds such as Wedge-tailed Shearwaters (‘Ua‘u Kani), sea turtles, jellyfish, various types of invertebrate larvae, and other coastal creatures. County regulations dictate that artificial lights must be directed downward and shielded to minimize light pollution and minimize effects of artificial lights projecting offshore. In addition, current state laws restrict light trespassing into the marine environment, except for public safety purposes.

3.1.8.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Short-Term Impacts: Construction activities related to the Proposed Action and Secondary Alternative would be conducted exclusively during the daytime and will not require artificial lighting. The only exception would be if artificial lighting is necessary for public safety purposes in compliance with HRS 205A-71. If used, any exterior lighting and lamp posts associated with the proposed construction activities shall be cut-off luminaries to provide the necessary shielding to mitigated potential light pollution in the coastal areas and lessen possible seabird strikes. No artificial light, except as provided in HRS 205A-30.5(b) and 205A-71(b) shall be directed to travel across property boundaries toward the shoreline and ocean.

Long-Term Impacts: No sources of artificial light will be emitted or constructed as part of the Proposed Action or Secondary Alternative.

No Action

The No Action Alternative would not generate any more artificial light than what already exists at the project site.

3.2 Natural Hazards

3.2.1 Coastal Processes

3.2.1.1 Existing Conditions

Coastal processes occur as a result of the interaction between water movement from waves and currents and the local bathymetry. Waves and currents drive the water movement in the nearshore area. Natural and manmade obstructions such as headlands, reefs, rock outcrops, seawall, and groins modify this dynamic activity resulting in coastal processes unique to the area. Maui’s shorelines are highly dynamic and frequently shift through time, particularly on sandy shores.

Coastal erosion is a natural process whereby the shoreline retreats inland over long periods of time as a result of wind, waves, prevailing currents, and storms. Shoreline retreat may also undergo acute or episodic erosion events associated with large surf, storm events, and seasonal changes in wave regime (i.e., winter/summer). Erosion can be exacerbated when sand supplies are confined, sand transport hindered, and/or sand reservoirs are depleted. Manmade structures such as seawalls can trap sand behind them, depleting sand from the beach, while coastal dunes provide sand to the shoreline during erosion episodes. Changing climates and future SLR can intensify wave induced long term coastal erosion rates beyond current conditions.

Situated on the West Maui coast, Kahana experiences conditions consistent with this region. Average wave heights and currents change throughout the year. During winter, the project shoreline is exposed to large waves generated in the North Pacific. Combined with strong trade wind waves, these forces transport sand southwards and offshore causing beach erosion. During the summer, waves from the south tend to move the sand to accrete at the north end of the bay (DLNR, 2013).

The Kahana Bay site has a strong southerly longshore current. In contrast to other locations along the Hawaiian Islands, the project site lacks a typically wide and shallow reef section, which can act as an efficient buffer of incoming waves. In particular, the reef fronting the Royal Kahana and the surrounding vicinity exhibits a rather deep and narrow reef section that allows energetic waves to reach the shore with little dissipation. The shoreline fronting the Valley Isle Resort functions as a headland that disrupts the longshore current, thus preventing sand loss at the small beach immediately south of the site. The results of these existing conditions are overall consistent with the coastal erosion study conducted by the Coastal Geology Group at the University of Hawaiʻi (Figure 1-3).

Tides at Kahana Bay are semi-diurnal, and the tidal range is 2.25 ft between MHHW and MLLW. Tidal datums are based on the NOAA tide station 1615680 located at Kahului Harbor, Maui (NOAA, 2020), the closest tide gauge to the project site. These datums, based on the present tidal epoch (1983-2011), are presented in Table 3-3. The highest observed water level at this site was 1.34 ft (ref. MHHW) observed on August 21, 2017 (Table 3-3).

Table 3-3: Tidal Datums for 1615680, Kahului Harbor, Maui

Datum	Value (ft MSL)
Mean Higher-High Water	2.25
Mean High Water	0
Mean Tide Level	1.11
Mean Sea Level	1.12
Mean Diurnal Tide Level	1.13
Mean Low Water	0.33
Mean Lower-Low Water	0

Source: NOAA, 2020

A wave assessment study was conducted to model local wave conditions at the project site for existing and post-project conditions using two numerical models: SWAN, a phase-averaged spectral wave model, and BOSZ, a deterministic wave model. The wave assessment study is presented in three parts, all of which are included in Appendix A. Part I describes the bathymetry preparation, selection, and input of wave conditions for computations with the BOSZ model and the computed results for the existing terrain conditions. Part II focuses on the modeling study for post-project conditions after the Proposed Action and presents the computed results compared to those from the existing conditions. Part III discusses modeling results and their implications on potential impacts of the Proposed Action, in terms of evaluating the functionality and potential impacts of the project design and surf impacts.

The model results showed the nearshore wave patterns, current patterns, wave induced water level elevations along the beach for various scenarios. Here, annual northwest and south swells are described. Annual northwest swells produce average wave heights of 4 ft, a southerly nearshore average current of 1.5 ft per second, and an average wave induced water level elevation of about 3.2 ft above MLLW. Existing high nearshore waves and strong southerly currents indicate increased sand transport towards the south, from where sand may be then transported offshore. Construction of the groins would modify and lower the nearshore current that will reduce the rate of sand loss. Annual south swells produce average wave heights of about 5 ft and strong rip circulations that can bring sand to shore. No significant net current movement is indicated, which agrees with the general observation that the beach accretes during south swells. The models also show that construction of groins may enhance the sand exchange and lead to greater beach stability.

3.2.1.2 Potential Impacts and Proposed Mitigation Measures

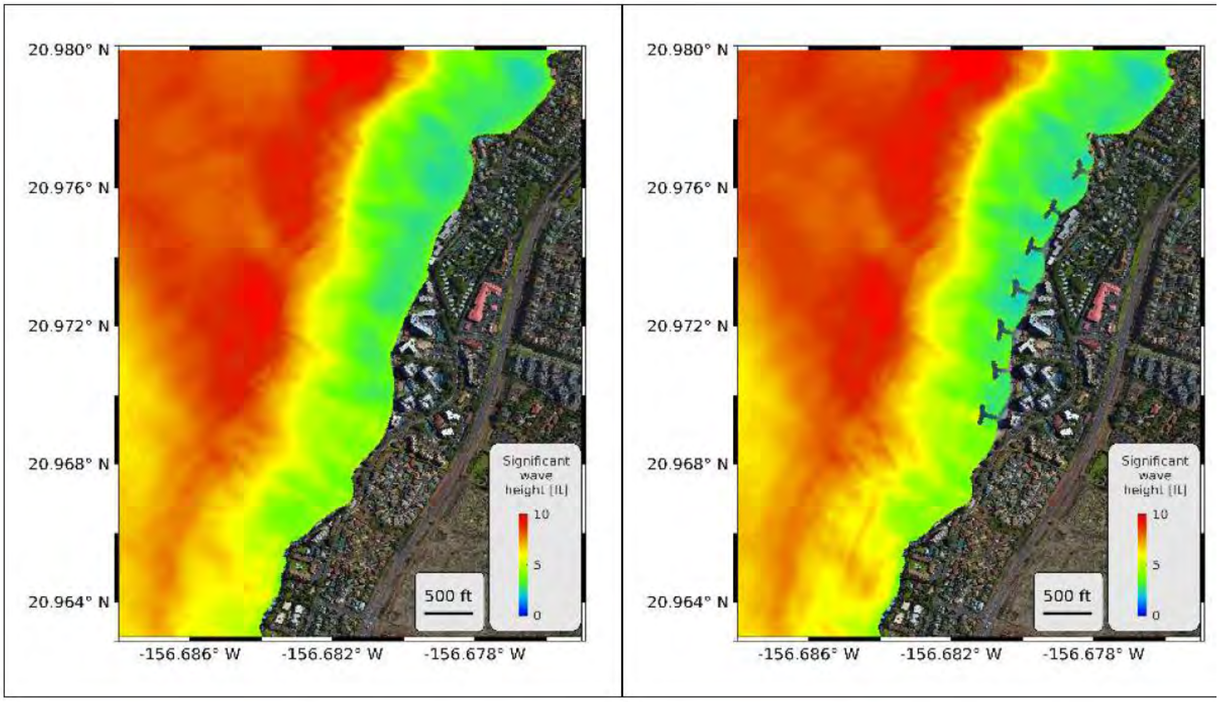
Proposed Action

Short-Term Impacts: Short-term impacts to nearshore coastal processes will start to occur as stabilizing structures are built and will persist as long-term impacts as the structures are put into place.

Long-Term Impacts: To determine post-construction impacts on nearshore coastal processes, four characteristic swell events were analyzed for Kahana Beach as described in Section 2.2.3.3, *T-Groin Design in Proposed Action,* comparing an original input grid to a modified input grid which included groins, dredged sand deposits, and the nourished beach. The placement of T-groins effectively deflects the longshore current seaward, which reduces the likelihood of beach loss and reduces significant wave height (Figure 3-11). While the nearshore drift is sensitive to the proposed structures, no significant change in shown in the current patterns offshore of the structures.

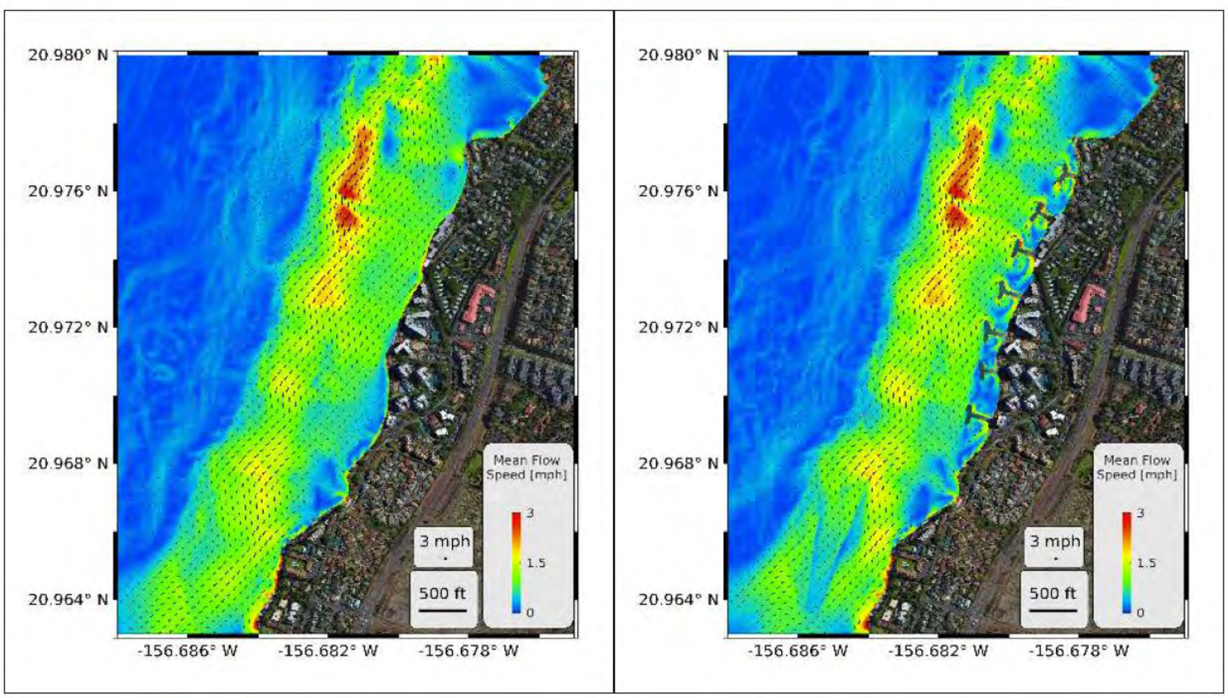
The wave and current conditions are almost identical under the existing and Proposed Action conditions. However, minor modifications of wave and flow patterns occur at downdrift areas of the project site. The natural headland of Pōhaku Park forms a shore-bound circulation cell with the last southern-most groin, which favorably extends the functionality of the last groin and protects the beach between. S-Turns beach has a complex circulation pattern due to the underlying reef and bathymetry. The uneven, tube-channel shaped bathymetry, over the reef flat likely contributes to the distinct rip current pattern. The rip current under the existing condition suggests sand loss from the beach during large northwest swell events (Figure 3-12). The modeling results under the Proposed Action show no significant change of the rip current. The nearshore zone directly makai to the properties is not affected.

The BOSZ computation results for the one-year north swell event shows similar flow patterns as the northwest swell for both the existing and Proposed Action conditions. The circulation results for the south swell scenario, however, are significantly different from the north and northwest swells. The south swell represents an annual wave event that is typical during the summer. The relatively smaller offshore wave heights produce slower flow speeds at the project area, which indicates less sand movement.



Adapted from Figure 8 of Wave Study Part II (Volker, 2020; Appendix A)

Figure 3-11: BOSZ significant wave height of original conditions (left) and post-project conditions (right) in a 1-year NW swell.

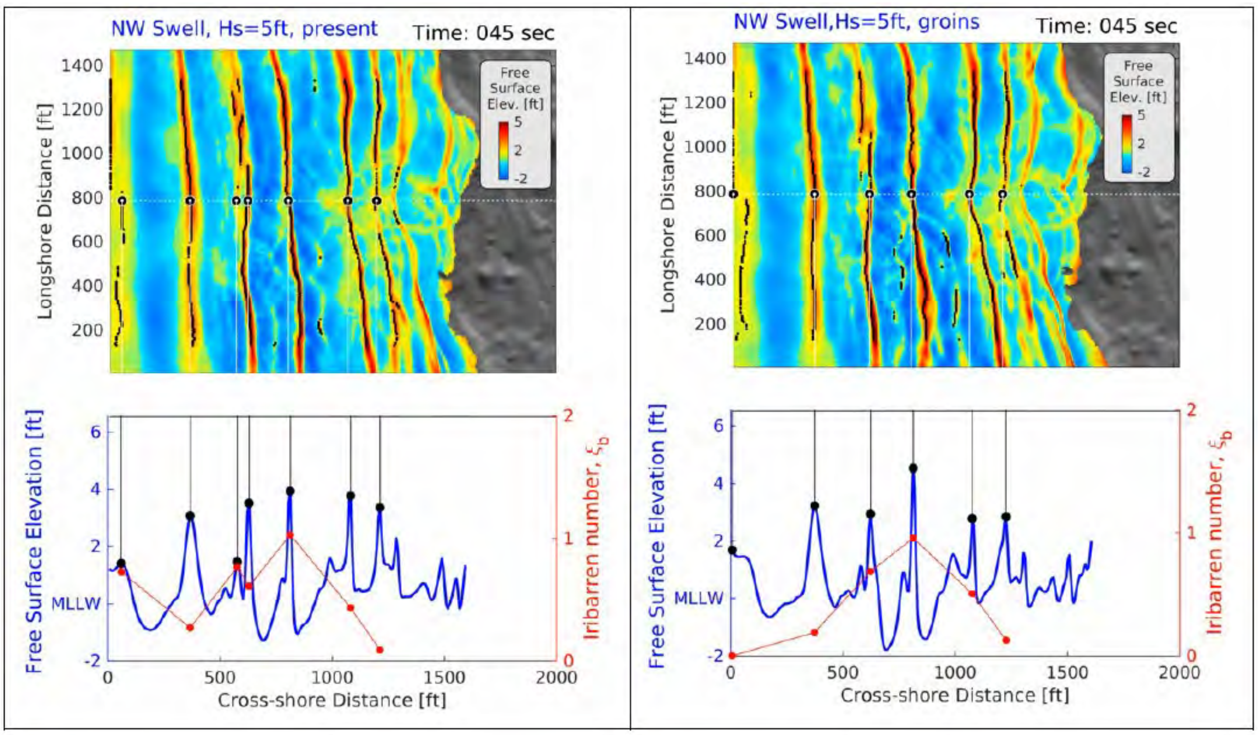


Adapted from Figure 12 of Wave Study Part II (Volker, 2020; Appendix A)

Figure 3-12: BOSZ mean flow velocity of original conditions (left) and post-project conditions (right) in a 1-year NW swell

Surf Impacts: When construction is completed, wave modeling results show that the Proposed Action does not impact surf conditions at S-Turns, Mushrooms and other surf sites in the area. Wavefields in the project area including dredging locations, shoreline, and surfing areas were modeled under two desirable surf conditions using the BOSZ model (see Section 3.2.1, *Coastal Processes*), including: 1) a one-year northwest swell with 50% energy intensity; and 2) northwest swell with 5 ft wave height and 14-second peak period. Comparison of surfing conditions pre- and post-construction of the Proposed Action showed nearly identical wave heights, wave phases, and breaker types under the modeled northwest swell scenarios (Figure 3-13). Evaluation of the wave model results at the surfing sites with and without the project showed no discernable change in wave surface elevations or wave steepness. In both cases, most waves start breaking approximately 750 ft offshore.

Further, a slight increase in wave height was observed next to sand extraction Sites 22 and 19. This is not expected to impact surfing sites. More detailed description of surf impact analyses is included in Part III of the Wave Study contained in Appendix A.



Adapted from Figure 4-1 of Wave Study Part III (Oceanit, 2021; Appendix A)

Figure 3-13: Wave propagation at 45 seconds around S-Turns area under existing conditions (left) and post-project conditions (right)

Sediment Transport: Modeling results indicate that the Proposed Action will have minimal sedimentation impacts to neighboring beach and properties, as it does not produce significant changes on wave and current patterns outside the project site.

Sedimentation analysis using the BOSZ model used three characteristic swell events to represent typical extreme annual sediment transport scenarios. Within BOSZ, the wave parameters for one-year return period swells from northwest (NW), north (N) and south (S) directions were input to estimate existing sediment transport patterns within the project area. The Proposed Action layout, which includes T-groin structures, beach nourishment and offshore sand extraction, was reflected in the BOSZ computations through modification of the input bathymetry and topography. The calculations were then repeated to discern potential changes in the sediment transport patterns due to both existing and Proposed Action conditions.

Comparison of the BOSZ computation results for mean current flow velocities due to the one-year return-period NW swell event for the existing and Proposed Action conditions indicate that the placement of T-groins effectively deflects the longshore current seaward, which reduces the likelihood of beach loss (Figure 3-12). While the nearshore drift is sensitive to the proposed structures, no significant change in shown in the current patterns offshore of the structures. The results also show that the proposed sand extraction slightly slows the flow pattern locally at the dredging site but does not create significant changes in the overall current condition as shown over the adjacent reef area.

Secondary Alternative

The Secondary Alternative will have minimal impacts on nearshore coastal processes as no stabilizing structures would be constructed as part of this alternative. Any effects from sand extraction described for the Proposed Action would be applicable to the Secondary Alternative.

No Action

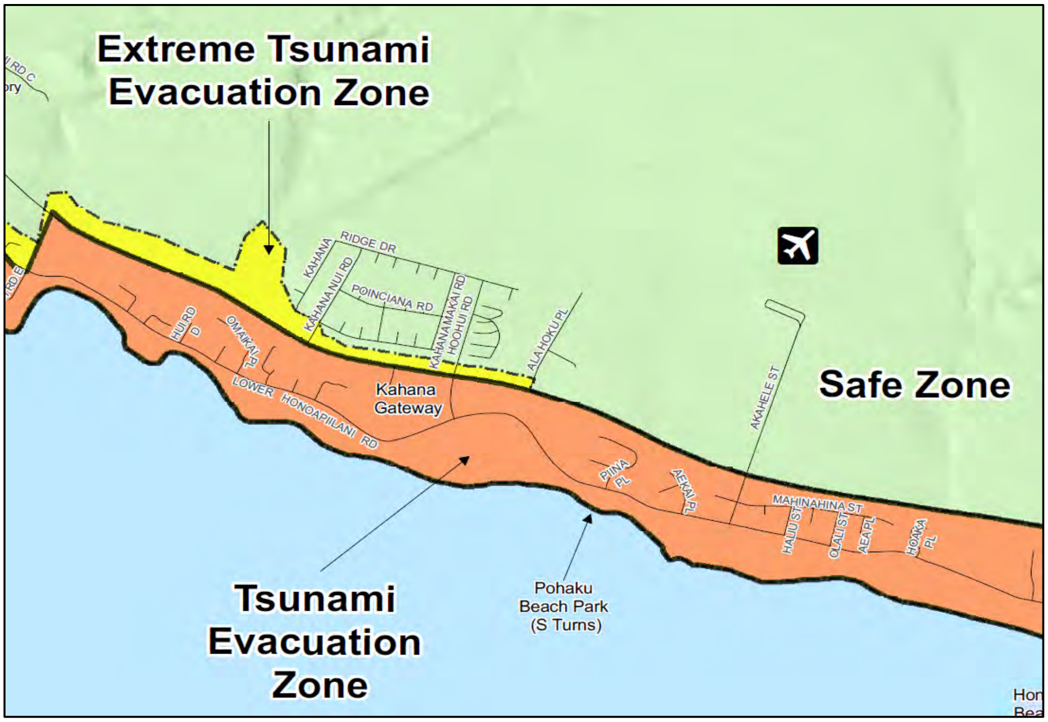
The No Action Alternative will not affect coastal processes and natural rates of coastal erosion will continue in Kahana Bay.

3.2.2 Rare Events - Tsunami and Hurricane Hazards

3.2.2.1 Existing Conditions

The project is located within a tsunami evacuation zone (Figure 3-14). Occupants within a tsunami evacuation zone are required to evacuate and move to a safe zone in the event of a tsunami warning.

Hurricanes are classified as tropical cyclones with violent winds, heavy rains, and abnormally high waves and storm tides. Hurricane season in Hawaiʻi occurs annually between the months of June through November, although large storms are rare. Hurricanes of note that have directly hit or caused great damage to the Hawaiian Islands include Hurricane Dot in 1959, Hurricane Iwa in 1982, and Hurricane Iniki in 1992. The southern coast of Kauaʻi received the brunt of Hurricanes Iwa and Iniki, although the hurricanes caused damage statewide. Although the occurrences of hurricanes in the islands are rare, storm surges and coastal flooding are expected to continue to become more severe and frequent with climate change predictions.



Source: County of Maui, 2015

Figure 3-14: Tsunami Evacuation Map

3.2.2.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

While the T-groins in the Proposed Action would be designed to adapt to and mitigate the effects of SLR and storm events, they are not designed to reduce impacts of extreme events such as hurricane or tsunami hazards.

Secondary Alternative

The Secondary Alternative will not impact or mitigate tsunami or hurricane hazards.

No Action

The No Action Alternative will neither impact nor mitigate tsunami or hurricane hazards.

3.2.3 Flood Hazard

3.2.3.1 Existing Conditions

Flood hazards for the portion of Kahana in which the project is located are depicted on Flood Insurance Rate Map (FIRM) panel number 1500030263F (effective date September 19, 2012). The project area is within a Special Flood Hazard Area that is subject to inundation by the 1% annual chance of flood, according to the National Flood Insurance Program (NFIP), Title 44 of 44 CFR. This equates to a 1% probability that in any given year that a flood will equal or exceed the base flood elevation. Mandatory flood insurance applies to these areas and is reflected in Table 3-7 in Section

3.4.2.3, *Property Values and Flood Insurance*. The project site is in Zones VE (hazards due to storm-induced velocity wave action) and AE (hazards due to rising waters) (FEMA, 2017) (Figure 3-15). The base flood elevation varies between 14-17 ft above MSL.

3.2.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: The Proposed Action will not affect flood hazards during construction. Construction BMPs, such as fiber rolls, will be implemented to contain or filter runoff should inland flooding occur.

Long-Term Impacts: The Proposed Action will extend the shoreline seaward, increasing the area between the ocean and the infrastructure on-land. The beach restoration and stabilizing structures will dissipate incoming wave energy and the extent of wave runup. The Proposed Action will be designed to be able to withstand and prevent a limited amount of flooding in the backshore of the project area. The existing flood hazard zones would not be changed.

Secondary Alternative

The Secondary Alternative with the proposed new beach would reduce inundation distance landward to some extent due to elevated beach profile. However, the impact would be less effective without offshore structures to dissipate incoming wave energy before it hits the shoreline.

No Action

The No Action Alternative will not impact flood hazards. As predicted erosion, SLR, and storm events continue, the natural flood hazard is likely to increase if no action is taken.

Source: FEMA, 2017

Figure 3-15: Flood Zone Map

3.2.4 Erosion Hazard

3.2.4.1 Existing Conditions

The majority of Maui's beaches are experiencing chronic coastal erosion with an average of about 1.1 ft of shoreline retreat per year (Fletcher et. al., 2003). The island has approximately 35 miles of sandy shoreline that are eroding. Since 1950, beach width has decreased 19% with 5 miles of beach lost and nearly three miles of highway threatened by coastal erosion (Fletcher et. al., 2003). The shoreline retreat along Kahana Bay is primarily the result of a culmination of chronic long-term erosion and several episodic erosion events over the past few winters.

Severe coastal erosion has plagued the Kahana Bay for several decades. The ongoing erosion has caused the installation of various protection measures in the majority of the current shoreline areas along Kahana Beach that include either armoring with permanent seawalls, temporary sand-fill geotextile structures, and restored dunes, or has resulted in exposed shoreline (Figure 1-5). The annual erosion rates at Kahana Bay are estimated between 0.5-1.9 ft/year, with an average of about 1.1 ft per year (Fletcher et al., 2003; County of Maui, 2016). Refer to Section 1.3*, Chronic and Eposidic Coastal Erosion and Existing Shoreline Protection Structures,* for further information about historical erosion hazards.

3.2.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Construction would be conducted in a phased progression to ensure that the shoreline is stabilized in each sliding work zone. The construction sequence will be coordinated to nourish the beach in a step-wise progression, from south to north, to create dry areas for construction equipment, work areas, and materials. Construction BMPs to stabilize the shoreline and prevent erosion during construction will be implemented.

Long-Term Impacts: The Proposed Action was selected as the highest-ranking solution to the regional erosion mitigation solution at Kahana Bay (Chapter 2). The T-groin structures are expected to prevent the accelerated coastal erosion and help stabilize the beach. The nourished beach and vegetated berm would be "soft" measures to protect the shoreline from further erosion, rather than hardening the shoreline.

Secondary Alternative

The Secondary Alternative would provide a "soft" measure to reduce the erosion hazard with the extended beach; however, the impact would be less effective without offshore structures to dissipate incoming wave energy before it hits the shoreline.

No Action

The No Action Alternative would not mitigate the existing erosion hazard. Chronic shoreline erosion would continue at Kahana Bay.

3.2.5 Sea Level Rise

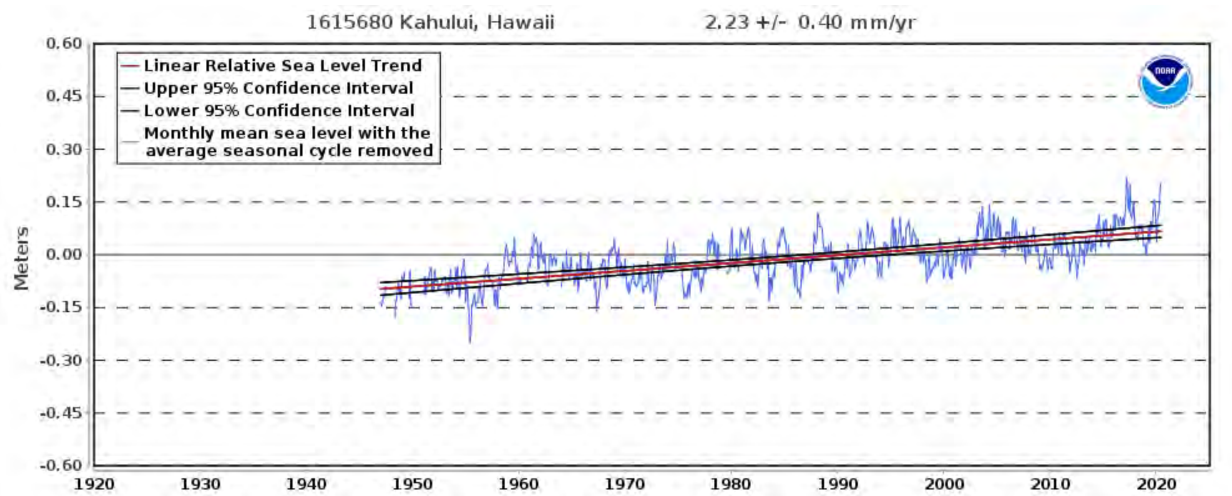
3.2.5.1 Existing Conditions

According to its fifth assessment report, the Intergovernmental Panel on Climate Change (IPCC) predicts that the worldwide sea level could rise 1.0-3.2 feet by the year 2100, depending on future efforts to mitigate for greenhouse gas emissions. The IPCC has outlined numerous impacts from this rise on coastal communities including beach erosion, inundation of land, increased flood and storm damage, saltwater intrusion into the freshwater lens aquifer, changes in precipitation, increased levels of land-based pollutants to coastal waters including sediments, nutrients, and contaminants, and more frequent, longer, and more powerful El Niño and La Niña events (IPCC, 2014).

According to the IPCC, the average global mean SLR over the last century was approximately 0.074 inches (1.88 mm) per year, with studies indicating that this rate may accelerate in the coming decades.

However, this rate is not uniform across the globe with some areas experiencing more accelerated rates than others. Tide gauge measurements may provide a historic record of the ocean's water level. In Kahului, the SLR rate during the last 75 years is approximately 2.23 mm/year (Figure 3-16). This trend is primarily caused by the thermal expansion of seawater as well as land-based ice melt as temperatures increase. UH climate researchers predict that rising sea levels caused by climate change will affect coastal locations around the State of Hawaiʻi. UH School of Ocean and Earth Science and Technology (SOEST) provides a SLR scenario for Honolulu projecting a 1 ft increase in sea level by mid-century, and about 3 ft by the end of the century (SOEST, 2018).

According to the State of Hawaiʻi SLR Report (Hawaiʻi Climate Change Mitigation and Adaptation Commission, 2017), Kahana Beach is anticipated to undergo significant erosion as sea levels rise. Various scenarios of SLR-XA, which include passive flooding, annual high wave flooding, and coastal erosion, are shown in Figure 1-7. Refer to Section 1.3.2 for more detailed SLR predictions for Kahana Bay.



Source: NOAA, 2020

Figure 3-16: Mean Sea Level Trends at Kahului Harbor, Maui, 1947-2019

3.2.5.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

The SLR-XA maps are created from modeling that did not account for future land use changes, including any mitigation and adaptation measures. The Proposed Action would help Kahana Bay be more resilient to SLR and protect the beach and structures along the shoreline. Beach nourishment raises the elevation of the sandy beach above the MHHW line and thus protects against shoreline flooding by elevated water levels from SLR. The increase of water depth over the nearshore reef by SLR enhances wave energy that arrives at shoreline, which leads to larger runup as well as inundation. The nearshore stabilizing structures (T-groins) would significantly reduce wave energy transmitted into littoral cells through the gap of T-heads. The Proposed Action would also reduce the impact of SLR by de-escalating coastal erosion at the project area.

Secondary Alternative

The Secondary Alternative does not include stabilizing structures and therefore, high-energy waves would arrive at the shore without attenuation by any breakwater-type structures. The nourished beach without stabilizing structures would be vulnerable to destructive waves, especially in stormy conditions or big swell events during the winter season. Without replenishing the beach with sand every few years to maintain the beach elevation and width, one-time beach nourishment only provides temporary protection against SLR flooding that would occur continuingly in the future.

No Action

The No Action Alternative would not reduce any impacts of SLR. The different SLR scenarios are predicted to flood the coastal area at Kahana Bay as delineated in Figure 1-7. Passive flooding, annual high wave flooding, and coastal erosion would continue as if under existing conditions (Section 3.2.5, *Sea Level Rise*). Shoreline armoring or other strategies would be needed on an individual parcel basis to protect habitable structures and infrastructure from SLR.

3.3 Ecological Resources

3.3.1 Terrestrial Biological Resources

3.3.1.1 Existing Conditions

Flora at the site is mainly planted and typical of West Maui developed resort and urban areas. The plants within the project area are sparse and mainly consist of introduced, landscaped, ornamental species. The soil along the vegetation line is highly disturbed, and a substantive amount of the shoreline is armored by sea walls, geotextile fabric sandbag structures, and rock mattresses. Birds observed in the project were non-native, common urban dwelling species, and no protected species were observed in the terrestrial area.

The existing yards and open space between the buildings consist of grassy lawns, manicured gardens and hedgerows, and shade trees. Most of the vegetated areas are regularly maintained by professional landscape services. Plant species on the properties are often cultivated and include non-native, ornamental, and introduced species such as seashore paspalum grass, plumeria trees, various palms, and bougainvillea and hibiscus shrubs among others. Tree species include monkeypod, coconut, palm, flame, milo, hau, kiawe, and beach heliotrope, among other common species. The vegetation adjacent to and inland of the active beach is dominated by salt-tolerant naupaka (*Scaevola taccada*), portia tree (or milo, *Thespesia populnea*), and false kamani (*Terminalia catappa)*. More diverse vegetation exists near Kahana Stream and outfall areas where fresh runoff water flow through. No vegetation is present in the beach area between the MHHW line and the vegetation line, as the sand is highly volatile due to wave action. The vegetation line is highly disturbed from shoreline protection structures, repairs, and human foot traffic. Transient vegetation, such as ʻakiʻaki grass and beach morning glory (*Ipomoea spp.*), can be found growing out into the beach area. A terrestrial biological survey conducted along the vegetation line of the project extent was prepared for the project area and is included as Appendix D (Oceanit, 2019). No protected flora or fauna species were observed within the project area.

There were no protected flora or fauna species within the surveyed project area. However, green sea turtles (*Chelonia mydas*) are frequently observed offshore (14 were seen in the 2019 marine benthic study [AECOS, 2021]). The project site is within the critical habitat for Hawaiian monk seals

(*Neomonachus schauinslandi*), which includes all terrestrial habitat that extends five meters inland from the shoreline of the main Hawaiian Islands (NOAA, 2015). A bird survey recorded common, introduced species such as chickens, common mynas, house sparrows, rock pigeons, and spotted doves, none of which are protected under the Migratory Bird Treaty Act (MBTA). Other migratory and transient shorebirds may occasionally pass through the area; however, human presence, disturbance, and development in the area do not create an ideal habitat for many bird species. Ghost crabs (*Ocypode spp.)* were the only macrofauna observed in the sandy beach area during the terrestrial survey (Oceanit, 2019; Appendix D). Other terrestrial fauna that may be in and around the project area include non-native mongoose (*Herpestes spp*.) and rats (*Rattus spp.)*.

3.3.1.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Construction impacts to terrestrial flora and fauna may include soil compression or disturbance of groundcover in areas where construction equipment may drive or be stored. Any construction impacts will be localized and temporary, especially with proper implementation of BMPs and control plans. To mitigate effects, construction routes and equipment areas should be staged along pre-existing roads, beach accesses, and open lawn areas to minimize impacts to existing flora. Construction BMPs will include gravel or lined access routes to distribute vehicle load and revegetation of any disturbed areas. The area is heavily landscaped and the shoreline in the area has undergone construction many times before.

To mitigate the risk of non-native species being introduced into the project areas, all equipment, personnel, and supplies will be properly checked to make sure that they are free of contamination (e.g., weed seeds, organic matter, or other contaminants) before entering project areas. Quarantine and/or management activities on specific priority species proximal to the project area will be considered and addressed as needed.

Potential impacts from the construction operations on terrestrial flora or fauna will be minimal as no sensitive, protected, or rare, threatened, or endangered (RTE) species are known to inhabit the area. However, if an RTE species is observed within the project area, all work in the area will stop until the animal leaves on its own accord (Section 3.3.3, *Rare, Threatened, and Endangered Species*).

Long-Term Impacts: The vegetated berm would be planted with native coastal plants to reduce wind erosion of the sand dune. The nourished beach area would provide additional sandy areas for turtles and monk seals to haul out. Sand crab holes on the beach may be covered by the sand nourishment, resulting in the loss of some of these invertebrates. However, invertebrates may be able to bury out of the sand, or individuals from nearby populations may be able to re-inhabit the area.

Secondary Alternative

The Secondary Alternative would have similar effects and mitigation efforts during construction as those described above for the Proposed Action.

No Action

The No Action Alternative is not expected to have impact on terrestrial biological resources.

3.3.2 Streams

3.3.2.1 Existing Conditions

Kahana Stream is the only perennial stream within immediate vicinity of the project site. The mouth of the Kahana Stream lies at the northern boundary of the project extent, adjacent to Kahana Village Resort. Kahana Stream extends 17 miles inland and is somewhat channelized between its ocean outfall and where it passes under a bridge over Lower Honoapiʻilani Road. Sediment, rocks, and other deposits from the stream mouth contributed to the formation of Kaʻea Point, a sand fringed headland at the north end of the project area. Kahana Stream is a perennial stream with a terminal stream order of 3. The watershed area is 5.2 square miles (13.5 square kilometers), with maximum elevation of 4,475 ft (1364 m). The Department of Aquatic Resources (DAR) classifies the watershed as medium size, steep in the upper watershed, and with little embayment. About 29% of the watershed is in the conservation land use district, approximately 65% is in the agricultural district, and 6% in the urban district. From its mouth, the stream extends 17 miles inland and has confluences with the Kahoma and Halona Streams, which have been diverted for irrigation and potable water uses since the late 1800s (Hawaiʻi Watershed Atlas, 2008).

Kahana Stream's outlet is often clogged with sand and sediment. Periodically, sand accreted in the stream's mouth is dredged and used to fill the sand berm fronting the neighboring Kahana shoreline.

3.3.2.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: A reinforced headland will be constructed adjacent to the stream mouth. BMPs will be used to protect water quality during construction. Machinery and equipment will be kept well out of the stream's embankments and opening and out of range of the stream's flow.

Long-Term Impacts: Implementation of the Proposed Action is not expected to significantly impact the flow capacity or maintenance of Kahana Stream. Sand nourishment limits will be kept away from the mouth of Kahana Stream. The reinforced headland that will be constructed will help to prevent the nourished sand from being transported to the stream mouth during South swells. During N and NW swells, the drift is generally in a southerly direction away from the stream mouth. The headland will be designed so that it does not contribute to clogging of the stream mouth with sediment being transported down the stream. The headland will also be designed to avoid any potential changes in the net littoral drift. The comprehensive wave model study concluded that the Proposed Action does not induce significant changes on wave and current patterns outside of the project site. Additionally, groin structures were shown to protect and retain the nourished beach sand at Kahana. It is not expected that additional maintenance of the stream outlet would be required.

Secondary Alternative

Short-Term Impacts: The Secondary Alternative is not anticipated to have any impacts on Kahana Stream, as there will be no construction or beach nourishment close to the Kahana Stream outlet.

Long-Term Impacts: Operation of the Secondary Alternative is not expected to significantly impact the flow capacity or maintenance of Kahana Stream. Sand nourishment limits will be kept away from the mouth of Kahana Stream. For this alternative, the longshore sand movement from Kahana Beach is expected to be greater than for the Proposed Action due to the lack of groins and a reinforced headland. However, the model results still show minimal sand deposition to be expected at the Kahana Stream mouth during the south swells that could potentially transport sand toward the stream. During the North and Northwest swells, sand transport from the nourished beach would go south, away from Kahana Stream.

No Action

The No Action Alternative would not impact Kahana Stream or other streams in the area.

3.3.3 Rare, Threatened, and Endangered (RTE) Species

3.3.3.1 Existing Conditions

Correspondence with the United States Fish and Wildlife Service (USFWS) during the consultation process identified species in accordance with Section 7 of the Endangered Species Act that may occur in, or transit through, the vicinity of project area (Appendix I). Consultation also included recommendations to avoid or minimize impacts to these species. The species of concern include:

- The endangered hawksbill sea turtle (*Eretmochelys imbricata*);
- The endangered Hawaiian petrel (*Pterodroma sandwichensis*);
- The endangered band-rumped storm-petrel (*Oceanodroma castro*);
- The endangered wedge-tailed shearwater (*Ardenna pacificus*);
- Federally threatened Newell's shearwater (*Puffinus auricularis newlii);* and
- Federally threatened green sea turtles (*Chelonia mydas*).

Adult green sea turtles are commonly found in West Maui and forage in the shallow nearshore areas and coral reefs. The hawksbill sea turtle is much less common in the Hawaiian Islands than the green sea turtle and is only known to nest in the southern reaches of the state. Sea turtles use both terrestrial habitats (beaches for nesting and/or basking) and offshore open ocean habitats. Nesting usually occurs between May through September, peaking in June and July, with hatchlings emerging through November and December (Appendix I; UFWS, 2020). Fourteen (14) green sea turtles (*Chelonia mydas)* were observed during the June 23, 2019 shore survey, and six more were seen during underwater surveys (AECOS, 2021; Appendix C). Several macroalgal species, including the invasive algae *A. specifera*, are known to be grazed by green sea turtles and are present in the of the project area.

The entire project site is considered to be a Hawaiian monk seal critical habitat, as this area is defined as the marine environment from 200 m below sea level to the shoreline and the terrestrial environment to 5m inland of the shoreline. In 2015, the main Hawaiian Islands and the remote Northwestern Hawaiian Islands were designated as critical habitat for this species (50 CFR 226), as published in the NOAA Final Rule (FR) (80 FR 50925). Fifty-one (51) endangered Hawaiian monk seal sightings were reported in the Kahana Bay area between 2009 and 2018, but no births have been observed (AECOS, 2021; Appendix C).

Humpback whales (*Megaptera novaeangliae*) are transient protected species that frequent Hawaiian waters annually from November to May with the peak in February and March and may be observed offshore of the project area during this time (NOAA, 2018). Humpback whales are likely to venture into nearshore areas.

None of the 20 listed coral species listed as threatened under the August 17, 2017 Final Rule Endangered Species Act (ESA) occur in Hawaiʻi; however, a rule for listing the cauliflower coral, *Pocillipora meandrina,* which occurs in the project area, was proposed on September 10, 2018 but is still under global status review. The State protected ʻopihi occurs in waters offshore of the project area.

No RTE species (plant or animal) were observed in the terrestrial portions of the project area during the terrestrial biological survey performed for the project (Appendix D). The properties are highly developed, human-occupied areas and not preferred habitat for RTE species. Hawaiian sea birds may pass through the project area at night during breeding, nesting, and fledgling seasons (March 1 through December 15). The wedge-tailed shearwater is one RTE species that may nest in littoral vegetation along the coastlines.

3.3.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Proposed Action construction around beaches can result in sand and sediment compaction, beach erosion, and contaminant and nutrient runoff. Short-term construction impacts are expected to be temporary and will be controlled with BMPs described below. Contamination from effluent discharges and runoff can pollute shallow nearshore areas where adult green sea turtles like to forage, making turtles more susceptible to disease and causing negative effects on algal feed. Short-term impacts from dredging and construction activities may coincide with green sea turtle foraging or resting in the nearshore area and on the sandy beach, respectively. If any turtles or monk seals are observed in the area, all work in the area will stop until the animal leaves the site on its own. Under Section 7 of the Endangered Species Act, NOAA Fisheries and the USFWS will be further consulted during the regulatory process.

To control project construction impacts to nearshore waters that may affect RTE species, a water quality monitoring program will be implemented as part of the 401 WQC process. USFWS standard BMPs will be incorporated into the process to reduce direct and indirect negative impacts to aquatic habitats. These BMPs include the following.

- Design dredging and filling activities to avoid indirect, negative impacts to aquatic habitats beyond the project area;
- Schedule dredging and filling in the marine environment to avoid coral spawning and recruitment periods;
- Contain turbidity and siltation using silt containment devices and maintain BMPs for the life of the construction period;
- Inspect all construction materials and equipment that will have contact with the aquatic environment for pollutants prior to being placed in the water;
- Avoid stockpiling of construction-related materials in, or in close proximity to, aquatic habitats that should be protected from erosion;

- Conduct fueling of vehicles and equipment away from the aquatic environment and with appropriate spill-prevention BMPs in place; and
- Protect all deliberately exposed soil or under-layer materials used in the project near water and stabilize as soon as possible.

The USFWS provided recommendations during the DEIS consultation process on measures to avoid project effects on sea turtles and monk seals. Those recommendations are delineated as follows:

- No vehicle use on, or modification of, the beach/dune environment during the sea turtle nesting or hatching season (May to December for Hawai‘i);
- Do not remove native dune vegetation;
- Incorporate applicable BMPs regarding Work in Aquatic Environments (specific consultation recommendations included in Appendix I) into the project design;
- Have a biologist familiar with sea turtles conduct a visual survey of the project site to ensure no basking sea turtles are present;
- If a basking sea turtle is found within the project area, cease all mechanical or construction activities within 100 ft until the animal voluntarily leaves the area;
- Cease all activities between the basking turtle and the ocean;
- Remove any project-related debris, trash, or equipment from the beach or dune if not actively being used; and
- Do not stockpile project-related materials in the intertidal zone, reef flats, or stream channels.

To protect RTE bird species, such as wedge-tailed shearwaters, nesting in or in the vicinity of the project area, visual surveys of the nearshore vegetation should be conducted throughout the project area during the species' breeding season (March through November). No artificial lighting will be used in the project, which will minimize adverse impacts to sea turtles and seabirds.

Long-Term Impacts: In the Proposed Action, the nourished beach would provide a wider sandy beach area that could be used by sea turtles and monk seals as additional haul out areas, especially in areas that lack beach currently. If green sea turtle nests are observed in the new beach area, proper agencies should be notified, and the area should be properly protected. Reduced effluent discharges soil runoff from the Proposed Action will have positive effects on RTE species habitat and food sources.

In general, projects that alter the natural beach profile along the shoreline or stabilizing structures that extend offshore may reduce suitability of onshore habitat for sea turtles. However, given project SLR estimates, increases in storm surge intensity, and other climate change-related factors, it is anticipated that continued mitigation of beach erosion is needed.

The Proposed Action will improve beach access for people and result in more foot and vehicular traffic along the shoreline, as well as potentially increase fishing activity in the area off the rock structures, although the T-groins are not currently designed for fishing access. Specific fishing tips to avoid interactions with turtles recommended by NOA-PIRO include using barbless circle hooks, using live bait, keeping clean catch away from turtles, and reporting illegal gillnets (AECOS, 2021; Appendix C).

Secondary Alternative

The Secondary Alternative would be expected to have similar short- and long-term impacts to RTE species as the Proposed Action in the dredging and fill areas. The biggest difference would be that there would not be any in-water stabilizing structures present, which would reduce habitat intrusions from stabilizing structures. The same mitigation efforts apply to the Secondary Alternative.

No Action

The No Action Alternative may result in the loss of the sandy beach and haul out area for RTE species along Kahana Beach, forcing monk seals and sea turtles to use neighboring beaches as haul out areas. No mitigation measures would be implemented as part of the No Action Alternative.

3.3.4 Marine Biological Resources

3.3.4.1 Existing Conditions

For the purposes of this DEIS, the nearshore marine environment is defined as the area beyond the MHHW line that includes the beach nourishment footprint and out to the farthest extent of the beach stabilizing structures. The area is characterized as a narrow beach and shallow reef flat. NOAA characterizes the benthic habitat in the nearshore area as macroalgae, turf algae, and uncolonized (NCCOS, 2017) (Figure 3-17). The proposed dredge limit areas are mainly uncolonized sand patches, which was verified in the marine benthic survey (AECOS, 2021; Appendix C).

A marine benthic survey was conducted in June 2019 for the offshore sand borrow sites, along the potential offshore barge/pipeline routes, and in the nearshore environment where sand nourishment would take place and sand stabilizing structures would be built (AECOS, 2021; Appendix C). Transects were established for each area to obtain quantitative data about benthic composition, coral abundance and size class distribution, as well as macro-invertebrate inventory, bottom complexity, and fish assemblage. According to the survey, the sand beach in this area is comprised mainly of limestone sand (46%) and sand (36%), with less than 0.5% each of turf algae, coralline crustose algae, and live coral. The project area supports a low abundance of fishes with low species richness, and a marginal coral community. On average, there are only 15.7 coral colonies per $10m^2$. Only 33 macroinvertebrate taxa were identified, the most common being sea urchins, black brittle stars, and lined sea hares. The constant anthropogenic presence in the area disturbs and affects the biological community.

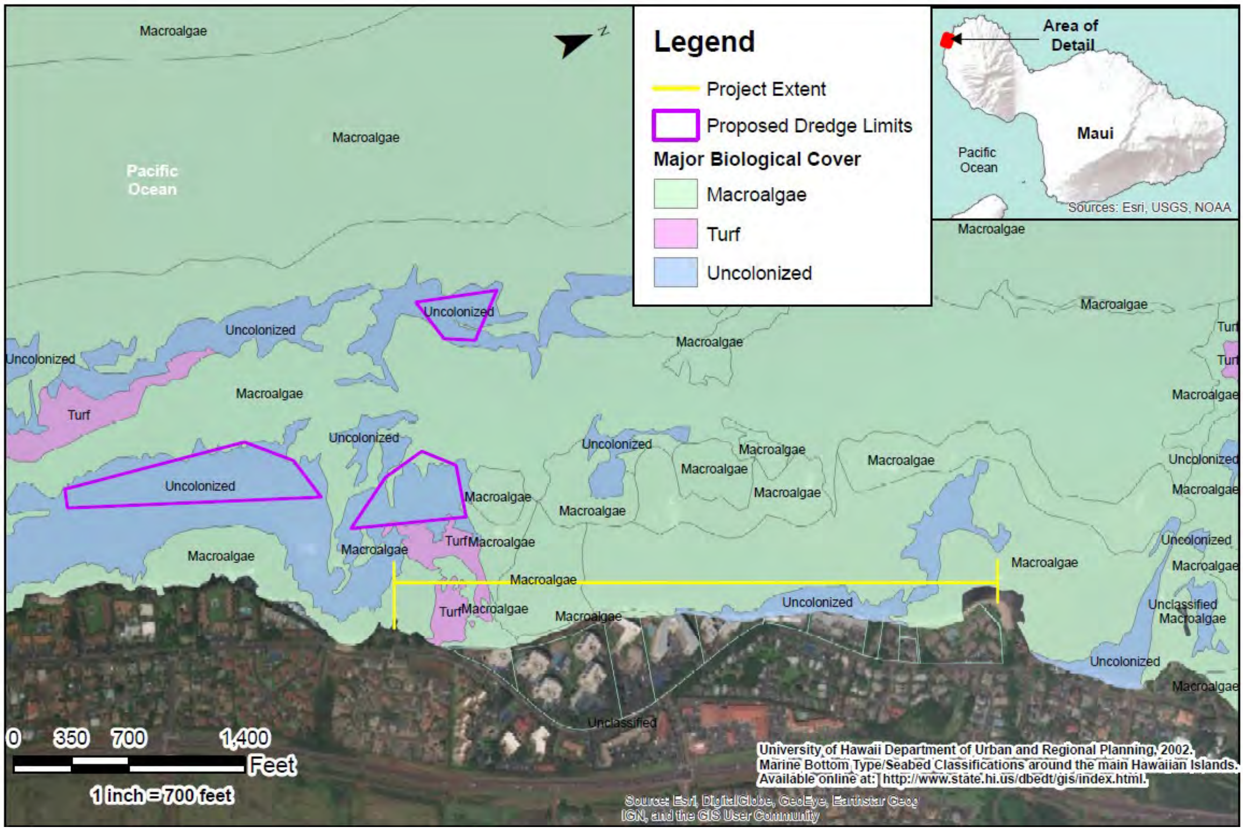


Figure 3-17: NOAA Marine Bottom Type

Marine biological resources, including coral cover, are low in the project area. Coral settlement and growth are limited by wave action, sand and rubble scour, turbid water and reduced light conditions, and burial with fine sediment. Coral abundance, size, and diversity are indicative of the richness of marine biological resources as corals are keystone species in coral reef ecosystems. The project area consists of a hard bottom with little to no vertical relief, which makes it susceptible to continually shifting sands. The lack of hard substrate makes it difficult for corals to establish. Within the project area, corals account for only 0.4% of the bottom cover. Coral colonies that were recorded were small, with 90% being less than 10 cm in diameter. The most common coral species in the area is *Pocillopora damicornis,* a fast-growing, silt-tolerant coral. Over 33 invertebrate taxa were identified, with sea urchins being the most abundant. A complete list of invertebrates observed can be found in Appendix C. One common invasive algal species, *A. specifera,* was observed during the benthic survey. This algal species is a favorite of green sea turtles and explains turtles' presence in the area (see Section 3.3.3., *Rare, Threatened, and Endangered Species)* (AECOS, 2021; Appendix C).

During the sand quality confirmation study, divers looked for macro-benthic infauna at each site using a 16.5 cm diameter push-core. The sediment from the core was gently sieved through a 2.36-mm coarse sieve to look for the presence of any animals in the sand. No animals were retained during these investigations of the sand patch. Macro invertebrate organisms observed during the sand quality confirmation study included *Halimeda* algae, evidence of tube-buildings worms, and lined sea hares. One horned helmet (*Cassis cornuta*) was also observed (Appendix B).

<u>Groin Locations</u> - Coral cover along the groin locations is very low (0.4%), and individuals are small, which reflects that the area is not particularly favorable for coral growth. Ninety percent of coral

heads are less than 10 cm in diameter. The most common coral species in this area is *Pocillopora damicornis,* and some mound-forming *Porites spp.* are also present in the area.

Each proposed groin location was surveyed using an 80-m transect perpendicular to the beach crest and three 25-m transects set parallel to shore. The three 25-m transects were characterized as 1) close to shore (future restored beach zone); 2) seaward of shore (underwater sand fill zone); and 3) at the head of the T-groin. Along the 80-m groin transects, the dominant bottom types were sand (50%) and bare limestone (30%). Live corals were very sparse and only observed in three of the transects. Along the 25-m transects set parallel to shore, the majority of the cover was macroalgae (55%) and sand (30%). Live coral cover was low; less than 1% of the mean cover.

Eighty-six (86) coral colonies along groin transects were counted, with the highest density at Groin 2 (5.9 colonies per 10 m^2). On average, there are about 1.6 coral colonies per $10m^2$. The majority of coral colonies observed were small (1-5 cm and 6-10 cm in diameter), with only very few larger (<20 cm) coral colonies.

Nearshore reef - The nearshore reef is dominated by sand veneer over limestone (84%). Invertebrate, rubble, and live coral cover are all well below 1% of the total cover.

Offshore Sand Borrow Sites - Biologists confirmed that offshore sand borrow sites are sand bodies. No corals were located within the offshore sand borrow sites (i.e., Sites 18, 19, and 22), but macroalgae cover within the soft bottom borrow sites consists mainly of *Halimeda kanaloana* fields at medium to high density.

Along the perimeter of the sand sites, hard bottom areas have approximately 0.5% coral cover. Five coral taxa (*Montipora capitata, Montipora patula, Pocillopora meandrina, Porites lobata,* and *Porites spp.)* were observed around the perimeter of Site 18. No corals were observed on the hard bottom on the perimeter of Sites 19 or 22. No rubble, macroalgae, turf algae, or CCA were recorded on transects placed around the perimeter of the sand sites. The majority of coral heads seen in this area were only 6-10 cm in size (34%), 21-40 cm (26%), and the largest colony was between 21-40 cm.

Pipeline/barge routes - The bottom type of the pipeline/barge routes is mostly sand (50%) and bare limestone (26%). Live coral cover is 4.5% cover on average, with an average of 12.7 coral colonies per $10m^2$. If a pipeline is the selected method, it can be laid along sand channels to avoid most living corals.

3.3.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Construction activities may cause temporary impacts to marine biological resources from dredging and fill activities. Corals identified near sand extraction sites should be indicated to the contractor, avoided, and monitored. To minimize impacts to marine resources, any coral colonies and macroinvertebrates that occur in the direct project area (e.g., within the dredge, nourishment, and sand stabilization structure footprint) may be relocated as practicable. Translocation of invertebrates must ensure that the receiving location is suitable for the species and one that is not already over or under populated with that species (AECOS, 2021; Appendix C).

NMFS PIRO suggest the following minimization and avoidance measures to reduce physical damage to marine biological resources and Essential Fish Habitat (EFH) during construction (Appendix I):

1) Restrict all physical contact with the bottom to unconsolidated sediments devoid of coral and seagrass.
2) Work platforms should be selected based on the following preferential hierarchy:
   a. Conduct all work from land.
   b. Use a barge with auto-positioning systems where thrusters will not cause increased turbidity.
   c. Anchor barges to (1) shoreline infrastructure; (2) nearby existing moorings; (3) anchors or spuds in/on sand only (as possible, have SCUBA divers lay anchors by hand in sand areas).
3) Prior to mobilizing, ensure all construction equipment, ballast, and vessel hulls do not pose a risk of introducing new invasive species and will not increase abundance of those invasive species present at the project location.
4) Minimize physical contact by divers and construction related tools, equipment, and materials with live benthic organisms, regardless of size, especially corals and seagrass.
5) Prevent trash and debris from entering the marine environment through the use of nets or barriers.
6) Relocate infrastructure materials (e.g., riprap, piles, boulders) that are colonized with benthic communities according to an approved relocation plan. Approved plans must ensure corals are moved to adjacent area(s) with similar habitat conditions, onto suitable substrates, using reliable attachment methods, in similar orientations. Monitoring is not required. If infrastructure materials (e.g. riprap, piles, boulders) that are colonized with benthic communities will be removed or destroyed as part of permitted activities, relocate these materials to an appropriate receiving site.
7) Have a qualified marine biologist identify and relocate hard corals that would be otherwise lost to project activities and which can be logistically moved according to an approved relocation plan. Approved plans must ensure corals are moved to adjacent area(s) with similar habitat conditions, onto suitable substrates, using reliable attachment methods, in similar orientations; and corals must be monitored for success (more frequently at the beginning, and for a duration of no less than 2 years). To provide accountability reference corals or a reference reef site should also be monitored concurrently to compare observed changes.
8) Ensure that new structures minimize shading impacts to marine habitats. Incorporate measures that increase the ambient light transmission under structures. Some of these measures include: maximizing the height of the structure and minimizing the width of the structure to decrease shade footprint; grated decking material; using the fewest number of pilings necessary to support the structures to allow light into under-pier areas and minimize impacts to the substrate; and aligning the boardwalk in a north-south orientation for the path of the sun to cross perpendicular to the length of the structure and reduce the duration of shading.
9) Perform pre-deployment reconnaissance (e.g., divers, drop cameras) to ensure that all anchors are set on hard or sandy bottom devoid of corals and seagrass and that chosen anchor locations

take into consideration damage that could occur from the anchor chain if the vessel swings due to currents or tides.

10) Require a long-term maintenance plan for gear, instrumentation, and equipment to prevent failures that lead to permanent adverse effects to EFH (e.g., vessel groundings).
11) Ensure structures are properly weighted to prevent movement from currents or waves and implement a maintenance plan to ensure integrity over time.
12) Lower utility lines or cables and maneuver the placement in a controlled manner using SCUBA in order to avoid all coral resources, when practicable.
13) Develop a Wave and Storm Contingency Plan for construction materials and equipment.
14) Develop a monitoring plan to consistently assess the condition of groin materials as well as a contingency plan if the condition is endangering EFH.

Long-Term Impacts: The marine benthic survey prepared for the project concluded that the Proposed Action would not result in significant long-term degradation of the environment or loss of marine habitat. The Proposed Action will "improve the shoreline condition, restore a recreational beach at the site, improve water quality by eliminating erosion of terrigenous fill, and increase potential biological habitat in a relatively barren reef flat area." Stabilizing structures will add hard substratum and provide vertical relief for corals, algae, and other invertebrates. As general sediment transport models are not anticipated to change from the Proposed Action, adverse impacts to offshore coral communities are not anticipated. Although ecological services of reef flat habitat will be lost under the footprint of the sand fill and stabilizing structures, the area is expected to recover over time as the benthic community is recruited from nearby areas and reestablishes (AECOS, 2021; Appendix C).

The area of direct impacts from sand fill was formerly a beach, which has since receded due to shoreline erosion. The sand fill will re-cover the habitat that has only been available to colonization by corals over roughly the last 50 years. Moreover, this nearshore area is a low-quality habitat for coral. Over the area that will be directly impacted by the Proposed Action, quantitative loss of corals was estimated to be 6,118 coral colonies in the direct impact area. The majority of corals within the direct footprint are small (less than 10 cm). Urchins (~100,000 individuals) and sea cucumbers (~26,814 individuals) are the most common macroinvertebrates in the area and would be most impacted by the Proposed Action. Predicted direct impacts to corals and macroinvertebrates are shown in Tables 26 and 27 of Appendix C.

The most effective mitigation for marine resource impacts is to avoid and minimize impacts. Should avoidance or translocation be infeasible and unavoidable impacts still exist, compensatory mitigation and restoration may be required. For example, pipeline routes should be surveyed for benthic resources and habitat and adjusted to avoid live coral heads as much as possible. In addition, if there are corals within the proposed sand borrow footprint, those areas should be excluded from dredging limits.

Possible areas of compensatory mitigation include designing stabilizing structures to mimic natural coral reef structure and act as artificial reef modules and relocating corals from direct impact areas. In addition, invasive algae elsewhere could be removed as part of a reef restoration effort to allow native algae and invertebrates to recolonize the reef. To ensure long-term success of native species, a partnership with DLNR Department of Aquatic Resources (DAR) Ānuenue Fisheries Research Center could be made to introduce native herbivores and collector urchins to the area as biological control against invasive algae.

It is recommended that a long-term biological and water quality monitoring program be implemented to monitor post-construction impacts. The biological monitoring program should include changes in densities and distribution of macroinvertebrates and corals on hard bottom surrounding the sand excavation areas, adjacent to the dewatering site, and offshore of the sand nourishment site, as well as the area surrounding the pipeline corridor if a hydraulic construction method is used (AECOS, 2021; Appendix C).

Groin Locations - Sand fill and boulders that comprise the sand stabilizing structures will bury a portion of the existing subtidal environment, which is primarily low relief sand, rubble, and consolidated limestone. Some benthic organisms, including small corals (estimated 2,086 coral colonies), would be lost in the construction process. However, these corals provide minimal ecological services to the coral reef ecosystem because of their low abundance, cover, and small size. Scattered individual coral heads located within the footprint of the sand stabilizing structures can be relocated to minimize impacts. Some nearshore tako habitat may also be lost; however, benthic invertebrates are expected to repopulate the areas after construction is completed, and sessile organisms will colonize new surfaces. The built rock stabilizing structures may provide additional stable bottom and calmer waters for coral development, but viability will ultimately depend on the overall environment.

To mitigate effects on and attempt to enhance marine resources, stabilizing structures can be designed to include holes and niche spaces for fish and invertebrates in the submerged portions, which will act as artificial reefs and provide vertical relief, topography, and hard stable substrate to which organisms can establish. An attempt to translocate corals and invertebrates in the direct impact area can also be made as practicable (AECOS, 2021; Appendix C).

Impact of Sediment Transport on Coral Reefs - The Proposed Action is not expected to have negative impacts on the sedimentation of coral reefs. To assess the potential impact on coral reefs, existing sediment deposition patterns in Kahana Bay were analyzed and compared to those expected after the Proposed Action was completed using the BOSZ model. The output of the BOSZ computations include wave parameters and current flow speed and direction from which general sediment transport patterns can be inferred. Based on analyses of the three typical annual extreme swell events, the Proposed Action is not expected to significantly increase seafloor sand movement. Moreover, the stabilizing structures will help maintain beach sand and reduce longshore sediment transport, which may improve water quality and benefit the coral reef environment. A detailed description of wave modeling and discussion of the results are included in Section 3.2.1, *Coastal Processes* and Appendix A.

Secondary Alternative

Sand nourishment without groins would not provide hard substrate or vertical relief, nor the opportunity for macroinvertebrate establishment and habitat. In addition, movement of placed sand and the erosion trends in the area would continue without stabilizing structures. Beach fill associated with the Secondary Alternative would result in an estimated loss of 3,700 coral colonies, 60,000 urchins, and 20,000 sea cucumbers.in the direct impact area (Tables 26 and 27 in Appendix C; AECOS, 2021). The majority of coral individuals are small (<10cm). The wave and circulation processes over the reef flat will be minimally changed from the existing conditions. However, the added large volume of sand will be exposed to wave actions, which could possibly increase sediment transport over the nearshore area and result in undesirable effects on coral reef environment (AECOS, 2021; Appendix C).

No Action

In the No Action Alternative, marine biological resources are not expected to change drastically in the short term since no construction activities would be implemented. However, in the long-term, erosion and resulting impacts to water quality in the nearshore area would continue and further degrade the nearshore habitat quality for corals and other marine organisms.

3.3.5 Fish Habitat

3.3.5.1 Existing Conditions

The marine benthic survey (Appendix C) described the project area as one that supports a low abundance of fish and a marginal coral community due to the mainly limestone/sand bottom type with limited topographical relief and structural complexity (Friedlander and Parrish, 1998). However, topographical relief in the area can be patchy, and fish can be present in high numbers where vertical relief occurs. For example, areas with limestone overhangs, boulders, and other mixed relief surfaces had greater fish abundance and biomass than the survey area average. The mean abundance of fishes was only 27 fish per $100m^2$. Fish size, or biomass, was higher at the offshore sites than in the nearshore areas, but overall biomass was low ($3.1g/m^2$). Species richness and diversity were also low (AECOS, 2021; Appendix C). The daily use of large numbers of waders, fishers, paddlers, and swimmers in the nearshore area disrupts and negatively influences the sparse biotic community. The average number of fish species per transect and fish biomass were less than other comparable locations in the area and across the state.

A total of 669 fishes were counted during the project survey (Table 18 in Appendix C) in areas with vertical relief and topographical complexity. Five trophic guilds were observed: herbivores, planktivores, mobile invertebrate feeders, sessile invertebrate feeders, and piscivores. In the nearshore area, piscivores were in the highest abundance (40%), followed by mobile invertebrate feeders (35%). At the offshore borrow areas, *Acanthurus* herbivores accounted for the greatest overall fish biomass (42%), followed by planktivores (23%). Fish abundance was the greatest at the hard bottom locations on the perimeter of the sand borrow sites (172 fishes per $100m^2$) and lowest at the groin locations (29 fishes per $100m^2$) (Table 19; Appendix C).

A total of 60 fish taxa were observed, 25% of which are endemic to Hawaiʻi. The most abundant species was the saddle wrasse (*Thalassoma duperrey*). Other common species included the damselfish (*Dascullus albisella*) and species of tang, surgeonfish, butterflyfishes, and triggerfish. Morey eels were also commonly seen in hard-bottom areas. Within the groin area, an average of 7 species per groin transect were observed. More complete breakdowns of fish richness, diversity, abundance, and biomass across the project areas are described in Appendix C (AECOS, 2021).

Results from the marine resources study will be used in the EFH consultation process, which is required in the Federal review to fulfill the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Further discussion of the EFH is included in Section 4.1.4.

3.3.5.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Submerged portions of beach stabilizing structures can be designed to incorporate topographical relief and structural complexity to increase niche spaces for fish (AECOS, 2021; Appendix C). Additional habitat for fishes will likely increase fish species richness, biomass, and abundance, similar to results observed in the Iroquois Point beach nourishment and stabilization project (AECOS, 2018). A long-term marine biological monitoring plan should be implemented to track the effects, recovery, and mitigation of the Proposed Action to fish habitat. Refer to Section 3.3.4.2 for more specific recommendations suggested by NMFS PIRO for EFH.

Secondary Alternative

The Secondary Alternative would have similar effects on fish habitat in the nearshore beach fill area. Without stabilizing structures, this alternative would not be able to incorporate mitigation measures in offshore structures to enhance fish habitat.

No Action

The No Action Alternative is not expected to have impacts on fish habitat. No mitigation measures would be implemented as part of the No Action Alternative.

3.4 Human Environment

This section discusses how the Proposed Action, Secondary Alternative, and No Action impact the human environment from a social and economic context, archaeological and cultural resources, and scenic and open space resources. For each section, the discussion includes existing conditions, possible impacts resulting from the Proposed Action, Secondary Alternative, and No Action, and, where appropriate, proposed mitigation measures.

3.4.1 Social

3.4.1.1 Population and Demographics

3.4.1.1.1 Existing Conditions

As of July 2018, Maui County's population was 167,207, or approximately 12% of the total population of the State of Hawaiʻi. The resident population of Maui has been growing rapidly, increasing by 21% from 2000 to 2010, due primarily to larger family sizes (COM OED, 2012). The population of Maui is expected to reach nearly 195,000 residents by 2030. Trends of significant population and job growth are expected through 2030. In West Maui, condominiums, timeshares, and other vacation rentals have an impact on job opportunities and their distribution across the island (County of Maui Department of Planning, 2012). By 2040, the population of West Maui is expected to grow to over 43,000, and housing demand is expected to increase by approximately 8% from the present (County of Maui, 2014).

The project area is part of the Nāpili-Honokōwai census designated place (CDP). According to the 2010 census, the Nāpili-Honokōwai CDP accounts for approximately 10.6% of the total County of Maui population (U.S. Census Bureau, 2018). The total population of Nāpili-Honokōwai CDP was

7,261 persons, with a median age of 38.3 years. The population under 18 years old accounted for 20.7% of the total population, while 9% of the population was over 65 years old.

The median household income for the Nāpili-Honokōwai CDP was estimated at $54,871 between the years of 2012 and 2016, which is lower compared to the County of Maui median household annual income ($68,777) and the State of Hawaiʻi median income ($71,977) (U.S. Census Bureau, 2018).

3.4.1.1.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative would help to protect existing housing and timeshare units but will not directly increase or decrease these units in the long term. Preservation and restoration of the iconic Kahana sandy beach would preserve and promote tourism and attract residents and visitors to the West Maui area.

An indirect effect on population increase may result as the Proposed Action and Secondary Alternative may attract more visitors, as well as present opportunities to increase housing and timeshare units. The extent of this indirect impact is unknown and increasing housing and timeshare units would require appropriate permits from the County of Maui.

No Action

If the No Action Alternative results in continued loss of the sandy beach area, damage to adjacent properties and structures may result in a decrease of residents and visitors.

3.4.1.2 Kahana Bay Character and Experience

3.4.1.2.1 Existing Conditions

Kahana Bay shares the attributes of the West Maui coastline, which is characterized by hotels, condominiums, visitor attractions, and tourism-related shops and services. Kahana itself embodies qualities of a resort area, including a small shopping center across the street, a variety of dining options, and recreational rentals. Pōhaku Park marks the southern boundary of the project site. The park is popular with local residents for fishing, surfing, and picnicking. Residents will often show up at pau hana (after work leisure time) to watch the sunset alongside the imposing shadows of Molokaʻi and Lanaʻi floating on the horizon. During winter, the surf break off of Pōhaku Park known as S-Turns, and the Mushrooms surf break just to the north of S-Turns, are particularly popular as the swells bring more manageable waves than at the breaks up north. Throughout the rest of the year, calm waters make for ideal conditions for the recently growing population of stand up paddle boarders.

South along the coast towards Kāʻanapali is much of the same—with hotels and condominiums lining the beach with more residences and subdivisions across Lower Honoapiʻilani Road. North of the project area towards Kapalua has a more residential character.

Kahana Bay is a quiet coastal community with a mix of condominiums, hotels, and houses. Just 15 minutes from Lahaina, Kahana has been a popular tourist destination since the 1970s, when its first condominiums and hotels were built along the shorefront. Unlike the nearby resort areas of Kāʻanapali and Kapalua, however, Kahana Bay maintains an intimate, neighborhood atmosphere despite the large tourism influence. The adjacent area immediately mauka of the project area is characterized by multi-story hotels and condominiums. At the northern end, a single-family home is flanked by mid-rise residential and timeshare apartments.

Presently, much of the Kahana Bay shoreline is heavily eroded and this is a predominant factor in existing character. To protect properties from flooding and damage, a variety of shoreline protection structures have been placed or constructed, including seawalls, sandbags and rock revetments, and a vegetated berm. Some areas only have usable beach during low tide; others are impassable due to sandbags placed to prevent property damage from the waves. The combination of protection structures has resulted in diminishing aesthetics, obstructed lateral shoreline access, and sometimes dangerous conditions. Figure 1-6 in Chapter 1 depicts severe effects of wave overtopping a seawall and emergency geotube structures installed to deter wave damage and flooding.

3.4.1.3 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-term Impacts: The existing character of the project area, currently dominated by a diminishing beach, shoreline protection structures, and occasional obstructed lateral beach access, will be further impacted by construction activities related to sand dredging, beach nourishment, and T-groin installation. Section 2.2.5, *Construction*, describes construction activities over a six- to eight-month period and includes figures depicting equipment and processes.

Anticipated short-term impacts include the presence of machinery, equipment, and stockpiling materials, increased noise, negative visual and aesthetic effects, and general disruption of beach and recreational activities. To mitigate short-term impacts, construction will be conducted in phases along the length of the beach and BMPs (e.g., filter socks, turbidity curtains) will be employed to prevent runoff on land and turbidity in water. Further, safety measures (e.g., signage, fencing) will be in place as a safety effort to keep the public away from construction activities.

Long-term Impacts: The Proposed Action will significantly alter the existing character by widening the beach, adding stabilizing structures and vegetated berms, and creating six separate areas, or coves, each of which would be framed by the beach and T-groin stems on the north and south. The makai, or west end, of this area would be open to the ocean. The widened beach and vegetated berm would be positive impacts on the existing character by improving the beach recreational experience with a larger sandy area and a protective shoreline environment. The vegetated berm will cover existing shoreline hardening structures that are permitted to remain in place.

Further, the potential for increased benthic habitat created by the T-groins may increase fishing and food gathering opportunities. While the presence of T-groins may be considered visually and aesthetically obtrusive, the stabilizing structures nevertheless will help to protect the shoreline and stabilize the Kahana Bay beach over a long-term time frame. It is estimated that beach renourishment would not need to occur until 30 years after project completion. Figures 3-18, 3-19, and 3-20 illustrate existing conditions compared to how the Proposed Action may change the existing character of Kahana Bay.

Figure 3-18: (a) Existing view looking north from the Pōhaku Beach Park toward the Kahana Beach Resort, Sands of Kahana, and Valley Isle Resorts; (b) Artistic rendering with T-groin, widened beach, and vegetated berm

Figure 3-19: (a) Existing view looking south along the Hololani and Royal Kahana properties; (b) Artistic rendering with T-groin, widened beach, and vegetated berm

Figure 3-20: (a) Existing view looking south along the private residence, Kahana Outrigger and Kahana Reef properties; (b) Artistic rendering with T-groin, widened beach, and vegetated berm

Secondary Alternative

Short-term Impacts: The Secondary Alternative will have similar short-term impacts as the Proposed Action, although the construction time will be shorter because stabilizing structures would not be built.

Long-term Impacts: The Secondary Alternative will significantly improve the existing character by widening the beach. In addition, vegetated berms would cover unsightly shoreline hardening structures that are permitted to remain in place. For some people, the absence of T-groins may be preferable from visual and aesthetic perspectives. It is noted, however, that beach renourishment would need to occur in estimated nine-year intervals, which means more frequent construction-related impacts and disturbance of beach enjoyment and visual and aesthetic ambience.

No Action

Under the No Action Alternative, the beach along Kahana Bay would continue to erode and emergency sandbag structures would still exist along the shoreline. As shoreline structures along the shoreline are undermined, more sinkholes and repairs to building structures would become more prevalent. This would likely diminish the resort and aesthetic character of the area as the shoreline degrades further.

3.4.1.4 Community Issues

Social impacts are changes that may occur as a result of the implementation of a Proposed Action, plan, or policy. Community issues are reactions to, opinions of, and concerns about the Proposed Action. Community issues may change over time as social priorities and values change.

Issue analysis helps decision-makers identify and analyze community concerns about a Proposed Action. It differs from statistical surveys in that the latter is designed to focus on frequency of reactions. Polls are valuable because they tell us about the opinions of the majority or the minority. The quantitative survey instrument is not conducive to dialogue, however, and the personalized reasons for the opinions expressed are not always evident or need to be inferred from responses. In contrast, the only time we refer to the quantity of opinion in issues analysis is where there is significant difference of number or a distinct trend.

Maui County Planning Department officials have discussed information about the Kahana Bay beach erosion project since 2012, as described in Table 3-4:

Table 3-4: Maui County Community Outreach Efforts

Group and Date	Topic
Kahana Village Association of Apartment Owners Workshop, 2012	The Benefits of Dune Restoration for Protecting Development
Maui Planning Commission, 2012	Assessing Erosion Control Options at Hololani Resort
County of Maui Regional Education and Outreach Meeting, 2015	Kahana Bay: Erosion Mitigation through Regional Beach Nourishment
Kahana Bay Restoration Foundation Open House, 2016	Kahana Bay: Planning for Restoration
Royal Kahana Association of Apartment Owners, 2016	Kahana Bay: Planning for Restoration
Valley Isle Condominium Association Owners' Meeting	Kahana Bay: Planning for Restoration

For the Oceanit EIS team, community outreach has been, and continues to be, an integral part of planning and designing the project, and in the preparation of the DEIS. In addition to ongoing interaction with public agencies and responses to community requests for information, Oceanit conducted three community outreach efforts to inform the community about the project and identify opinions, concerns, and issues. The following sections describe the purpose of these three efforts and summarize findings.

3.4.1.4.1 January 2019 Meeting

At the request of a community resident, Dr. Michael Foley of Oceanit met a small group of kūpuna and local environmentalists to discuss potential beach restoration options at Kahana Bay. The meeting was convened on January 22, 2019 and included the following participants.

Table 3-5: Participants in Oceanit's January 22, 2019 Meeting

Name	Affiliation
Thorne Abbott	Coastal Planners
Jim Buika	County of Maui Planning Department Coastal Zone Management Planner
Paul Hanada	Maui resident Fisherman
Glen Kamaka	West Maui resident Nā Papaʻi Wawae ʻUlaʻula member
Kaipo Kapu	West Maui resident Local fisherman and surfer
Keʻaumoku Kapu	West Maui resident Naʻaikane O Maui Aha Moku Council
Tara Owens	University of Hawaiʻi Sea Grant program
Felimon Sadang	Kahana Beach property owner Local fisherman Aha Moku Council
John Seebart	West Maui resident, Kahana Bay Steering Committee (KBSC) member
Mike Summers	Planning Consultants Hawaii

The purpose of this meeting was to introduce local Native Hawaiian leadership and cultural experts to the Kahana Bay project team. A background summary of artificial reefs in Hawaiʻi was provided, as well as information on how this concept is applied to the proposed Kahana erosion mitigation project. Comments and suggestions are hereby summarized:

<u>Conditions and experience in the project area</u> - Participants described how sandbars shift in the bay with the seasons and how this affects surfing conditions. There was concern that the restored beach could be quickly swept away and that the design of stabilizing structures needs to work with current waves. It was suggested that the DEIS include aerial photographs of existing conditions over time. It was also noted that sand harvested offshore may contain decomposing organisms, which, when used for beach nourishment, could cause bacteria-related health problems. A participant who currently lives in the project area noted that the beach formerly extended about 50 ft beyond a nearby seawall. He reported that the wall has collapsed many times as the beach continued to erode. He expressed general support for the project.

Impacts on neighboring communities - Participants wanted the project team to study and disclose the cumulative impacts of the project on neighboring properties and their owners and suggested that pre- and post-project conditions be monitored.

Public resources and access - There was concern about using sand, which was considered a public resource, for the protection of private property. Participants also discussed the importance and need to protect mauka-makai and lateral beach access.

Communication with the community - There were strong suggestions that the project team communicate with the community transparently and effectively. It was further suggested that the project team stay in touch with local and traditional beach users throughout the process and in EIS studies.

3.4.1.4.2 Phase 1: February 2019 Key Informant Interviews

Planning Consultants Hawaii, an Oceanit subconsultant, conducted eleven key informant interviews in February 2019 prior the publication of the EISPN. Interviewees were familiar with the project area and shoreline erosion. Appendix E, *Community Outreach Phase I Report on Key Informant Interviews,* identifies participants and summarizes the approach and findings.

Interviewees were provided a list of common questions, as well as additional questions appropriate to their areas of affiliation and expertise. The findings are hereby summarized.

Ocean related activities - Key informants identified the following ocean related activities that were ongoing within Kahana Bay:

Surfing
Stand Up Paddle Boarding
Windsurfing
Body surfing
Tako fishing
Spear fishing
Pole fishing
Swimming
Snorkeling
Kayaking
Sitting on beach
Occasional jet skiing, parasailing, kite surfing

Change within the Kahana Bay shoreline area - Key informants identified the following significant changes that have occurred within the project area:

- Transition from agriculture, open space, low density residential to resort development between the 1960s through 1970s;
- Sea level rise; loss of shoreline access; near total loss of a 35- to 100-ft-wide beach that stretched from Pōhaku Beach Park to the Kahana Stream;

- Degradation of the reef and nearshore coastal waters; disappearance and/or decline of limu, wāwaeʻiole, wana, ʻōhiki crab, lobster, fish, and other traditional gathering foods; and
- Erection of concrete and sandbag seawalls fronting the condominiums to mitigate erosion; failure of existing seawalls; undermining of existing infrastructure and structures from shoreline erosion.

<u>Significance of the shoreline erosion</u> - Key informants generally agreed that the shoreline erosion is significant, and that some form of action is warranted to address the ongoing problem.

<u>Concern over existing erosion impacts</u> - Key informants identified common concerns and impacts associated with the shoreline erosion, including the following:

- Impact to property owners, including negative impacts related to property values and livability;
- Loss of infrastructure and utilities;
- Degradation of nearshore water quality; degradation of reefs and marine ecology;
- Beach loss and associated impacts to shoreline access, including access for traditional Hawaiian practices; and
- Degradation of aesthetic quality, including visual impacts caused by sandbags and seawalls.

<u>Perceptions of positive and negative impacts associated with T-groins with beach nourishment</u> - Key informants identified positive and negative impacts associated with installing T-groins with beach nourishment to mitigate erosion at Kahana Bay.

- Potential positive impacts included:
    - Protects private property and structures and reduces sedimentation caused by shoreline erosion;
    - Possible creation of marine habitat, the creation of a beach and potential new locations for fishing; and
    - Protection of tax revenue.
- Potential negative impacts included the following. Most of these impacts were mentioned by most or all interviewed.
    - Degradation/impacts to reefs and marine habitat; loss of tako gathering and fishing grounds; impacts to the existing fish and benthic organisms living within the sand that is proposed to be mined; impacts to the seabed from sand mining;
    - Impacts to the nearshore ecosystem from pollutants and organisms brought to shore by the mining of offshore sand;
    - Changes to natural ocean currents; impacts to surf spots;
    - Visual and aesthetic impacts caused by the groins;
    - Development and long-term maintenance costs and the parties responsible for paying those costs; and
    - Project interaction with existing seawalls and the removal of the groins following their useful life.

Recommendations - Key informants provided the following recommendations that are applicable to the EIS preparation and future actions related to the project.

- Community outreach and input – Those interviewed wanted to see broader community outreach, more input from fishermen and consultation with kūpuna. They suggested that the project team "Tell the story in a clean, understandable, and broad way," and noted that "the presentation can impact how well the solution is received."

- EIS studies – Studies related to cultural resources and practices, beach nourishment and sand compatibility, offshore artificial reefs, impacts on water quality, and dredging impacts were suggested. Further, it was suggested that baseline data and conditions on habitats and activities be included in these studies.

- Impacts on neighboring properties – Key informants wanted to see how the project would impact the shoreline to the north and south of project area in terms of beach and surfing changes. It was recommended that a broader regional plan extending from the shoreline south of Kahana Bay, to Kahana Bay and to Nāpili north of the project area be prepared and that there be a long-term planning approach to address SLR and mitigation in the West Maui Community Plan Update.

- Project alternatives – It was suggested that the DEIS include a thorough study of the managed retreat option, and that there be follow-up managed retreat workshops in West Maui to bring experts together. Key informants suggested a plan to move key infrastructure away from the shoreline. Further, those interviewed wanted to see a study of subsidy/buy-back program/government funding assistance to help property owners conduct managed retreat. A few interviewees also suggested that the project eliminate proposed groins altogether. A recommended mitigation alternative included creating shoreline planting, or a living shoreline.

- Infrastructure and recreational resources – Key informants wanted to see better control of existing drainage runoff from the project area into the ocean, and they pointed out that older resorts may not have effective catchment systems. Several informants suggested more opportunities for shoreline access and recommended improvements at Pōhaku Park, including a "facelift," showers, and additional public parking.

3.4.1.4.3 October 2020 Focus Groups

In October 2020, four virtual focus group meetings[1] were conducted to engage with four interest groups, including cultural, ocean activities, environment/sustainability, and adjacent and surrounding residents. Participants in each group shared common interests and/or background. This approach allowed participants to build upon each other's input in a constructive, rather than oppositional, manner. Prospective participants included those previously interviewed, their networks, and community leaders in the interest areas. The focus group sessions were facilitated by Berna Cabacungan Senelly. Dr. Michael Foley, principal investigator and project designer, was available to respond to technical questions. The sessions were informal and recorded in the Zoom online meeting

[1] *At the time of the focus groups, in person meetings would not comply with social distancing and group gathering restrictions due to the COVID-19 pandemic.*

platform with permission from each group. Twenty-two people participated, and three individuals participated in all four sessions, although they wore the "hat" appropriate to each group's interest area. Appendix E, *Community Outreach Phase II Report on Focus Groups*, summarizes the approach and findings of focus groups conducted during the preparation of the DEIS.

Comments about the Overall Proposed Action

Beach Nourishment - There was consensus that coastal and beach erosion is a serious island-wide problem and that beaches are significantly narrowing. Beach nourishment was generally accepted as a solution, although there was doubt that nourishment will be a long-term viable solution.

Mining and transporting sand were of major concern. Participants were not confident that dredging sand for this project could be accomplished without significant negative impacts on the environment and water quality. It was noted that the project should use ocean and not inland sand and that the sand come from nearby areas in the same ahupuaʻa. It was further noted that excess dredged sand, if any, should be stockpiled to ensure access to future supply without having to dredge more sand.

T-groins - Participants were very interested in T-groins and asked how the structures would be constructed, what they would look like, the source of rocks, and their long-term effectiveness. There was acknowledgement that T-groins would help to keep the sand and beach in place and thus require less upkeep. Participants also hoped that T-groins would replace existing seawalls and sandbags, which they believed contributed to beach and coastal erosion. It was also hoped that the T-groins would be open to the public for fishing access.

Of concern was the visual impact of human constructed structures in a natural ocean setting. Participants felt that the groins' length and height were "excessive" and "visually painful to see." Such visual impacts were considered to counter the beauty of current prevailing views of the ocean. As with the sand sources, it was suggested that the pōhaku (rock) for groins be taken from the same ahupuaʻa.

Managed Retreat Alternative - Participants in all groups discussed managed retreat as an alternative that should be seriously considered. It was expected that SLR will continue to erode the coast and its beaches, and eventually the community will need to figure out how to move people and structures further mauka.

Participants had different ideas about the timing of implementing managed retreat. A couple of people felt that managed retreat should be the preferred alternative in the DEIS. Most participants, however, felt that managed retreat should be considered as a viable alternative in the future. There were suggestions that permits allowing the Proposed Action to proceed should include some type of condition for long-term managed retreat. Participants strongly urged the DEIS preparers to thoroughly discuss managed retreat.

Surrounding Properties - A common topic in all focus groups was the effect of the Proposed Action on properties adjacent to Kahana Bay. Participants expressed their concerns from the following perspectives:

- Project impact on sand movement and quantities north and south of the project site, and whether there would be a hardening effect on neighboring properties;

- Whether the beach at S-Turns would be used as a staging zone for sand dredging and T-groin construction;
- The possibility of sand coming back on its own with wave swells from the right direction, and whether the Proposed Action would prevent sand coming in from S-Turns to fill in Kaʻōpala Bay;
- Whether sand captured by project T-groins would keep sand from migrating to properties and beaches down current; and
- Who is liable if significant negative impact(s) would occur due to any of these factors.

Participants urged that the DEIS include the study of wave effects and sand movement on adjacent properties. They hoped that the Proposed Action will help to indirectly restore shoreline north of Kahana. A common mitigation measure suggested by participants was monitoring sand movement, wave currents, and beach changes south and north of the project area in a long-term time frame, which was characterized by some as a ten-year monitoring program.

Comments About Cultural and Socioeconomic Concerns

In the big picture context, for many participants, the concept that "nature will have its way" is both cultural and "local." While they did not want to see people lose their homes and properties, there was an underlying belief that, over time, dealing with SLR will be more about attitudes than the location and relocation of buildings. In various ways, they expressed their belief that public policies, community values and cultural beliefs will ultimately determine how Maui and Hawaiʻi will adapt to SLR.

There was a perceived conflict between private benefit and public interest. For some, there was an underlying sentiment with that the Proposed Action would benefit visitors and "condo owners," who were perceived as outsiders more affluent than local residents.

Biological Concerns

Participants were concerned that construction activities would negatively impact fish, monk seals, turtles, corals, reefs, and overall benthic habitat due to dredging, sedimentation, and water quality degradation. Corals and reefs are essential ingredients of the affected shoreline. Participants warned that sedimentation resulting from construction activities would settle on reefs and rocks and destroy habitat and may obstruct coral spawning.

On the other hand, it was noted that the proposed T-groins could present an opportunity to grow coral collected from the project area in an off-site location, harvest the reared coral, and plant them along the T-groins to propagate new coral growth. Participants also felt that the T-groins may serve as new habitat for ocean life and support more fish and species. This would be positive for fishers and food gatherers.

3.4.1.4.4 Analysis of Community Outreach Input

The project team community outreach program was initiated in January 2019 and continues to be an inclusive process that engages a diverse group of community and cultural leaders, environmental specialists and advocates, ocean users, and interested residents. The input and community dialogue over this two-year period have been consistent in terms of content and perspectives, in that there were no "new" topics raised that were not previously discussed. The input received by the time of this writing was highly influential in determining the scope of DEIS studies and content.

Of significance is the collaborative and cooperative attitudes of participants throughout community outreach efforts. Participants had different values and perspectives that were positive, neutral, or negative towards the project. Nevertheless, they shared their views openly and amicably. As the project proceeds in the EIS and subsequent processes, every effort will be made to continue collaborative dialogue and address community concerns.

3.4.2 Economy

This section discusses the impacts of the Proposed Action and the Secondary Alternative on employment, the visitor industry, property values and flood insurance, and fiscal revenues.

3.4.2.1 Employment

The Proposed Action and Secondary Alternative will generate direct and indirect jobs. The Proposed Action is estimated to generate approximately 16 to 20 construction jobs related to sand dredging and placement and T-groin construction. The Secondary Alternative is estimated to generate 12 to 14 construction jobs related to sand dredging and placement. There will also be jobs needed to support these primary construction activities and these auxiliary or indirect jobs are estimated at 40 to 60 positions. The increase in jobs is a positive effect on the economy, and no mitigation measures are proposed.

3.4.2.2 Visitor Industry

3.4.2.2.1 Existing Conditions

Tourism is a driving economic force in West Maui, with an estimated 68% of the working population employed in the hospitality industry. While Hawai‘i's economy is heavily reliant on the visitor industry, the importance of tourism in West Maui is particularly significant. Kā‘anapali was the first master-planned resort area in Hawai‘i in 1961, and the resort and destination development trend rapidly expanded on West Maui. Most of the Kahana Bay condominiums were constructed not long after in the 1970s.

The West Maui region accounts for over half of Maui Island's annual tourist count. In 2016, the West Maui region had the island's largest average daily visitor population of around 33,000 people and the highest number of visitor units of about 11,000 units (HTA, 2017b). Maui County compiled a Socio-Economic forecast report that highlighted issues and estimated growth based on projections developed by the State of Hawai‘i Department of Business, Economic Development, and Tourism (DBEDT), and forecasted West Maui 2040 projections of annual visitors at an estimated 36,287, which would account for about 56.1% of the total visitors to Maui at that time (DBEDT, 2021).

Total visitor spending on Maui was $7.6 billion in 2017, an increase of 3.7% from the prior year, with an average stay of 8.05 days on the island. Hotel occupancy was at 76.8% in May 2019 compared to a low of 62.1% experienced in 2009. Further, West Maui is the island's second largest employment center, drawing an estimated average daytime population of 63,706 persons. This includes about 10,287 residents who remain in West Maui during the day, 19,868 workers from West Maui and elsewhere who commute to West Maui, and 33,551 visitors (MCPD, 2019).

However, as with the decline of tourism throughout Hawaiʻi, during the COVID-19 pandemic, Maui County economic losses are notable. In 2020, Maui County experienced a loss of 22,900 jobs, which was a 28.7% decrease in the third quarter of 2020 compared to the same quarter of 2019. Jobs decreased the most in the Accommodation sector, which lost 10,700 jobs or 82.3%. Jobs in the Food Services and Drinking Places category decreased by 5,100 jobs or 49.0%. Reports by Hawaiʻi's DBEDT indicate that these losses will impact the greater West Maui region's resort areas for several years to come (DBEDT, 2021).

Sandy beaches are one the area's most valuable visitor attractions, and several West Maui beaches have held the title of "America's Best Beach" throughout the years, including Kāʻanapali Beach in 2003, Fleming Beach in 2006, and Kapalua Bay in 1991. Kahana Bay has historically been the area of choice for those seeking a quieter atmosphere than the larger resort destinations while still within proximity to Lahaina. However, with the Kahana Bay beach rapidly eroding, depleted sand conditions would be less likely to attract visitors back to the bay, even as the economy improves and the tourism industry is revived.

3.4.2.2.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-term impacts: The Kahana Bay beach, currently characterized by diminishing sand, shoreline protection structures, and obstructed lateral beach access, is not an attractive visitor attraction. Construction activities will further detract from an enjoyable beach experience that visitors seek when engaging in passive and active beach recreational activities. To mitigate short-term impacts, construction will be conducted in phases along the length of the beach, and BMPs will be employed to ensure that the work site has no adverse effects on the surrounding area. Further, safety measures will be in place as a mitigation effort to keep the public away from construction activities.

Long-term impacts: The Proposed Action would result in a long-term significant positive impact on Kahana Bay's ability to attract visitors. With a beach widened to 1975 conditions, Kahana Bay will once again draw island visitors as the tourism industry is revived and society adapts to post-pandemic conditions. Economic conditions are anticipated to be improved by higher occupancy in Kahana Bay condominiums and increased patronage of nearby shops and businesses.

Some visitors may not appreciate the visual aspects of the T-groins. On the other hand, the six new coves, or partially enclosed bodies of water, may be considered a unique and enjoyable recreational resource along the West Maui coast.

Secondary Alternative

Short-term impacts: Short-term construction impacts resulting from the Secondary Alternative are similar to those of the Proposed Action, although the duration would be less because stabilizing structures would not be constructed. BMPs similar to the Proposed Action would be employed.

Long-term impacts: The Secondary Alternative would have a positive impact on Kahana Bay's attraction as a visitor destination. While the Secondary Alternative would enhance the visual and aesthetic experience of a widened beach, beach nourishment would be required more frequently than the Proposed Action, and the visitor experience would be disrupted in approximate nine-year intervals, a stark contrast to the nourishment estimated requirement of 30 years with the Proposed Action.

No Action

If the No Action Alternative results in loss of the sandy beach area, this area may be less attractive to visitors and may eventually alter the population and demographics of the area.

3.4.2.3 Property Values and Flood Insurance

3.4.2.3.1 Existing Conditions

Table 3-6 presents condominium unit and property value information of adjacent properties. The information compares the total values of condominiums units and underlying properties to values of units and properties under threat of flooding, erosion, and related damages. This table shows the following:

- Of the total 961 condominium units, 811 units, or 84%, are under threat of flooding, erosion, and related damages.
- The total value of condominium units is estimated at $605 million, of which $507 million, or 84%, could be reduced in the event of threatening conditions.
- The total property value of the land occupied by the condominiums is estimated at $92 million. If no further action is taken, an estimated $88 million of property values may be reduced to some degree on properties that are affected by threatening conditions.

Table 3-6: Property Values of Properties Associated with the Proposed Action

Property Name	Total Units	Units Under Threat of Flooding, Erosion, and Related Damage	Total Condo Value	Total Value of Condos Under Threat of Flooding, Erosion, and Related Damage	Condo Master Land Value	Land Value Under Erosion Threat
Kahana Village	42	42	$51,216,640	$51,216,640	$13,222,600	$13,222,600
Kahana Outrigger	16	16	$16,302,000	$16,302,000	$3,343,600	$3,343,600
Kahana Reef	88	88	$47,379,800	$47,379,800	$8,765,400	$8,765,400
Pohailani I & II[1]	114	62	$50,915,640	$25,228,360	$9,492,600	$2,700,040
Hololani	64	64	$44,937,500	$44,937,500	$4,847,900	$4,847,900
Royal Kahana	236	236	$110,051,140	$110,051,140	$11,228,500	$11,228,500
Valley Isle Resort	120	120	$68,950,200	$68,950,200	$10,347,000	$10,347,000
The Sands of Kahana[2]	196	98	$173,111,620	$100,354,460	$24,597,300	$27,597,300
Kahana Beach Resort	84	84	$38,015,140	$38,015,140	$5,863,300	$5,863,300
Single-Family Parcel	1	1	$4,293,000	$4,293,000		
Total	**961**	**811**	**$605,172,680**	**$506,728,240**	**$91,708,200**	**$87,915,640**

Source: County of Maui, 2021

[1] There are 29 units in Pohailani II that occupy oceanfront property and 65 units in Pohailani I, which is mauka of Lower Honoapiilani Road. All of Pohailani II units are subject to flooding and erosion threat. It is estimated that 20% of Pohailani I, or 13 units, are subject to the same conditions. This amounts to a total of 62 affected Pohailani units. The land value of Pohailani II is $1,001,900 and $8,490,700 for Pohailani I. In estimating the value of lands under erosion threat, the full value of Pohailani II is included and 20% of Pohailani I is included.

[2] Sands of Kahana has two of four buildings at threat of erosion, or about half of 196 units.

The extent of reduction of condominium unit and property values will depend on the alternative selected to mitigate impacts. If managed retreat or accommodation measures, as discussed in Sections 2.5.2 and 2.5.3, respectively, are employed, both alternatives are anticipated to significantly decrease the economic values of condominium units and properties. Neither alternative is considered a feasible alternative at this time and was not further studied in this DEIS.

Flood insurance designations and assigned rates also have significant economic implications. FEMA sets flood insurance rates, and determining factors include the amount and type of coverage being purchased, location and flood zone, and the design and age of structure. The properties adjacent to Kahana Bay are in Zones VE and AE (Section 3.2.3, *Flood Hazard*). Flooding in Zone VE areas are affected by waves higher than three feet and have a one percent or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Zone AE pertains to hazards relating to rising waters. Mandatory flood insurance purchase requirements and floodplain management standards apply to these flood zones. Flood insurance for adjacent properties is a significant expense, and annual premiums for most of the adjacent properties are provided on Table 3-7.

Table 3-7: Annual Flood Insurance Premiums for Adjacent Properties

Property Name	Annual Flood Insurance Premiums
Kahana Village	$226,964
Kahana Outrigger	$28,864
Kahana Reef	$98,660
Pohailani I & II	$138,576
Hololani	$77,331
Royal Kahana	$232,021
Valley Isle Resort	$91,192
The Sands of Kahana	Evidence not available
Kahana Beach Resort	Evidence not available

3.4.2.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Short-term impacts: The short-term duration of construction impacts is not expected to impact the economic value of condominium units and adjacent properties, both of which are based on trends and regional conditions. Further, flood insurance rates are not anticipated to be impacted by short-term construction impacts. No mitigation is necessary.

Long-term impacts: Both the Proposed Action and Secondary Alternative will have a long-term stabilizing effect on the values of adjacent condominium units and their underlying properties. The Proposed Action, designed for a 50-year life span, will have a greater positive impact in that it will help to protect and stabilize the adjacent properties over a longer time frame than with the Secondary Alternative. In that the economic impacts on nearby condominium units and property values are expected to be positive, no mitigation is necessary at this time.

While solutions presented by the Proposed Action and Secondary Alternative are directly related to flood zone designations and insurance rates, it is beyond the scope of this DEIS to identify impacts on FEMA flood designations and insurance rates. Property owners would need to submit a Letter of Map Amendment to FEMA.

No Action

If current conditions continue and beach erosion worsens, it is anticipated that the values of condominium units and properties will likely deteriorate with decreased occupancy and revenues. Flood insurance rate levels are likely to continue current trends.

3.4.2.4 Fiscal Revenue

3.4.2.4.1 Existing Conditions

The properties adjacent to the project area contribute significant fiscal revenues to Maui County. Table 3-8 lists taxes paid to Maui County related to property, general excise, transient accommodation, and timeshare occupancy. In 2019, these taxes were estimated at almost $11 million.

Table 3-8: Tax Revenues Generated by Adjacent Properties

	Tax				
Property Name	**Property Value**	**General Excise**	**Transient Accommodations**	**Timeshare Occupancy**	**Total Tax by Property (2019)**
Kahana Village	$236,425.24	$178,431.56	$329,995.50		$834.852.30
Kahana Outrigger	$112,421.64	$90,505.52	$200,954.40		$403,881.56
Kahana Reef	$266,298.62	$106,652.57	$236,806.60		$609,757.79
Pohailani I & II	$218,839.59	$94,940.00	$210,800.00		$524,575.79
Hololani	$298,406.90	$129,937.12	$288,506.58		$716,850.60
Royal Kahana	$845,347.20	$639,240.15	$1,417,978.75		$2,902,566.10
Valley Isle Resort	$610,779.00	$263,457.84	$584,970.00		$1,459,206.84
The Sands of Kahana VC	$1,289,346.28	$237,327.54	$100,589.10	$227,486.04	$1,854,748.96
The Sands of Kahana WO	$324,486.48	$184,871.72	$411,397.05		$920,755.25
Kahana Beach Resort	$451,928.28	$92,175.41	$54,153.85	$69,989.91	$668,247.45
Single-Family Parcel	$10,117.98				$10,117.98
Total	**$4,691,397.21**	**$2,017,539.43**	**$3,899,151.83**	**$297,475.95**	**$10,915,864.65**

Source: County of Maui Real Property Tax Assessment Division, 2021

3.4.2.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Short-term impacts: The short-term duration of construction impacts is not expected to impact fiscal revenue generated by the adjacent properties. No mitigation is necessary.

Long-term impacts: Both the Proposed Action and Secondary Alternative will have a positive effect on fiscal revenues by stabilizing and possibly increasing values of adjacent condominium units and their underlying properties, thereby increasing taxes. The Proposed Action will have a greater positive impact on fiscal revenues due to a long-term 50-year life span that will help to stabilize the adjacent properties over a time frame longer than the Secondary Alternative. In that the fiscal revenue impacts are expected to be positive with the Proposed Action and Secondary Alternative, no mitigation is necessary.

No Action

If current conditions continue and beach erosion worsens, it is likely that the values of condominium units and properties will deteriorate with decreased occupancy and revenues that could possibly lead to decreased tax revenues.

3.4.3 Archaeological Resources

3.4.3.1 Existing Conditions

An archaeological literature review and field inspection for the project area and surrounding region was conducted for the project. The literature review revealed one known archaeological site in the vicinity of the project that included a destroyed heiau located at Kahana Point, which was documented by W. Walker in a 1931 survey. A list of other historical archaeological sites in the area identified in the archaeological report contained in Appendix G, *Archaeological Literature Review and Field Inspection*.

Land use in the coastal area of West Maui in pre-contact and early historic times involved the use of coastal resources, cultivation of loʻi, and small gardening plots. The former presence of several heiau in the Kahana ahupuaʻa, as documented by Walker in 1931, attests to the ceremonial significance of the area and indicates a sizeable pre-contact population. Near the project area, a 1998 study noted the presence of salt gathering areas along the Kahana coastline and taro cultivation within Kahananui stream valley.

An archeological field inspection was conducted to identify any potential historic properties within the Proposed Action areas that may be affected. Subsurface testing was not performed during the field inspection. The inspection determined that much of the shoreline is suffering from chronic erosion, which has impacted the infrastructure and buildings along the coast. A large section of the coastline is comprised of shoreline hardening measures to prevent further erosion from taking place, and which has ultimately contributed to a cumulative loss of sandy beach and shoreline access. The current proposed modifications will impact the shoreline as well as the built environment within the project area, but no pre-contact or historic properties were identified during this field investigation.

Due to the investigation findings, an archaeological inventory survey is not recommended for the project area in advance of the Proposed Action. However, given the history of the ahupuaʻa and the previous archaeology recorded within the vicinity of the current area of potential effect, archaeological monitoring is recommended during ground-disturbing activity related to the Proposed Action. There is the potential for subsurface cultural deposits consisting of artifacts from multiple temporal periods and/or burial sites.

3.4.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Construction is not expected to have significant impacts on archaeological resources. Only one archaeological site was identified in the area, but, as the literature review found, it has been totally destroyed. There will be minimal excavation conducted in the nearshore area during construction of the Proposed Action. Since there is little chance that archaeological resources exist in the offshore sand borrow areas, little impact to archaeological resources is expected from offshore dredging activities.

To mitigate impacts to archaeological resources that may occur, an archaeological monitor should be present during earth moving activities. Should a suspected artifact or possible cultural and/or archaeological site be found, construction will cease until a qualitied individual(s) can inspect the site or artifact.

Long-Term Impacts: The Proposed Action could help to preserve archaeological resources that may exist in the sandy area by reducing coastal erosion that could expose the sensitive artifacts.

Secondary Alternative

The Secondary Alternative is expected to have similar impacts on archaeological resources as the Proposed Action. In addition to the impacts on archaeological resources described for the Proposed Action, which will be similar to the Secondary Alternative, there may be some excavation involved along the shoreline to secure the buried toe protection.

No Action

The No Action Alternative may result in continued shoreline erosion in the project area, which could expose archaeological resources if they are present. However, there would be no anthropogenic disturbance to these archaeological resources since no construction would take place.

3.4.4 Cultural Impact Assessment

3.4.4.1 Existing Conditions

A Cultural Impact Assessment (CIA) for the project is included in Appendix H. The CIA complies with the State of Hawaiʻi's environmental review process under HRS §343 that requires consideration of the project's potential effect on cultural beliefs, practices, and resources. The CIA used archival research and community consultation efforts to assess the project's potential impacts on cultural beliefs, practices, and resources pursuant of HAR §13-275 and §13-284.

The project area is located within and offshore of the ahupuaʻa of Kahana, which is within the traditional moku of Kāʻanapali and the modern judicial district of Lāhainā. Background research for the CIA included information specific to Kahana Ahupuaʻa and Kāʻanapali moku when available, which predominately included kaʻao and moʻolelo (Appendix H; Section 3, *Kaʻao and Moʻolelo*). Traditional and historic documentation of this specific area is sparse. To supplement the traditional and historic documentation of Kāʻanapali, the background research for the CIA was expanded to include the broader district of Lāhainā, as Lāhainā was the traditional and historic epicenter of life in the region.

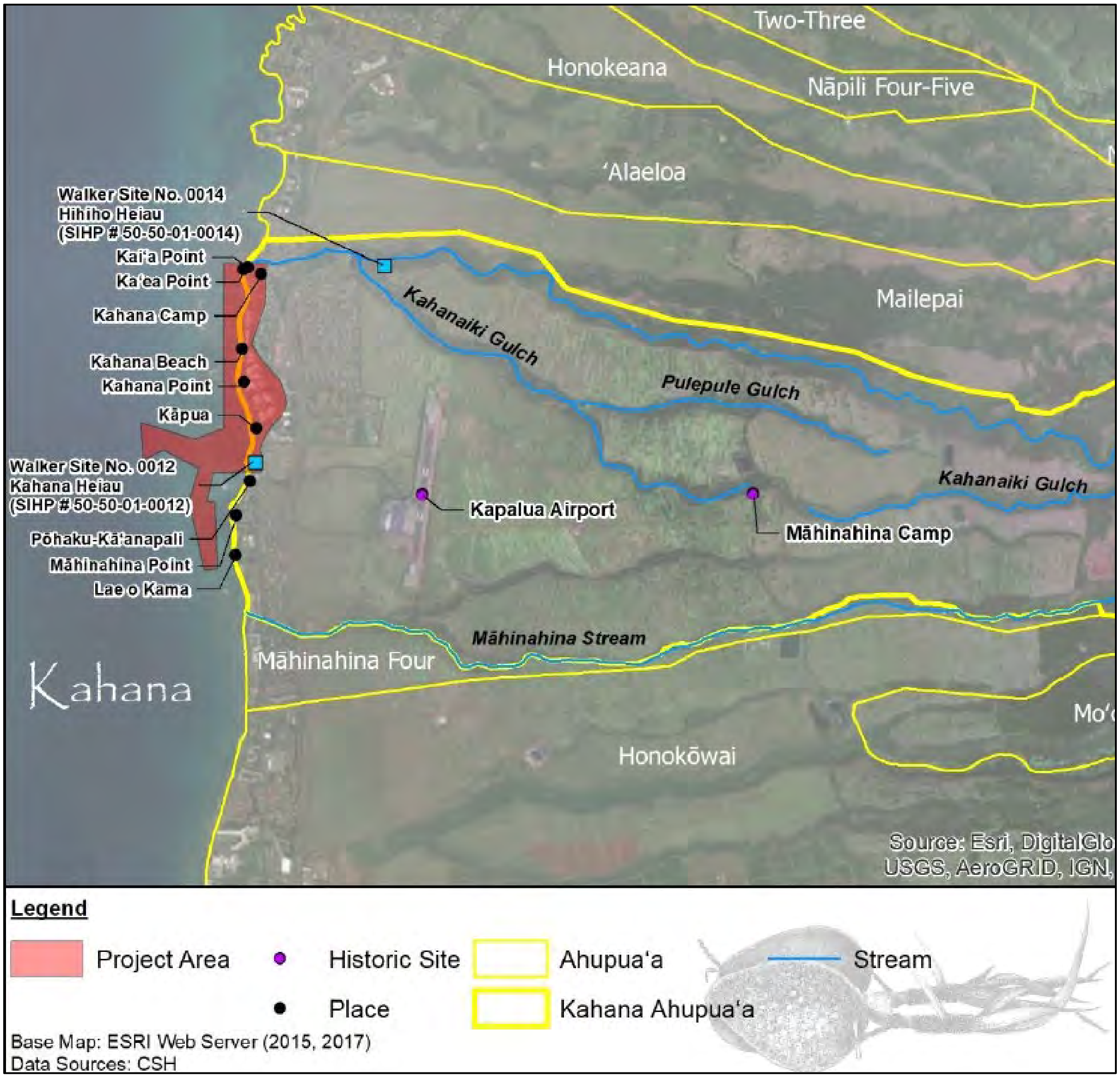
The CIA presented a thorough review of kaʻao, moʻolelo, ʻōlelo noʻeau, mele, and oli in order to present traditional accounts of ancient Hawaiians living in the vicinity of the project area. These stories, songs, and sayings still speak to the characteristics and environment of the area and its people. The CIA also identified wahi pana, storied places, in and around the project area. Named locations identified include heiau, land units, and topographical features. Within the project area, located from north to south, are Kaiʻa Point, Kaʻea Point, Kahana Camp, Kahana Beach, Kahana Point, Kāpua, and the destroyed Kahana Heiau. Just past the southern bound of the project area sits Pōhaku o Kāʻanapali, a legendary boulder after which Pōhaku Park is named today (Figure 3-21).

Looking back at the history of the area, the CIA describes the Lāhainā region's significance to Kamehameha I during the unification of the Hawaiian islands, for the missionaries, and for the commercial pursuits of sugar and whaling. In the mid-nineteenth century, with the Māhele and the Kuleana Act, four Land Commission Awards (LCAs) were awarded within the current project area. The four areas were described as taro land, a salt patch, and two house lots.

The CIA also included an archaeological literature review, noting that past archaeological studies, alongside traditional knowledge and historic era observations, have shown that traditional Native Hawaiian burial practices were common within near shore sand dunes in the region. Of note in the immediate vicinity of the project area, a study of a property on the mauka side of Honoapiʻilani Highway identified a platform constructed over a human burial and a petroglyph etched into a boulder that had likely been moved to clear land for sugarcane cultivation.

Community consultations comprised a significant portion of the CIA and offered insight to the cultural practices that occur within the project area. The CIA includes the comments of a cross section of concerned community leaders, residents, and professionals. Those whose families have lived in or near the project area recall growing up with values that emphasized caring for the ocean's resources so that they could provide for the generations to come and sharing one's catch with neighbors.

Ocean resources traditionally caught and gathered within the area include: ulua, papio, omilu, manini, kūmū, moana, moilua, halalū, ʻoama, oʻiʻo, moi, kala, nehu, opelu, ahi, uku, nabeta, tako, eel, lobster, Kona crab, ʻaʻama, paiʻea, pipipi, kūpeʻe, opihi, wana, salt, and limu such as ogo and wāwaeʻiole. The waters off Kahana also see sharks, whales, and dolphins. Traditional practices cited were naturally ocean-centered and included fishing, gathering, long and shortboard surfing, paddleboarding, bodyboarding, and swimming.



Adapted from Figure 8 of the Cultural Impact Assessment (CSH, 2021)

Figure 3-21: Place Name Map of Kahana (Adapted from CSH, 2021)

3.4.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: During construction, fishing, gathering, recreation, and surfing will be unavailable in active construction zones for public safety reasons. Construction will be phased so that the beach will be accessible in some safe areas along the beach for cultural activities as long as it is safe to do so.

Long-Term Impacts: Beneficial community impacts from the Proposed Action include mitigating beach and shoreline erosion. The restored public beach area would expand the potential recreational use for residents and visitors. However, community resources such as fishing within the footprint of the proposed beach fill and stabilizing structures would be lost. Mitigation of cultural resource and fishing and gathering impacts could include stabilizing structures designed to incorporate artificial reef elements that promote coral establishment and create microhabitats for fish and invertebrates. If designed correctly, these structures could provide new resources for fishermen and gatherers.

The CIA identified the following potential cultural impacts from the Proposed Action:

- Potential to impact gathering of near-shore ocean resources from fishing and diving; and
- Potential to impact the ocean environment and the natural processes of beach erosion and accretion.

The following mitigation actions were recommended to promote and preserve cultural beliefs, practices, and resources of Native Hawaiian and other ethnic groups:

- Conduct a marine environmental study that includes evaluation of marine habitat to be followed up with periodic monitoring (see Section 3.3.4, *Marine Biological Resources*);
- Create a community advisory group which is informed of and involved in all aspects of planning and implementation of proposed projects;
- Inform and educate project construction workers and all other personnel involved in construction and related activities of the possibility of inadvertent cultural finds and proper notification and procedures; and
- In the event that iwi kūpuna and/or cultural finds are encountered during construction, consult with cultural and lineal descendants of the area to develop a reinternment plan and cultural preservation plan (Appendix H).

Secondary Alternative

The beneficial community and cultural impacts from a restored beach would be similar to those of the Proposed Action, without the effects of stabilizing structures. The loss of community resources would be less, as the footprint of this alternative does not extend as far offshore as the Proposed Action. Artificial reef elements and new resources for fisherman and gatherers would not be possible in this alternative.

No Action

The No Action Alternative is not expected to impact cultural resources as they currently exist.

3.4.5 Scenic and Open Space Resources

3.4.5.1 Existing Conditions

The oceanfront view plane of West Maui is an iconic attraction for visitors and permanent residents alike. The scenery includes views of the islands of Molokaʻi and Lanaʻi and the Pailolo Channel offshore of the beach. During the winter season, views of humpback whale activity are common. The ongoing coastal erosion at Kahana Bay has significantly impacted the view along the shoreline. Emergency and permanent shore protection, active erosion scarps, salt-damaged vegetation, collapsed trees, exposed roots and root balls, and caution tape are very unsightly compared to the once pristine sandy beaches that fringed Kahana Bay. Red and brown plumes and high levels of turbidity in nearshore waters from exposed banks and escarpments are observed often following storm events (Figure 1-4).

3.4.5.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Short-term impacts on scenic and open space resources are expected during the construction period as machinery, equipment, stockpiling materials, and other related activities may be present for several months. To mitigate effects from construction, construction will be conducted in phases along the length of the beach and BMPs will be employed to ensure that the work site is kept tidy.

Long-Term Impacts: The Proposed Action will result in permanent changes to scenic and open space resources along the Kahana shoreline. The nourished beach would have a positive impact on the appearance of the widened shoreline and the vegetated berm will cover existing shoreline hardening structures that will be permitted to stay in place. The stabilizing structures would have a permanent impact on the view of and from the shoreline. To mitigate the visual effects of the structures, they could be designed to occupy a low elevation and profile. Figures 3-18, 3-19, and 3-20 in Section 3.4.2, *Kahana Bay Character*, illustrate how the widened beach, vegetated berm and T-groins may appear after construction along certain stretches of the beach.

Secondary Alternative

Short-term Impacts: The Secondary Alternative would have similar short-term open space and aesthetic impacts during construction; however, the duration would be less than that of the Proposed Action because no stabilizing structures would be constructed. Similar short-term BMPs to mitigate construction effects can be implemented as described in the Proposed Action.

Long-term Impacts: The widened beach and absence of T-groins would enhance the visual and aesthetic value of Kahana Bay. However, beach erosion would continue, albeit at a slower pace than the No Action Alternative, and construction activities related to beach renourishment are anticipated to occur approximately every nine years, thereby temporarily impacting open space and aesthetic resources.

No Action

The No Action Alternative would lead to continued erosion of the beach and shoreline. Terrigenous material may continue to be released in the nearshore area and create unattractive plumes. Emergency shoreline armoring structures will likely persist and create an unnatural and unsightly appearance.

3.4.6 Public Safety

3.4.6.1 Existing Conditions

The current condition of the shoreline is hazardous for public safety in some areas of the Kahana shoreline. Temporary sandbag revetment and stabilizing structures pose a danger to those who walk or climb on their unstable and slanted surfaces. The hazard can be compounded when the bags become slick with algae. During high tide and wave activities, beach goers walking along the shoreline frequently walk on top of the sandbag structures despite numerous signage advising against it. Damage to the sand structures and rock mattresses create puncture and tripping hazards for beach users that traverse the beach area barefoot. Several sinkholes have formed behind existing seawalls and need to be repaired. The sinkholes and subsequent filling activities create hazardous conditions in the backyards of condominium owners.

During the winter when storms and high waves are prevalent, people residing within those condominiums closest to the ocean, such as those units in the Valley Isle and Pohailani, are directly exposed to wave overtopping (Figure 1-6).

3.4.6.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: Construction materials, large fill stockpiles, and heavy machinery may cause temporary hazards to public safety. To ensure no accidents occur, temporary BMPs, such as orange fencing to exclude non-essential personnel, will be installed around the construction areas. The contractor will be required to submit a site-safety health plan that will detail these safety measures that will be implemented during construction.

Long-Term Impacts: The Proposed Action will reduce hazards to public safety by mitigating the effects of wave runup and erosion that currently threaten the inhabited condominium structures. Removing temporary sloped shoreline protection structures and replacing them with a sandy beach would decrease the risk of slips, trips, and falls and increase public safety and access.

Secondary Alternative

The Secondary Alternative would provide similar benefit for public safety. However, protection from waves and erosion may not be as long-lasting as with the Proposed Action, and some or all of the coastal protection structures may need to be left in place or rebuilt.

No Action

The current prediction of SLR and more frequent storms associated with climate change will continue to exacerbate public safety hazards with the No Action Alternative. Emergency structures that threaten public safety will continue to persist along the shoreline.

3.5 Public Services

3.5.1 Recreational Facilities and Resources

This section describes existing conditions of recreational resources and activities, as well as of public parks and public shoreline accesses. Potential impacts and proposed mitigation measures are discussed for the Proposed Action, the Secondary Alternative, and the No-Action Alternative.

3.5.1.1 Recreational Resources and Activities

3.5.1.1.1 Existing Conditions

Shoreline recreational activities in the area are typical of most beach and coastal areas in Hawaiʻi and include swimming, surfing, stand up paddle boarding, sunbathing, beach combing, leisure, and walking. The outer reef areas are often used for snorkeling and diving among corals, turtles, and reef fish. Fishing for both subsistence and recreation purposes includes a variety of methods such as pole, net, and spear. Tako (octopus) hunting, limu (seaweed) picking and other resource-gathering activities are important cultural, recreational, and inter-generational activities that occur in this area. A local fishing family resides amidst the condominiums in the project area and still fish as part of their cultural livelihood.

Strong trade winds blow through the Pailolo Channel and create favorable conditions for wind and kite surfing offshore of the project area. Small watercraft such as kayaks are launched off Kahana Beach and offer quick access to the offshore reefs for snorkeling, fishing, and ocean recreation. Stand-up paddle boarding, outrigger canoeing, surfing, and boogie boarding are also popular along the shore and over the reef at the surf breaks. The main break in the project area is known as S-Turns, which is located south of Kahana Beach offshore of Pōhaku Park. Another surf break called Mushrooms is located just north of S-Turns offshore of Kahana Beach Resort.

3.5.1.1.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: The Proposed Action construction will involve beach nourishment and construction of T-groins. Equipment staging and work areas are anticipated to temporarily hinder access and/or disrupt normal recreational use of portions of the beach as heavy equipment will be utilized. To mitigate this impact and to protect public safety, a designated truck hauling route surrounded by barricades, including temporary fencing around terrestrial work areas, would be created across Kahana Beach to minimize disruption to beach access and the need for large-scale beach closures. Further, designated crossing guards may be stationed at various locations along the truck haul route to escort beach users to and from the water, similar to truck haul route operations during construction in Waikiki, Oahu (Coastal Geology Group, 2013).

Offshore sand dredging areas will be marked to clearly delineate the boundaries. These areas will be unavailable for recreational use during construction due to safety factors. To secure the area, construction mitigation measures may include temporary fencing around terrestrial work areas, in-water silt curtains and buoys during construction, and other measures to exclude non-essential personnel and protect public safety.

Existing parks in the area are not expected to be affected during construction. Sand dredging would occur in proximity to S-Turns and Mushrooms which are popular surf sites offshore of Pōhaku Park and Kahana Beach Resort, respectively. This may disrupt surfing when the operation is near the surf breaks, but the conditions for surfing will be small during the summer when dredging activities are planned to take place. A proposed mitigation measure is to effectively and widely inform the community of the temporary disruption period so that surfers can plan accordingly.

Construction activities related to both beach nourishment and T-groin construction are also anticipated to temporarily negatively impact ocean habitats for fish, tako, and other marine life. This would disrupt food gathering activities, such as fishing, diving, and tako hunting. Throughout the duration of construction, beach areas for passive activities, such as sunbathing and walking, would be limited and the ambience would be negatively impacted. Once the construction of the project is complete, the quality of these activities would resume and improve given the widened beach.

Long-Term Impacts: Once the beach is renourished and T-groins are constructed, the widened beach area would serve as an area for numerous recreational and beach activities. The stretch of beach along the entire bay would be widened, made contiguous, and be available for public use. Significantly increased beach area would allow for more beach use activities, such as sunbathing and lateral shoreline walking. In addition, the six beach coves created between the stabilizing structures will create conditions calmer than the open ocean.

The Proposed Action is not anticipated to generate long-term impacts on surf conditions. Changes to coastal processes from sand extraction are not expected to alter the surf breaks at S-Turns or Mushrooms. Further discussion of surf break impacts is detailed in Section 3.2.1, *Coastal Processes* and in Part III of the Wave Study (Appendix A).

The presence of T-groins would alter recreational routes related to swimming, kayaking, stand up paddleboarding, and other ocean activities occurring directly along the coastline. While these activities may continue, users would need to either stay between the T-groins or venture out beyond the breakwaters.

The T-groins may provide opportunities for marine habitats as they would be constructed primarily of rock. The rock rubblemound design makes use of heavy armor stones keyed and fit in one or two layers over smaller underlayer stones. This construction technique is common for similar coastal structures in Hawaiʻi. While these would have a long-term positive impact on the benthic environment, the T-groins also have the potential to enhance public recreational and fishing opportunities, such as pedestrian access and fishing posts. The groins will not be designed to specifically provide pedestrian access out to the sea, however. It is not yet determined what, if any, restrictions will be placed on access and fishing from the groins.

Secondary Alternative

Short-Term Impacts: The Secondary Alternative would have fewer short-term impacts on recreational resources and activities because activities would be limited to sand nourishment and placement and not include the construction of stabilizing structures. In terms of short-term impacts on beach activities, impacts would be similar to those of the aforementioned Proposed Action effects. Similarly, short-term impacts on ocean habitats would resemble those of the Proposed Action and would affect shoreline food gathering activities as earlier discussed.

Long-Term Impacts: With the absence of T-groins, the Secondary Alternative will allow unobstructed lateral shoreline access related to swimming, kayaking, stand up paddle boarding, and other ocean activities occurring laterally along the shoreline. Further, the widened beach will be a positive impact for beach goers, passive beach activities, and aesthetic and visual experiences. As with the Proposed Action, long-term impacts on surfing are expected to be negligible.

The frequency of sand nourishment would be higher than the Proposed Action, however, and would disrupt lateral shoreline and beach activities on an estimated time frame of nine-year intervals, compared to the initial beach nourishment needed with the Proposed Action estimated at 30 years after construction.

No Action

If neither the Proposed Action nor the Secondary Alternative are implemented, chronic erosion accelerated by SLR will continue to diminish the beach. The narrowing beach would significantly reduce opportunities for beach. Further, beach activities may be reduced. The loss of sand beach could deter some recreational use of this shoreline. There will be little or no impact on surf sites, the benthic environment, or offshore food gathering activities as they currently exist.

3.5.1.2 Public Parks and Shoreline Access

3.5.1.2.1 Existing Conditions

Four Maui County parks are located within one mile of the project area. Three parks, including Pōhaku, Kauhale Mahina, and Honokōwai are located south of the project site while Kahanaiki Park is located just north of the project site (Figure 3-19).

- Pōhaku Park, where S-Turns is located, is at the southern extent of the project area. This approximately one-acre park offers access to leisure activities, swimming, surfing, and ocean recreation. The park has a parking lot, portable toilets, picnic tables, barbeque grills, trash receptacles, several benches, and an outdoor shower. Pōhaku Park is a popular pau hana (after work) gathering place and has a seasonal offshore surf break that adds to its popularity.

- Kauhale Mahina Park is approximately 0.7 miles south of the southern end of the project site. Kauhale Mahina Park is a small, open, mauka area adjacent to a drainage canal located where Hoaka Place intersects with Lower Honoapi‘ilani Road. The park has several paved parking stalls and picnic tables and has a wide grassy lawn for lounging and exercising pets.

- Honokōwai Beach Park is located one mile south of Pōhaku Park and offers parking, picnic areas, restrooms, showers, and playground equipment. The 4.6-acre park offers grassy lawns for leisure activities and is Americans with Disabilities Act accessible.

- Kahanaiki Park is located where Kahana stream flows under Lower Honoapi‘ilani Road, just north of the project site. The park and its grassy lawn extend mauka of the roadway along Omaikai Place, a residential cul-de-sac. The park is approximately 500 ft from the county's shoreline access path (#216) on the northern extent of the project area. There are no sidewalks across the Kahana Stream bridge and pedestrians must walk on the roadway itself.

Public shoreline lateral access is protected by Hawai‘i statutes. Cross-shore public beach accesses and public parking currently available in the area are listed below and shown in Figure 3-19:

- "Kahana 1," located between Kahana Beach Resort and Sands of Kahana on the southern end of the project area, is designated by Maui County as a public shoreline access. Sands of Kahana has dedicated eight public parking spaces along the southern portion of the property and is adjacent to the public shoreline access.

- "Kahana 2," located between Kahana Outrigger and Kahana Village on the northern end of the project area is designated by Maui County as a public shoreline access. Parallel parking along the mauka side of Lower Honoapi‘ilani Road can accommodate approximately five to ten cars.

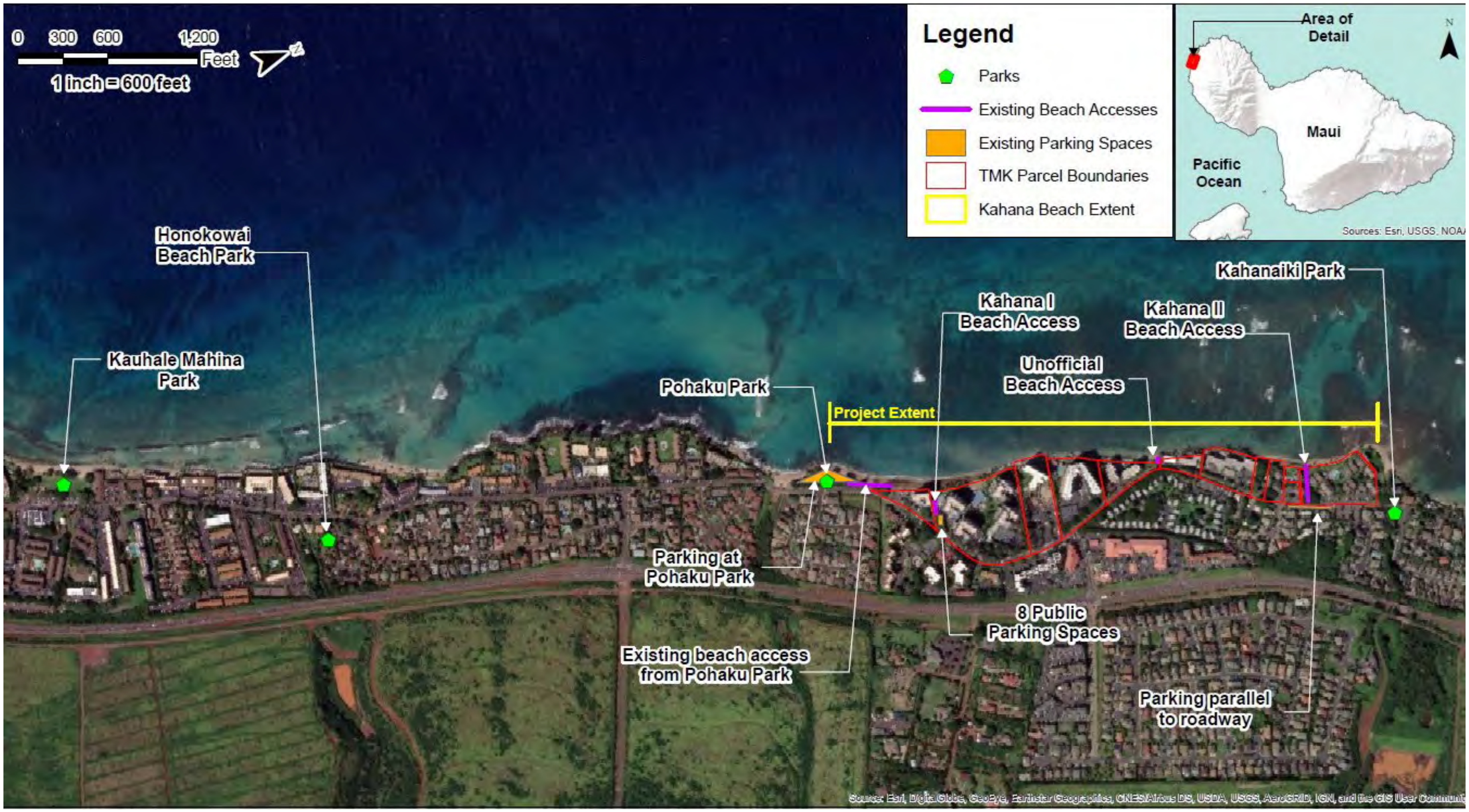


Figure 3-22: Existing Parks and Public Accesses

- An undesignated and unofficial beach access is located between Hololani and Pohailani in the vicinity of the middle of the project area where Lower Honoapiʻilani Road veers closest to the shoreline. Currently, beachgoers step down to reach the beach. There is no public parking or sidewalk along this road near this access point.

In addition to designated and undesignated parking spaces for these shoreline accesses, people can also reach these accesses via the Maui public bus services provided along Lower Honoapiʻilani Road. There are three bus stops along the stretch of Lower Honoapiʻilani Road that runs parallel to the project site: Pōhaku Park, Kahana Manor, and Kahana Outrigger (see Section 3.6.1, *Roadways and Public Transportation*).

3.5.1.2.2 Potential Impacts and Proposed Mitigation Measures

<u>Proposed Action</u>

Short-Term Impacts: During construction, the Proposed Action may indirectly impact Pōhaku Park users by disrupting or impeding lateral pedestrian shoreline access from the park to Kahana Bay due to sand dredging and beach placement activities. Proposed mitigation measures include public notification of lateral shoreline access changes along the beach during the duration of the construction period.

Construction of the Proposed Action is expected to have no impact on Kauhale Mahina Park, Honokōwai Beach Park, and Kahanaiki Parks. Construction activities are expected to have short-term impact on cross-shore public shoreline accesses located in the project area. The Kahana 1 public access may need to temporarily close when construction impacts occur in this vicinity.

Long-term Impacts: In the long-term, the Proposed Action is anticipated to have positive impacts on Pōhaku Park users who want to access Kahana Bay beach. Currently, lateral beach access from the park is impeded due to a steep shoreline access path just makai of a guardrail along Lower Honoapiʻilani Highway. The Proposed Action will improve lateral shoreline pedestrian access between the park and Kahana Bay by adding sand to elevate and widen the beach in this area.

The Proposed Action will help to stabilize the beach with the T-groins, reducing sand movement and retaining beach width over the 50-year lifespan of the T-groins. The Proposed Action will not change public access conditions at the Kahana 1 and Kahana 2 beach accesses, but will improve the shoreline experience due to widened beaches. Conditions at the unofficial access between Hololani and Pohailani would likely improve because the renourished beach would replace existing sandbags that impede access and will make it easier for the public to access the widened beach along Kahana Bay.

Secondary Alternative

Short-term Impacts: As with the Proposed Action, the Secondary Alternative may impact Pōhaku Park users by disrupting or impeding pedestrian access between the park and Kahana Bay due to sand dredging and beach nourishment activities. The scale and length of time of this impact will be less than those of the Proposed Action because T-groin related construction activities would not occur. Other impacts related to parks and public access are similar to the Proposed Action.

Long-term Impacts: The Secondary Alternative will have similar long-term impacts on public parks and shoreline access by providing shoreline users a significantly widened beach. However, sand renourishment would need to occur at approximately every nine-years, compared to no renourishment needed with the Proposed Action until after 30 years of implementation.

No Action

Under the No Action Alternative, the beach would continue to erode and beach access along the shoreline would diminish. Public recreational activities and public shoreline access will continue to significantly decrease.

3.5.2 Schools and Education

3.5.2.1 Existing Conditions

The State of Hawaiʻi Department of Education (DOE) operates four public schools in West Maui. Additionally, two private schools and the UH Maui College Lahaina Education Center are located within the area. West Maui schools and educational facilities are listed in Table 4-3.

Table 3-9: West Maui Schools and Educational Facilities

School	Type	Location
Kamehameha III	Elementary	Lahaina
Princess Nahienaena	Elementary	Lahaina
Lahaina	Intermediate	Lahaina
Lahainaluna	High School	Lahaina
UH Maui College (Lahaina Education Center)	Higher Education	Lahaina
Maui Preparatory Academy	Private (PK-12)	Nāpili
Sacred Hearts School & Early Learning Center	Private (PK-8)	Lahaina

The nearest school to the project vicinity is Maui Preparatory Academy, located approximately one mile north of the project site along Honoapiʻilani Highway. The other West Maui schools listed are located over seven miles away from the project site.

3.5.2.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Implementation of the Proposed Action or Secondary Alternative are not expected to have impacts on schools and education in the area.

No Action

The No Action Alternative would not affect schools and education.

3.5.3 Solid Waste Disposal

3.5.3.1 Existing Conditions

Each of the condominiums maintains their own solid waste collection and disposal services which they pay for independently.

Maui County provides solid waste collection service to West Maui. Construction waste is accepted at the Pōhakulepo Concrete Recycling Facility (i.e., Hawaiian Cement) and the Central Landfill located in Puʻunene. The County also has several recycling centers where plastic bottles, aluminum cans, cardboard, glass, and other recyclables can be dropped off. A small state recycling service for beverage containers is located on Lahainaluna Road in Lahaina. In addition, the Olowalu Recycling and Refuse Convenience Center is a larger center located on Honoapiʻilani Highway at Olowalu Village Road, three miles south of Lahaina.

3.5.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Short-Term Impact: The Proposed Action and Secondary Alternative may generate some solid construction waste, which will be collected and properly disposed of by the contractor in accordance with all state and county regulations.

Long-Term Impact: In the long-term, the increased recreational area could result in more users that may indirectly produce more solid waste and recyclable materials. The increase in trash could necessitate the need for more receptacles and more frequent collection and disposal, thereby resulting in a secondary impact. However, this would not be expected to exceed the County's ability to provide collection and disposal services.

No Action

The No Action Alternative would not affect solid waste disposal in the short- or long-term. No mitigation measures are required.

3.5.4 Medical Services

3.5.4.1 Existing Conditions

The only hospital on island is Maui Memorial Medical Center in Kahului located in Central Maui approximately 30 miles away from the project site. Ambulance service is operated under a state contract with American Medical Response. Two ambulance service units operate in West Maui: one out of the Nāpili Fire & Ambulance Station and the other out of the Lahaina Comprehensive Health Center. Other health services in West Maui include the Doctors on Call Urgent Care Center, Urgent Care West Maui, Kaiser Permanente's Lahaina Clinic, and other small private practices. The West Maui Hospital and Medical Center is expected to open in late 2019 or 2020 in Kaʻanapali.

3.5.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

The Proposed Action and Secondary alternative would not directly impact medical services in the area. Increases in the need for emergency medical services may occur, however, if more people choose to visit Kahana because of increased beach space and more recreational opportunities, thereby resulting in a secondary impact.

No Action

The No Action Alternative would not impact medical services.

3.5.5 Police and Fire Protection

3.5.5.1 Existing Conditions

The Kahana area is served by the Maui Police Department's Lahaina patrol district. The Lahaina Police Station is located approximately five miles away at the Lahaina Civic Center. There is also a police sub-station in Nāpili.

Fire protection in West Maui is provided by the Maui County Department of Fire and Public Safety. Two fire stations are located in West Maui: the Lahaina Fire Station located at the Lahaina Civic Center, and the Nāpili Fire & Ambulance Station located on 4950 Hanawai Street adjacent to Honoapiʻilani Highway in Nāpili. The Nāpili station is closest in proximity to Kahana; located about 1.7 miles from the project site. The Lahaina station includes a ladder company and has a boat for ocean rescues. County fire hydrants are provided at regularly space intervals along Lower Honoapiʻilani Road, and each of the condominium complexes has fire alarms and fire extinguishers within their buildings.

3.5.5.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative may attract more visitors and have an increased de facto population, which may result in secondary impacts and need for increased police and fire protection.

No Action

The No Action Alternative would not impact police and fire protection.

3.6 Public Infrastructure

3.6.1 Roadways and Public Transportation

3.6.1.1 Existing Conditions

The closest major road to the project site is the Honoapiʻilani Highway (Hawaiʻi Route 30), which follows the coastline from Maʻalaea in central Maui to Puamana, Lahaina, Kāʻanapali, and Kapalua in West Maui. It is the only major highway that provides vehicle access between West Maui and Kahului. It connects with the Kahekili Highway, Route #340, at Honokōhau Bay to the north of the project area.

Access to the condominiums along Kahana is via Lower Honoapiʻilani Road, a two-lane County-owned road that runs just inland of the oceanfront condominiums. The Lower Honoapiʻilani Roadway meets the upper Honoapiʻilani Highway at Honokōwai to the south and at Kapalua to the north of the project area. There are a number connecting roads between the highway and lower roadway, with the nearest being Hoʻohui Road. It splits the project area roughly in half, located just inland of the Royal Kahana. Maui public bus services are provided along Lower Honoapiʻilani Road. There are three bus stops along the stretch of Lower Honoapiʻilani Road that runs parallel to the project site. The stops are located at Pōhaku Park, Kahana Manor, and Kahana Outrigger.

The nearest airport to the project site is the Kapalua/West Maui Airport which is located approximately one mile southwest and mauka of the project site and offers commuter flights to Kahului, Honolulu, and neighboring islands. The Kahului Airport is located approximately 25 miles to the southeast of the project area.

3.6.1.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Short-Term Impacts: Movement of construction vehicles and materials may cause short-term impacts to local traffic in the area during construction. To mitigate these impacts, a traffic plan will be implemented by the construction contractor as needed.

Long-Term Impacts: By protecting the shoreline along Kahana Bay, the Proposed Action and Secondary Alternative would also help to protect Lower Honoapiʻilani Road from long-term erosion due to wave action that reaches this roadway. Hence, harmful long-term impacts to West Maui roadways and public transportation systems are not anticipated.

If the wider sandy beach and recreation area increase visitors to the area, demand for public parking may also increase. Possible mitigation measures to accommodate increased pedestrian traffic may include working with Maui County to increase parking in the area, extend or build sidewalks along stretches of Lower Honoapiʻilani Road. Additionally, more pedestrian crosswalks and signage could improve pedestrian safety near existing beach access paths. These mitigation measures could be additional projects related to, but not within, the current scope of the project.

No Action

The No Action Alternative would not result in any changes to existing roadways and public transportation in the area.

3.6.2 Water System and Services

3.6.2.1 Existing Conditions

Maui County Department of Water Supply supplies potable water to the Kahana area from Kanaha Stream and wells. Water treatment and storage takes place at the Lahaina Water Treatment Facility, which has an average daily production of 1.6 million gallons per day (mgd). Each of the private properties has private water meters and pay the County for potable water services. The only public feature that uses County water is the outdoor shower at Pōhaku Park at the southern end of the project area.

3.6.2.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

Short-Term Impacts: During construction, County water may be used to rinse equipment, reduce dust emissions from stockpiles, or for other construction-related BMPs and operations. However, water use is not expected to be significant and potable water use would be conserved to the greatest extent practicable.

Long-Term Impacts: Once in operation, the Proposed Action and Secondary Alternative are anticipated to have negligible impact on the water system in West Maui. If the wider beach increases recreational users in the area, there may be an increased need for public showers and/or public drinking fountains which is not expected to exceed the County's ability or capacity to provide potable water given its existing infrastructure. Mitigation measures for increased water use could include working with the County to install public showers, foot washing spigots, and/or drinking water fountains, especially in the central part of Kahana Bay since the nearest public facilities are at Pōhaku Park to the south.

No Action

The No Action Alternative would not result in any short-term changes to the water system. If coastal erosion continues inland at its current rate; however, water infrastructure may eventually be damaged or compromised.

3.6.3 Wastewater System and Services

3.6.3.1 Existing Conditions

Properties in the project area are connected to the County's centralized sewer collection line that follows along Lower Honoapiʻilani Road. The Lahaina Wastewater Reclamation Facility (WRF) currently treats an average dry weather flow of approximately 5 mgd. The plant is capable of treating approximately 5.5 mgd (County of Maui, 2018). The Lahaina WRF provides preliminary, secondary, tertiary, and disinfection facilities. Each of the private properties is connected to the County's centralized sewer line, and these users pay for wastewater services. Pōhaku Park provides self-contained portable restroom facilities for the public that are regularly serviced and pumped, but not connected to the centralized wastewater system. Two portable restrooms, one of which is ADA accessible, are provided by Maui County for public use at Pōhaku Park.

3.6.3.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative are anticipated to have negligible impact on the public wastewater treatment and/or collection system or the capacity of the Lahaina WRF to treat wastewater effluent. In the long-term, the existence of a wider, more attractive sandy beach could reasonably result in more users and, indirectly, an increased need or use of public restrooms or comfort facilities. However, this effect would not exceed the County's ability to provide wastewater treatment services given its existing infrastructure. When compared to No Action, each alternative would have similar non-significant impacts on the County's centralized wastewater system and services.

No Action

The No Action Alternative would not result in any short-term changes to the wastewater system. If coastal erosion continues inland at its current rate; however, wastewater infrastructure may eventually be damaged or compromised.

3.6.4 Drainage System

3.6.4.1 Existing Conditions

Drainage infrastructure is present in the backshore area of the project site (Figure 1-5). The majority of the drainage infrastructure is underground but open at its discharge point to the shoreline. At the discharge point, the water infiltrates through the sand prior to being discharged into the ocean, but if there is a large storm event, will be discharged directly to the ocean.

Between the Hololani and Pohailani condominiums, an approximately 15 ft-wide County drainage easement extends a short distance from Lower Honoapiʻilani Road to the ocean. A grated storm drain inlet on the mauka side of the road collects stormwater, which flows under the roadway in an 18-inch diameter reinforced concrete pipe and discharges to the ocean. The pipe outlet is fitted with a duckbill check valve to prevent sand from entering the pipe.

A drainage pipe approximately 60 inches in diameter is located between the Valley Isle Resort and the Sands of Kahana which discharges to the shoreline. A short swale, lined only on the Valley Isle Resort side with grouted rubble paving, extends from the pipe outlet toward the ocean. Depending on the time of year, the swale may be clogged with sand and the pipe outlet may be partially or fully plugged with sand.

Between the Sands of Kahana and the Kahana Beach Resort, there is an unlined drainage swale approximately 4 ft wide at the bottom and 8 ft wide at the crest. This swale directs local drainage of parking lots, landscaping, sidewalks, and roadways toward its ocean outlet.

Outside of the project limits, just south of Pōhaku Park, a large concrete-lined drainage channel and stilling basin is located in a County drainage easement on the mauka side of Lower Honoapiʻilani Road. The channel transitions to a box culvert as it crosses under Lower Honoapiʻilani Road and then discharges to Pōhaku "S-Turns" beach park. The box culvert consists of three cells, each 9 ft wide and 3 ft high. The box culvert is often partially or completely clogged with sand.

Along the more urbanized segment of Lower Honoapiʻilani Road, south of Hoʻohui Road, curbs and gutters direct stormwater from parking lots, sidewalks, and roadways into drain inlets and catch basins that ultimately discharge to the ocean. North of Hoʻohui Road, there are generally no curbs and gutters along Lower Honoapiʻilani Road and the drainage mostly flows off the road and infiltrates into the ground or sheet flows toward the ocean.

The existing drainage facilities that discharge to the ocean in the vicinity of the project site are maintained by the Maui County Department of Public Works (DPW), Maintenance Division. Maintenance personnel conduct inspections of the culvert and drainage pipe outlets when hurricanes or severe storm events are forecast to hit the area. County personnel clear sand blocking the drainage path to the ocean and from clogged pipes or culverts.

3.6.4.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action

Short-Term Impacts: If there are any temporary obstructions of pipes or drainage ways caused by construction equipment and materials, the contractor will be required to clear the structure and drainage path to the ocean, prior to any significant storm event. Consistent weather monitoring will be required to ensure that workers have sufficient time to clear drainage structures and drainage ways of sand, equipment, or other debris. Appropriate mitigation BMPs will be implemented to ensure that water quality is protected. With mitigation measures such as appropriate weather monitoring, maintenance, and BMPs, implementation of the Proposed Action is not expected to incur short term impacts to the drainage facilities.

Long-Term Impacts: Implementation of the Proposed Action is not expected to significantly impact the function or maintenance of the box culvert outlet to the south of Pōhaku Park. The wave study concluded that the Proposed Action does not induce significant changes on wave and current patterns outside of the project site. Additionally, the groin structures were shown to protect and retain the nourished beach sand at Kahana. It is not expected that additional maintenance of the drainage structure will be required.

The function and maintenance of the two pipes and drainage swale within the project limits that outlet to Kahana Beach so is not expected to be significantly impacted by the Proposed Action. The Proposed Action is not anticipated to add any additional storm flows to the pipes and swale. The existing drainage swale between Sands of Kahana and Kahana Beach Resort conducts surface flow to the beach where it infiltrates or discharges directly to the ocean during larger storm events. The grading of the backshore beach will continue to have a positive drainage slope after the beach is nourished to facilitate drainage, and the proposed vegetated berm will have a break in the berm adjacent to the swale to allow surface flow to reach the ocean unimpeded.

The 60-inch diameter pipe outlet between the Valley Isle Resort and the Sands of Kahana directs flow to the ocean via a partially lined swale. To promote increased flow volume and ease of maintenance at this swale, it is recommended to fully line the swale which will help reduce the amount of sand that enters the swale. A fully lined swale would also provide a boundary for clearing the sand prior to extreme storm events. The proposed vegetated berm would be designed to have a break in the berm adjacent to the pipe outlet and swale to allow surface flow to reach the ocean unimpeded.

The 18-inch diameter pipe outlet between Hololani and Pohailani discharges at the existing shoreline. To ensure that the Proposed Action does not increase the required maintenance for this pipe outlet, the pipe will be extended toward the ocean and closer to the proposed shoreline. The drainage pipe will be fitted with a duckbill check valve to prevent sand from entering the pipe.

It is recommended that the properties adjacent to each of the drainage structure outlets works in conjunction with Maui County DPW Maintenance Division to ensure that the outlets are sufficiently maintained, especially prior to extreme storm events.

Potential impacts to the Kahana Stream Channel are discussed in Section 3.3.2, *Streams*.

Secondary Alternative

Short-Term Impacts: With the use of similar mitigation measure as are discussed for the Proposed Action, implementation of the Secondary Alternative is not anticipated to impact the drainage facilities.

Long-Term Impacts: Implementation of the Secondary Alternative is not expected to significantly impact the function or maintenance of the drainage facilities. The mitigation measures and negligible impacts will be similar to those of the Proposed Action. One difference, however, from the Proposed Action is that without groins that limit the longshore sand movement, the northward and southward sand transport along the beach might cause seasonal accretion and erosion of sand at the ends of the project site. This might increase the sand build up at the south end of Kahana Beach during North and Northwest swells. Based on model results and the natural headland between Kahana Beach and S-Turns beach, it is not anticipated that a significant amount of sand would be transported from Kahana Beach to S-Turns beach. Maintenance of the box culvert at that location is expected to take roughly the same effort.

No Action

The No Action Alternative would not result in any short-term changes to the drainage system. If shoreline erosion continues inland at its current rate, however, drainage infrastructure may eventually be impacted or damaged.

3.6.5 Electrical, Telephone, and Cable Television Services

3.6.5.1 Existing Conditions

Local electrical service is provided by Maui Electric Company. Poles and overhead lines run on the side of the Lower Honoapi‘ilani Roadway. The overhead lines cross the street at various locations, such as from the makai side of the road at Pōhaku Park to the mauka side at the Sands of Kahana to the intersection of Honoapi‘ilani Highway and Ho‘ohui Road. Power lines are mostly on the makai side of the road to the north. The utility poles accommodate telephone, cable television, internet, and electrical lines. Cable, telephone, and internet services in Lahaina are provided through Spectrum, Viasat (satellite), and Hawaiian Telcom.

3.6.5.2 Potential Impacts and Proposed Mitigation Measures

Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative are not expected to impact electrical, cable, or television services. No mitigation measures would be needed.

No Action

If shoreline erosion continues, underground utilities may eventually become threatened or damaged.

3.7 Summary of Secondary and Cumulative Impacts

Previous sections in this chapter discuss direct impacts of the Proposed Action and Secondary Alternative related to physical and natural resources (Section 3.1), natural hazards (Section 3.2), ecological resources (Section 3.3), the human environment (Section 3.4), public services (Section 3.5) and public infrastructure (Section 3.6).

This section summarizes secondary and cumulative impacts of the Proposed Action and Secondary Alternative. A secondary impact refers to an effect that is removed in distance, but still is reasonably foreseeable. A cumulative impact can result from a series of individual actions that when considered collectively could have discernable environmental, socioeconomic, and cultural effects. Table 3-10 identifies secondary and cumulative impacts on affected resources.

Table 3-10: Summary of Secondary and Cumulative Impacts

Resource	Secondary and Cumulative Impacts
3.1.6 Water Quality	Water quality in the nearshore area is expected to improve with the Proposed Action, which will reduce shoreline erosion and turbidity. Water quality impacts are expected during project activities from turbidity produced by dredging, sand distribution on the beach and groin construction, but these impacts will be mitigated by BMPs that will isolate active work areas from adjacent water. The water between the groin interspaces will have slightly increased residence time, but overall water circulation will be sufficient to prevent stagnation and water quality degradation.
3.2.1 Coastal Processes	The Proposed Action will cause minor wave and current modifications downdrift (south) of the project site. T-groins will reduce beach loss by deflecting the longshore current seaward, reducing nearshore drift. Current patterns offshore of the structures will not be affected. All of the Proposed Action activities are restricted to the littoral cells between Pōhaku Point and Kaʻea Point. Most coastal dynamics during normal conditions generally occur within the littoral cells and any impact that would occur on adjacent littoral cells would take place only during severe events. Two other beach nourishment efforts south of Kahana are planned in Nāpili and Kāʻanapali, but are not expected to be impacted by the Proposed Action at Kahana. The project activities are limited to the littoral boundaries defined by the headlands on either side of Kahana Bay. Under normal conditions, the sand will not move across these boundaries. However, during severe events such as heavy wave action or storm conditions, there may be some sand exchange between the adjacent littoral cells. Some of the replenished sand from Kahana Bay might be moved to the adjacent beaches during severe events. This additional sand coming from Kahana Bay will benefit these beaches in the long term.
3.2.3 Flood Hazard	The beach restoration and stabilizing structures will dissipate incoming wave energy and the extent of wave runup and prevent a limited amount of flooding in the backshore of the project area. The existing flood hazard zones would not be changed.
3.2.4 Erosion Hazard	The Proposed Action and Secondary Alternative are designed to reduce erosion hazards at Kahana Bay and will result in cumulatively less erosion in the Kahana Bay Area.
3.3.3 Ecological Resources	By improving shoreline conditions and ecological resources in the long-term time frame, the Proposed Action is expected have positive secondary impacts on the regional ocean environment. T-groins will provide topographical relief,

Resource	Secondary and Cumulative Impacts
	substrate, and niche space that will attract marine invertebrates and fishes over time, which could improve marine environmental quality for RTE species that may occur in the nearshore area. Long-term water quality improvements will benefit ecological resources in the area. However, increased foot traffic and human presence expected from the widened beach and possible increased fishing off of stabilizing structures may have effects on ecological resources and environmental quality.
3.4.1.1 Population and Demographics	The Proposed Action and Secondary Alternative would increase Kahana's attractiveness for shoreline properties, local residents, and visitors. This would result in a secondary impact of increasing the level of de facto population of residents and visitors who visit Kahana to enjoy the expanded shoreline resources to conditions prior to excessive erosion. Another secondary impact is related the possible increased interest in adding more residential and visitor units to adjacent properties. This would require permits and changes that are not estimable and not included in the scope of this DEIS.
3.4.1.2 Kahana Bay Character and Experience 3.4.5 Scenic and Open Space Resources.	The secondary impact of the Proposed Action and Secondary Alternative is the overall improvement of the character of, not just the Kahana shoreline, but also its environs. Pōhaku Park users and residents north of Kahana will be able to easily walk along the beach to Kahana and expand their recreational venues and experiences. Further, the T-groins and the resulting six semi-enclosed coves in the Proposed Action will add an additional recreational feature not currently available in the area. A related secondary impact is related to scenic and open space resources. The north–south views will be that of a widened Kahana Beach, rather than a narrowing beach fronted by various forms of shoreline protection. Further, those who live mauka of Kahana and/or travel along Lower Honoapiʻilani Highway will see a widened beach between buildings.
3.4.2.2 Visitor Industry	The Proposed Action and Secondary Alternative will have a positive cumulative impact on the West Maui visitor industry. The widened Kahana Beach will attract more visitors to the West Maui shoreline, thereby expanding recreational opportunities for those in the wider region. Further, the Proposed Action will include seven T-groins that would create six new coves, or semi-enclosed shoreline areas, that will introduce a new feature to the West Maui visitor attractions.
3.5.3 Solid Waste Disposal	The widened beach and other shoreline improvements are likely to increase the number of residents and visitors to Kahana. More people would increase the volume of trash and this could necessitate the need for more receptacles and more frequent solid waste collection and disposal, thereby resulting in a secondary impact. However, this would not be expected to exceed the County's ability to provide collection and disposal services.
3.5.4 Medical Services 3.5.5 Police and Fire Protection	An increase in the need for emergency medical services may occur as more people choose to visit Kahana because of increased beach space and expanded recreational opportunities, thereby resulting in a secondary impact of the Proposed Action.

Resource	Secondary and Cumulative Impacts
	Similarly, there would be an increased de facto population due to a likely increase in residents and visitors who visit and enjoy the widened Kahana Beach.
3.6 Public Infrastructure	The Proposed Action and Secondary Alternative will have secondary beneficial impacts on public infrastructure in and along Kahana. Currently, a portion of Lower Honoapiʻilani Road between the Hololani and Pohailani is threatened by long-term erosion due to wave action that reaches this roadway. A secondary impact is that the Proposed Action and Secondary Alternative will help to protect this roadway, as well the public transportation system that traverses Lower Honoapiʻilani Road, by widening the beach, thereby increasing the distance between wave action and the roadway system. The Proposed Action will have additional secondary beneficial impact with an offshore breakwater "head" to prevent horizontal sand movement from longshore drift parallel to the shoreline while also reducing the intensity of incoming waves. Further, by mitigating wave impacts along the shoreline, the Proposed Action and Secondary Alternative will help to ensure that public infrastructure systems that serve adjacent properties, such as wastewater and water systems, can continue to operate without disruptions that may be caused by damage related to flooding.

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4. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

This section identifies Federal (Section 4.1), State (Section 4.2) and the County of Maui (Section 4.3) land use plans, policies and controls that are relevant to the Proposed Action and Secondary Alternative. Section 4.4 provides a list of required approvals and permits.

4.1 Federal

The project will require various permits and approvals from regulatory agencies at the federal, state, and local levels. Regulatory agencies are tasked with ensuring that the project is compliant with statutes, rules, policies, and plans that they are responsible to uphold. Each permit or approval that may be needed for this project is briefly described in this section followed by a discussion on how the Proposed Action and Secondary Alternatives relate and comply with permit/approval policies in a manner that either avoids or minimizes any negative impacts. Construction work within waters of the United States may require a United States Army Corps of Engineers (USACE) permit in accordance with the federal CWA Section 404, the DOH Section 401 WQC, CZMA, the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Fish and Wildlife Coordination Act, and other applicable laws and regulations. The USACE issues both Nationwide and Individual (i.e., Section 404 and Section 10) Permits. Nationwide Permits (NWPs) are designed to streamline the USACE permitting process of minor projects that will have minimal impact on the nation's aquatic environment (e.g., in-kind and in-place maintenance, survey activities, minor dredging in certain locations). Given the scale of this project, it is unlikely to qualify for NWP and an Individual Permit review is expected.

In addition, the project may be subject to NFIP since the project site falls within a FEMA Special Flood Hazard Area (SFHA) , though this is implemented at the local level through Maui County. Each of these requirements are described in more detail below.

The current project may require a National Environmental Policy Act (NEPA) EIS if federal funds are used for the project. The NEPA process begins when a federal agency develops a proposal to take a major federal action. Major federal actions may include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by Federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals. Currently, there are no NEPA triggers for the project. However, this could change if FEMA BRIC funds are obtained for the Proposed Action as discussed in Section 2.3.2, *Project Funding*. If the application is approved and the Proposed Action is federally financed, a NEPA EIS will be prepared pursuant to 40 CFR Part 1502.

4.1.1 Clean Water Act Section 404

Section 404 of the CWA establishes a program to regulate the discharge of pollutants (i.e., dredged or fill material) into waters of the United States, which include navigable waters seaward of the high tide line, lakes, ponds, streams, ditches and adjacent wetlands. Regulated activities include fill for water resource projects, infrastructure development and mining projects. Section 404 requires a permit from the USACE before dredged or fill material may be discharged into any waters of the United States, including wetlands.

Relationship to the Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative include dredging and deposition of sand fill seaward of the high tide line. Further, the Proposed Action includes constructing structures within the Pacific Ocean. A CWA Section 404 Permit will therefore likely be required for both the Proposed Action and Secondary Alternative.

The Proposed Action will mitigate coastal erosion with sand nourishment and establish stabilizing structures to help contain sand along the shoreline. The Secondary Alternative will provide for sand nourishment, although replenishment is expected to occur more frequently without stabilizing structures. Both alternatives restore, enhance, create, and preserve aquatic functions and values, while the No Action Alternative will allow existing coastal erosion to continue. During construction of either alternative, short-term impacts on the nearshore reef environments, water quality, and marine resources will be mitigated by effective BMPs to control areas of impact.

4.1.2 Rivers and Harbors Act of 1899, Section 10

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C 401 et seq.) requires authorization from the USACE for the construction of any structure in or over navigable waters of the United States, the excavation and dredging or deposition of material, or any obstruction or alteration to a navigable water. Note that the USACE's general definition of navigable water are those "waters subject to the ebb and flow of the tide […] and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce."

Relationship to the Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative include dredging and deposition of sand fill as well as constructing structures within the Pacific Ocean for the Proposed Action. Waters in Kahana Bay are tidal and considered navigable, therefore a permit from the USACE will be required in accordance with Section 10 of the Rivers and Harbors Act. However, the project is not expected to affect waterbody navigation.

4.1.3 National Flood Insurance Program, Title 44 of the Code of Federal Regulations

The NFIP was established by the National Flood Insurance Act of 1968 (NFIA, 42 U.S.C. §4001 et seq.) to offer primary flood insurance to properties with significant flood risk and to reduce flood risk through the adoption of floodplain management standards. Only property owners in participating communities, like Maui County, can purchase this federally backed insurance protection against losses from flooding. The NFIP is managed by FEMA, which produces FIRMs to depict Special Flood Hazard Areas (SFHA) and risk premium zones (Congressional Research Service, 2019). Each participating community has its own floodplain management regulations.

Relationship to the Proposed Action and Secondary Alternative

The project area and adjacent properties lie within a high-risk SFHA, which means that the area has a 1% or greater risk of flooding each year. The project area is designated as Zones VE (hazards due to storm-induced velocity wave action) and AE (hazards due to rising waters) (FEMA, 2017) (Figure 3-15). The base flood elevation varies between 14-17 ft above MSL. Insurance policies list specific coverage exclusions and limitations. Usually, NFIP excludes property outside of a building, such as vegetation and seawalls.

The project will be reviewed by Maui County's Department of Planning and Zoning Administration and Enforcement Division before construction begins to ensure that the project meets the local floodplain management standards. Since both the Proposed Action and Secondary Alternative involve exterior work only, many of the Maui County Floodplain Management Regulations (in MCC Chapter 19.62) do not apply. A SFHA permit may not be required since the proposed changes to the existing drainage outlets are minor with no additional flow volume. Dredging, deposition of sand fill, and groin construction is unlikely to increase flood damage risk to nearby properties. No significant fill or other improvements are proposed that would change the level of the base flood nor aggravate existing flood-related erosion hazards, no watercourse alterations will occur, and no changes to nearby residential and nonresidential structures are planned. In fact, both alternatives are intended to reduce erosion risk and may result in decreased flood risk as well.

4.1.4 Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.920)

Consultation with the NMFS is required when a federal agency directly conducts work, funds work, or permits work in an area that will adversely affect EFH (Section 305(b)(2), as described by 50 CFR 600.920). The EFH consultation process entails contacting NMFS and providing an EFH Assessment (EFHA), which contains a description of the Proposed Action, a determination from the federal agency as to how the action will affect EFH, an assessment of those adverse effects, and proposed ways to mitigate for the adverse effects, if applicable. An adverse effect to EFH is anything that reduces the quality and/or quantity of EFH. It may include direct, indirect, and site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of an action. NMFS will review the EFHA and may provide conservation recommendations to avoid, minimize, offset for, or otherwise mitigate, expected adverse effects.

In the main Hawaiian Islands, EFH has been designated in the marine water column from the surface to a depth of 1,000 m, from the shoreline to the outer boundary of the Exclusive Economic Zone (370 kilometers/200 nautical miles/230 miles), and the seafloor from the shoreline out to a depth of 700 m. These waters and submerged lands support various life stages for the management unit species (MUS) identified under the Western Pacific Regional Fishery Management Council's, Pelagic and Hawai‘i Archipelago Fishery Ecosystem Plan (FEP), hereafter referred to as Hawai‘i FEP. The MUS and life stages found in these waters include eggs, larvae, juveniles, and adults of bottom fish MUS, crustacean MUS, and pelagic MUS. Specific types of habitat considered as EFH include coral reefs, patch reefs, hard substrate, seagrass beds, soft substrate, artificial or man-made structures, mangrove, lagoon, estuarine, surge zone, deep-slope terraces, and pelagic/open ocean.

The EFH guidelines contained in 50 CFR 600.920(f) enable federal action agencies to use existing consultation or environmental review procedures to satisfy the MSA consultation requirements if the procedures meet the following criteria: 1) the existing process must provide NMFS with timely notification of actions that may adversely affect EFH; 2) notification must include an assessment of the Proposed Action's impacts on EFH that meet the requirements for EFHA discussed in section 600.920(e); and 3) NMFS must have made a finding pursuant to section 600.920(f)(3) that the existing process satisfies the requirements of section 305(b)(2) of the MSA. For the purposes of this DEIS, the EFHA was integrated with the Fish and Wildlife Coordination Act (FWCA) coordination process.

Relationship to the Proposed Action and Secondary Alternative

Early consultation with NMFS Pacific Islands Regional Office (PIRO) for the project began during the preparation of the EISPN. The marine benthic and water quality monitoring survey protocol for the project was reviewed by NMFS, who provided written consultation dated April 30, 2019. In addition, NMFS PIRO provided comments on the EISPN on August 14, 2019 and are contained in Appendix I, EISPN and Pre-Consultation Comments and Responses. Comments were reviewed and incorporated into the project and this DEIS in Sections 3.1.6, *Water Quality*, 3.3.4, *Marine Biological Resources*, and 3.3.5, *Fish Habitat*.

Information required for an EFH study has been incorporated in Section 3.3.5, *Fish Habitat*, and is presented in the marine resource assessment survey included as Appendix C. This information will be the basis for the EFHA that will be submitted in the future to fulfill the MSA consultation requirements.

4.1.5 Fish and Wildlife Coordination Act (16 United States Code [U.S.C.] 661-666c)

The Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661-666c) mandates that wildlife, including fish, should receive equal consideration as other aspects of water resource development. This is accomplished through consultation with NMFS, the USFWS, and appropriate state agencies whenever any body of water is proposed to be modified in any way and a federal permit or license is required. These agencies determine the possible harm to fish and wildlife resources, the measures needed to both prevent the damage to, and loss of, these resources, and the measures needed to develop and improve the resources, in connection with water resource development. NMFS, the USFWS, and state agencies submit comments to federal licensing and permitting agencies on the potential harm to living marine resources caused by the proposed water development project, as well as recommendations to prevent harm (NMFS, 2004). In all, the FWCA compliance process includes the following four steps: consultation (notice of initiation); reporting (e.g., field surveys and summary reports) and recommendations to protect, mitigate, and restore natural resources; action agency consideration of recommendations; and action agency implementation of recommendations.

Relationship to the Proposed Action and Secondary Alternative

Beach nourishment and restoration, as included in the Proposed Action and Secondary Alternative, would cause significant long-term positive impacts to the nearshore benthic environment by restoring a wide sandy beach where scoured reef flat currently exists. Although ecological services of reef flat habitat will be lost under the project footprint, it is expected that as the benthic community re-establishes, biological habitat will increase as compared to existing conditions. To limit the impacts beyond the "footprint" of the historical beach, the Proposed Action and Secondary Alternative are designed to restore the beach as closely as possible to the sandy beach conditions in 1975. Therefore, both are expected to comply with FWCA.

4.2 State of Hawaiʻi

4.2.1 Hawaiʻi Environmental Policy Act

The Hawaiʻi Environmental Policy Act (HEPA) establishes the system of environmental review at the state and county levels. HEPA ensures that environmental concerns are given appropriate consideration in decision-making, along with economic and technical considerations. Hawaiʻi Revised

Statutes (HRS) Chapter 343 codifies HEPA, and HAR Chapter 11-200.1 contains rules for implementing the environmental review process. These statutes and rules also define actions that trigger the initiation of the environmental review process.

The Proposed Action involves the following HEPA EIS triggers:

- Use of state or county lands or the use of state or county funds;
- Use of land classified as a conservation district; and
- Use within a shoreline area as defined in HRS 205A-41.

4.2.2 State Land Use Districts

HRS Chapter 205-2 establishes a Land Use Commission that classifies all lands in the state into four major SLUDs: urban, rural, agricultural, and conservation. Urban districts contain activities or uses provided by ordinances or regulations of the county where the urban district is situated. Land uses in urban districts are governed by the county government.

Conservation districts include areas necessary for protecting watersheds and water sources. Within the conservation district, there are five progressively more restrictive subzones: general, limited, protected, resource and special. All areas located makai of the state-certified shoreline and all submerged lands within the State of Hawaiʻi are within the resource subzone of the conservation district, although some areas may have stricter subzone designations. Decision-making and approvals within the conservation district range from simple Site Plan Approvals from OCCL, to Departmental and Board Permits that require Conservation District Use Permits and public hearings.

Relationship to the Proposed Action and Secondary Alternative

The project area and adjacent properties are designated urban and conservation, as shown in Figure 3-1. The nine condominiums and single-family parcel located mauka of the shoreline are in an Urban SLUD area, within County jurisdiction and regulated by MCC.

Portions of privately-owned coastal property that have eroded and submerged lands have become part of the conservation district. Areas makai of the shoreline, including the project area, are within the conservation district, resource subzone. These areas fall under the jurisdiction of the State of Hawaiʻi Department of Land and Natural Resources Office of Conservation and Coastal Lands (DLNR OCCL), where County zoning is superseded per HRS 205-5. The conservation district is regulated pursuant to HRS-183C, and the rules are detailed in HAR §13-5.

Beach nourishment, construction of retaining structures, and grading sand to widen the beach are all permissible activities within the urban district per state land use restrictions and designations. These activities are also permissible activities within the conservation district resource subzone.

HAR §13-5-22 regulates land uses and activities, such as beach restoration and the associated permit requirements in the protected subzone. Under HAR §13-5-22 Section P-16, Beach Restoration, D-1, the Proposed Action may require a Conservation District Use Permit (CDUP) approved by the Board of Land and Natural Resources (BLNR). Land Use D-1, which requires a Board Permit, is described as follows:

> "*Sand placement in excess of 10,000 cubic yards including structures necessary to retain sand, extraction of sand from submerged lands, and transportation or transmission of sand from an offshore extraction site to the replacement site.*"

The requirements listed for the protected subzone also apply to the less restrictive resource subzone. HAR §13-5-24 describes more intensive development activities, such as marine construction in the resource subzone, that also require a CDUP approved by the BLNR.

Conservation District Use Applications (CDUAs) are reviewed by the BLNR in public hearings normally conducted on Oʻahu, but are currently conducted online due to COVID-19 protocols. Prior to the BLNR public hearing, a public meeting is usually held on Maui to solicit comment and input from the public. Upon acceptance of the FEIS, KBSC may submit a CDUA.

4.2.3 Hawaiʻi State Plan

The Hawaiʻi State Plan, codified in HRS Chapter 226, serves as a guide for the future long-range development of the State. The Plan identifies goals, objectives, policies, and priorities and provides a basis for priority determination and resource allocation involving public funds, services, human resources, land, energy, water, and other resources. The State Plan is intended to improve coordination of federal, state and county plans, policies, programs, projects, and regulatory activities. It outlines a system for integration of all major state and county activities.

The Plan is divided into three parts. Part I contains the overall theme, goals, objectives, and policies. The State's objectives and policies focus on population, economy, physical environment, facility systems, and socio-cultural advancement. Part II provides the framework in planning coordination and implementation. It establishes a statewide planning system to coordinate and guide all major state and county activities and to implement the overall theme, goals, objectives, policies, and priority guidelines. Part III identifies priority guidelines.

Table 4-1 presents the relationship of the No Action, Proposed Action, and the Secondary Alternative to relevant sections of Part I of the Hawaiʻi State Plan. Table 4-2 presents the relationship of the Proposed Action and Secondary Alternative to relevant sections of Part III of the Hawaiʻi State Plan. Part II concerns internal agency coordination and is not relevant to this analysis.

Table 4-1: Relationship to the Hawaiʻi State Plan Part I

§ 226-4 State Goals	No Action	Proposed Action	Secondary Alternative
§ 226-4 (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.	No change in existing conditions	Supportive	Supportive
Discussion: Hawaiʻi's shoreline and ocean resources are integral to the physical and socio-economic well-being for individuals and families. The No-Action Alternative does not support this goal, because it will			

§ 226-4 State Goals	No Action	Proposed Action	Secondary Alternative
maintain existing conditions, including ongoing coastal erosion, and is not anticipated to create or support a stable natural system. The Proposed Action and Secondary Alternative support this goal by restoring and nourishing the beach, thereby, providing stability to valuable natural systems. The Proposed Action will further support this goal by establishing stabilizing structures that will contribute to long-term beach stability.			
§ 226-11 Objectives and policies for the physical environment – land-based, shoreline, and marine resources. § 226-11 Objective (1) Prudent use of Hawai‘i's land-based, shoreline, and marine resources. § 226-11 Objective (2) Effective protection of Hawai‘i's unique and fragile environmental resources.	Not Supportive	Supportive	Supportive
Discussion: The Proposed Action and Secondary Alternative are intended to mitigate historical coastal erosion and stabilize the shoreline environment. The proposed methodologies in both alternatives will use beach nourishment sources originating in the vicinity of the project site, thereby minimizing significant change to the ecosystem. Additionally, the Proposed Action will help to significantly mitigate future erosion in the long-term time frame with stabilizing structures. The No Action Alternative would allow continued beach erosion and does not support these objectives.			
§ 226-11 Policy (1) Exercise an overall conservation ethic in the use of Hawai‘i's natural resources. § 226-11 Policy (2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems. § 226-11 Policy (3) Take into account the physical attributes of areas when planning and designing activities and facilities. § 226-11 Policy (4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.	Not Supportive	Supportive	Supportive
Discussion: The No Action Alternative may allow for temporary and property-specific improvements but will not promote a cohesive long-term effort to comprehensively address coastal erosion. The Proposed Action and Secondary Alternative will implement policies related to overall conservation ethic by helping to mitigate historical coastal erosion that has contributed to environmental degradation. In addition, planning of the Proposed Action and Secondary Alternative has sought to minimize impacts on ocean and land human activities, including recreational and food gathering practices.			

§ 226-4 State Goals	**No Action**	**Proposed Action**	**Secondary Alternative**
Additionally, the Proposed Action is particularly supportive of the policy to manage natural resources without generating costly or irreparable environmental damage. The use of stabilizing structures will help to mitigate ongoing coastal erosion on a long-term basis and is estimated to require sand dredging for beach renourishment at 30 years of the structures 50-year life span, rather than in the estimated 9-year intervals with the Secondary Alternative. Further, the stabilizing structures will provide additional surfaces that can support benthic habitat.			
§ 226-11 Policy (6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai‘i. § 226-11 Policy (7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion. § 226-11 Policy (8) Pursue compatible relationships among activities, facilities, and natural resources. § 226-11 Policy (9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.	Not Supportive	Supportive	Supportive
Discussion: Planning for both the Proposed Action and Secondary Alternative incorporates identification of rare and endangered plant and animal species and recommended mitigation if necessary. See Section 3.3.3, *Rare, Threatened, and Endangered Species* for related discussion. At the time of this writing, public financing of the Proposed Action may include Maui County CFD. As discussed in Section 2.3.2, *Project Funding*, the Maui County Council is considering exploring this option. In addition, KBSC has applied for funding in the FEMA BRIC program, which is currently in review. Every effort has been made to ensure that beach nourishment with or without stabilizing structures will be compatible with human activities, natural resources, and facilities. Further, mitigating long-term coastal erosion will help to maintain public access along the shoreline.			

§ 226-4 State Goals	No Action	Proposed Action	Secondary Alternative
§ 226-12 Objective (b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to: § 226-12 Policy (1) Promote the preservation and restoration of significant natural and historic resources. § 226-12 Policy (2) Promote incentives to maintain and enhance historic, cultural, and scenic amenities. § 226-12 Policy (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	Not Supportive	Supportive	Supportive
Discussion: The No Action Alternative will allow the continuation of coastal erosion and will not promote either the preservation and restoration policies or the preservation of views given current and continued degradation of shoreline resources. The Proposed Action and Secondary Alternative will help replenish beach sand, thereby proactively maintaining shoreline resources, including coastal views and mauka to makai scenic vistas. The Proposed Action will additionally support continuation of the beach front by providing stabilizing structures that will help keep the sand in place. While the T-groins may not be aesthetically pleasing for some, they nevertheless serve the purpose of protecting and stabilizing the beach, which is a significant coastal view resource.			
§ 226-13 Objectives (b) To achieve land, air, water quality objectives, it shall be the policy of this State to: § 226-13 Policy (2) Promote the proper management of Hawai'i's land and water resources. § 226-13 Policy (5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	Not Supportive	Supportive	Supportive
Discussion: The historical and ongoing degradation of shoreline resources is a significant threat to coastal resources and adjacent properties. The No Action Alternative will not manage ongoing erosion, and therefore not reduce related threat to property. The Proposed Action and Secondary Alternative are designed to mitigate and control this beach erosion. Both will replenish sand, and additionally, the Proposed Action would significantly mitigate future erosion with appropriate structures. Reduced erosion may even improve water quality by reducing terrigenous materials from entering the ocean.			

§ 226-4 State Goals	No Action	Proposed Action	Secondary Alternative
§ 226-23 Objectives and policies for socio-cultural advancement – leisure § 226-23 Policy (4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological or biological values while ensuring that their inherent values are preserved. § 226-23 Policy (10) Assure adequate access to significant natural and cultural resources in public ownership.	Not Supportive	Supportive	Supportive
Discussion: The No Action Alternative will maintain status quo and does not support these policies. The beach will continue to erode, lateral public access will continue to diminish, and scenic and open space resources will continue to degrade. The Proposed Action and Secondary Alternative are designed to control beach erosion by replenishing beach resources, thereby promoting continued and increased lateral shoreline access. They will also greatly increase the open space area for recreation with widened beaches. In addition, the Proposed Action, which includes effective stabilizing structures, will significantly help to mitigate erosion in the long-term time frame and maintain lateral coastal public access.			

Table 4-2: Relationship to Hawaiʻi State Plan Part III Priority Guidelines

§ 226-103 Economic priority guidelines	No Action	Proposed Action	Secondary Alternative
§ 226-103 (b) Priority guidelines to promote the economic health and quality of the visitor industry. § 226-103 (b) (2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provides for adequate shoreline setbacks and beach access. § 226-103 (b) (4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaiʻi's significant natural, scenic, historic, and cultural resources.	Not Supportive	Supportive	Supportive

§ 226-103 Economic priority guidelines	No Action	Proposed Action	Secondary Alternative
Discussion: Hawai'i's sandy beaches and ocean resources are significant attractions that are foundational to the success of the visitor industry. The preservation and protection of these coastal and ocean resources support a vibrant visitor industry, as well as contribute to resident quality of life. The Proposed Action and Secondary Alternative would be supportive of efforts to enhance and maintain the shoreline by replenishing sand to expand the beach to historic conditions. In addition, the Proposed Action would help maintain the integrity of the restored shoreline with appropriate and effective structures. The No Action Alternative would not support these economic policies in that it would allow continued shoreline degradation. In terms of shoreline access, there has been continued and significant depletion of sand thereby exposing reef and rocks. This presents a major deterrent for shoreline access points such as a stairway and ramp which are no longer functional. The increased presence of sinkholes also presents a safety hazard.			

4.2.4 Hawai'i State Recreation Functional Plan

State Functional Plans are considered, in conjunction with County General Plans, primary guideposts for implementing the Hawai'i State Plan. The State Functional Plans, developed in 1991, outline specific strategies of policies and priority actions that need to be addressed in the short-term time frame. This section includes an analysis of the project's relationship to the State Recreation Functional Plan to evaluate relationship with fundamental State policies.

The State Recreation Functional Plan identifies six issue areas, including:

1. Ocean and shoreline recreation;
2. Mauka, urban, and other recreation opportunities;
3. Public access to shoreline and upland recreation areas;
4. Resource conservation and management;
5. Management of recreation programs, facilities, and areas; and
6. Wetlands protection and management.

For each issue area, objectives, policies, and actions were outlined. Policies and actions were identified specific to the island and responsible agency. The following discusses how project purpose and need may be relevant to State Recreation Plan issue areas.

- *Issue Area 1: Ocean and shoreline recreation*

  Specific issues include saturation of beach park capacity, water safety, user conflicts, and inadequate boating facilities. In this DEIS, project need and purpose address coastal erosion and propose mitigation; neither of which are related to objectives, policies, and actions listed for this Issue Area.

- *Issue Area 3: Public access to shoreline and upland recreation areas*

  Specific issues include loss of public access due to development, landowner liability as a barrier to public access, restricted access to State Forest Reserve lands, and acquisition and management of accessways. In terms of the Proposed Action and Secondary Alternative, public access to the subject shoreline is not restricted due to development and landowner liability has not been a factor in restricting public access. Further, three public beach access areas are located in the adjacent shoreline properties, thereby allowing mauka to makai access to the shoreline. Hence, the Proposed Action and Secondary Alternative are not relevant to this Issue Area.

- *Issue Area 4: Resource conservation and management*

  Specific issues include environmental degradation and enforcement. In the context of this Functional Plan, environmental degradation is caused by human activity impacts on water quality, such as nonpoint source pollution, litter, debris, anchor damage to corals and so on. In terms of the Proposed Action and Secondary Alternative of this DEIS, historic environmental degradation is due primarily to natural phenomenon and secondarily to shoreline hardening and other methods intended to protect properties from flooding. To the extent that the Proposed Action and Secondary Alternative will enable removal of some of these structures, they are proactively addressing this issue.

4.2.5 Department of Health Section 401, Water Quality Certification

A Section 401 Water Quality Certification (WQC) is required when the action needs a federal permit, license, certificate, approval, registration, or statutory exemption, and may result in any discharge of a pollutant into State waters.

Relationship to the Proposed Action and Secondary Alternative

The Proposed Action and Secondary Alternative include dredging and deposition of sand fill. Further, the Proposed Action includes constructing structures within the Pacific Ocean. A CWA Section 404 Permit will therefore be required for both the Proposed Action and Secondary Alternative. Subsequently, an application for Section 401 WQC will be submitted for either the Proposed Action or Secondary Alternative.

4.2.6 Hawaiʻi Coastal Zone Management

Coastal Zone Management (CZM), as codified under Chapter 205A, HRS, is a public initiative that integrates resource, ecosystem and place-based management of coastal resources. CZM also balances the needs of economic development and conservation of resources in a sustainable manner. The Federal CZM Program was created through passage of the CZM Act of 1972. Hawaiʻi's CZM program was enacted in 1977.

Hawaiʻi's CZM Program is the State's resource management policy umbrella and guiding perspective for the design and implementation of allowable land and water uses and activities. The CZM Program focuses its work on the complex resource management problems of coastal areas in the part of the State that are under the highest stress. Within a framework of cooperation among federal, state, and local levels, the Hawaiʻi CZM Program employs a wide variety of regulatory and non-regulatory techniques to address coastal issues and uphold environmental law. These techniques include stewardship, planning, permitting, education and outreach, technical assistance to local governments and permit applicants, policy development and implementation, and identification of emerging issues and exploration of solutions. Table 4-3 presents the relationship between the Hawaiʻi CZM Program and the Proposed Action and Secondary Alternative.

Table 4-3: Relationship to Hawaiʻi CZM

CZM Objectives and Policies	No Action	Proposed Action	Secondary Alternative
§ 205A-2 (b) Objectives (1) Recreational resources (A) Provide coastal recreational opportunities accessible to the public. § 205A-2 (b) Objectives (3) Scenic and open space resources (A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.	Not Supportive	Supportive	Supportive
Discussion: The No Action Alternative would allow continuation of historic beach erosion that restricts lateral shoreline access, reduces recreational opportunities, and negatively impacts coastal scenic and open space resources. The Proposed Action and Secondary Alternative would help to increase and maintain coastal recreational opportunities by nourishing the beach in an environmentally sensitive and effective manner. In addition, the Proposed Action would provide a long-term solution to coastal erosion with engineered stabilizing structures. By replenishing beach resources, the Proposed Action and Secondary Alternative help to protect, preserve, and restore coastal scenic and open space resources.			
§ 205A-2 (b) Objectives (4) Coastal ecosystems (A) Protect valuable coastal ecosystems, including reefs, *beaches, and coastal dunes,* from disruption and minimize adverse impacts on all coastal resources. [2]	Not Supportive	Supportive	Supportive
Discussion: Potential short-term Proposed Action impacts on marine resources may include an increase in turbidity levels 1) at sand source areas during sand extraction operations; 2) at stabilization structure construction sites; and 3) during sand replenishment operations. The Secondary Alternative would have similar impacts related to sand extraction and replenishment, although these events would occur every nine years, compared the Proposed Action estimated beach replenishment need at 30 years. The primary long-term Proposed Action and Secondary Alternative impact on the coastal ecosystem is beneficial in that there will be a reduction in beach erosion and turbidity levels in nearshore waters. The Proposed Action would have significant positive long-term impacts on the coastal ecosystem due to the mitigative effects of stabilizing structures by requiring significantly less frequent beach nourishment than the Secondary Alternative. In terms of coastal dunes, there is a man-made coastal dune on the northern edge of the project area. The Proposed Action and Secondary Alternative will include a vegetated berm planted with native flora and will therefore create a continuous coastal dune spanning the length of the project area.			

[2] *Italicized portions are amendments to §205A as enacted in Act 016 on September 15, 2020.*

CZM Objectives and Policies	No Action	Proposed Action	Secondary Alternative
§ 205A-2 (b) Objectives (5) Economic uses (A) Provide public or private facilities and improvements important to the State's economy in suitable locations.	Not Supportive	Supportive	Supportive
Discussion: KBSC is applying for public funding through the Maui County CFD Fund and FEMA BRIC program. If one or both of these funding sources are made available, project implementation will use public resources to improve shoreline resources important to the State economy. CFD funding will also transfer ownership to Maui County, thereby rendering the project a public facility.			
§205A-2 (b) Objectives (6) Coastal hazards (A) Reduce hazard to life and property from *coastal hazards*. [2]	Not Supportive	Supportive	Supportive
Discussion: The subject area has a history of significant coastal erosion, thereby threatening all properties in this area. The Proposed Action will help to achieve this CZM objective by replenishing sand resources fronting adjacent properties and mitigating future erosion with stabilizing structures. While the Secondary Alternative will include beach nourishment, its mitigative effect for future erosion is limited to periodic replenishment and would require such events more frequently than the Proposed Action. The No Action Alternative would not mitigate historic coastal erosion and would therefore not support this CZM objective.			
§205A-2 (b) Objectives (9) Beach *and coastal dune* protection (A) Protect beaches *and coastal dunes for* *(i) Public use and recreation;* *(ii) The benefit of coastal ecosystems; and* *(iii) Use as natural buffers against coastal hazards; and* *(B) Coordinate and fund beach management and protection.* [3]	Not Supportive	Supportive	Supportive
Discussion: The Proposed Action and Secondary Alternative will help to achieve this CZM objective by restoring and protecting Kahana Bay Beach for public use and recreation. The Proposed Action would further protect the beach for public use and recreation with stabilizing structures. While the Secondary Alternative will replenish sand resources fronting adjacent properties and create a vegetated berm, its mitigative effect for future erosion is limited to replenishment and would require renourishment events more frequently than the Proposed Action. The No Action Alternative would allow further coastal erosion and not protect beaches for public use and recreation.			

[3] *Italicized portions are amendments to §205A as enacted in Act 016 on September 15, 2020.*

CZM Objectives and Policies	No Action	Proposed Action	Secondary Alternative
§205A-2 (c) Policies (1) Recreational resources (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by: (ii) *Requiring restoration of coastal resources that have significant recreational and ecosystem value,* including, but not limited to, *coral reefs*, surfing sites, fishponds, sand beaches *and coastal dunes*, when ~~such~~ *these* resources would be unavoidably damaged by development; or requiring ~~reasonable~~ monetary compensation to the State for recreation when *restoration* is not feasible or desirable.[4] §205A-2 (c) Policies (1) Recreational resources (B) (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value. §205A-2 (c) Policies (1) Recreational resources (B) (vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing.	Not Supportive	Supportive	Supportive

Discussion: The Proposed Action and Secondary Alternative are supportive of these CZM policies in several ways. Their implementation will restore a sand beach with recreational value to approximate conditions present in 1975. This beach has been subject to significant and historical erosion which impedes public use and lateral shoreline access. The Proposed Action and Secondary Alternative will help maintain continued lateral shoreline access that is currently impeded by beach erosion and loss of sand.

No impacts to surfing are expected according to wave models comparing to post-Proposed Action conditions. A discussion of surf impacts is summarized in Section 3.2.1 *Coastal Processes,* as discussed in detail in Part III of the Wave Study in Appendix A.

The Proposed Action would include stabilizing structures that would increase biological habitat in a relatively barren reef flat area. Although ecological services of reef flat habitat will be lost under the project footprint, it is expected that, as the benthic community reestablishes, increased biological habitat would be a benefit for fishers and other food gatherers, thereby expanding shoreline recreational opportunities. It is noted that policies related to public use and access of the T-groins have not been developed as of this writing and will need to be developed with County and State agencies.

[4] *Italicized portions are amendments to §205A as enacted in Act 016 on September 15, 2020.*

CZM Objectives and Policies	No Action	Proposed Action	Secondary Alternative
§205A-2 (c) Policies (9) Beach Protection (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 (C) Minimize the construction of public *shoreline hardening* structures*, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreation and waterline activities* *D) Minimize grading of and damage to coastal dunes*[5]	Not Supportive	Supportive	Supportive
Discussion: The Proposed Action will include beach nourishment, a vegetated berm, and T-groins. The vegetated berm included in the Proposed Action and Secondary Alternative will create a continuous coastal dune along the span of the project shoreline. At the time of this writing, Maui County is revising its Shoreline Rules and the proposed stabilizing structures are not considered shoreline hardening as follows: "*<u>Shoreline hardening does not include beach stabilizing structures, such as groins and breakwaters, designed by a professional engineer to stabilize a sandy beach along an eroding shoreline.</u>*" The Secondary Alternative will include buried toe protection, which has not been designated as shoreline hardening by Maui County at the time of this writing.			

4.2.7 Special Management Area

Chapter 205A-21, HRS, defines SMA as lands extending inland from the shoreline as delineated in maps filed with the Authority, in this case the Maui Planning Commission, as of June 8, 1977 or as amended pursuant to §205A-23. Each authority is tasked with reviewing developments with the SMA. Among other actions, "development" includes:

- Grading, removing, dredging, mining or extraction of any materials; and
- Construction, reconstruction, demolition, or alteration of the size of any structure.

Special Management Area permits are issued by individual counties. As shown in Figure 3-4, the project area lies within the SMA and the Proposed Action and Secondary Alternative will require an SMA permit. Section 4.3.5, *Special Management Area and Shoreline Setback Variance,* discusses the relationship between SMA permit guidelines and the Proposed Action.

[5] *Italicized portions are amendments to §205A as enacted in Act 016 on September 15, 2020.*

4.2.8 Shoreline Certifications - Hawai'i Administrative Rules Chapter 13-222

HAR Chapter 13-222 standardizes the application for shoreline certifications for purposes of implementing the shoreline setback law and other related laws. The shoreline delineates the highest wash of the waves from the highest tide of the year, excluding named storms such as hurricanes or tsunamis. The shoreline can be evidenced by the vegetation or debris lines and excludes artificially induced vegetation. A survey completed by a licensed surveyor is submitted to the DLNR and verified with a site visit by DLNR staff. A notice of the survey and its purpose is published in the OEQC Environmental Notice and offers the public an opportunity to comment. The Department of Accounting and General Services (DAGS) also posts pictures and copies of the survey on their website for review and comment. Based on public comments, physical geomorphology of the site, and evidence from coastal processes, including historical evidence, the State Surveyor and the DLNR OCCL make a recommendation to the BLNR.

The shoreline is certified by the BLNR during a public meeting on the matter, and its certification is valid for one calendar year. Typically, a state-certified shoreline survey is conducted prior to initiation of project permitting. Since the certification expires after 12 months, a state-certified shoreline would likely need to be repeatedly certified for a complex project that has to obtain both discretionary (e.g., SMA, Shoreline Certification, CDUP) and ministerial permits (e.g., building, grading or flood) permits.

The certification process ensures that any encroachments onto the public domain are resolved, determines what jurisdictions are involved, what permits may be necessary, and serves as the basis from which the County shoreline setback line is measured. An easement may be required for any sand retaining structures, or portion thereof, that extend seaward of the certified shoreline. Decisions on easement requests would be made by the BLNR during public hearings and can require a real estate appraisal, a survey delineating the encroachment, its dimensions, and a metes and bounds description.

Relationship to Proposed Action and Secondary Alternative

The process to obtain a certified shoreline will occur in discretionary permits, such as the SMA, shoreline and/or CDUP permits, subsequent to FEIS acceptance. The estimated location of the shoreline is shown on project diagrams, site plans and applicable schematics and would be reviewed and commented on by the DLNR OCCL and DAGS during the DEIS. The shoreline's location was determined by evaluating maps and historic shoreline positions delineated by the University of Hawai'i on aerial photography. In many cases, this data was based on the beach toe, vegetation line and/or other shore reference features as reflected on the erosion map for Kahana Bay in the Maui Shoreline Atlas (2003).

Importantly, the state-certified shoreline cannot move seaward from its former certified position. Thus, if the beach is widened, the County shoreline setback area does not move seaward but rather remains in its present location and the public area is expanded seaward. Additionally, the land created by a wider, sandy beach would automatically be within the State Conservation District, under the jurisdiction of the DLNR OCCL, and cannot be developed for private or commercial purposes by the abutting condominium properties without express approval and permits. A state-certified shoreline would be obtained prior to final decision-making on discretionary permits by government agencies and public decision-making bodies.

4.2.9 Hawai‘i Ocean Resources Management Plan

A comprehensive plan mandated by HRS Chapter 205A and Chapter 225M, the Hawai‘i Ocean Resources Management Plan (ORMP), is intended to provide a framework and implementation strategy for the state and other agencies. Included in this framework are ecological, cultural, historical, aesthetic, recreational, scenic, and open space values. The first ORMP was published in 1985. It is scheduled to be updated every five years based on a process that incorporates input from government and statewide public interests. The most recent update was in 2020.

The vision for Hawai‘i’s ocean resources is “a healthy island ecosystem that fosters social and economic sustainability through the preservation and restoration of Hawai‘i’s unique cultural and environmental values.” In the latest iteration published in 2020, a fourth perspective was added, and along with the original three delineated in the 2013 version, is intended to be referenced as a guiding principle. The management perspectives of the 2020 version of the ORMP are:

1. Connecting land and sea;
2. Preserving our ocean heritage;
3. Promoting collaboration and stewardship; and
4. Adapting to changing conditions (added in 2020).

Further, the 2020 ORMP refined the 2013 version’s management priorities into three focus areas, including development and coastal hazards, land-based pollution, and marine ecosystems. The 2020 ORMP builds upon previous versions of the Plan and is more focused on implementation of the Plan rather than the update of its contents. Table 4-4 outlines how the Proposed Action, Secondary Alternative and No Action are related to the 2020 ORMP Focus Areas. Table 4-5 presents how the project relates to relevant 2013 ORMP management priorities and goals.

Table 4-4: Relationship of 2020 ORMP Focus Areas

2020 ORMP Focus Areas	2013 Management Priorities	No Action	Proposed Action	Secondary Alternative
Development and Coastal Hazards	Appropriate Coastal Development Management of Coastal Hazards	Not Supportive	Supportive	Supportive
Land-Based Pollution	Watershed Management	Not Relevant	Not Relevant	Not Relevant
Marine Ecosystems	Marine Ecosystems	Not Supportive	Supportive	Supportive

Discussion: The Proposed Action and Secondary Alternative are supportive of management priorities related to development and coastal hazards and marine ecosystems. Neither the Proposed Action nor Secondary Alternative are relevant to the land-based pollution management priority.

Table 4-5: Project Relationship to Relevant 2013 ORMP Management Priorities and Goals

Relevant 2013 ORMP Goals	No Action	Proposed Action	Secondary Alternative
Management Priority #1: Appropriate Coastal Development Goal C: Expand options to protect existing developments from further coastal development.	Not Supportive	Supportive	Supportive

Discussion: The 2013 ORMP background on Management Priority #1, Goal C, notes that "the most difficult issues to address are coastal development issues that stem from development that already exists." Such is the case with existing conditions that prompt the Proposed Action and Secondary Alternative. The adjacent properties were developed between the early 1970s and early 1980s, prior to enactment of SMA rules and regulations.

The subject beach has experienced historical degradation that results in significant depletion of sand and shoreline. The Proposed Action and Secondary Alternative will expand options to protect existing developments by replenishing sand resources. In addition, the Proposed Action will help to expand long-term options by installing stabilizing structures designed to lessen beach erosion and lessen the frequency of sand replenishment.

A target of this Management Priority is *Managed Retreat* through the development of long-term planning strategies that would include specific adaptation strategies, such as retreat zones, prohibition of shoreline armoring and assessment of impacts on underground infrastructure and utilities. While managed retreat is addressed as an alternative to the Proposed Action, it is not considered feasible from a social and economic standpoint at this time. Section 2.5.2, *Managed Retreat,* provides further discussion on this matter.

Another target of this Management Priority is *Enhance Natural Infrastructure to Build Coastal Resilience.* This target includes implementation of cost-effective beach nourishment and streamlining for offshore permitting. Both the Proposed Action and Secondary Alternative support this target in their intent to replenish severely depleted sand supply. The Proposed Action will further support this target by establishing stabilizing structures to help protect sand resources from future erosion.

Relevant 2013 ORMP Goals	**No Action**	**Proposed Action**	**Secondary Alternative**
Management Priority #2: Management of Coastal Hazards Goal A: Support adoption of county laws for BMPs to reduce risks from coastal hazards, including impacts from climate change.	Not Supportive	Supportive	Supportive
Discussion: As discussed in Section 4.3, *County of Maui Regulations,* the Proposed Action will support related County laws because it will have significant positive impacts on coastal processes by mitigating coastal erosion with sand replenishment and establishing stabilizing structures to help contain sand along the shoreline. The Secondary Alternative will provide for sand nourishment, although replenishment is expected to occur more frequently without stabilizing structures. The No Action Alternative will allow existing coastal erosion and therefore not support related County laws. As discussed in Section 3.2.5, *Sea Level Rise,* the Proposed Action will help to buffer the effects of known SLR, as the beach nourishment would act as a natural solution to raising the elevation of the sandy beach above the MHHW line and protecting the beach and structures along the shoreline. As discussed in Section 3.1.1, *Climate,* the Proposed Action is not expected to have significant impact on the climate in the Kahana Bay area.			

4.2.10 Hawai‘i Coastal Erosion Management Plan

The DLNR OCCL Coastal Lands Management Program coordinates the management of coastal resources including beaches, dunes, and rocky shorelines seaward of county jurisdictions and within the State Conservation District. The Coastal Lands Management Program maintains the balance between conservation of coastal resources and responsible development of coastal areas. The Program supports sustainable alternatives for coastal erosion management including programs for beach and dune restoration and guidelines for other “soft” approaches to shoreline protection through the DLNR Coastal Erosion Management Plan (COEMAP) (DLNR, 2000).

COEMAP identifies five alternatives for erosion management that help to define the framework for decision-making. Table 4-6 outlines how the Proposed Action and Secondary Alternative relate to these alternatives.

Table 4-6: Relationship to COEMAP Five Alternatives for Erosion Management

COEMAP Five Alternatives for Erosion Management	No Action	Proposed Action	Secondary Alternative
a. Abandonment – "do nothing"	Applicable	Not applicable	Not applicable
Discussion: COEMAP notes that this alternative is based primarily on socioeconomic considerations and involves a high level of community participation and dialogue. While a few states have allowed beachfront buildings to collapse rather than permit shoreline hardening, abandonment has not been considered in Hawaiʻi as an erosion management alternative. The No Action Alternative would essentially constitute abandonment nevertheless, since historic coastal and beach erosion would continue and existing structures would eventually likely collapse and require Managed Retreat. This DEIS evaluates Managed Retreat as an alternative in Section 2.5.2.			
b. Beach restoration – "fill the beach with sand"	Not applicable	Applicable	Applicable
Discussion: The Proposed Action and Secondary Alternative are designed to implement this alternative. COEMAP identifies several challenges to beach restoration, including finding the appropriate source of sand that will constitute a stable beach in the subject location, determining the necessary fill volume, and evaluating data on historical change and projections of future change patterns, as well as estimating the economic life and design components. In addition, potential environmental disruptions at the sand source must be fully assessed and mitigated to an acceptable level. This DEIS discusses these impacts and related mitigation throughout Chapter 3.			
c. Erosion control – "slow down the erosion rate"	Not applicable	Applicable	Not applicable
Discussion: COEMAP defines the purpose of this alternative as slowing the loss of the placed sand. Structures include groins, T-groins, detached breakwaters, artificial headlands, and so on. Further, COEMAP notes that this approach is more appropriate where the problem is chronic erosion due to diminished sediment supply. The Proposed Action will include stabilizing structures as erosion control measures and is discussed in detail in Section 2.2.3, *Stabilizing Structures*.			
d. Adaptation – "live with it"	Applicable	Not applicable	Not applicable
Discussion: COEMAP identifies several options that would protect the natural shoreline from human alterations. These options would require modifications of human occupancy. One of these options is implementing a "coastal retreat" policy, which is considered as the Managed Retreat Alternative discussed in Section 2.5.2. The Managed Retreat Alternative is not considered feasible at this time. The No Action Alternative would be applicable to this alternative, although none of the COEMAP options would be considered.			

COEMAP Five Alternatives for Erosion Management	No Action	Proposed Action	Secondary Alternative
e. Hardening – “build walls”	Not applicable	Not applicable	Applicable
The No Action Alternative and Proposed Action do not include hardening. The Secondary Alternative includes possible hardening in the form of buried toe protection, as described in Section 2.4, which will provide backshore protection should the erosion of the nourished beach continue toward the adjacent properties. Buried toe protection will stabilize the shoreline and help prevent erosion of terrigenous materials until the beach can be nourished again. Buried toe protection has not been determined by Maui County as shoreline hardening at the time of this writing. Section 2.5.1 also discusses shoreline armoring, including revetments and seawalls, none of which are considered feasible.			

4.3 County of Maui

Within the County of Maui planning framework, the General Plan supports the Hawaiʻi State Plan and is consistent with State Functional Plans. The 2010 Countywide Policy Plan articulates a vision statement and core values for 2030, and provides broad goals, objectives, policies, and implementing actions that collectively support the desired direction of the County's future. Based on the countywide framework, the Maui Island Plan provides policy direction for the development of land, the extension and improvement of transportation services and infrastructure, the development of community facilities, the expansion of Maui's economic base, the provision of housing, and the protection of natural and cultural resources.

4.3.1 County of Maui 2030 General Plan: Countywide Policy Plan

The Maui County Charter requires that its General Plan recognize and state the major problems and opportunities concerning the needs and development of the County and the social, economic, and environmental effects of such development. The 1990 General Plan was approved by the County Council in 1991. Given the significant socio-economic, demographic, and physical changes in the last decade, Maui County prepared a comprehensive Policy Plan to 2030 that provides the basis for updating the Maui Island Plan and the nine Community Plans.

Adopted in March 2010, the County of Maui 2030 General Plan provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future. The Plan articulates a vision statement and core values for 2030; describes current conditions; identifies guiding principles; and identifies goals, objectives, policies, and implementing actions to realize the vision and objectives based on eleven key strategies:

1) Protect the Natural Environment;
2) Preserve Local Cultures and Traditions;
3) Improve Education;
4) Strengthen Social and Healthcare Services;
5) Expand Housing Opportunities for Residents;

6) Strengthen the Local Economy;
7) Improve Parks and Public Facilities;
8) Diversify Transportation Options;
9) Improve Physical Infrastructure;
10) Promote Sustainable Land Use and Growth Management; and
11) Strive for Good Governance.

Goals and objectives related to *Protect the Natural Environment* are particularly relevant to the Proposed Action and Secondary Alternative, and Table 4-7 discusses the project's relationship to this goal and its objectives.

Table 4-7: Relationship to Countywide Policy Plan Goal and Objectives for Strategy to Protect the Natural Environment

Countywide Policy Plan Goal and Objectives for A. Protect the Natural Environment	No Action	Proposed Action	Secondary Alternative
Goal: Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity. Objective 1: Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations. Policy 1(e): Protect undeveloped beaches, dunes and coastal ecosystems, and restore natural processes.	Not Supportive	Supportive	Supportive
Discussion: While the subject beach is fronted by development and is therefore not undeveloped, the adjacent coastal ecosystem has historically been experiencing significant erosion. Allowing these conditions to continue would be contrary to the protection and restoration of beaches, dunes, and coastal ecosystems, as well as the restoration of natural processes. The No Action Alternative would allow erosion conditions to continue. The Proposed Action and Secondary Alternative will support this goal, objective, and policy by implementing a beach nourishment program using nearby sand resources to ensure compatibility, thereby helping to restore natural processes. Both will also expand the coastal dune to span the length of the project area. In addition, the Proposed Action will include stabilizing structures that will further mitigate beach erosion in the long-term.			

Countywide Policy Plan Goal and Objectives for A. Protect the Natural Environment	No Action	Proposed Action	Secondary Alternative
Objective 2: Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island. Policy 2(a): Protect and restore nearshore reef environments and water quality. Policy 2(b): Protect marine resources and valued wildlife. Policy 2(f): Strengthen coastal-zone management, re-naturalization of shorelines, where possible, and filtration or treatment of urban and agricultural runoff.	Not Supportive	Supportive	Supportive
Discussion: As discussed in Section 3.3.4, *Marine Biological Resources,* the Proposed Action and Secondary Alternative, would cause significant long-term positive impacts to the nearshore benthic environment by restoring a wide sandy beach where scoured reef flat currently exists. To mitigate destruction beyond the "footprint" of the historical beach, the Proposed Action and Secondary Alternative are designed to restore the beach to the sandy beach conditions in 1975. It is noted that short-term impacts on the nearshore reef environments, water quality, and marine resources will be mitigated by effective BMPs to control areas of impact. Additionally, the Proposed Action includes stabilizing structures designed to slow longshore currents and reduce wave action and runup. Further, these structures would lessen sand movement and scour, and create more favorable conditions for sessile invertebrate establishment, as well as reduce light attenuation caused by turbidity.			
Objective 3: Improve the stewardship of the natural environment. Policy 3(a): Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value. Policy 3(h): Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.	Not Supportive	Supportive	Supportive

Countywide Policy Plan Goal and Objectives for A. Protect the Natural Environment	No Action	Proposed Action	Secondary Alternative
Discussion: In Hawaiʻi, coastal and beach resources have significant recreational and cultural values, whether these values are related to food gathering, passive enjoyment or active play, such as swimming, surfing, and paddle boarding. For many years, coastal and beach erosion have deterred public uses. The loss of sand not only decreases actual beach area, but also presents safety issues related to lateral shoreline access. The Proposed Action and Secondary Alternative will help restore the beach area with sand nourishment. In addition, the Proposed Action will help to control future erosion in the long-term with stabilizing structures. Regarding public access, lateral access is becoming increasingly difficult due to narrowing and sometimes complete lack of beach area. The Proposed Action and Secondary Alternative will help restore the beach area, thereby restoring full lateral shoreline access.			

4.3.2 Maui Island Plan

The Maui Island Plan sets the direction for the future based on the vision, principles, and objectives set forth in the General Plan. Its contents are specific to the island and are based on extensive dialogue with the community. The Maui Island Plan provides policy direction for the development of land, the extension and improvement of transportation services and infrastructure, the development of community facilities, the expansion of Maui's economic base, the provision of housing, and the protection of natural and cultural resources. The Maui Island Plan was adopted and took effect in December 2012.

Key highlights of the Maui Island Plan include:

- A Directed Growth Management Plan that establishes future growth areas and enables predictable development;
- Protection of Maui's small towns and rural character;
- Protection of designated affordable housing;
- Protection of watersheds and coastal resources;
- Identification of transit corridors;
- Economic diversification; and
- Integration of land use and infrastructure planning.

The Proposed Action and Secondary Alternative are specifically related to the *protection of watersheds and coastal resources*. The Maui Island Plan distinguishes between coastal erosion, a natural process whereby beach width is maintained by sand resources held in dunes while coastal land is lost, and beach erosion, the loss of beach due to erosion and sand impoundment behind seawalls. The Maui Island Plan identified major shoreline protection issues, including:

- Lack of an integrated CZM program;
- Deteriorating reef health and fish stocks, and compromised marine ecosystems;

- Poor water quality arising from upland activities; and
- Limited beach and public facilities.

Table 4-8 presents the relationship between Proposed Actions and Maui Island Plan issues related to shoreline, reefs, and nearshore waters.

Table 4-8: Relationship to Maui Island Plan Goals, Objectives and Policies and Actions Related to Shoreline, Reefs, and Nearshore Waters

Maui Island Plan Goal and Objectives for Shoreline, Reefs, and Nearshore Waters	No Action	Proposed Action	Secondary Alternative
Goal 2.2: An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity. Objective 2.2.2: Improved reef health, coastal water quality and marine life. Policy 2.2.2.c: Carefully manage beach nourishment activities to protect the coastal and marine ecosystem. Polity 2.2.2.e.: Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with an intent to protect the coastal and marine ecosystem.	Not supportive	Supportive	Supportive
Discussion: As discussed in Section 3.3, *Ecological Resources,* beach nourishment included in the Proposed Action and Secondary Alternative would significantly improve the shoreline area by restoring a wide sandy beach where scoured reef flat currently exists. To mitigate destruction beyond the "footprint" of the historical beach, the Proposed Action is designed to restore the beach to the sandy beach conditions in 1975. Beach nourishment activities conducted as part of the Proposed Action and Secondary Alternative will be closely monitored and managed, as well as coordinated with appropriate public agencies to ensure that reef health, coastal water quality, and marine life are not significantly impacted by the actions. Further, the Proposed Action includes stabilizing structures designed to slow longshore currents and reduce wave action and runup, thereby reducing sand movement and scour, creating more favorable conditions for sessile invertebrate establishment and reducing turbidity. The stabilization structures would add hard substratum and provide vertical relief for corals, algae, and other invertebrates. Submerged portions of beach stabilization structures can be designed to incorporate topographical relief and structural complexity to increase niche spaces for fish. Additional habitat for fishes will likely increase fish species richness, biomass, and abundance. The Proposed Action and Secondary Alternative will not include shoreline armoring as currently defined by Maui County.			

4.3.3 West Maui Community Plan and Update

Six Community Plans apply countywide and island wide policies to specific regions, including West Maui, South Maui, Central Maui, Upcountry, North Shore, and East Maui. The project area is situated in the Kāʻanapali sub-area of the West Maui Community Plan area. The Kāʻanapali subarea covers

13,174 acres that lie just north of Lahaina and contains the communities of Kahana, Honokōwai, and Kāʻanapali. Kāʻanapali is the state's first master -planned resort community, and a popular tourist destination that includes hotels, retail shopping and condos. Honokōwai and Kahana are smaller resort areas that also have a limited amount of housing for residents. The subarea also contains the small, state-managed Kapalua Airport.

Figure 3-3 shows how the project area and the surrounding areas are designated on the West Maui Community Plan. The beach area at Kahana Bay is designated Open Space (OS). This designation is intended to be free of obstructions, such as buildings and walls exceeding four feet in height. Adjacent uses include resorts, condominium and residential. These lands are designated Hotel (H), Multi-Family Residential (MF), and Public/Quasi Public (P).

The Maui County Council adopted the West Maui Community Plan in 1996. Its policies express the long-term visions for West Maui and are used in developing and prioritizing relevant programs as it establishes a long-range land use pattern. Goals, objectives, policies and implementing actions were developed for:

- Land Use;
- Environment;
- Economic Activity;
- Cultural Resource;
- Housing;
- Urban Design;
- Infrastructure;
- Social Infrastructure; and
- Government.

Proposed actions are specifically relevant to matters related to the environment, and Table 4-9 summarizes the relationship between the project alternatives and environment goals, objectives, and policies.

Table 4-9: Relationship between West Maui Plan Goal and Objectives for the Environment

West Maui Plan Goal and Objectives for the Environment	No Action	Proposed Action	Secondary Alternative
Goal: A clean and attractive physical, natural and marine environment in which man-made developments on or alterations to the natural and marine environment are based on sound environmental and ecological practices, and important scenic and open space resources are preserved and protected for public use and enjoyment. Objective 7: Preserve, protect and/or nourish the shoreline and sand dune formations throughout the planning region. These topographic features are essential to beach	Not supportive	Supportive	Supportive

preservation and a significant element of the natural setting that should be protected. Objective 11: Prohibit the construction of vertical seawalls and revetments except as may be permitted by rules adopted by the Maui Planning Commission governing the issuance of SMA emergency permits and encourage beach nourishment by building dunes and adding sand as a sustainable alternative.	
Discussion: To mitigate destruction beyond the "footprint" of the historical beach, the Proposed Action and Secondary Alternative are intended to restore the beach as close as possible to the sandy conditions in 1975. This will help to protect the shoreline and sand dunes in the subject area. The Proposed Action will additionally include stabilizing structures that will help mitigate nearshore littoral drift, as well as allow for the elimination of temporary structures currently permitted by SMA emergency permits. The Proposed Action and Secondary Alternative will not include seawalls and revetments.	

An update of the West Maui Community Plan is currently underway. The draft current as of this writing identifies the following goals:

1. Ready and resilient systems;
2. A complete, balanced, and connected transportation network;
3. Responsible stewardship of resources, culture and character;
4. Economic opportunity through innovation and collaboration; and
5. Safe, healthy, livable communities for all.

Proposed actions are related to *Goal 3: Responsible stewardship of resources, culture and character*, and both the Proposed Action and Secondary Alternative are consistent with the intent of this goal.

Beach erosion at Kahana Bay is specifically cited in the *West Maui Community Plan Climate Change and Sea Level Rise Technical Resource Paper* (University of Hawaiʻi Sea Grant, 2018). The report states that "Kahana Beach may be the most severe example on Maui whereby aging high-density condominium resort complexes without sufficient setbacks are now threatened by the impacts of chronic coastal erosion and seasonal high waves." The Technical Report acknowledges that beach nourishment is effectively considered an interim solution, and notes that Kahana alternatives will need to consider projected lifespans of various alternatives.

4.3.4 County of Maui Zoning

As discussed in Section 4.2.2, *State Land Use Districts,* areas makai of the shoreline are within the Conservation District (Figure 3-1), Resource Subzone, including portions of privately-owned coastal property that have eroded and submerged lands. These areas fall under the jurisdiction of the State DLNR OCCL, where County zoning is superseded per HRS 205-5.

The nine condominiums and single-family parcel located mauka of the shoreline are zoned "Hotel (H-2)," "Duplex (D-1)," "Residential (R-3)," and "Apartment (A-2), (A-1)" under the County of Maui

Zoning, as depicted in Figure 3-2. Neither the Proposed Action nor Secondary Alternative will require re-zoning.

4.3.5 Special Management Area and Shoreline Setback Variance

Special Management Area

The project site lies within the SMA and as discussed in Section 4.2.6, *Hawai'i Coastal Zone Management*, Maui County is responsible for issuing an SMA permit for development within the SMA. The following are development actions relevant to this DEIS:

- Grading, removing, dredging, mining or extraction of any materials; and
- Construction, reconstruction, demolition, or alteration of the size of any structure.

An SMA application will be submitted upon acceptance of the FEIS. In evaluating the SMA application, the Maui Planning Commission uses guidelines set forth in §205A-26. Table 4-10 outlines the relationship between guidelines set forth in §205A-26 and Proposed Actions. Changes due to Act 16 implemented in 2020 are italicized.

Table 4-10: Project Consistency with Relevant SMA Review Guidelines

Relevant SMA Review Guidelines	No Action	Proposed Action	Secondary Alternative
§ 205A-26 (1) All developments in this special management area shall be subject to reasonable terms and conditions to ensure: §205A-26 (1) (D) Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources*, beaches, coastal dunes,* and scenic and recreational amenities and *minimize impacts from* floods, wind damage, storm surge, landslides, erosion, *sea level rise,* siltation, or failure in the event of earthquake.	Inconsistent	Consistent	Consistent
Discussion: The Proposed Action and Secondary Alternative will alter existing land forms by nourishing the subject beach with nearby sand resources. This activity is designed to mitigate historic coastal and beach erosion and therefore is not expected to cause adverse effects to water resources and scenic and recreational amenities. Rather, they are intended to enhance scenic and recreational amenities. In addition, the Proposed Action, with its stabilizing structures, is intended to stabilize the beach to slow the need for future maintenance alterations due to coastal and beach erosion. In the No Action Alternative, proposed changes would occur on an individual property level and meeting SMA review guidelines would need to be evaluated for each application.			

Relevant SMA Review Guidelines	No Action	Proposed Action	Secondary Alternative
§205A-26 (2) No development shall be approved unless the authority has first found: §205A-26 (2) (A) That the development will not have any *significant* adverse environmental or ecological effect, except as *any* adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety or compelling public interests. *Those* adverse effects shall include~~,~~ but not be limited to~~,~~ the potential cumulative impact of individual developments, each ~~*one*~~ of which taken *by* itself might not have a *significant* adverse effect and the elimination of planning options.	Inconsistent	Consistent	Consistent
Discussion: Unlike the No Action alternative, the Proposed Action and Secondary Alternative will not have substantial long-term adverse environment or ecological effects. While construction activities may temporarily increase turbidity levels at sand extraction and stabilization structure sites, the long-term effect of reducing beach erosion and turbidity levels in nearshore waters will help to improve environmental and ecological conditions. Further, the Proposed Action would have significant positive long-term impacts on the coastal ecosystem due to the mitigative long-term effects of stabilizing structures.			
§205A-26 (3) The authority shall seek to minimize, where reasonable: §205A-26 (3) (B) Any development *that* would reduce the size of any beach or other area usable for public recreation §205A-26 (3)(C) Any development *that* would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach §205A-26 (3)(D) Any development *that* would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast	Not relevant	Relevant	Relevant

Relevant SMA Review Guidelines	No Action	Proposed Action	Secondary Alternative
Discussion: The Proposed Action and Secondary Alternative will increase beach size and public recreation opportunities with beach nourishment. Additionally, the Proposed Action will help to sustain recreational opportunities in the long-term time frame with stabilizing structures. The No Action Alternative will continue conditions that contribute to the reduction of beach areas. Currently, the mauka-makai view includes multi-family and resort structures surrounded by landscaped open spaces. The Proposed Action stabilizing structures will alter the visual landscape by adding coastal structures to the ocean view plane (Section 3.4.9, *Scenic and Open Space Resources*). Any negative impact on views and lines of sight are outweighed by the positive impact of restoring the beach and full lateral shoreline access.			

Shoreline Setback Variance

§205A-46 provides that a shoreline setback variance may be granted for a structure or activity otherwise prohibited. Table 4-11 outlines the relationship between Proposed Actions and structures that may be considered for a variance if the change is necessary for or ancillary to certain conditions.

Table 4-11: Project Consistency with Shoreline Setback Variances for Certain Necessary and Ancillary Conditions

Relevant Necessary and Ancillary Conditions Considered in Shoreline Setback Variances[6]	No Action	Proposed Action	Secondary Alternative
§ 205A-46 (7) Private facilities or improvements that are clearly in the public interest. §205A-46 (9) Private facilities or improvements that may artificially fix the shoreline; provided that the authority *may consider* hardship to the applicant if the facilities or improvements are not allowed within the shoreline area*; provided further that a variance to artificially fix the shoreline shall not be granted in areas with sand beaches or where artificially fixing the shoreline may interfere with existing recreational and waterline activities unless the granting of the variance is clearly demonstrated to be in the interest of the general public*	Inconsistent	Consistent	Consistent

[6] *Italicized portions are amendments to §205A as enacted in Act 016 on September 15, 2020.*

Relevant Necessary and Ancillary Conditions Considered in Shoreline Setback Variances[6]	No Action	Proposed Action	Secondary Alternative
Discussion: Improving beach conditions is in the public's interest. The beach and shoreline provide opportunities for passive and active recreation, food gathering, and aesthetic enjoyment. At the time of this writing, the source of funding has not been determined. As discussed in Section 2.3.2, *Project Funding*, KBSC is discussing the potential of Maui County funding through CFD and has applied for FEMA BRIC funding. Hardship on nearby properties is increasingly evident. Beach erosion at Kahana Bay is specifically cited in the *West Maui Community Plan Climate Change and Sea Level Rise Technical Resource Paper* as perhaps the most severe example on Maui of the effects of chronic coastal erosion and seasonal high waves.			
§ 205A-46 (10) Moving of sand from one location seaward of the shoreline to another location seaward of the shoreline; provided that the authority also finds that moving of sand will not adversely affect beach processes, will not diminish the size of a public beach, and will be necessary to stabilize an eroding shoreline.	Inconsistent	Consistent	Consistent
Discussion: The proposed beach nourishment process, which is necessary to stabilize an eroding shoreline, is designed to avoid negative impacts on beach processes. The location and source of sand for beach nourishment are presented in Section 2.2.1, *Beach Nourishment,* of this DEIS. Potential adverse impacts of sand relocation are identified, and effective mitigation is proposed.			

KBSC will submit an application for a shoreline setback variance upon acceptance of the FEIS.

4.4 List of Required Permits and Approvals

A summary of potential federal, state, and county requirements and government approvals that may be required for the Proposed Action are listed below.

Federal

Section 10, Work in Navigable Waters of the U.S. (USACE)
Section 404, Clean Water Act, for Fill in Waters of the U.S. (USACE)
Other Federal laws that may affect the project, including:

- Archaeological and Historic Preservation Act (16 United States Code [USC] §469(A) (1))
- National Historic Preservation Act (NHPA) of 1966 (Section 106) (16 USC §470(F))
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC §3001)
- Clean Air Act (42 USC §7506(C))
- Clean Water Act (33 USC §1251-1387)
- Coastal Zone Management Act (16 USC §1456(C) (1))
- Endangered Species Act (16 USC §1536(A) (2) and (4))
- EO 13089, Coral Reef Protection (63 FR 32701)
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (16 USC §703-711 (66 FR 3853))
- EO 12898, Environmental Justice
- Fish and Wildlife Coordination Act (FWCA) of 1934, as amended (16 USC §661-666(C) et seq.)

- Magnuson-Stevens Fishery Conservation and Management Act (16 USC §1801 et seq.)
- Marine Mammal Protection Act (MMPA) of 1972, as amended (16 USC §1361-1421(H) et seq.)
- Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC §703-712 et seq.)
- Rivers and Harbors Act (33 USC §403)

State of Hawai'i

Conservation District Use Permit (CDUP) (DLNR-OCCL)
DLNR Beach Nourishment Regulations (DLNR-OCCL)
Shoreline Certification (DLNR-Land Division)
Easement and Right-of-Entry (ROE) Applications and associated Revocable Permits (DLNR Land Division)
National Pollutant Discharge Elimination System (NPDES) (DOH-CWB)
Section 401 Water Quality Certification (WQC) (DOH-CWB)
Coastal Zone Management Consistency Determination (Office of Planning)

County of Maui

Special Management Area
Shoreline Setback Variance
Stockpile Permit
Grading Permit

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5. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF HUMANITY'S ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This section discusses the relationship between the short-term uses of humanity's environment and how those uses may compromise or enhance the long-term productivity of that environment. Explored are the economic, social, and cultural gains anticipated from the Proposed Action and Secondary Alternative, which are weighed against how the Proposed Action and Secondary Alternative may narrow or expand other comparable long-term opportunities the environment offers, including avoidance of any risks posed to health and safety.

5.1 Trade-Offs Among Short-Term and Long-Term Gains and Losses

Short-term losses resulting from the Proposed Action and Secondary Alternative are related to construction activities. Sand dredging and placement and T-groin construction will impact nearshore marine habitats and water quality for several months. While BMPs will be in place to mitigate impacts, short-term losses to these resources will nevertheless occur. Compensatory mitigation options to replace some of these lost marine resources may be explored.

Another area of short-term loss is related to the human experience in and around Kahana. During construction, portions of the beach and nearshore ocean areas will be limited for use and lateral shoreline access for safety reasons. In addition, the beach experience will be hampered by noise and visual impacts from construction activities and the presence of construction vehicles and equipment. Surfing at S-Turns may and/or Mushrooms be temporarily interrupted when sand dredging is occurring in the immediate vicinity.

These short-term losses are significantly outweighed by the long-term benefits of a widened beach and shoreline protection against what has been significant coastal erosion. In the long-term time frame, local residents and West Maui visitors will be able to once again enjoy a Kahana Beach that will be restored as much as possible to 1975 conditions. Both the Proposed Action and Secondary Alternative include a vegetated berm that will help to protect shoreline properties from shoreline erosion and flooding. Further, the benthic environment will benefit from a reduction of reef scouring due to strong wave action within Kahana Bay.

The Proposed Action will have additional long-term gains with the installation of seven T-groins and a reinforced headland. These stabilization structures, designed for a 50-year life span, will help to deflect strong wave currents that contribute to beach and shoreline erosion. Further, the T-groins can provide additional hard substrate and niche spaces for benthic habitat, thereby increasing fish and ocean life resources. This long-term benefit will increase resources for food gatherers and fishers.

Long-term losses related to the Proposed Action include the loss of continual lateral nearshore access and visual and aesthetic impacts. Currently, ocean users, such as swimmers, kayakers, and stand up paddle boarders can conduct their activities along the entire length of the Kahana shoreline. With the T-groins, continual lateral shoreline traverse would need to occur outside the ends of the T-groins that will extend approximately 200 ft from shore.

This loss of continual lateral nearshore access may be offset, however, by the creation of six coves, or partially enclosed water bodies. These coves may provide somewhat protected shoreline venues that will continue to support ocean recreational activities and serve as a new and unique ocean recreational resource for West Maui. For those who appreciate these conditions, the Proposed Action may be considered a long-term gain.

5.2 Extent to Which Proposed Action Forecloses Future Options

Neither the Proposed Action nor the Secondary Alternative will foreclose future options. As discussed in Section 2.3, *Alternatives Considered but Not Further Evaluated*, other alternatives include shoreline hardening, managed retreat and accommodation. Current public policy indicate that it is highly unlikely that shoreline hardening will be allowed in the future. Managed retreat and accommodation may be considered as possible solutions in the future. The presence of a widened beach and shoreline stabilizing structures would not exclude opportunities to implement these alternate solutions.

5.3 Narrows the Range of Beneficial Uses of the Environment

Neither the Proposed Action nor Secondary Alternative will narrow the range of beneficial uses. Rather, beach nourishment, as included in both the Proposed Action and Secondary Alternative, will increase opportunities to enhance water quality, expand beach-related passive and active uses, and protect properties from flooding and shoreline erosion. Further, stabilizing structures in the Proposed Action will expand opportunities to enhance the benthic environment by diversifying substrate, reducing sand movement, and creating more favorable conditions for coral establishment compared to existing conditions.

5.4 Long-Term Risks to Health and Safety

The Proposed Action and Secondary Alternative will reduce long-term risks to health and safety. The widened beach and vegetated berm of both the Proposed Action and the Secondary Alternative help to reduce risk of flooding by providing a buffer between strong waves and shoreline properties, residential and visitor units, and infrastructure systems including roadways, wastewater, and drainage systems. The Proposed Action will further reduce future erosion in that the design with T-groins was selected as the ideal stabilizing structures for Kahana Bay because it combines the benefits of a straight groin "stem" with an offshore breakwater "head" to prevent horizontal sand movement from longshore drift parallel to the shoreline while also reducing the intensity of incoming waves.

6. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be recovered or reversed, such as the permanent conversion of wetlands and loss of cultural resources, soils, wildlife, or agricultural production. "Irreversible" refers to the loss of future options and applies primarily to the impacts of use of nonrenewable resources, such as minerals or cultural resources. "Irretrievable" refers to the loss of a resource that is not renewable and cannot be recovered for future use. This section discusses unavoidable impacts and the use of non-renewable resources. Discussions on possible irreversible curtailment of the range of beneficial environmental uses and environmental accidents are presented as well.

6.1 Unavoidable Impacts

Impacts to the benthic environment and water quality during construction are short-term unavoidable impacts from both the Proposed Action and Secondary Alternative. Potential impacts to these resources include increased total suspended solids and turbidity levels at sand source borrow areas during dredging, dewatering, and construction of sand stabilizing structures, and during sand fill placement operations. Construction equipment, fuel, and introduced treated materials, such as concrete, into the marine environment can also result in nutrient and chemical contamination. The extent of construction-related unavoidable impacts will be lessened by effective BMPs identified in Section 2.7.1.5, *Construction Best Management Practices.*

Another unavoidable short-term impact is related to human activity. Beach activity in Kahana Bay will be temporarily interrupted by construction activities, as areas are restricted for safety reasons. These restrictions will occur in the water and on land. Further, surfing at the popular S-Turns and Mushrooms surf spots may be temporarily interrupted during early phases of construction. In addition to restrictions on use, there will also be unavoidable impacts during construction, including noise and visual impacts.

If No Action occurs, continued significant beach erosion and threats to shoreline properties are unavoidable impacts.

6.2 Use of Non-Renewable Resources

Both the Proposed Action and the Secondary Alternative will use non-renewable resources. Sand from the immediate area will be dredged and relocated to widen the beach and create a vegetated berm in both scenarios. The estimated volume of sand is 50,000 to 10,000 cy. In the Proposed Action, rocks of various sizes will be mined or blasted from existing quarries and used in the construction of seven T-groins. It is estimated that construction of the stabilizing structures will require 30,000 to 40,000 cy of stone.

While these non-renewable resources will be moved from their current locations, the sand and rocks will continue to serve as environmental resources. The sand will expand beach resources and form the foundation of a shoreline berm vegetated with native plants. The rocks will help to control the effects of beach erosion and provide additional benthic habitat.

6.3 Irreversible Curtailment of the Range of Beneficial Uses of the Environment

The Proposed Action and Secondary Alternative will support the continuation and expansion of opportunities to continue to enjoy Kahana Bay and its beach. However, with the Proposed Action that includes stabilization structures that extend offshore, continuous nearshore lateral access will be irreversibly curtailed. The stabilizing structures, which will extend approximately 200 ft from the shore, will create six separate coves, thereby obstructing continuous lateral nearshore access along Kahana Beach. Ocean users who want to swim, paddleboard, kayak, and participate in other ocean activities in a continuous route along the shoreline will need to conduct such activities beyond the boundaries of the T-groins.

6.4 Possibility of Environmental Accidents

As discussed in Section 2.7.1.5, *Construction Best Management Practices*, a construction BMP plan will be prepared prior to construction to significantly reduce the risk of environmental accidents related to sand dredging and placement, and construction of T-groins. Construction BMPs will be in place for the entire duration of construction to isolate the active work area and protect water quality from potential contaminants. Further, construction equipment and vehicles will be maintained and monitored on a regular basis to ensure proper operation.

7. UNRESOLVED ISSUES

This section identifies unresolved issues and describes how they will be resolved prior to project implementation.

Financing and the Use of Public Funds

As discussed in Section 2.3.2, *Project Funding*, there are two possibilities for funding the project. The first is private funding by adjacent property owners. The second is public funding, and two options are being pursued at the time of this writing, including Maui County CFD and FEMA BRIC. These are not exclusive of each other, and it is possible that both types of funding may be available for the Proposed Action. This issue will be resolved when Maui County and FEMA issue their decisions.

Stabilizing Structures Ownership and Maintenance

If the project is funded by Maui County CFD, Maui County would own the stabilizing structures per CFD regulations. While maintenance could be the responsibility of the appropriate County agency, there is also an option for a public-private partnership with KBSC that may include funding and outsourcing. Resolving these issues will depend on whether CFD funds will be used in project implementation.

Permits, Easement, and Right-of-Entry (ROE) Approval

Section 4.4, *Required Approvals and Applicable Regulatory Requirements,* lists federal, state, and Maui County permits and approval required to proceed with project implementation. Of note is that the stabilizing structures, including T-groins, would be constructed seaward of the certified shoreline in the ocean, which is public domain managed by the State of Hawaiʻi. An easement for the structures' footprints and ROE approval will be required prior to project implementation. The applicant for the easement and ROE will depend on the ownership entity at the time of implementation.

Construction Time Frame

As discussed in Section 2.2.5, *Construction,* two factors will help to determine when and how long construction activities can occur. The first factor, weather constraints, is influenced by high-energy swells which produce significant wave heights and tidal patterns that can create dangerous conditions that affect the scheduling of dredging and construction. Due to significant mobilization and demobilization efforts related to construction equipment, it is recommended that the contractor select a window from late spring to early fall.

The second factor is coral spawning constraints. Generally, coral spawning occurs in the summer months. The potential for adverse impacts and risk can be minimized with BMPs such as a silt curtain with sufficiently fine mesh size to isolate the dredging and construction areas from the ocean surface to sea floor. Impacts on coral spawning can be greatly minimized by using mechanical dredging with an excavating dredger instead of suction dredging to avoid pumping large amounts of water.

There are two possible construction time frames to accommodate both the coral spawning period and annual high surf conditions. One scenario assumes that environmental conditions and selected contractor qualifications will support simultaneous sand dredging and stabilization structure construction. Under a best-case scenario, construction could be completed in six to nine months.

The other scenario assumes that environmental conditions would reduce opportunities to complete construction in a single, consecutive time period. Under this scenario, construction would need to be conducted over two years during ideal seasonal conditions. For example, partial beach nourishment and T-groin construction would occur in Year 1, and remaining beach nourishment and groin construction completed in Year 2.

Resolving construction time frame issues will depend on permit requirements, environmental conditions current at that time, and the contractor's judgement in developing work and safety plans compliant with appropriate rules, regulations, and BMPs.

Stabilizing Structures Liability and Management of Public Access

In Hawaiʻi, stabilizing structures located in the ocean are popular recreational and fishing venues for residents and visitors alike. These structures can be used for pedestrian access for closer views of the ocean, pole fishing and net throwing, and a launching point for swimming, diving, and surfing. While there is sometimes signage warning of safety hazards or prohibiting access, these signs are often ignored. T-groins in the Proposed Action are anticipated to be similarly popular.

At the time of this writing, the rock T-groins and reinforced headlands are designed for their primary function as stabilizing structures and not for pedestrian access. In resolving this issue, three questions need to be addressed. First, should the public be allowed to access the T-groins? Second, who is liable should accidents occur? Third, if the public is allowed to access the T-groins, who is responsible for managing and monitoring safety concerns?

8. CONSULTATION

This section lists agencies, community groups, and individuals who were consulted throughout project design and preparation of this DEIS. Section 8.1 presents agencies and individuals who were consulted prior to the DEIS preparation, and spans from pre-EISPN publication to EISPN comments. Section 8.2 covers the DEIS preparation time frame and includes community participants in focus groups and consulted agencies.

8.1 Consultation Prior to DEIS Preparation

8.1.1 Community Consultation Prior to EISPN Publication

As discussed in Section 3.4.3.1, *Community Issues,* two outreach efforts were conducted prior to EISPN publication to inform the community and solicit input to understand community reactions and opinions. Table 8-1 lists community participants in the January 2019 meeting and those who were interviewed in February 2019. The full key informant report is included in Appendix E.

Table 8-1: Community Consultation Prior to EISPN Publication

Name	January 2019 Meeting	February 2019 Interviews
Thorne Abbott	X	
Jim Buika	X	
Paul Hanada	X	
Glen Kamaka	X	X
Kaipo Kapu	X	
Ke‘eaumoku Kapu	X	
Tara Owens	X	
Felimon Sadang	X	X
John Seebart	X	X
Mike Summers	X	
Elle Cochran		X
Tova Callender		X
Mark Deakos, PhD		X
Ekolu Lindsey		X
Kai Nishiki		X
Andrew O'Ridoran		X
Kelly Robinson		X

8.1.2 Agency Pre-Consultation and Agency Community Commenters

Regulatory agencies who were participated in pre-consultation meetings and/or submitted comments on the EISPN are listed in Table 8-2.

Table 8-2: Agencies who Participated in Pre-Consultation and Submitted Comments to the EISPN

Agency	Pre-consultation meeting	Submitted EISPN comment
Federal		
NOAA, NMFS, Pacific Islands Regional Office (PIRO)	11/1/2018	X
Department of the Army, USACE Honolulu District	11/1/2018	
State of Hawai‘i		
DOH Clean Water Branch	12/11/2018	
DOH Clean Air Branch		X
DLNR Division of Aquatic Resources	1/16/2019	X
DLNR Division of Forestry and Wildlife		X
DLNR Engineering Division, Flood Hazard		X
DLNR Land Division, Maui District		X
DLNR OCCL		X
Office of Planning, Coastal Zone Management Branch		X
Maui County		
Department of Environmental Management		X
Maui County Sea Grant	1/17/2019	
Department of Planning	1/17/2019	X
Department of Public Works, Engineering Division	X	X
Office of the Mayor Environmental Program	X	
Department of Environmental Management, Solid Waste Division		X
Hawai‘i State Legislature Representative Angus McKelvey	X	
Hawai‘i State Legislature State Senator Roz Baker	X	

Over 125 comments were received from individuals and community groups. Individual commenters are listed below.

Steve and Dawn Adams
Paula Alcoseba
John and Lisa Alpine
Foster Ampong
Annie Arkebauer
Rex O. Baker
Ed Barker
Andy and Diana Barnes
Brooke and Ken Barrett
Debra and Roger Barrett
David Bates
Sandra R. Bates
Max Becerra
Angel Becerra
Corie Biggs
Ken and Lois Boling
Tim and Tori Bahoravitch
Michelle Baringer
Ron and Cindy Brauer
Thaddeus Bettner
Jody Bowman
Rick Bowman
Marq and Diana Bresnan
Michael Brazeal
Bob Brown
Betsy Bryant
Robert and Wendy Brymer
Rick and Pat Bresciani
Kent Cardwell
Bill and Diana Carter
Richard and Susan Chavez
Michael and Geralyn Clairmont
Martha and Bob Covey
Roberta Csaplar
John Dommes
David Draper
Jan Hettwer-Dummer
Terry Edwards
Chris Engdall
Gerard and Bonnie Esker
Bud and JoAnn Fawver
Joyce and Sid Fender
Don and Connie Geahlen
Carol and Sam Miller
Greg Monroe
Ron Glassman
Michael and Helen Gauthier
Cyndy Gomes
Dale and Duskie Gramm
Patricia Hall
Rick Harter
Warren and Cheryl Haws
Kenneth Hughes
Steven and Heather Iverson
Carl Jackson
Anne Javier
David and Patricia Jenkins
Paul G. Johnson
Juliane Kiehn
Debby and Mike Kinsley
John Kober
Jen Knight
Ken and Mary Krass
Michelle Kubo
Karen M Kulik
David A. Kulisch
George Lasher
Patrick and Jamie LeDoux
Julie Leis
David Llewellyn
Malcom MacEwen
Mahinahina Beach Association of Apartment Owners
Robert M. Mardirossian and Mary Alice Lavin
Dr. Wayne and Carol Martin
Shirley and Daniel Messinger
Robert C. Miske, Lieutenant Colonel
Nancy Mitchell
Carly Monroe
John Newlin
Andrea Nissim
Joel Mur and Joanne Nivison
Tracey Novey and Ellen Thoma
Jessica Oliveira
Scott M. Pinkerton
Paul Quagliata
Alice Redmond-Neal and G
Wilma J. Reynolds POA for Carole A. Gudde
Gloria Ricchio
Kelli Robertson
Kelly Robinson
Debbie Rogers
Stuart A. and Denise G. Root
Ronni Rosenfield
Gary Sandler
Martha Sauter
Patricia B Scheibel and Robert C Scheibel
Merrill Schulze
Bob and Margie Schultz
Linda and Mike Sherman
Mark & Debby Sherrod
Corliss L. Smith
Larry L. Smith
Randall and Renay Smith
Linda Springer
Barbara Stanley
Lloyd & Betty Steinke
Robert Stellmacher
Amy Stephens
Rik Tarnoff
William D. Taylor and Dorothy S. Taylor
Rick and Kathy Thompson
George and Sheila Tichy
Rajeev Vachani
Darrell and Windy Vannimwegen
Vance Vanevenhoven
David Neal Warren and Tracy Vinzant
William C. Wallace
Troy Warman
Kathy and Rolen Wegner
David Wertheim
John Wiseman
Stephen D. Wolnitzek
Richard and Candice Yang

8.2 Consultation During Preparation of the DEIS

8.2.1 Community Consultation

Section 3.4.1.3.3, *Phase 2: October 2020 Focus Groups,* describes four focus groups that were conducted during the preparation of the DEIS. Table 8-3 lists the participants in these focus groups.

Table 8-3: Community Participants of October 2020 Focus Groups

Name	Focus Group			
	Cultural	Ocean Users	Environment	Resident
Foster Ampong	X	X	X	X
Lauren Blickley		X		
Tova Callender			X	
Jay Carpio	X			
Mark Deakos			X	
Lucienne deNaie			X	
Liz Foote			X	
John Gorman			X	
Paul Hanada	X	X	X	X
Sterling Honea			X	
Vernon Kalanikau	X	X		
Archie Kalepa	X			
Ekolu Lindsey	X	X		
Dane Maxwell		X		
Junya Leonard Nakoa	X	X		
Kai Nishiki		X	X	X
Dustin Paradis			X	
Felimon Sadang	X	X	X	X
Tamara Paltin			X	X
Christine Roberson		X	X	
Kelly Robinson				X
John Seebart				X
Darrell Tanaka		X		

8.2.2 Agency Consultation

Oceanit sent written requests to agencies that included project information and solicited comments for the EISPN and DEIS. Table 8-4 lists agencies who were sent requests and those who responded. Reproductions of agency consultation and responses are included in Appendix J.

Table 8-4: Agency Consultation During DEIS Preparation

Agency	Sent written request for further input on EISPN	Responded to written request during DEIS Preparation
Federal		
Department of the Interior U.S. Fish and Wildlife Service	X	X
Department of the Interior Geological Survey Pacific Islands Water Science Center	X	
Department of the Army, USACE Honolulu District	X	
NOAA, NMFS, Pacific Islands Regional Office (PIRO)	X	X
NOAA Hawaiian Islands Humpback Whale Sanctuary	X	
Environmental Protection Agency	X	
Federal Emergency Management Agency, Region IX	X	
State of Hawai'i		
Office of Planning	X	
DOH Clean Water Branch	X	
DOH Clean Water Branch, Maui District Office	X	
DLNR Division of Aquatic Resources	X	X
DLNR Division of Boating and Ocean Recreation	X	
DLNR Division of State Parks	X	
DLNR Division of State Parks, Maui District Office	X	
DLNR Engineering Division	X	
DLNR State Historic Preservation Division	X	
DLNR Maui District Office	X	
DLNR Office of Conservation and Coastal Lands	X	
Office of Hawaiian Affairs	X	
Department of Transportation Harbors Division	X	X
Maui County		
Department of Environmental Management	X	
Department of Parks and Recreation	X	X
Department of Planning	X	X
Department of Planning Zoning Administration and Enforcement Division	X	
Department of Public Works Engineering Division	X	X

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9. LIST OF PREPARERS

DEIS Preparers

Oceanit

Earthplan

Blue Ocean Civil Consulting

Wave Assessment Study (Parts I, II and III)

Voelker Roeber and Oceanit

Kahana Bay Sand Study

Ecological Monitoring and Analysis LLC and Oceanit

Marine Resource Assessment and Water Quality Survey

AECOS, Inc.

Terrestrial Biological Resources Study

Oceanit

Phase I Community Outreach - Key Informant Interviews

Planning Consultants Hawai‘i, LLC

Phase II Community Outreach – Focus Groups

Oceanit and Earthplan

Archaeological Literature Review and Field Inspection

Scientific Consultant Services, Inc.

Cultural Impact Assessment

Cultural Surveys Hawai‘i

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Appendix A:

Wave Assessment Study

(Parts I, II, and III)

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Kahana Bay nearshore wave assessment study with the Boussinesq Ocean & Surf Zone model *BOSZ*

(Results for existing conditions)

prepared for Oceanit Inc., Honolulu, Hawaii

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Contents

1 Introduction

The Kahana Bay area located at the Western tip of Maui, HI, has experienced strong coastal erosion over the past years. Buildings and vacation condominiums are threatened to get exposed to direct wave action and the width of the beach has decreased in some location to a minimum. Many home owners have piled up sand in front of their properties to buffer the energetic wave runup and to temporarily replace sand loss. Maintaining a healthy amount of sand at the beach not only protects houses and properties but also contributes to the tourism industry.

Oceanit is planning to conduct a regional erosion mitigation study. This effort includes a phase-resolving modeling effort for particular key wave events to better understand the local wave dynamics at the site.

Figure 1: West Maui between Honokahua Bay in the North and Ka'anapali Beach in the South.

Figure 2: Kahana Bay project site.

2 Bathymetry and Topography

The Kahana Bay site is well represented by several individual sources of bathymetry and topography data. The data sources vary in terms of resolution and coverage; therefore, some processing work is necessary to generate a Digital Elevation Model (DEM). The DEM is then used as the basis for the bathymetry/topography input grid in *BOSZ* .

Data Sources:
NOAA provides a broad selection of bathymetry and topography data. The NOAA Data Access Viewer *https://coast.noaa.gov/dataviewer/#/lidar/search/* shows the availability of various data sources in a user-friendly graphical interface. Due to light absorption in deeper water, LiDAR systems can only be used in relatively shallow water around the coast. Around Hawai'i, the bathymetry can be measured with LiDAR system to about 30-40 m depth depending on the visibility of the particular data of the measurements.
The NOAA LiDAR data were obtained by a combined sensor for bathymetry and topography data, i.e. the dataset includes data points over dry land covering the entire shoreline and low-lying areas around West Maui.

The NOAA LiDAR files were downloaded from the NOAA Data server. Each file was subsequently gridded to 5 m resolution, masked around the perimeter of their coverage, and later merged into one large textfile. This procedure ensures a uniform representation of the data without giving excessive weight to certain spots were the point cloud data has a higher resolution than 5 m. It also helps to reduce the total file size.

Important:
One thing to keep in mind: The topography is based on data from one particular LiDAR scan. The accuracy of this dataset is quite good but it is very likely that the shape of the beach, its sand volume, and also the slope are now different compared to the time of the survey. Therefore, the data are not fully representative for the present site conditions. However, the data is the best available information for the nearshore topography. In case we want to know whether the planned groin structures have an impact on the runup/inundation, we should be able to see it as relative changes matter most. In this case, we are looking for the changes between the scenarios with and w/o structures rather than a value, which is close to the present conditions or the actual runup/inundation. The alongshore variations of the runup/inundation are certainly representative for the particular locations even if the beach topography has changed, since concentration of wave energy depends mostly on the nearshore processes and not so much on the actual beach slope. The reef structure has not

changed significantly between the time of the survey and today.

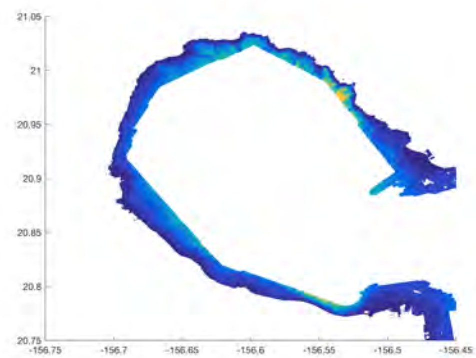

Figure 3: Merged subsections of the individual NOAA LiDAR data for West Maui.

Since the limits of the LiDAR data follow an irregular outline, it is necessary to use additional datasets for deeper water and higher topography. These datasets come from the SOEST 50 m Multibeam data:
http://www.soest.hawaii.edu/HMRG/multibeam/bathymetry.php
and the USGS 10 m topography data:
https://viewer.nationalmap.gov/basic/.

Data merging:
The second step involves merging the data sources. To avoid overlapping of the data sources, the SOEST 50 m Multibeam data and the USGS 10 m topography data have to be masked over the area of the LiDAR data. Though the LiDAR data extends all the way down to 30-40 m water depth, the data coverage is not of uniform density and the sparsity increases with depth. To ensure a smooth transition between the surrounding bathymetry from the multibeam data, we decide to limit the LiDAR data to depths above the -25m bathymetric contour. Upon masking of the multibeam data and the USGS topography data, the three datasets are merged. The result is a dataset of different resolutions (5 m NOAA LiDAR data, 50 m SOEST multibeam data, 10 m USGS topography data), which is resampled to uniformly 5 m by 5 m resolution. The final database is shown in Fig. 4. The geographic reference is WGS84 and the nautical datum is mean sea level. For all subsequent computations, the vertical datum was set to MLLW (MSL - 0.34 m).
It should also be noted that the topography data does not include buildings and vegetation but instead is based on the bare earth elevation. Runup, inundation, and overtopping might look differently from real-world conditions.

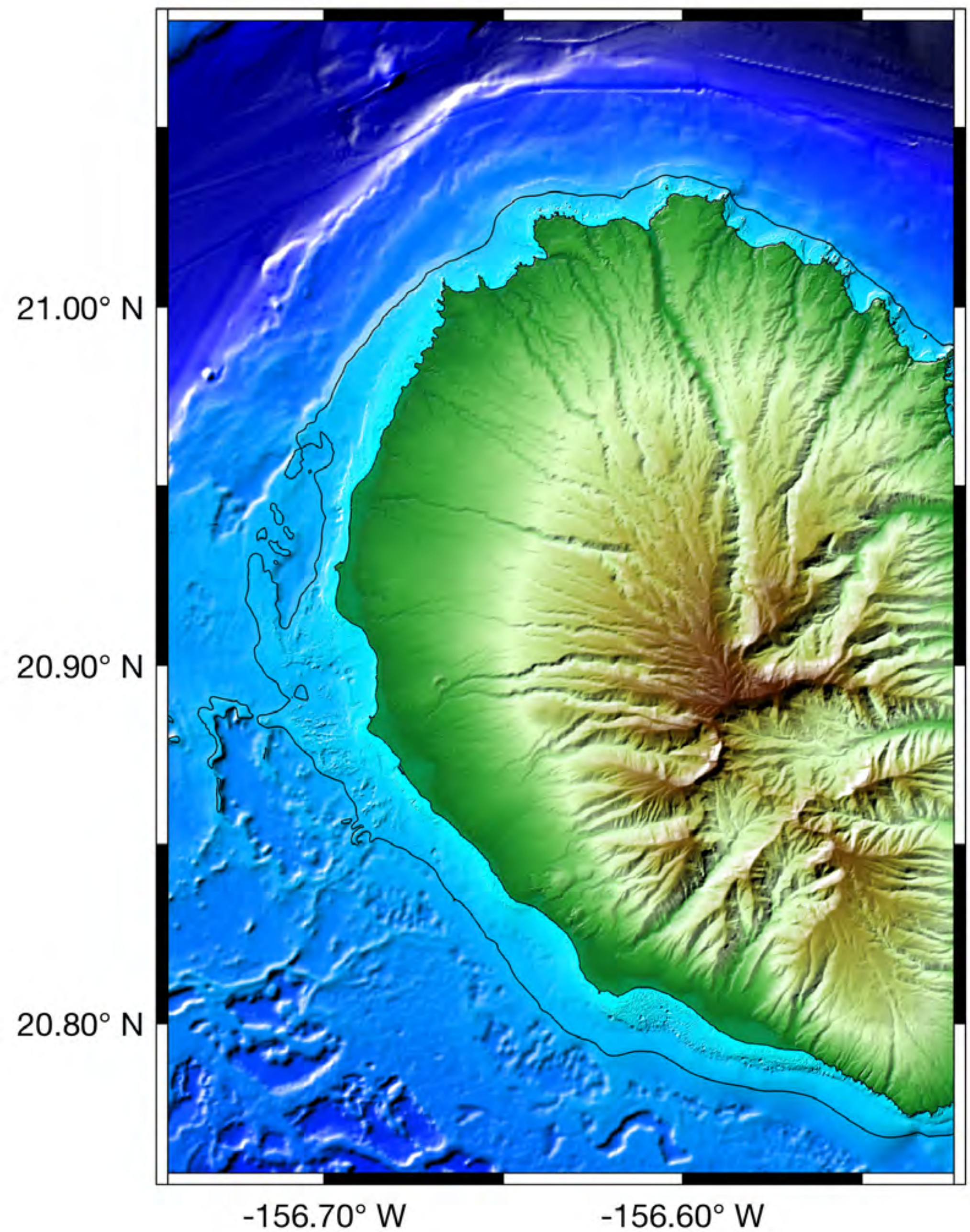

Figure 4:
Bathymetry and topography database for West Maui (black line denoting the 40 m isobath).

3 *BOSZ* Modeling approach

The numerical computations are performed with the *BOSZ* model developed by (Roeber and Cheung, 2012), which is based on a modified version of the Boussinesq-type equations by (Nwogu, 1993). The model is capable of generating waves through internal wavemakers along all open boundaries. The wavemaker runs parallel to the offshore boundary of the model domain (facing NW) generating waves of a 180° window. The lateral wavemakers along the northern and southern boundary of the domain extend over the cells in the grid where the water depth is 40 m. Since the directional window of the lateral wavemakers is also 180°, it is possible to generate waves that propagate offshore. These waves will pass the offshore wavemaker and will be absorbed in the sponge layer placed between wavemaker and domain boundary. Especially the scenario of the South swell presents a situation where some wave from southerly directions propagate towards the Northwestern end of the model domain and eventually get absorbed by the sponge layer at the open ocean side..
With the input based on wave spectra, the wavemaker decomposes the spectral components and generates each component of the spectrum as one single wave with a random phase. This can quickly lead to tens of thousands of individual wave components, which - as an ensemble - represent the fully developed sea state. The spectral input can vary along the boundary, i.e. the energy level of the wavemaker can change along its trajectory.

The phase-resolving modeling effort focuses on four characteristic swell events for the Kahana Beach site. The swell events were determined by Oceanit and they represent three typical 1-year return swells and one 50-year extreme swell event. The main characteristics of the swells are given in Fig. 5.

Table 4. Wave parameters for annual high prevailing and extreme event conditions

Event	Wave Height (feet)	Wave Height (meter)	Wave Period (sec)	Wave Direction (deg)
1-year northwest swell (from CDIP 187 buoy)	21.1 (25.3)	6.43 (7.71)	18	327
1-year north swell (from CDIP 187 buoy)	16.7	5.09	16	1
1-year south swell (from CDIP 239 buoy)	7.7	2.35	16	190
50-year extreme (from NDBC 51001 buoy)	37.8	11.52	18	327

Figure 5: Swell events for Kahana Beach site assessment study.

The four swell events were computed with SWAN over an area covering West Maui, Molokai, and Lanai to provide the transformed wave spectra near the Kahana Beach site. In contrast to the first set of swell events, the North and the South swell are now based on a 16 sec peak period representing more energetic conditions than initially planned.

Due to the complex reef structure around West Maui, it is crucial to define an appropriate modeling domain for the input in *BOSZ* . The size, and orientation of the domain depends mainly on the swell direction and energy as well as the local water depth. The objective is to utilise SWAN for the main wave propagation between the islands and towards the project site. The nearshore wave field is then computed by *BOSZ* with input from the wave spectra provided by SWAN.

To get a feeling for the directionality of the nearshore wave spectra, SWAN was run with the input of the 1-year NW swell and a virtual gauge was placed near the project site in 33 m water depth (see Fig 6).

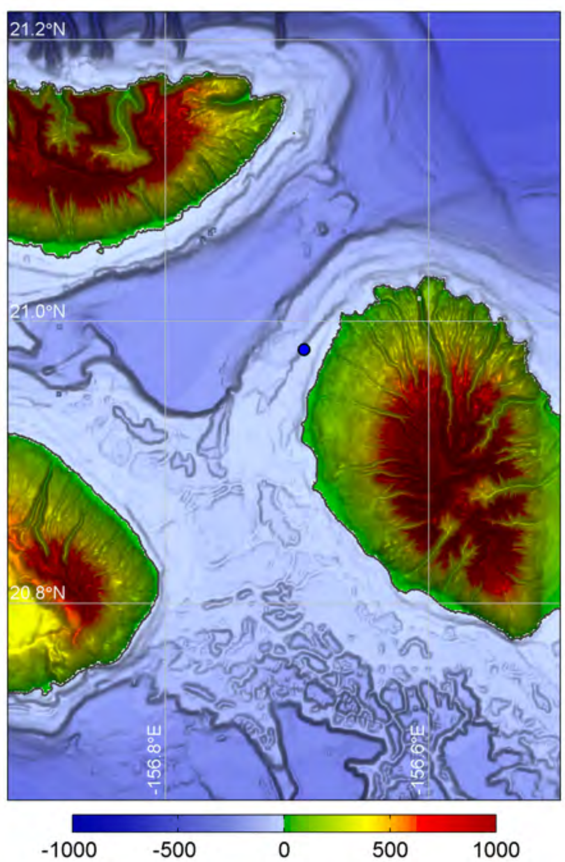

Figure 6: SWAN model domain with virtual gauge near Kahana Beach site assessment study.

The preliminary results shows a wave spectrum with a pronounced Northwesterly peak and a secondary peak from the West (see Fig. 7). A second test run in SWAN showed that the unexpected westerly component is mainly due to the boundary condition. Without the wave input from the western boundary, the second peak in the spectrum is much weaker (see Fig 8). This scenario is closer to reality since the island of Oahu acts mostly as wave blockage for NW swells.

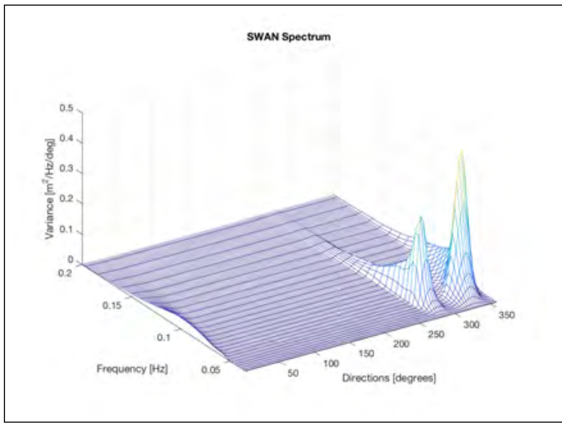

Figure 7: Preliminary SWAN spectrum based on North and West boundary input.

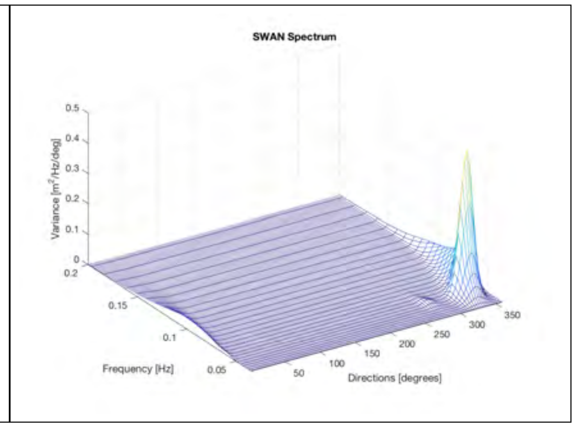

Figure 8: Preliminary SWAN spectrum based on North boundary input only.

Based on the setting in SWAN to only use the North boundary for wave input in case of North or Northwest swells and only the South boundary for South swells, we decided to output the SWAN spectra near the Kahana Beach site along the 40-m contour.

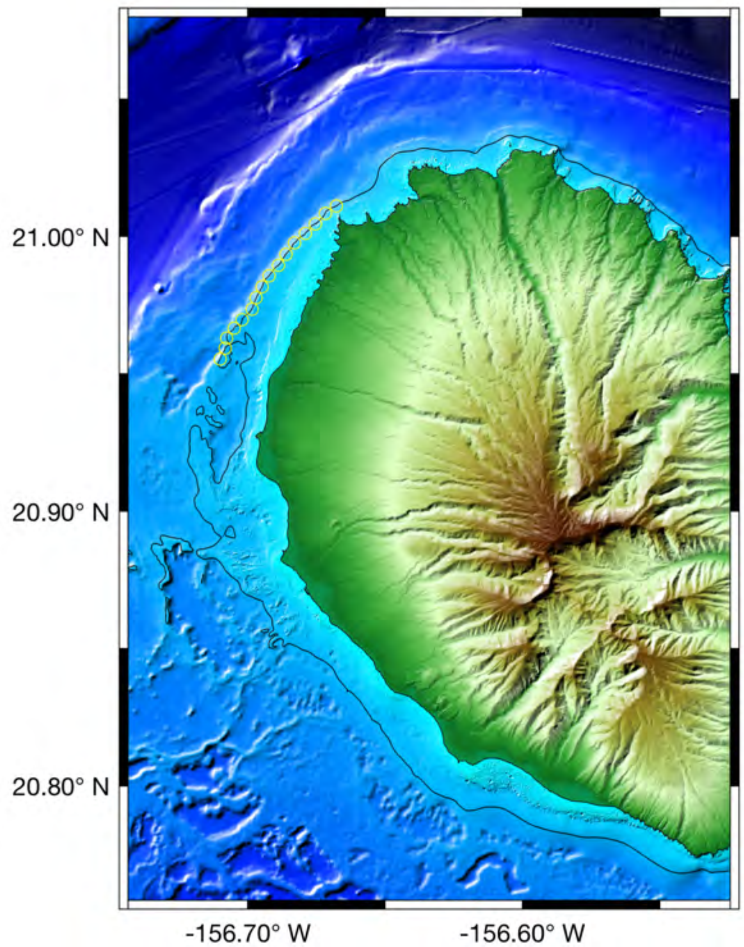

Figure 9: Bathymetry and topography database for West Maui with virtual gauges (green circles) from SWAN along the 40-m contour.

SWAN was then run for the three 1-year return swells and the 50-year extreme event and the 16 directional spectra were saved along the 40-m isobath. The locations of the spectra are about 500 m apart to closely represent the changes in wave energy from the swells along the offshore boundary of the *BOSZ* model.

We follow the approved strategy to limit the bathymetric depth to 40 m and rely on SWAN to provide the refracted and shoaled input spectra for *BOSZ* . The decision to use the SWAN spectra along the 40 m isobath is based on a best compromise between accuracy and computation time. Boussinesq-type models have limited dispersion properties and the phase-resolving computation should be limited to the nearshore area (waves are relatively long compared to the water depth). For most swell waves, shoaling and refraction become predominant in shallow water, i.e. where the water depth to wavelength ratio is around 1/10-1/20. SWAN is able to adequately shoal and refract swell spectra into the nearshore domain as long as the bathymetric changes are not too abrupt (diffraction problem) and before wave breaking occurs. *BOSZ* can accurately compute waves of $kh < \pi$, which means wavelengths that are twice as long as the local water depth. Even waves as long as the local water depth are computed with acceptable accuracy of frequency dispersion. Starting the*BOSZ* computation in 40 m depth ensures a complete representation of shoaling and refraction processes and at the same time avoids problems associated with deep water and excessively dispersive waves. More information can be found in chapter 3 of (Roeber et al., 2019).

The remaining refraction, shoaling, and final wave breaking process is then computed in *BOSZ* . The wavemaker in *BOSZ* truncates the input wave spectrum at a 0.14 Hz (7 sec), which corresponds to wavelength of around 80 m. This ensures that the input waves are accurately computed by the governing equations within the applicable range of dispersion. The truncation at 0.14 Hz affects only the very far tail of the spectrum and does not interfere with the main window of the swell spectrum. It should be noted, that shorter waves than of 0.14 Hz can certainly be computed by *BOSZ* during the computation (e.g. superharmonics). The truncation only affects the wave input for the above stated reasons to ensure accuracy and stability of the computation.

The tables below show the variations of Hs, Tp, and Dp along the offshore boundary of the designated model somain as shown by the 16 spectra.

Table 1:
Hs, Tp, Dp at the 16 sites as output by SWAN for 1-year return period **Northwest swell**.

Gauge	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Hs [m]	3.50	3.43	2.97	2.93	2.85	2.70	2.51	2.44	2.06	1.93	2.06	2.14	1.77	1.87	1.76	1.87
Tp [sec]	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9
Dp [°]	346	346	346	343	346	346	343	343	340	346	343	349	343	355	349	346

Table 2:
Hs, Tp, Dp at the 16 sites as output by SWAN for 1-year return period **North swell**.

Gauge	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Hs [m]	3.10	3.12	2.75	2.74	2.69	2.58	2.39	2.42	2.15	1.92	1.94	2.06	1.86	1.79	1.71	1.66
Tp [sec]	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Dp [°]	352	352	352	349	352	352	349	349	346	349	346	352	349	1	355	352

Table 3:
Hs, Tp, Dp at the 16 sites as output by SWAN for 1-year return period **South swell**.

Gauge	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Hs [m]	0.39	0.42	0.44	0.47	0.55	0.60	0.69	0.75	0.82	0.95	1.08	1.07	1.08	1.03	1.14	1.20
Tp [sec]	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Dp [°]	262	253	259	256	253	250	250	244	241	241	208	202	199	208	199	187

Table 4:
Hs, Tp, Dp at the 16 sites as output by SWAN for 50-year return period **NW swell**.

Gauge	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Hs [m]	5.18	5.08	4.38	4.32	4.21	3.99	3.70	3.61	3.04	2.84	3.04	3.15	2.61	2.75	2.59	2.76
Tp [sec]	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9
Dp [°]	346	346	346	343	346	346	343	343	340	346	343	349	343	355	349	346

Figs. 10 to 13 show the 16 spectra for the North, Northwest, and South swells as listed in tables 1 to 4 show Hs, Tp, and Dp. The order is North to South.

The four swell events show average peak directions of 346.1° for the Northwest swell, 351.5° for the North Swell, 232.5° for the South swell, and 346.1° for the 50-year Northwest swell (identical to 1-year NW swell). This leads to offsets in peak angles with respect to the grid orientation of -34.1°, -39.5°, 79.5°, and -34.1°.

The variation of wave energy is typical for West Maui with decreasing energy towards the Southern gauge location for Northerly swells. In case of the 1-year South swell, the energy decreases towards the North. However, in all cases, the change of energy is not following a continues pattern, since some gauges experience wave energy from local refraction processes ("refraction fingers").

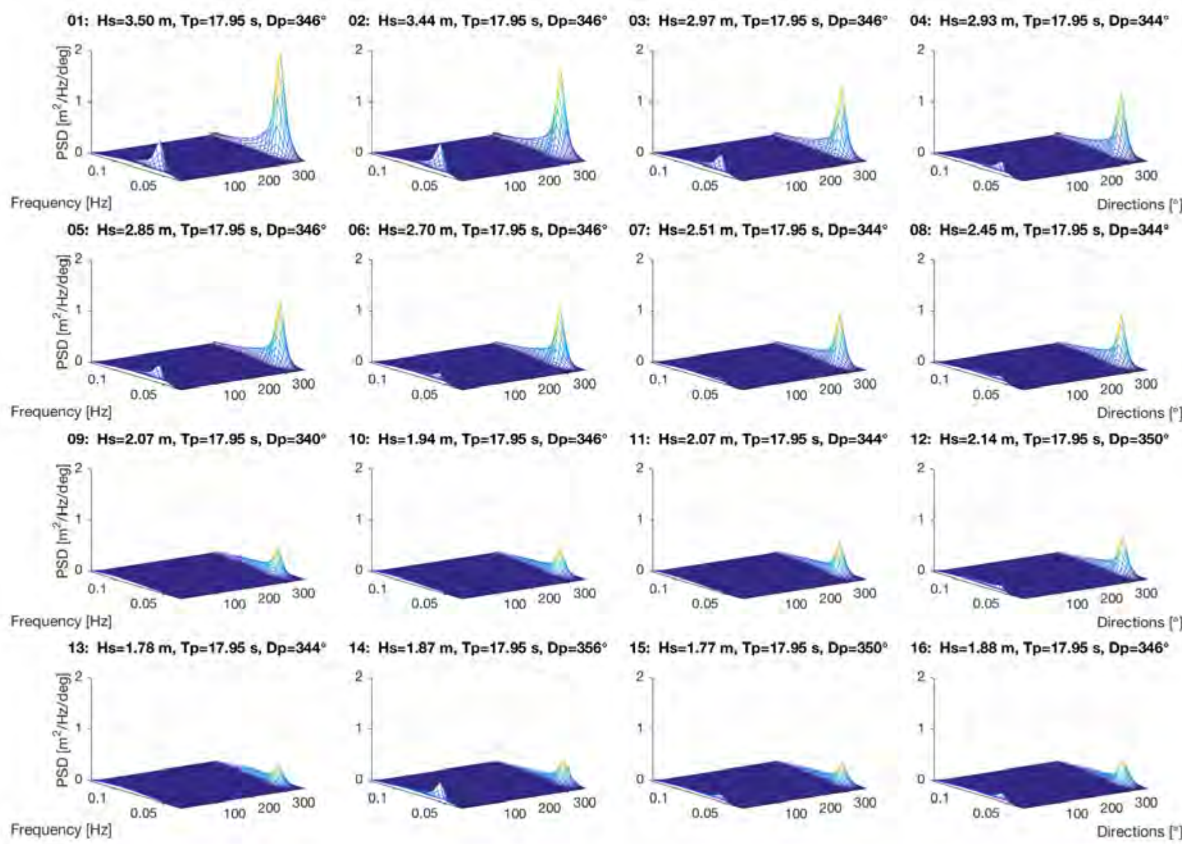

Figure 10:
SWAN spectra along the 40-m contour for the 1-year return **Northwest swell** (case 1 Fig.5).

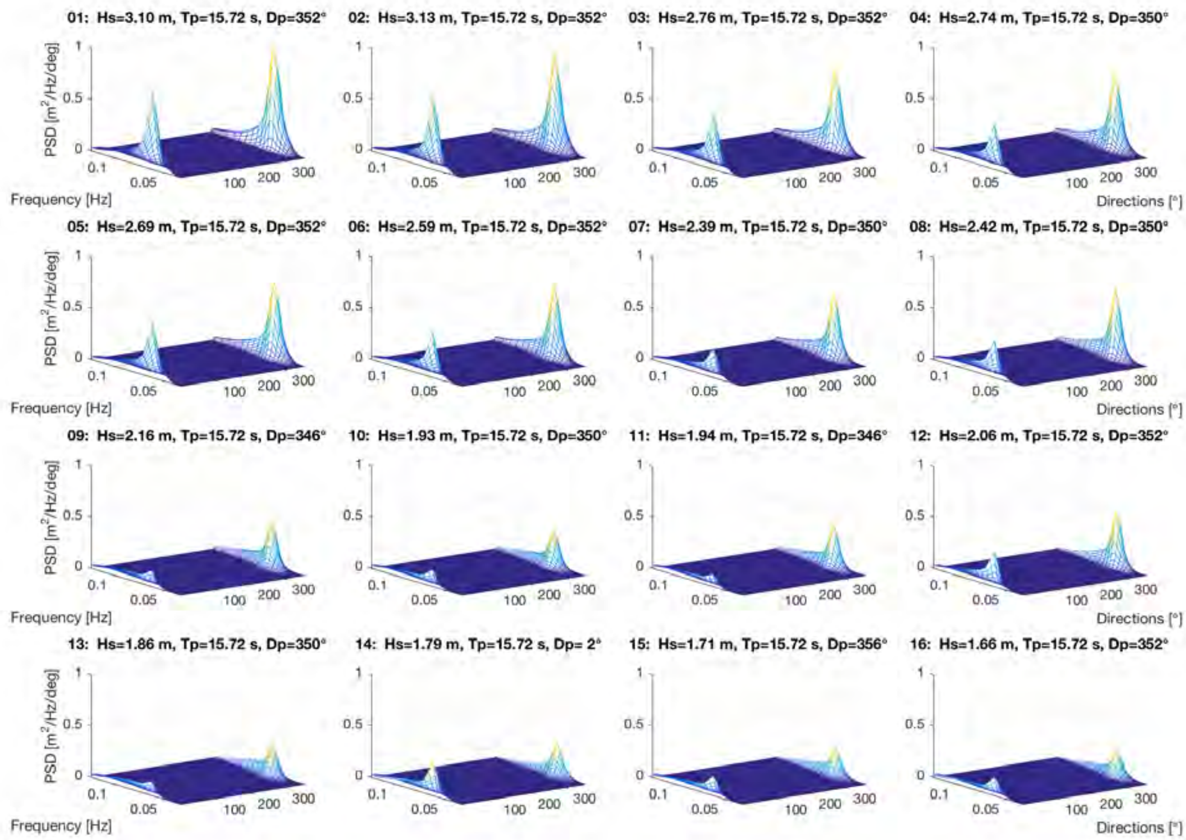

Figure 11:
SWAN spectra along the 40-m contour for the 1-year return **North swell** (case 2 Fig.5).

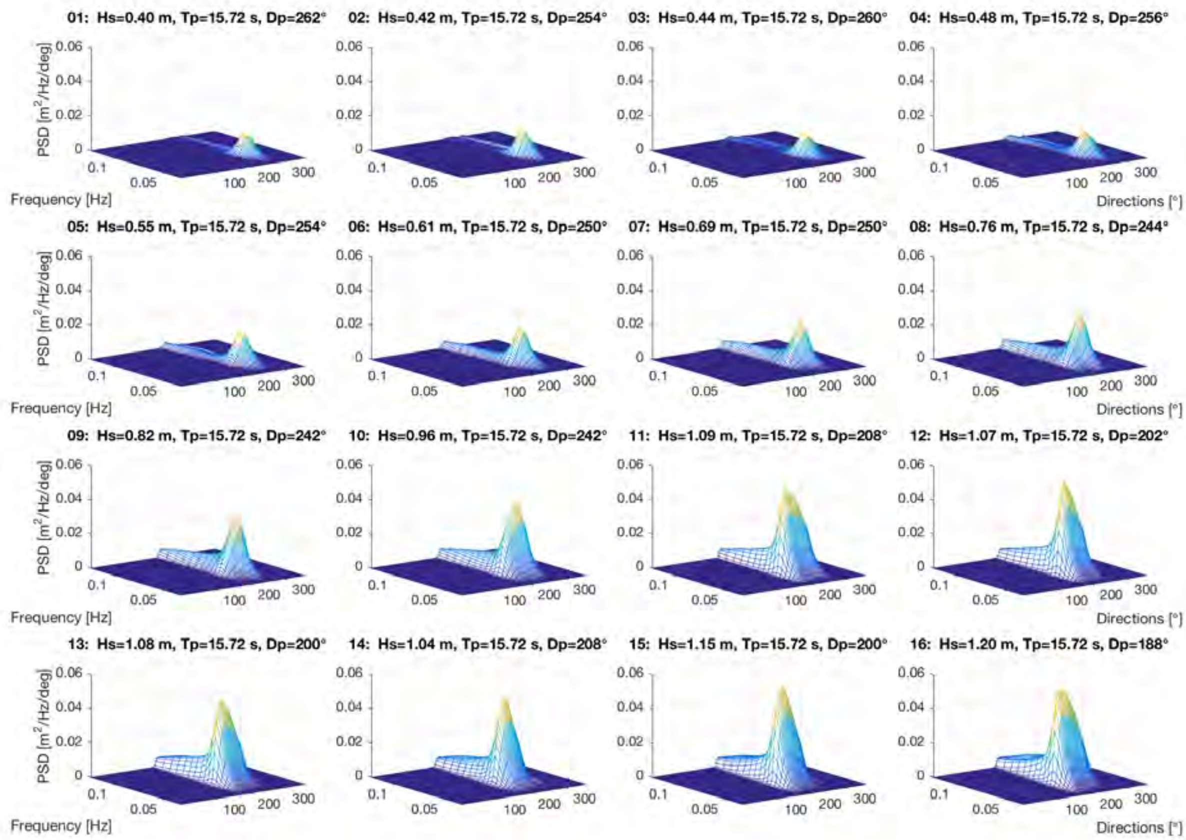

Figure 12:
SWAN spectra along the 40-m contour for the 1-year return **South swell** (case 3 Fig.5).

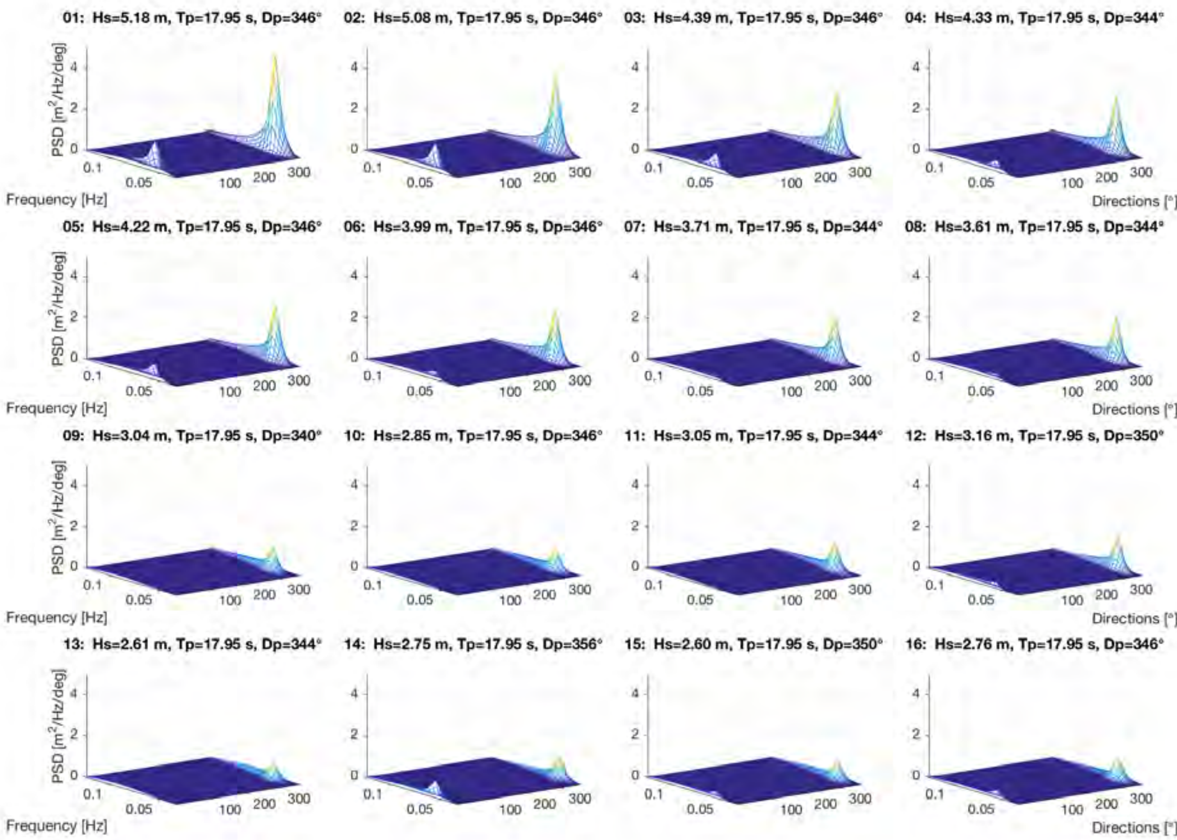

Figure 13:
SWAN spectra along the 40-m contour for the 50-year return **Northwest swell** (case 4 Fig.5).

4 *BOSZ* computational domain

A series of preliminary tests was performed to find an optimum size and orientation of the numerical domain for the *BOSZ* computations. The goal was to find a setup that works equally well for Northern and Southern swells.

We decided to use a domain covering the stretch of coastline between Kapalua in the North and Honoapiilani Park in the South. The domain is 8.0 km long (alongshore) and 3.9 km wide (cross-shore) with a uniform resolution of $\Delta x = \Delta y = 5$ m grid spacing. This results in a total of 1,248,000 cells, of which 851,841 cells (68 %) are initially below MLLW. The grid was oriented with the offshore boundary facing towards NW (312°).

The water depth was set to uniform 40 m offshore of the 40-m isobath. The lateral boundaries were slightly modified and also set to constant 40 m depth to allow for proper generation of the individual waves along all open boundaries. This reduces the natural wave shadows along the boundaries and ensures that the individual waves can refract over the entire modeling domain. The original bathymetry can be seen in Fig. 14 and the modified bathymetry is shown in Fig. 15. Since the domain is covering large portions of the bathymetry outside of the study site, the computed results along the boundaries are ignored and attention is focused on the center part of the domain.

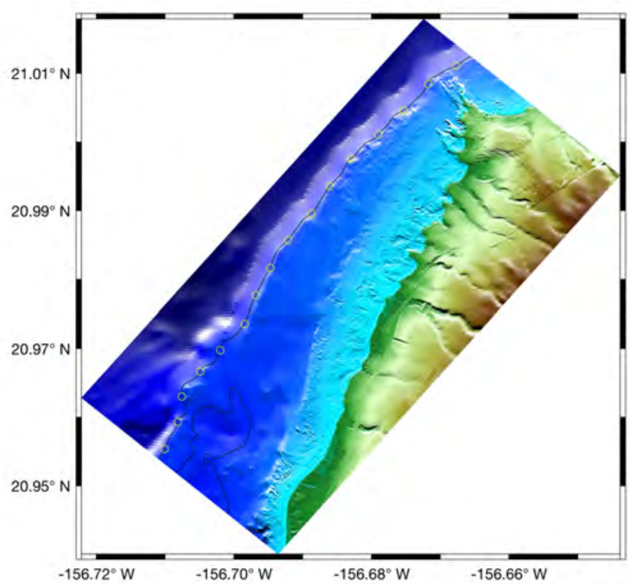

Figure 14: *BOSZ* model bathymetry with 40-m isobath and locations of the 16 SWAN virtual gauges.

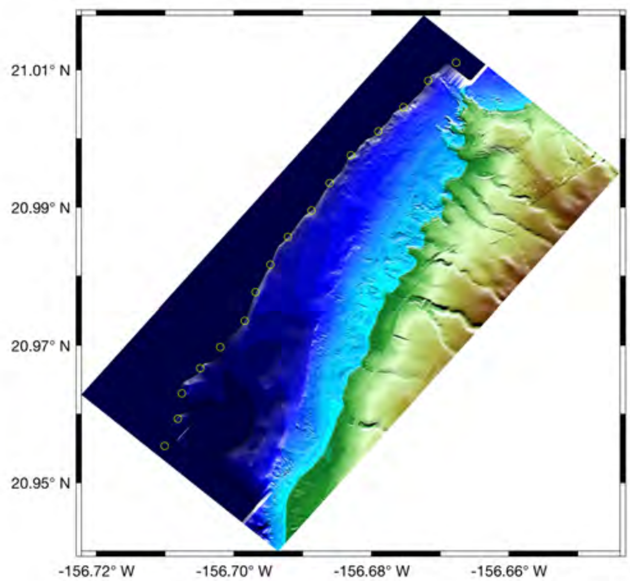

Figure 15: *BOSZ* model domain with uniform depth offshore of the 40-m isobath and locations of the 16 SWAN virtual gauges.

4.1 Model Setup

All computations are based on a chart datum of mean lower low water (MLLW) and an extreme water level of 0.6 m above MSL, which results in an initial water level of 0.939 m above MLLW, i.e. the computed variation of the free surface oscillates around a positive reference level of 0.939 m. In case of the 50-year extreme event, a water level of MLLW+1.939 m was chosen. Wave setup, recirculation patterns, or wave run-up are not affected by the reference level.

The wavemaker was set tup in a way that the wave directions were preserved with respect to compass orientation. Since the offshore boundary of the computational domain faces 312°, the peak wave angles have to be offset by -34.1° (peak 346.1°), -39.5° (peak 351.5°), 79.5° (peak 232.2°) and -34.1° (peak 346.1°) for the Northwest, North, South, and 50-year NW swell respectively.

The wavemaker is capable of generating full 360° of wave directions. Since the wave generation zone is placed near the lateral boundaries but not directly *at* the boundary, any wave, which moves towards the boundaries is absorbed by a sponge layer between wavemaker and boundary. This creates realistic open ocean conditions without artificial reflections or wave trapping.

The *BOSZ* model was run for a total of 2 hour and 10 min for the initial ramping up of the sea state. All values were obtained from the last 2 hours of computations. Usually, 1 hour is sufficient to allow for statistically representative values such as Hs or wave setup. The extra hour of computation, however, ensures that long infra-gravity waves can properly developed.

5 Results

5.1 *BOSZ* data output and plots

The following plots illustrate the data generated from the *BOSZ* computations. The data used for generation of the plots will be part of the deliverables. The data files are described for each bullet point.

Besides the matrices with the data output listed below, several other data files are provided. These files include the bathymetry, as well as the geographic coordinates in WGS84. The grid resolution is of uniform 5 m in both x- and y-direction.

All matrices are of identical size (1480 cells in cross-shore direction, and 720 cells in long-shore direction). This is the size of the computational domain except for 60 cells along the open ocean boundaries where the sponge layers and wavemakers are located. The plots below show a smaller area focusing on the site around Kahana. The data files come in conventional MATLAB format and can therefore be simply visualized in MATLAB as e.g. `mesh(X,Y,ETA2)`.

The variables contain NaNs over the topography. For all variables derived from time series such as Hs, the matrices contain NaNs where the topography is above MLLW+WL (WL is the initial water level of 0.94 m for 1-year events and 1.94 m for the 50-year event). The variables with free surface (`ETA` and `MAXETA`) show the run-up and only contain NaNs where the water has not reached.

The data files for the 4 scenarios are named:
`Data_Kah_N.mat`
`Data_Kah_NW.mat`
`Data_Kah_S.mat`
`Data_Kah_NW50.mat`

General variables:

- Variable name `BATHY`: Bathymetry of model domain referenced at MLLW.
- Variable name `X`: Longitude of model domain in WGS84.
- Variable name `Y`: Latitude of model domain in WGS84.

Specific variables:

- Free surface elevation at the end of the full computation of 2h 10 min. The zero level of the initial free surface is elevated by 0.94 m above MLLW for the 1-year events and by 1.94 m above MLLW for the 50-year event. Visualization only.
  Unit: meters [m]. Variable name `ETA`.

- Significant wave height computed after the first 10 min (ramping time) over a 2-h period (from 10 min to 2h 10 min).
  Unit: meters [m]. Variable name `HS`.

- Wave setup (mean free surface elevation) computed after the first 10 min (ramping time) over a 2-h period (from 10 min to 2h 10 min).
  Unit: meters [m]. Variable name `WSTP`.

- Mean wave direction computed after the first 10 min (ramping time) over a 2-h period (from 10 min to 2h 10 min). The direction was computed from the waves' geometry $atan(\eta_y/\eta_x)$. This approach is reliable as long as the wave directions do not show more than 90° variation. In case of the South swell, the results should be viewed with caution. For proper assessment of the prevailing wave direction, it is recommended to consult the animations with the flow velocities.
  Unit: degrees [°] (North = 0 | 360). Variable name `DIR`.

- Maximum free surface elevation computed after the first 10 min (ramping time) over a 2-h period (from 10 min to 2h 10 min). This includes the maximum runup/inundation.
  Unit: meters [m]. Variable name `MAXETA`.

- Mean flow speed and direction computed after the first 10 min (ramping time) over a 2-h period (from 10 min to 2h 10 min).
  Unit: meters/second [m/s]. Variable names `MEANU` and `MEANV`.

- Maximum hydrodynamic force per meter width computed after the first 10 min (ramping time) over a 2-h period (from 10 min to 2h 10 min).
  The force is computed as $F = 1/2 \cdot \rho \cdot C_D \cdot B \cdot h \cdot (u^2 + v^2)$, where ρ denotes the density of sea water as 1035 kg/m^3, B is the width of an exposed object in the cross-flow direction, h is the flow depth, and u and v are the flow velocities in x and y-direction. The empirical drag coefficient, C_D, is assumed to be 1.
  Unit: kilo Newton per meter width [kN/m]. Variable name `MAXF`.

5.2 Results from 1-year Northwest swell

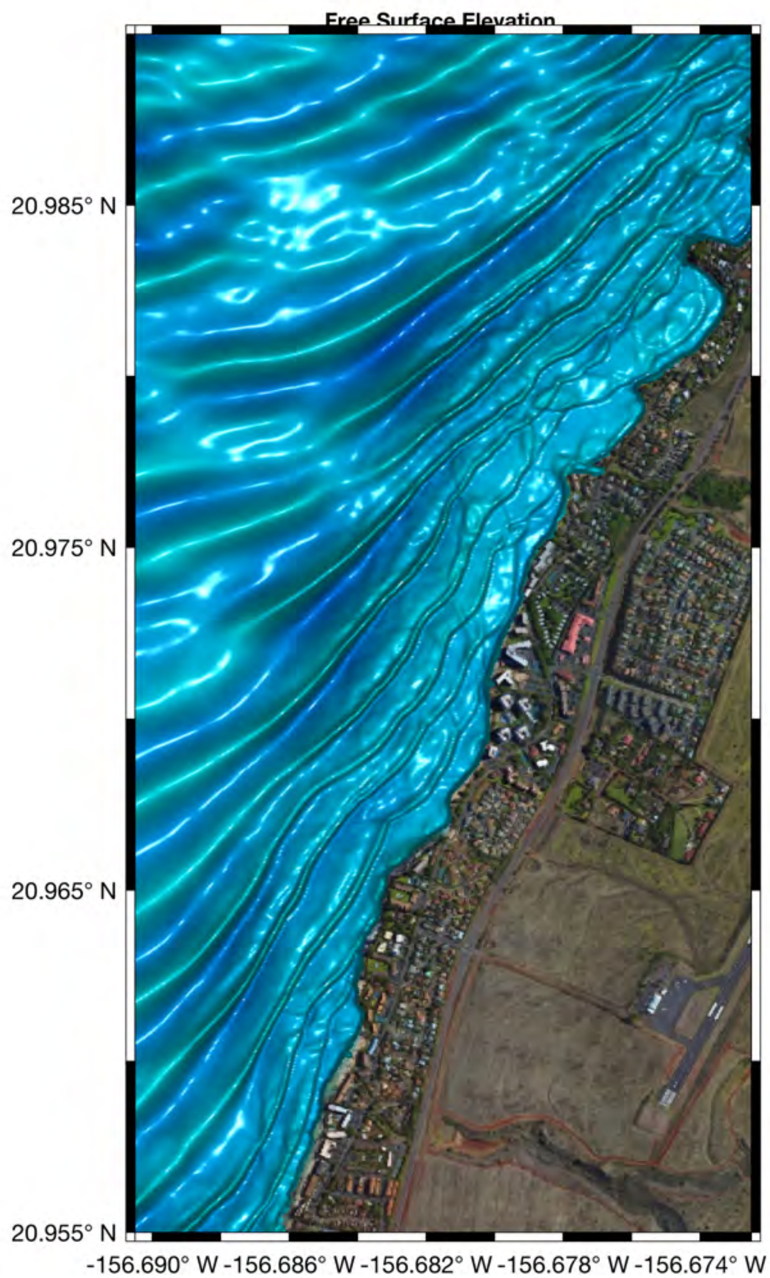

Figure 16: *BOSZ* free surface elevation after 2-h computation.

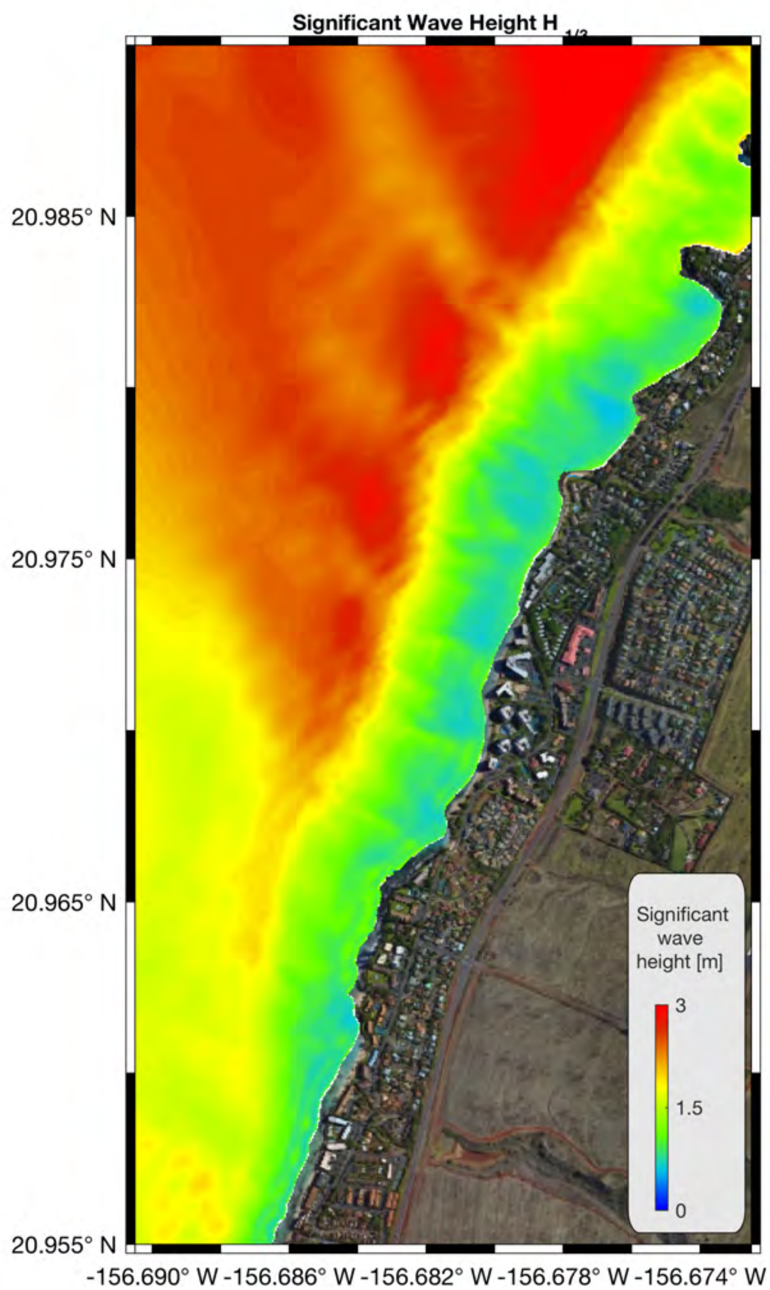

Figure 17: *BOSZ* significant wave height after 2-h computation.

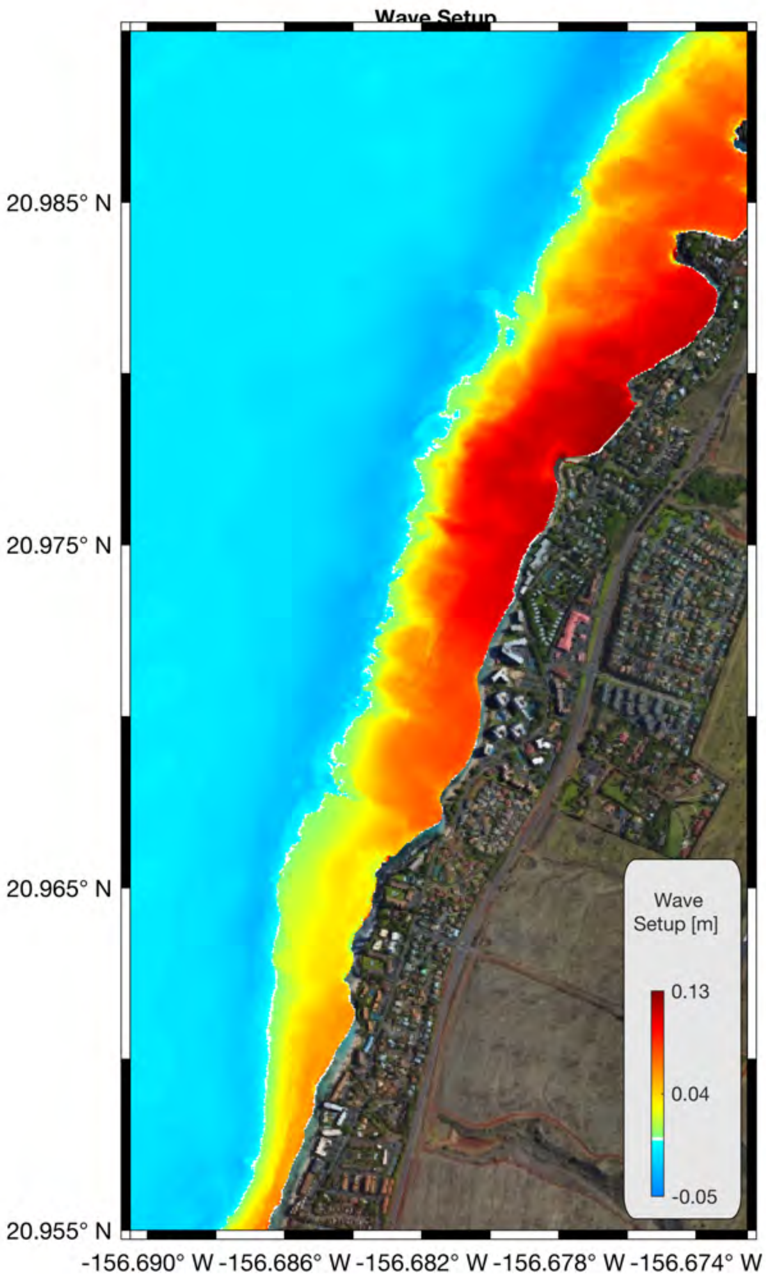

Figure 18: *BOSZ* wave setup after 2-h computation (above MLLW+0.94 m).

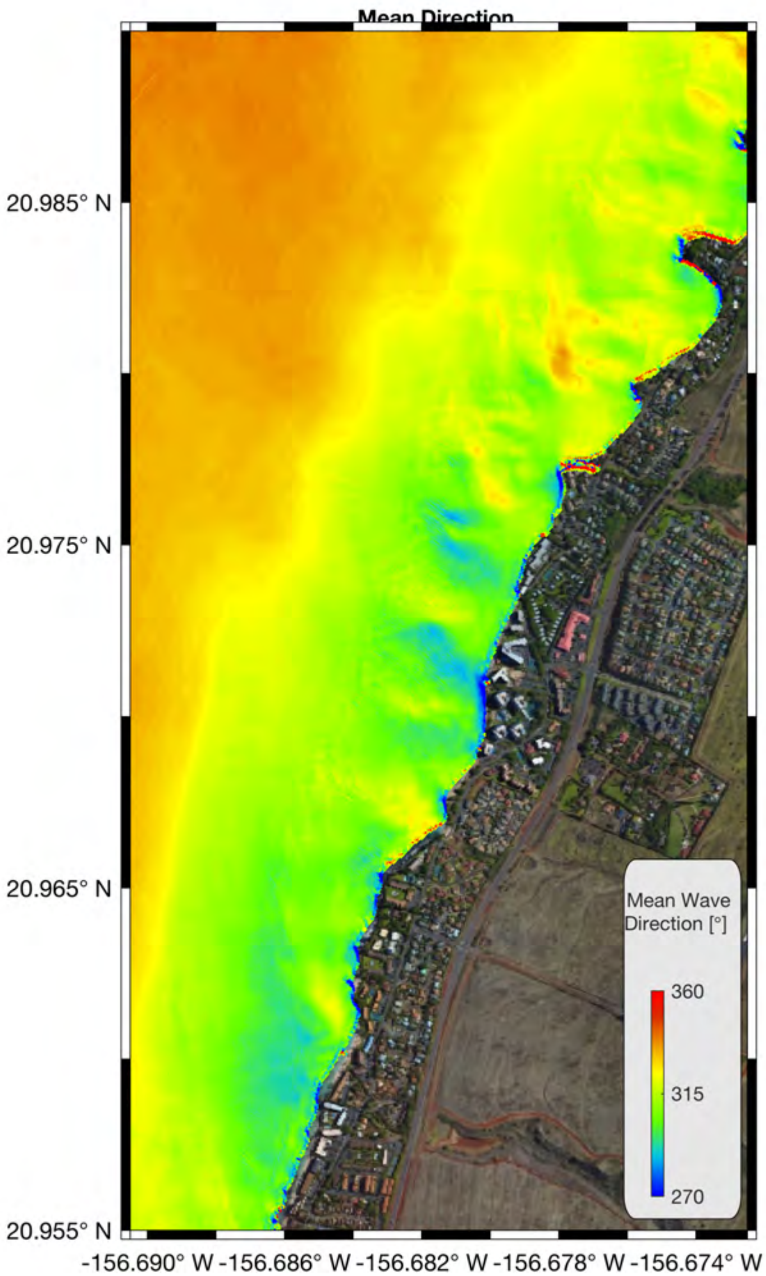

Figure 19: *BOSZ* mean wave direction over 2-h computation.

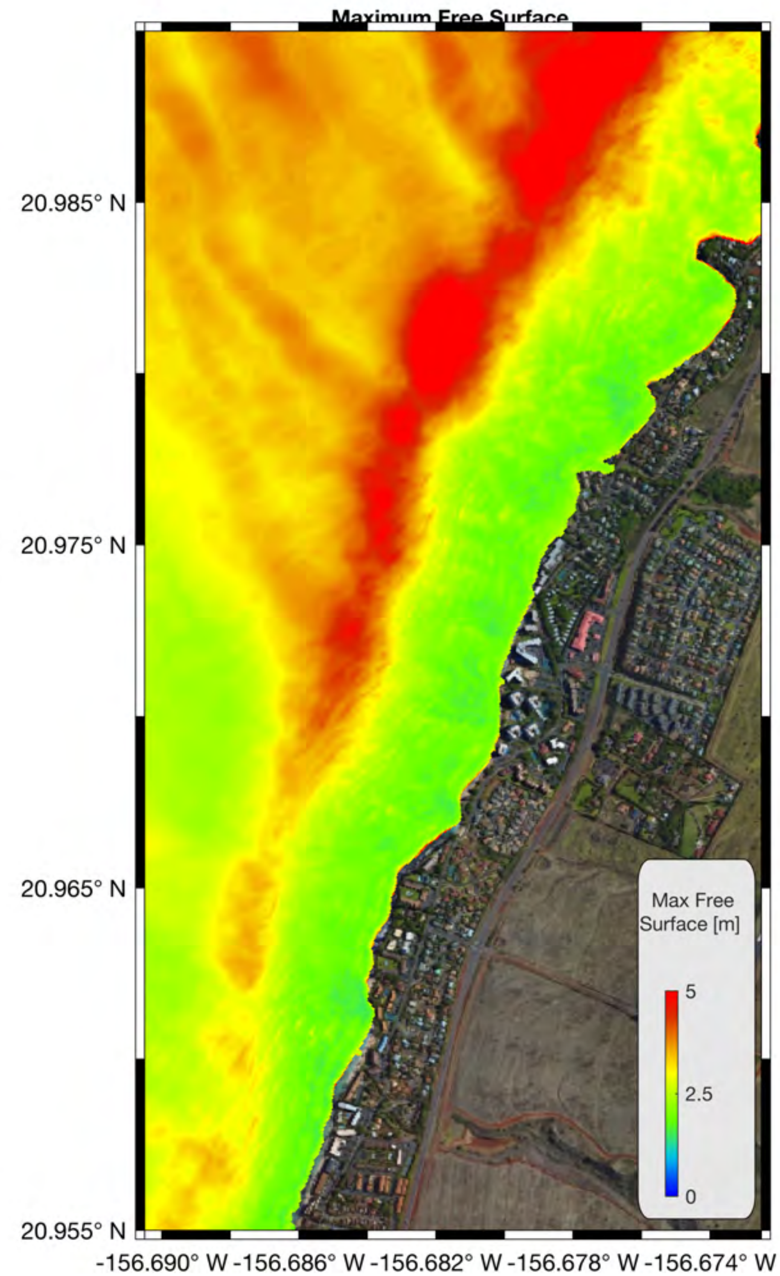

Figure 20: *BOSZ* maximum free surface elevation (wave crest) over 2-h computation.

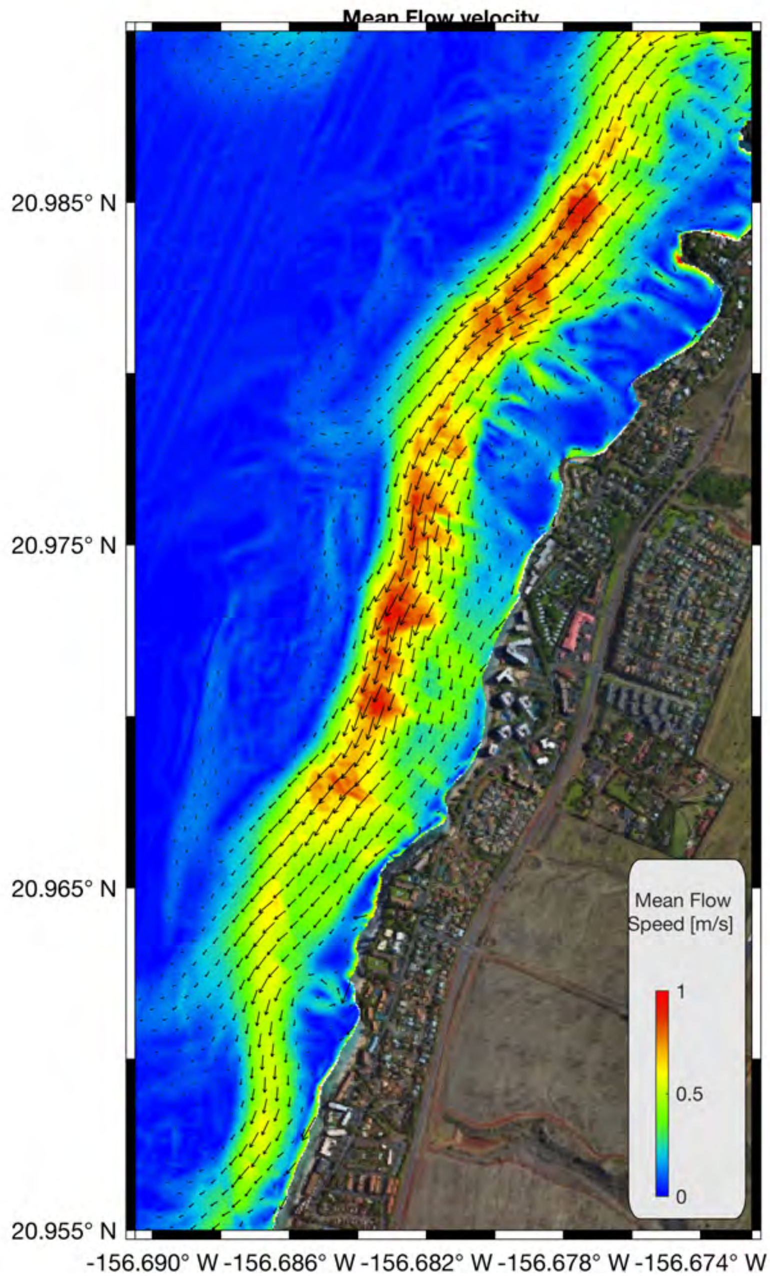

Figure 21: *BOSZ* mean flow velocity over 2-h computation.

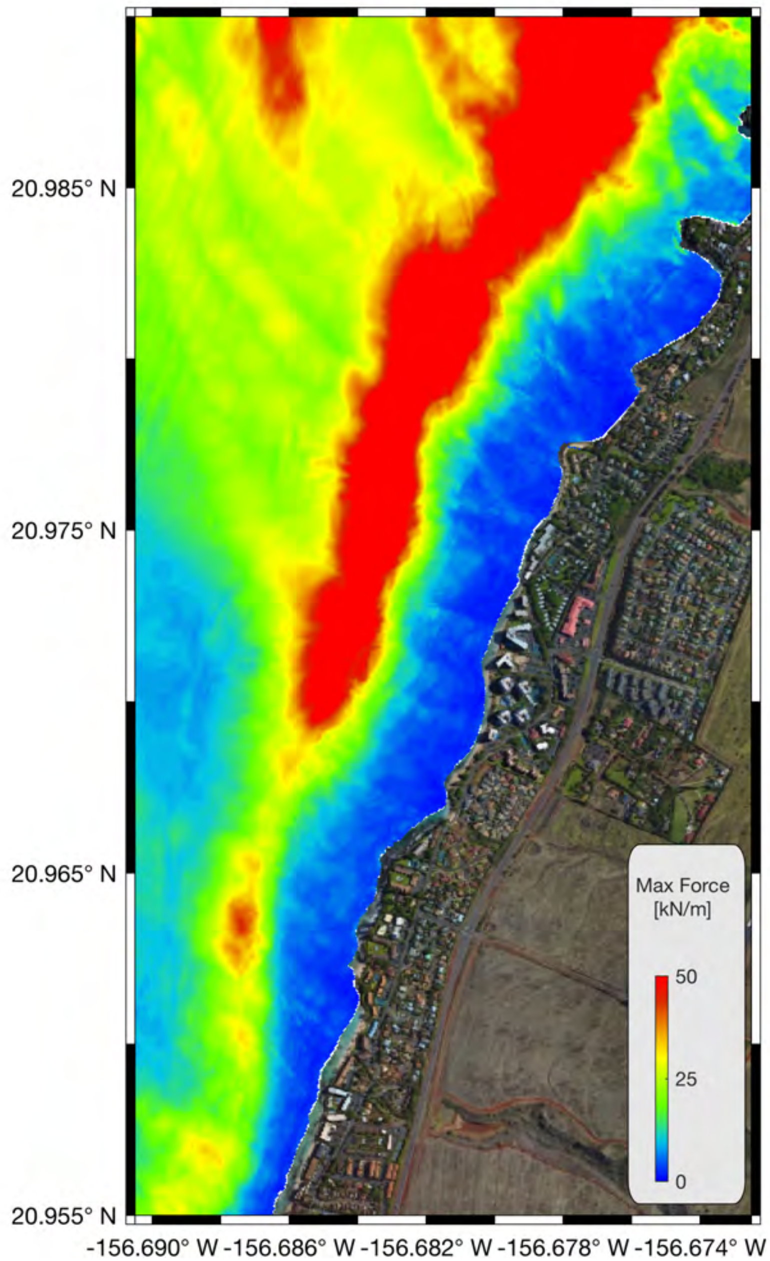

Figure 22: *BOSZ* maximum hydrodynamic force per meter width over 2-h computation.

5.3 Results from 1-year North swell

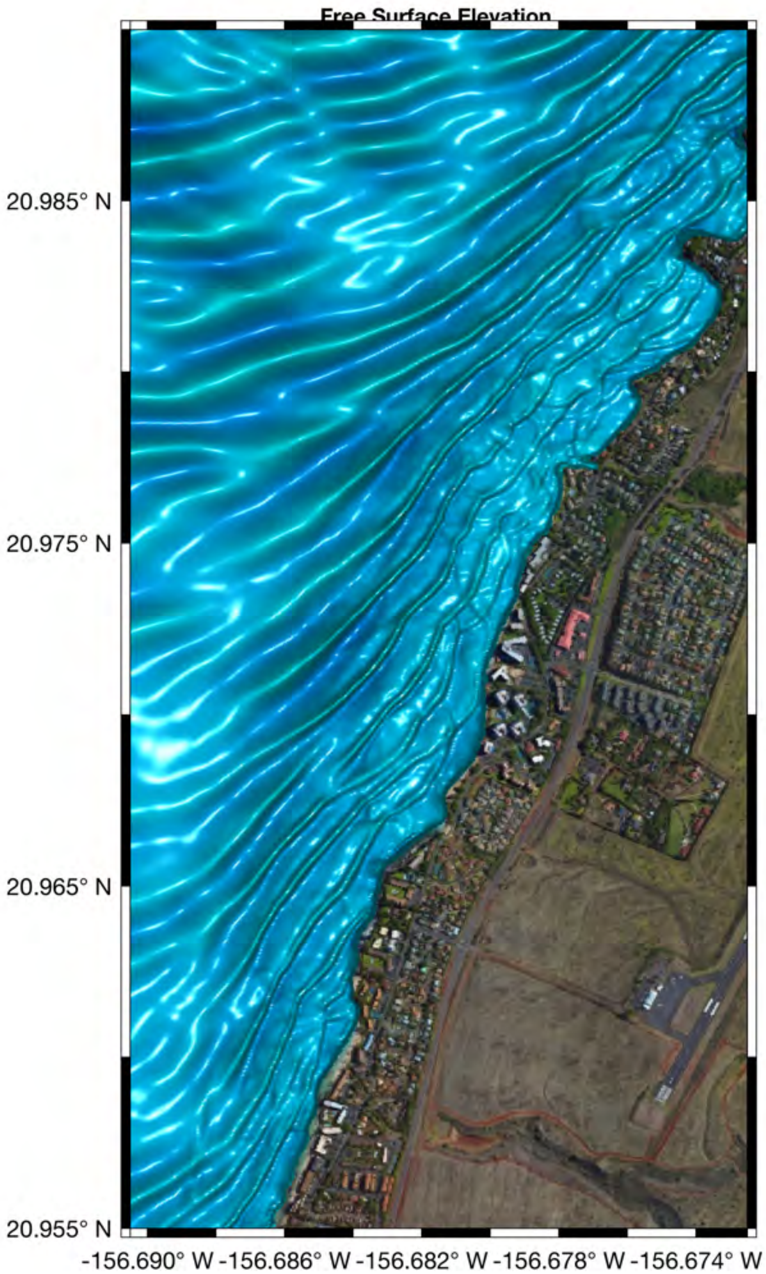

Figure 23: *BOSZ* free surface elevation after 2-h computation.

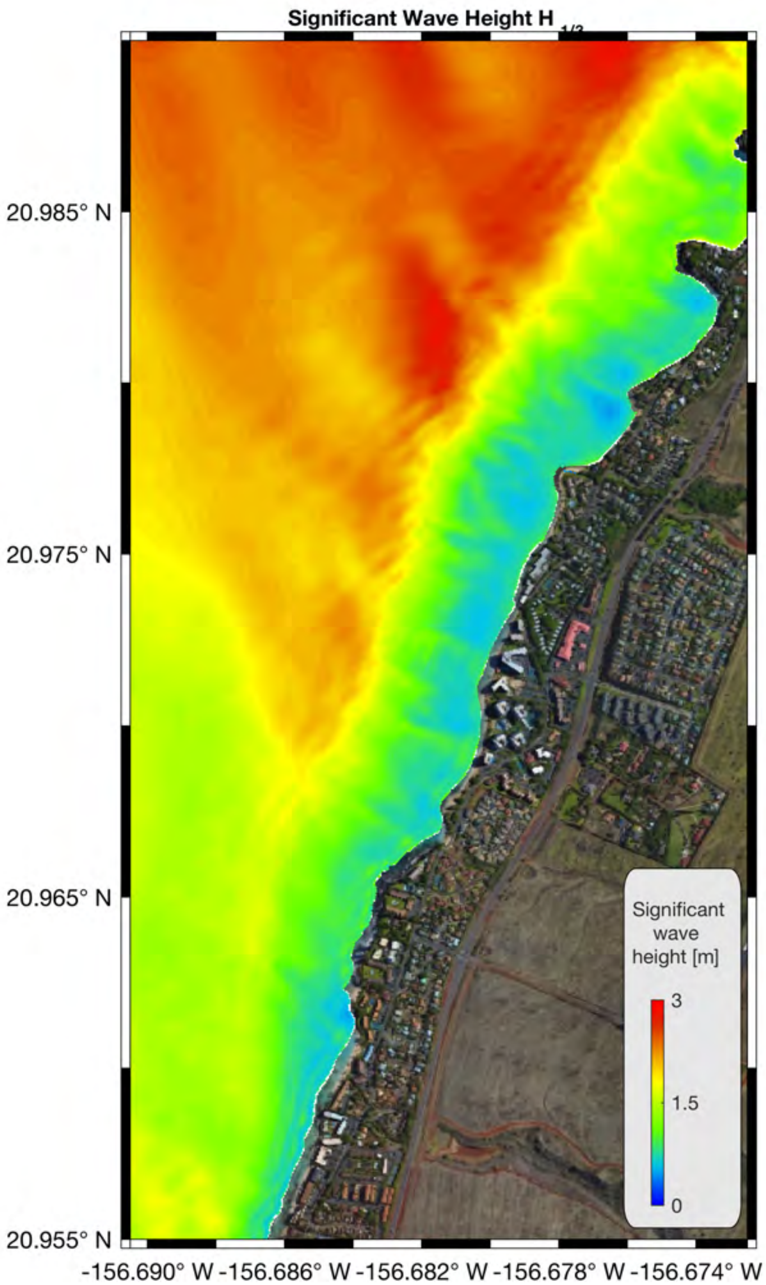

Figure 24: *BOSZ* significant wave height after 2-h computation.

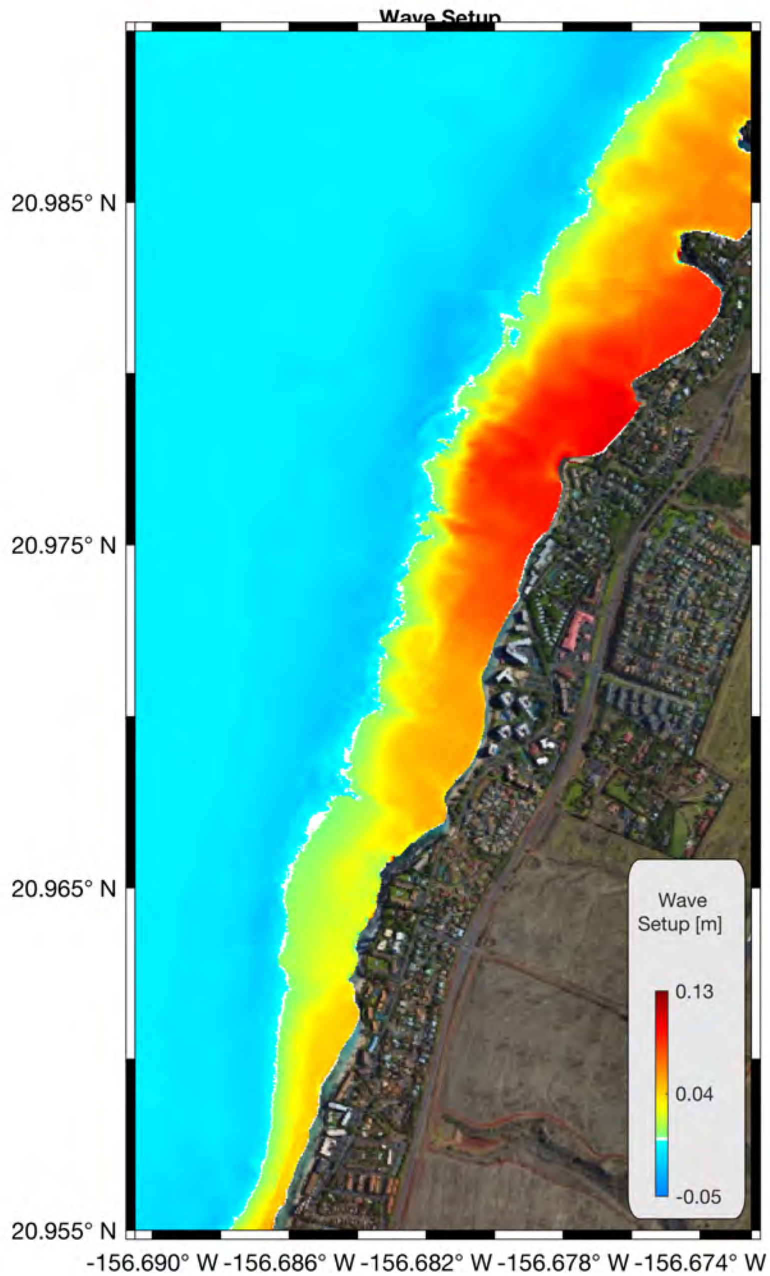

Figure 25: *BOSZ* wave setup after 2-h computation (above MLLW+0.94 m).

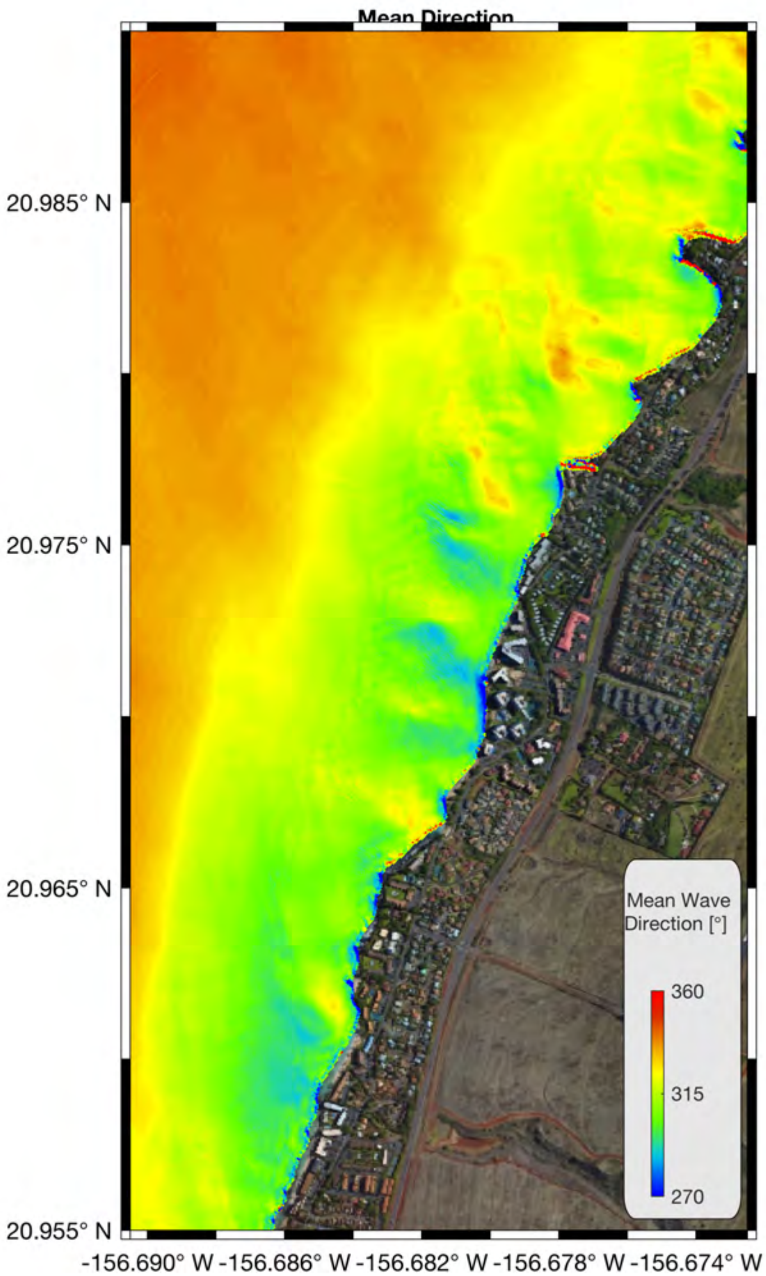

Figure 26: *BOSZ* mean wave direction over 2-h computation.

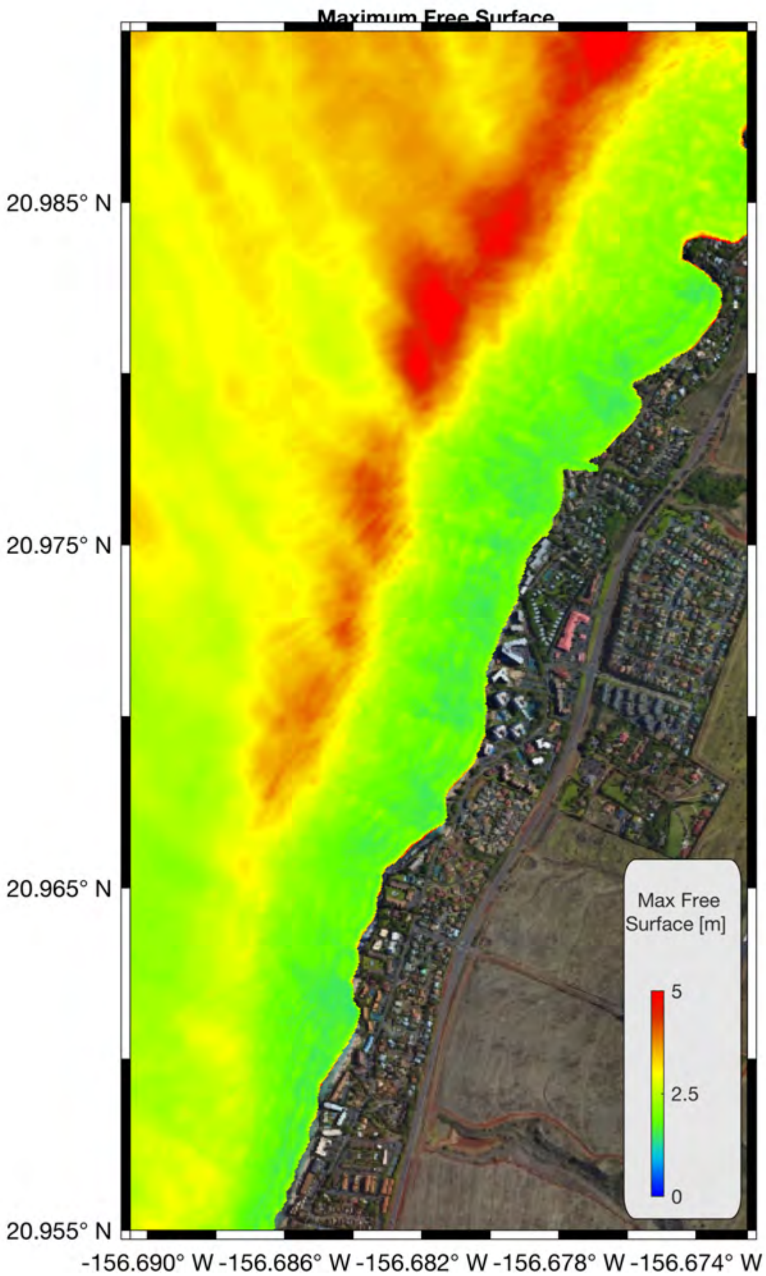

Figure 27: *BOSZ* maximum free surface elevation (wave crest) over 2-h computation.

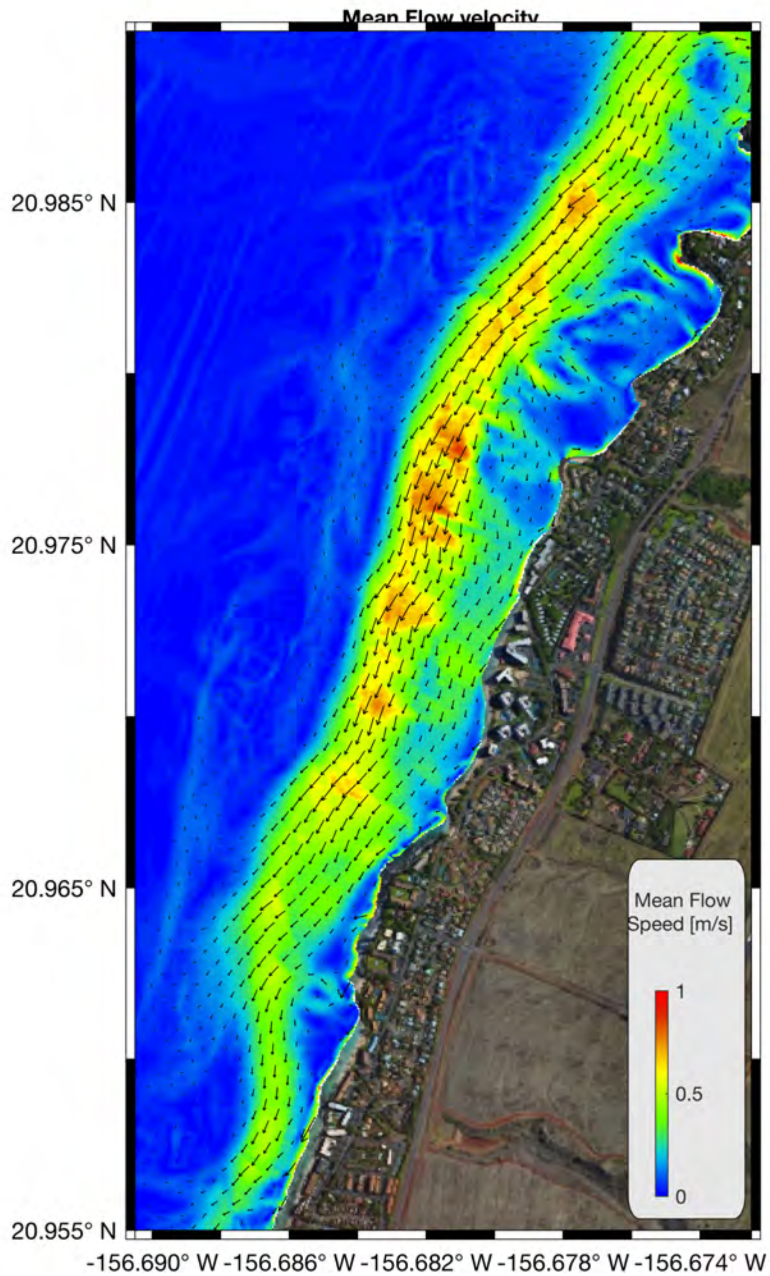

Figure 28: *BOSZ* mean flow velocity over 2-h computation.

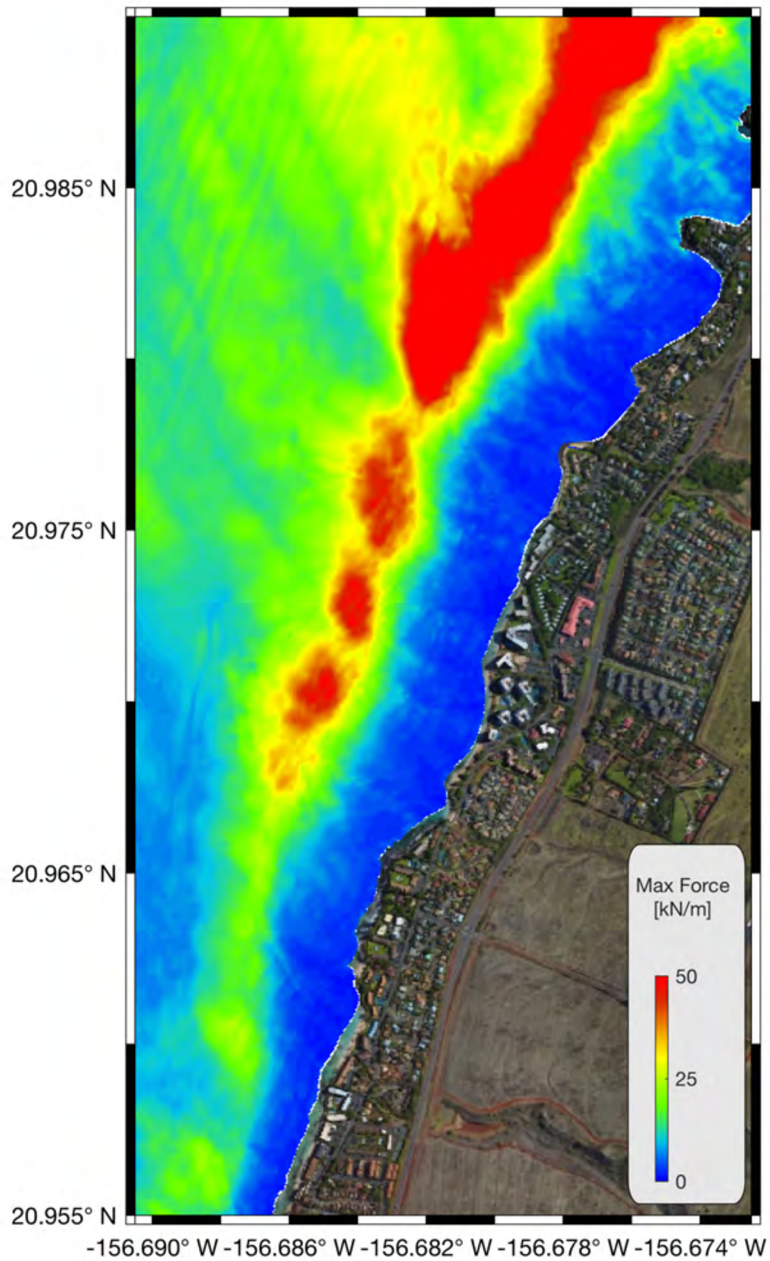

Figure 29: *BOSZ* maximum hydrodynamic force per meter width over 2-h computation.

5.4 Results from 1-year South swell

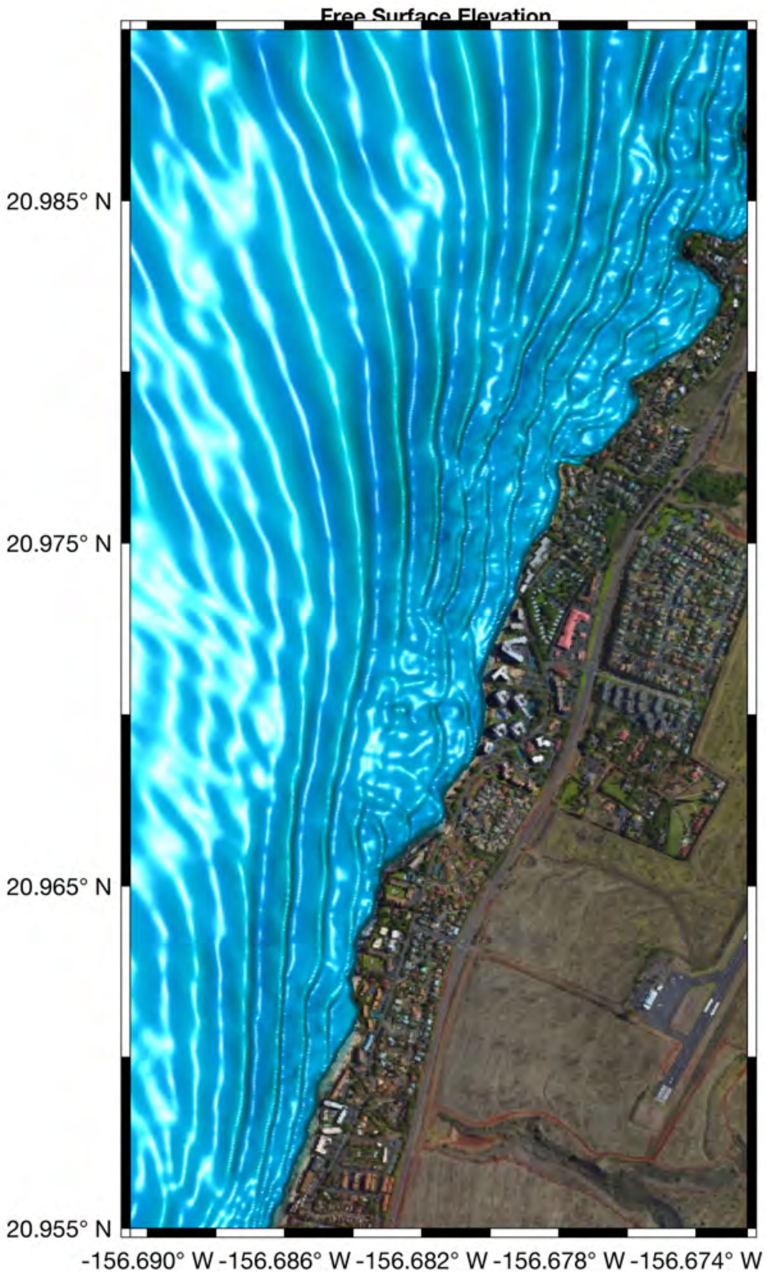

Figure 30: *BOSZ* free surface elevation after 2-h computation.

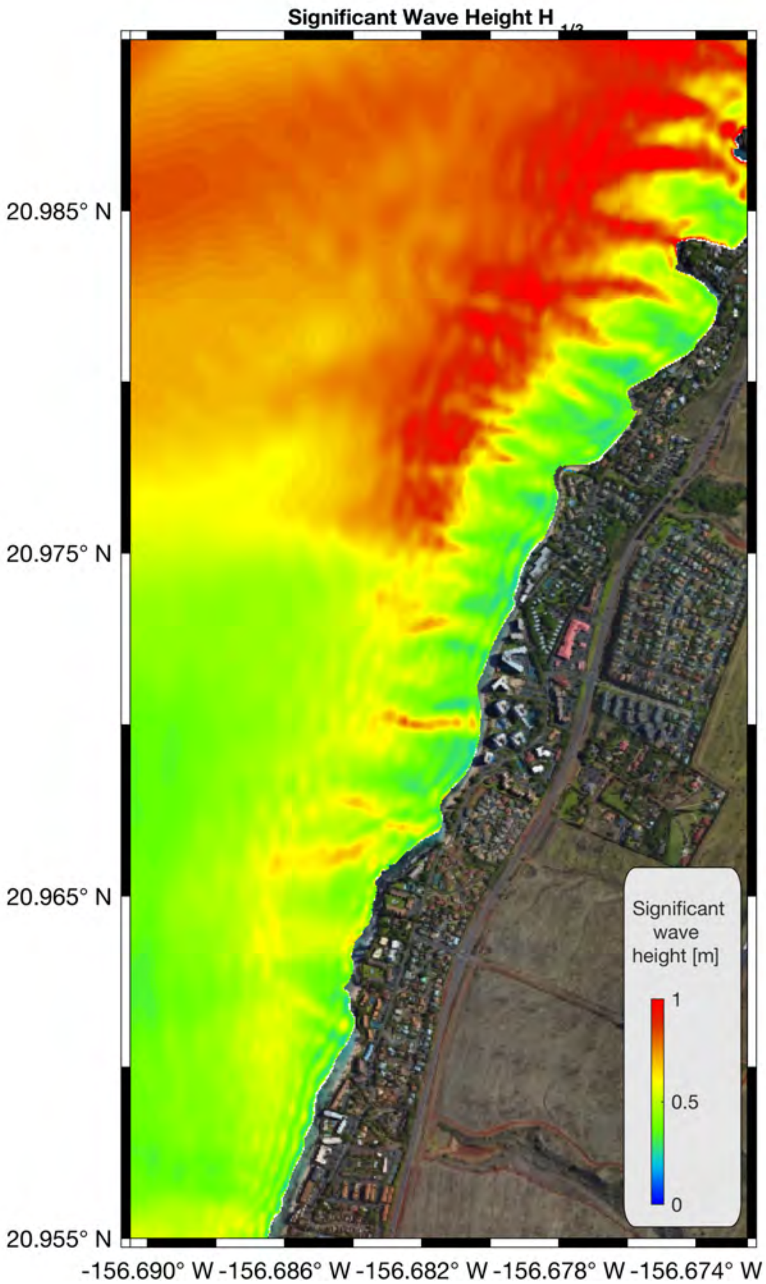

Figure 31: *BOSZ* significant wave height after 2-h computation.

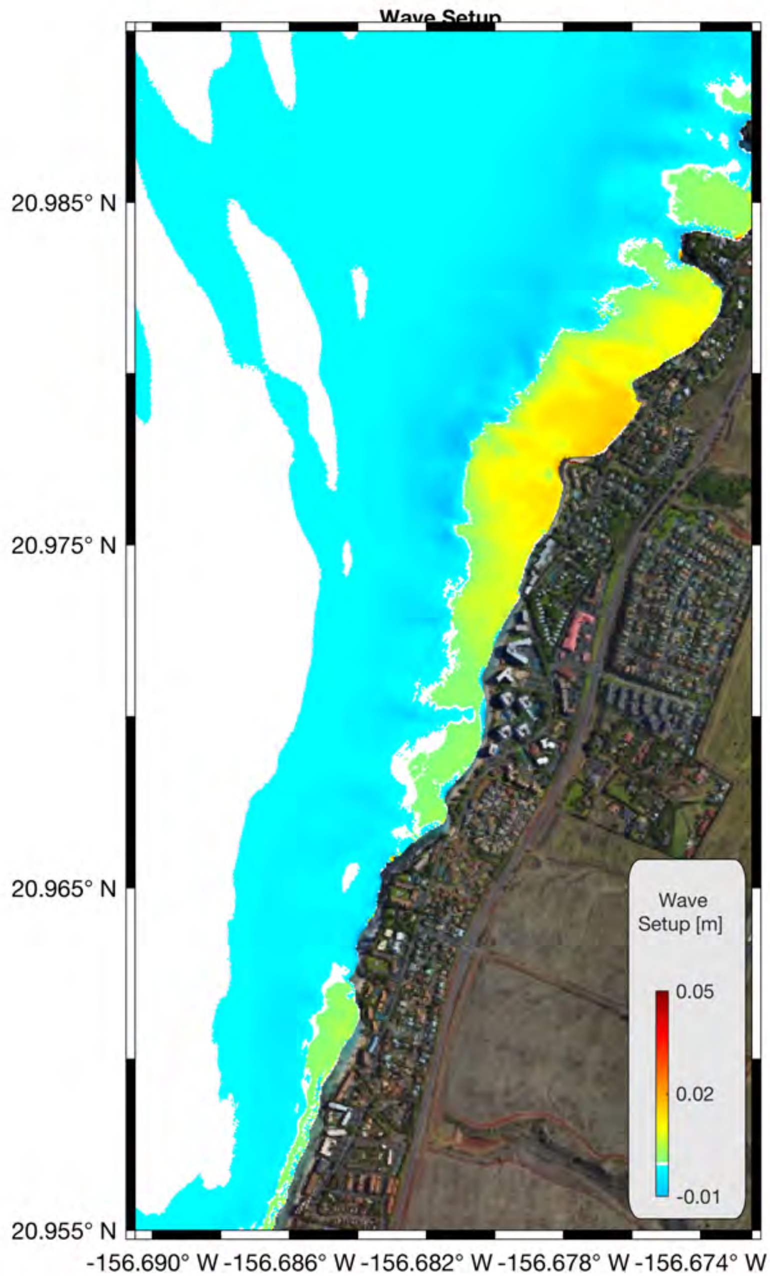

Figure 32: *BOSZ* wave setup after 2-h computation (above MLLW+0.94 m).

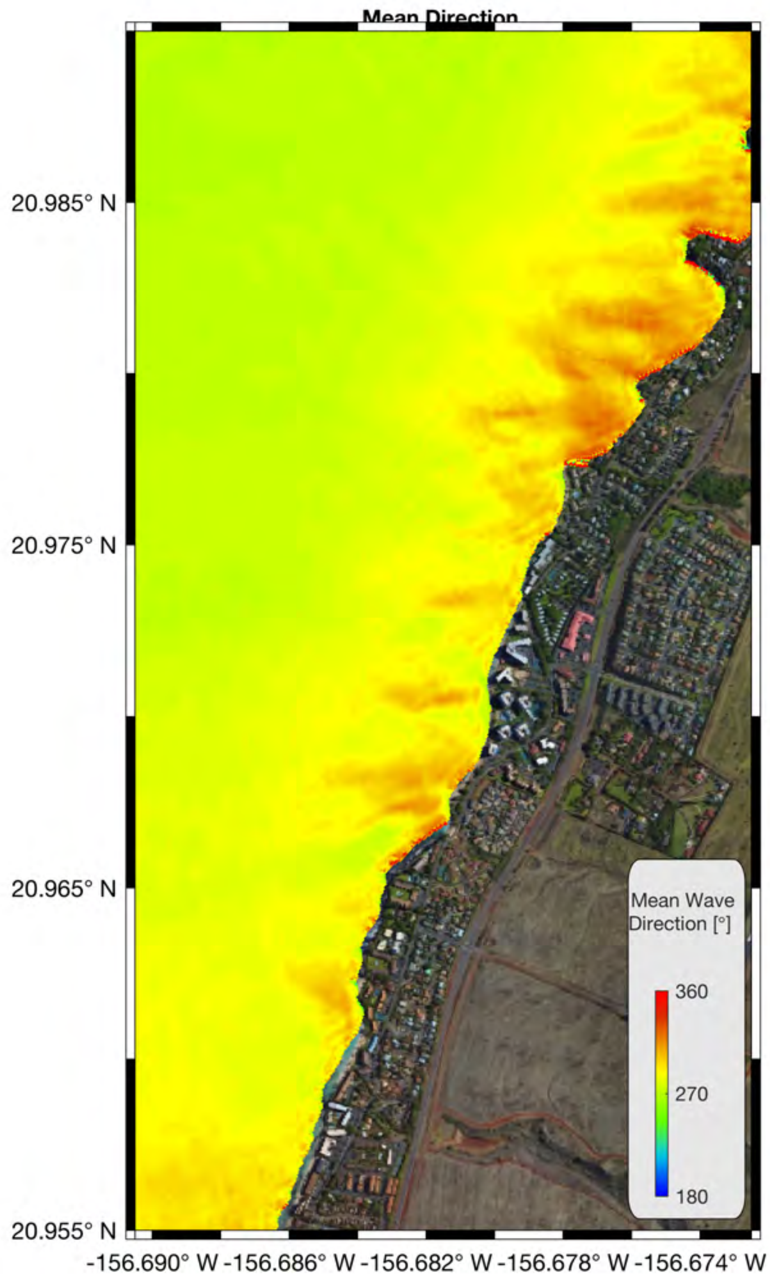

Figure 33: *BOSZ* mean wave direction over 2-h computation.

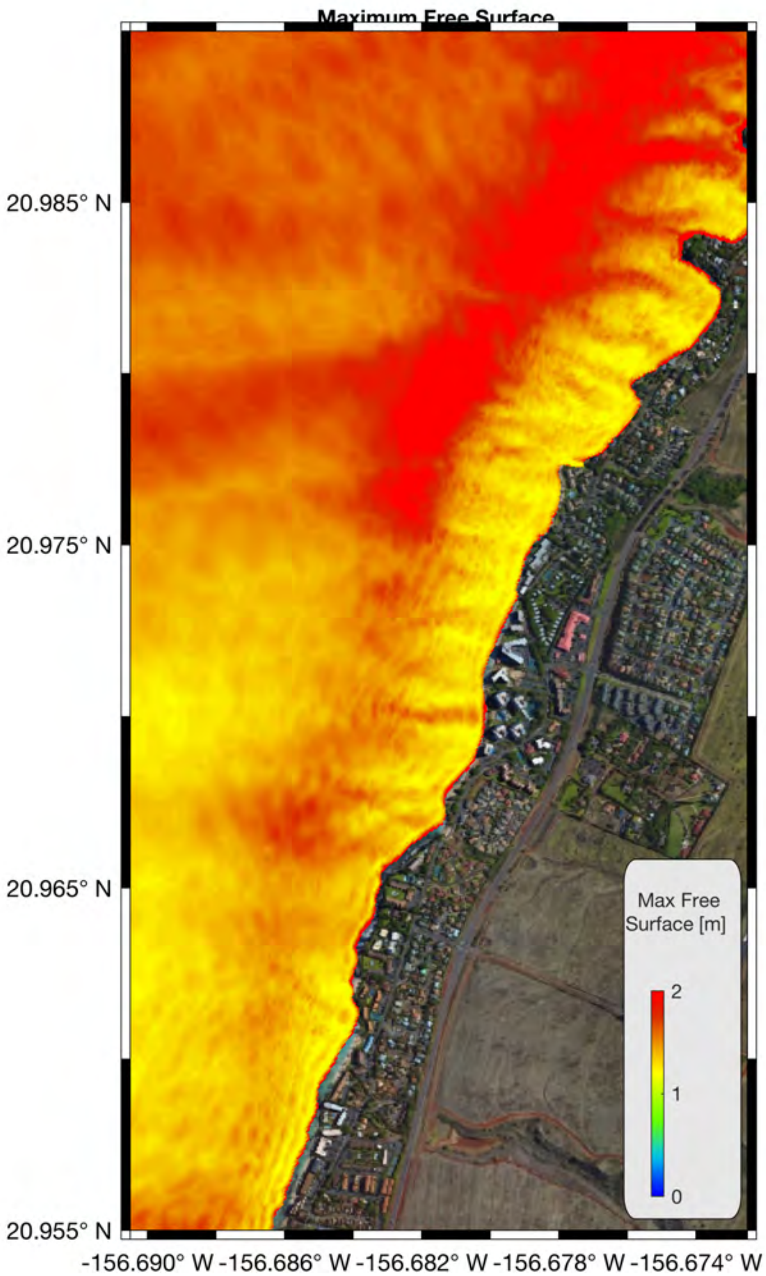

Figure 34: *BOSZ* maximum free surface elevation (wave crest) over 2-h computation.

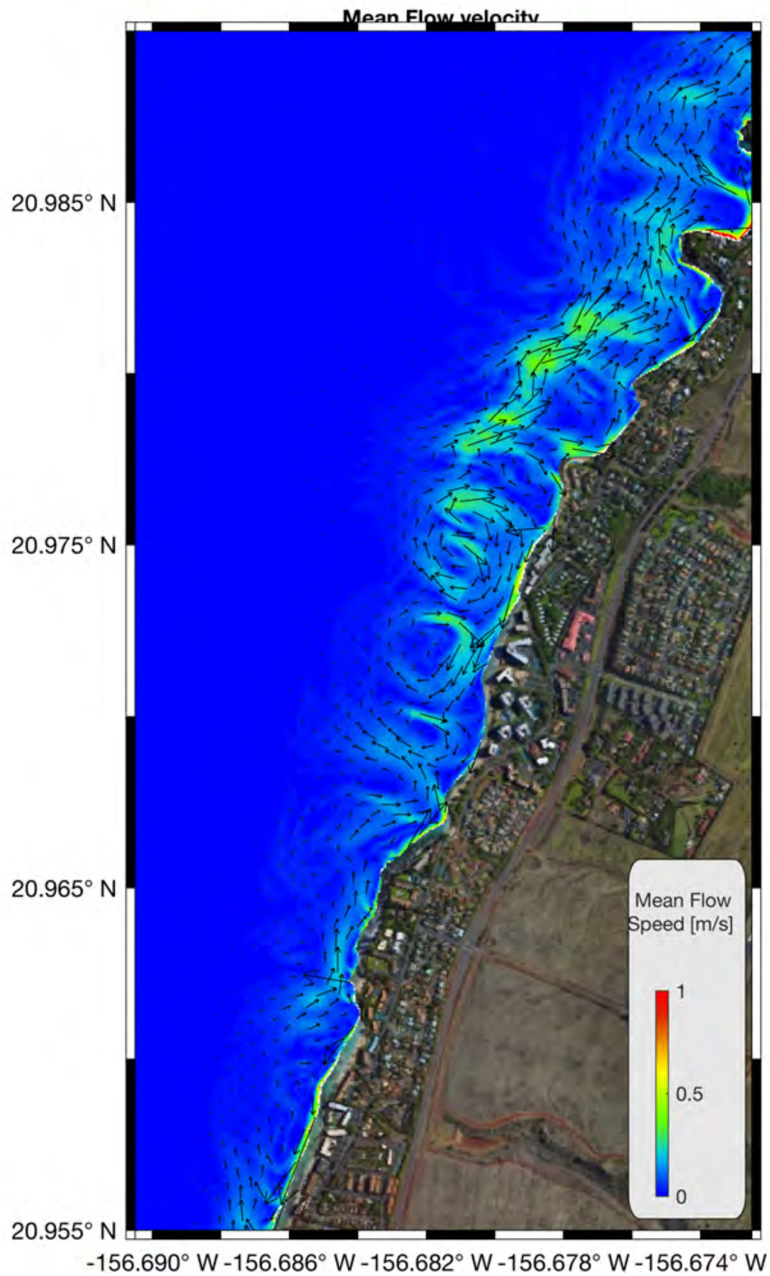

Figure 35: *BOSZ* mean flow velocity over 2-h computation.

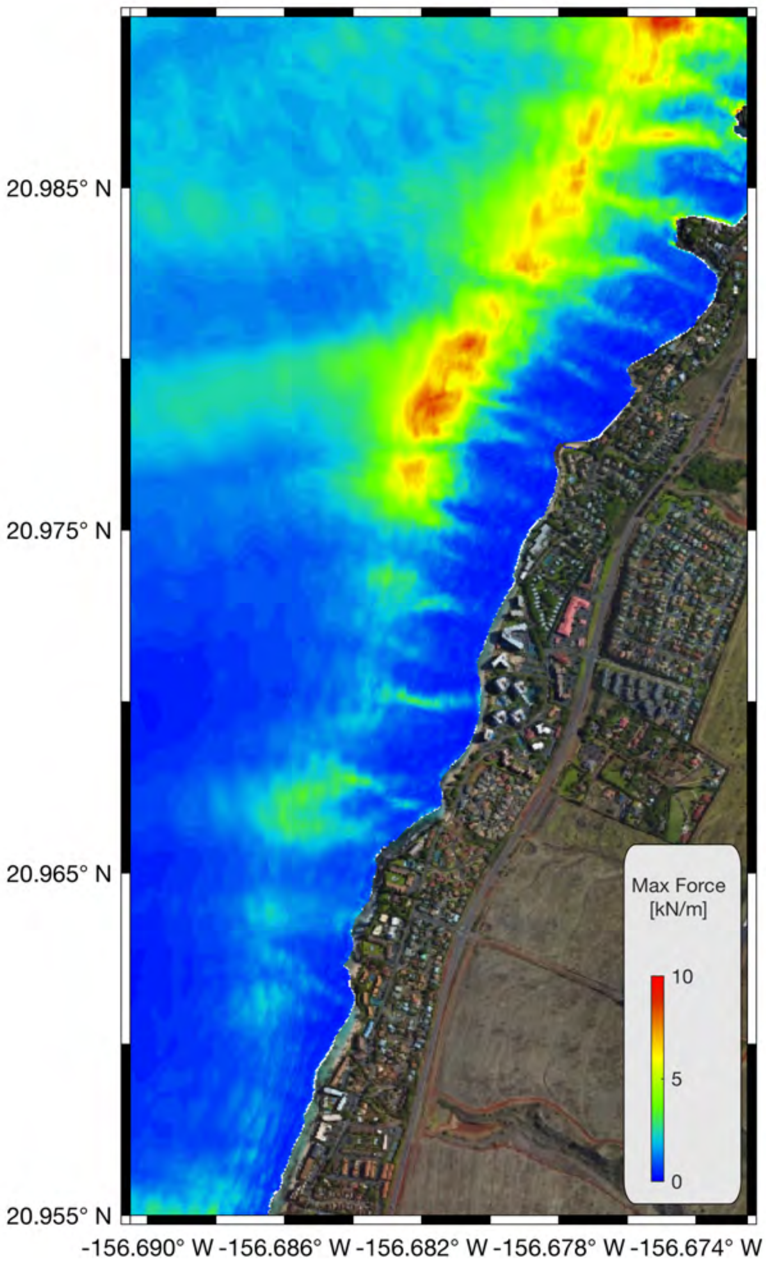

Figure 36: *BOSZ* maximum hydrodynamic force per meter width over 2-h computation.

5.5 Results from 50-year Northwest swell

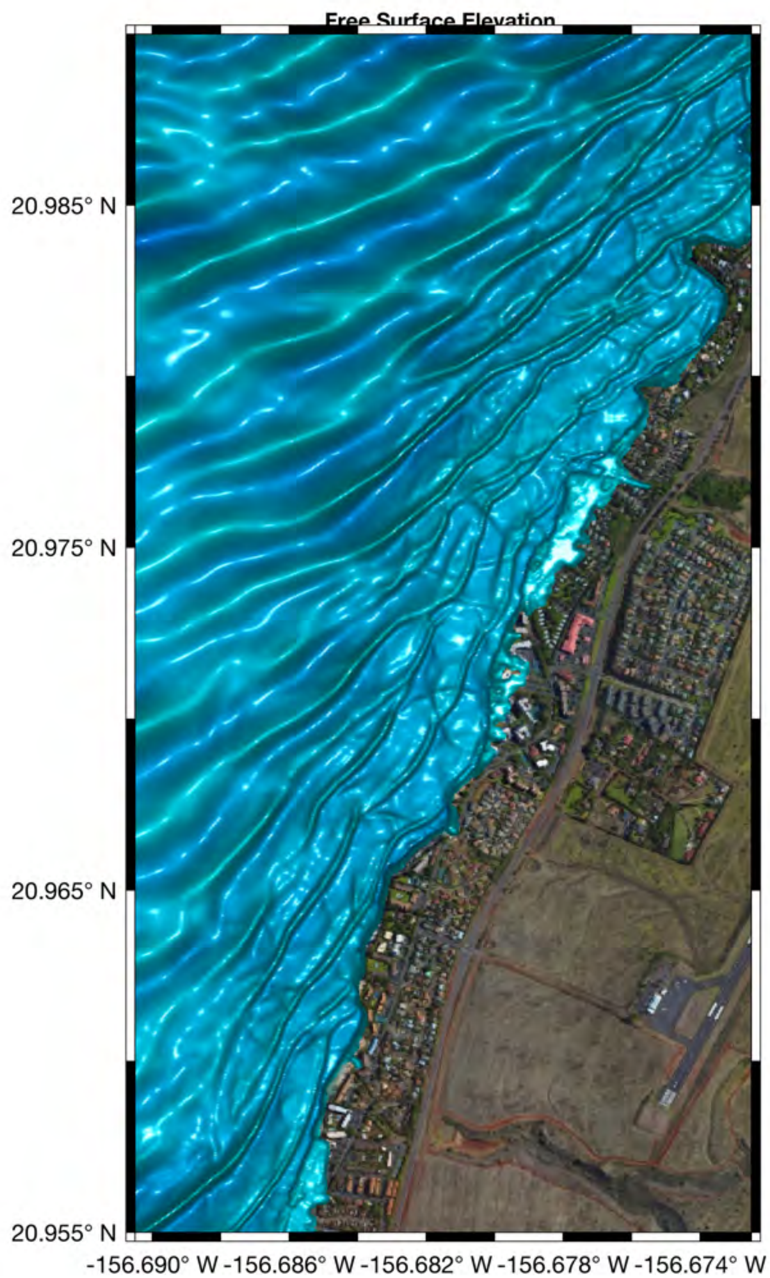

Figure 37: *BOSZ* free surface elevation after 2-h computation.

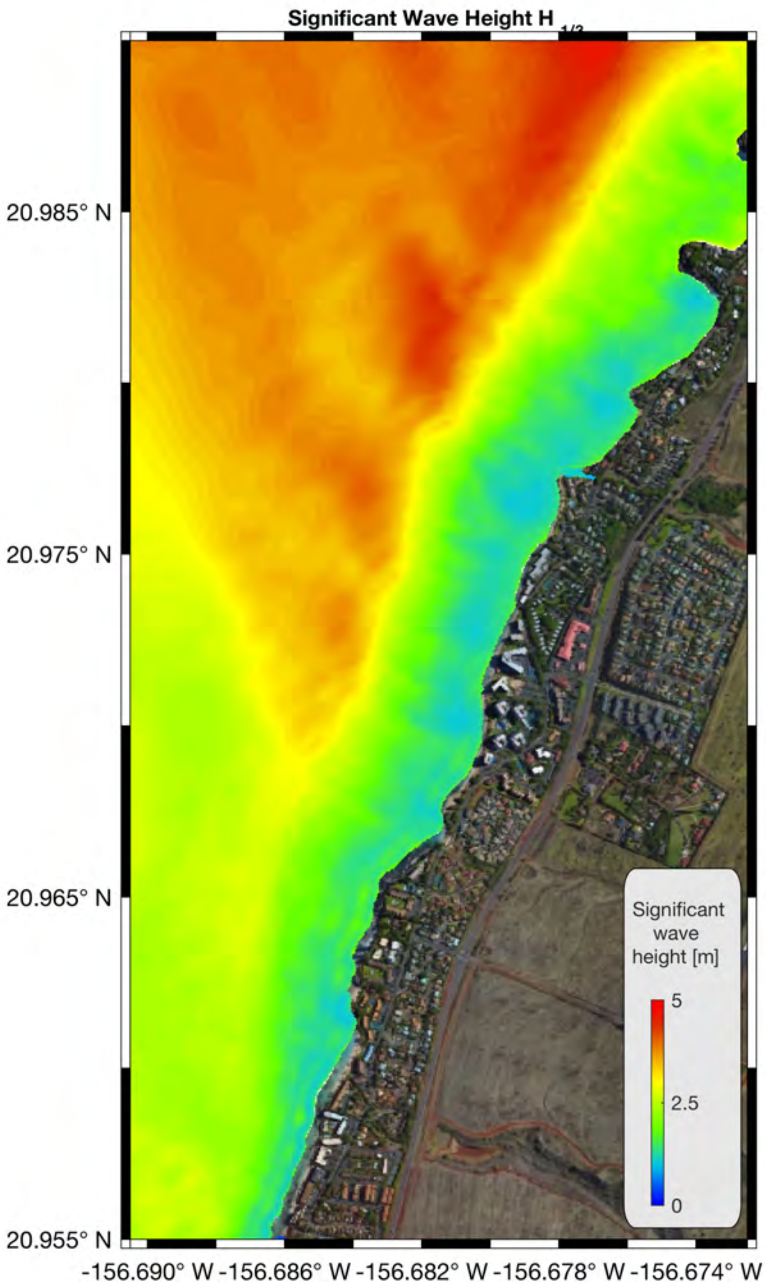

Figure 38: *BOSZ* significant wave height after 2-h computation.

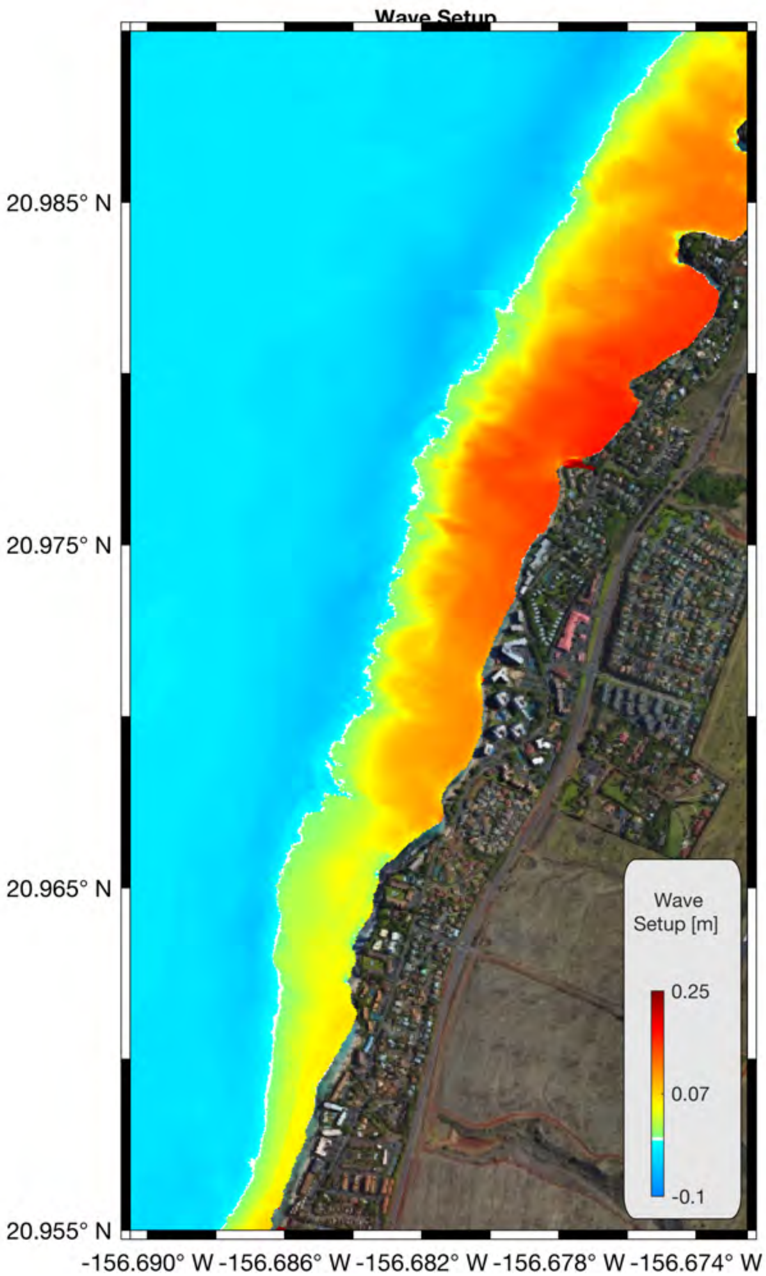

Figure 39: *BOSZ* wave setup after 2-h computation (above MLLW+1.94 m).

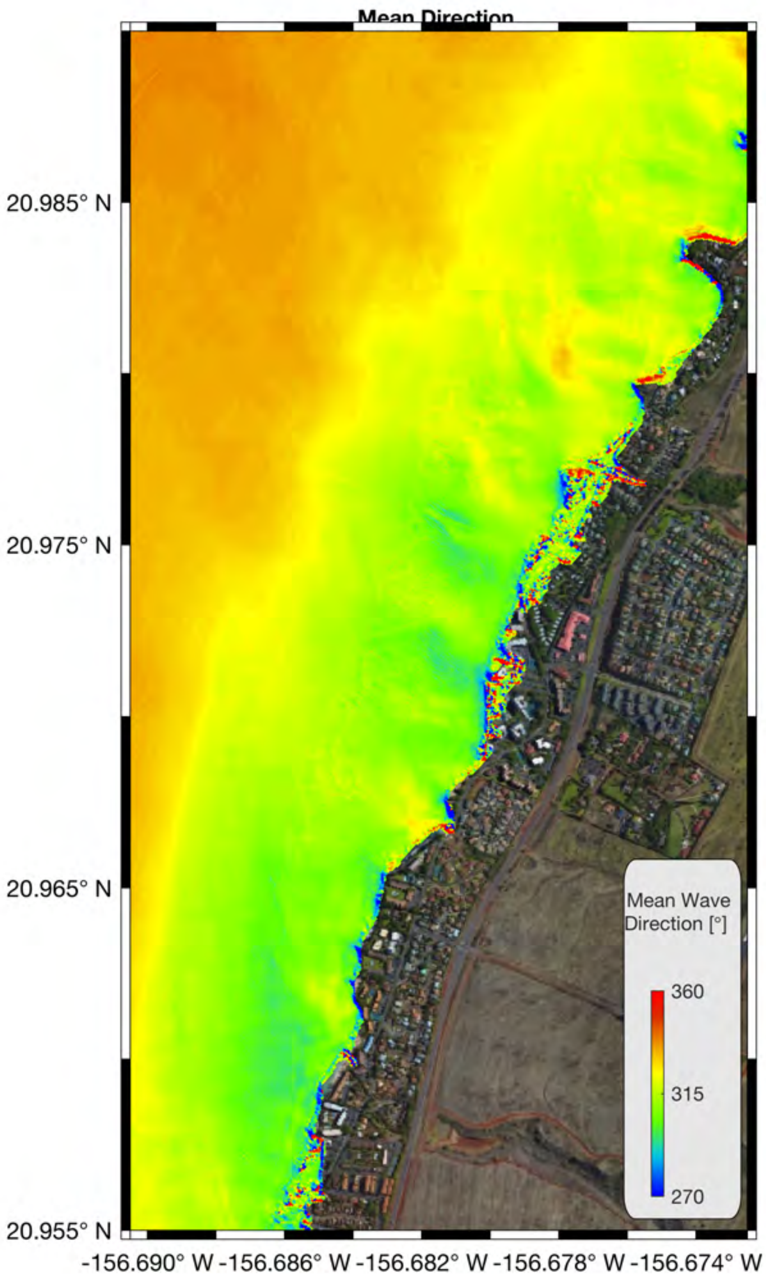

Figure 40: *BOSZ* mean wave direction over 2-h computation.

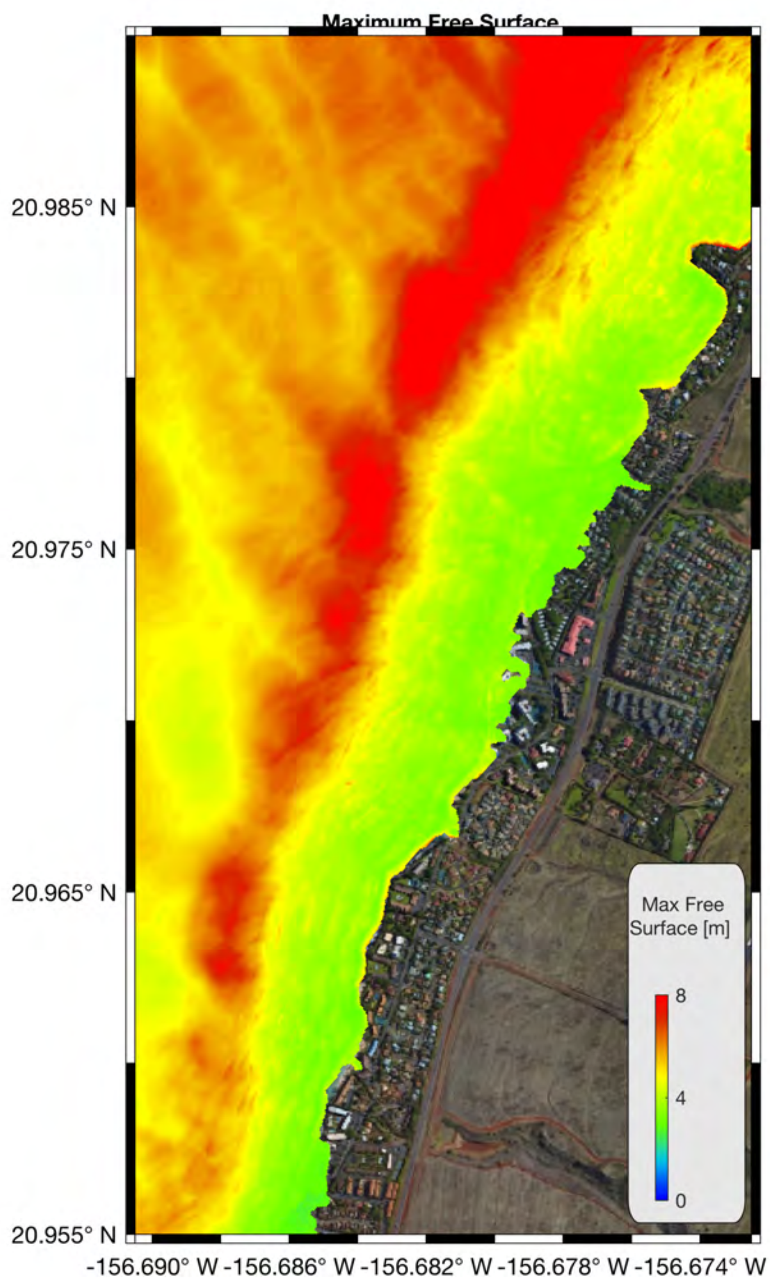

Figure 41: *BOSZ* maximum free surface elevation (wave crest) over 2-h computation.

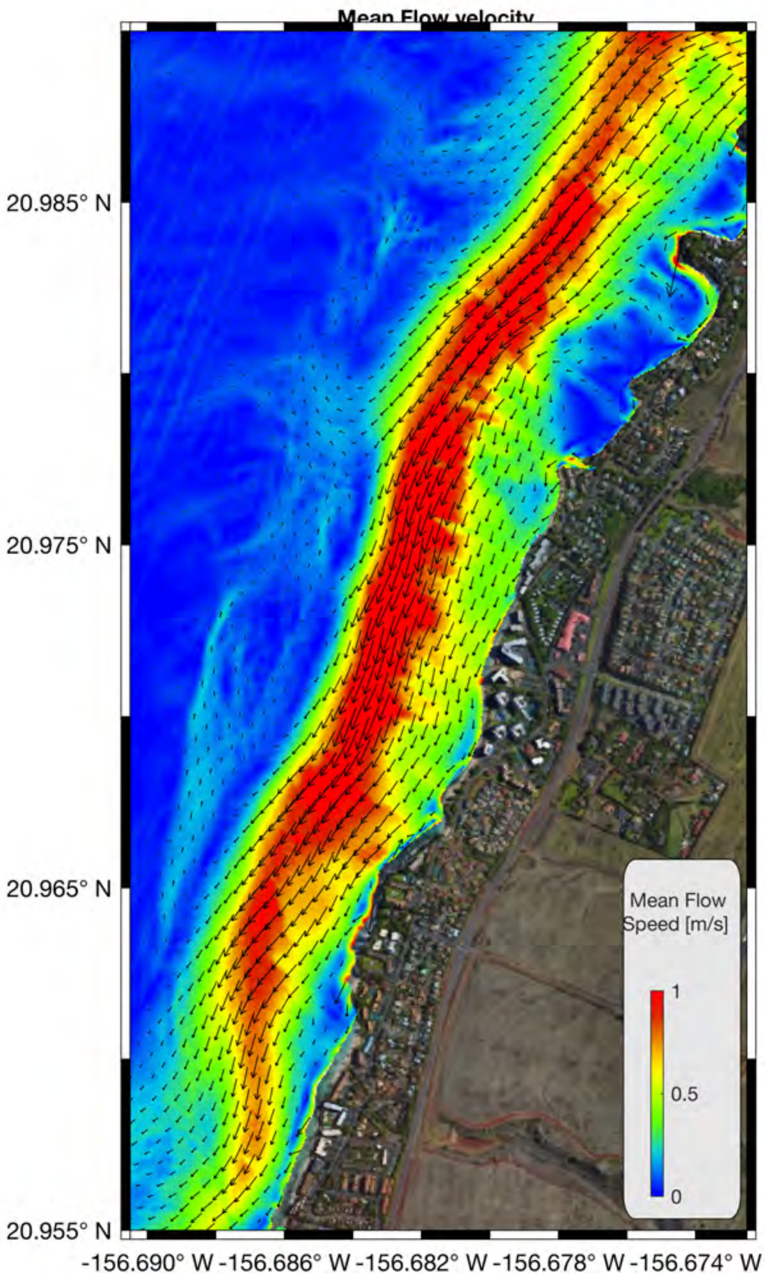

Figure 42: *BOSZ* mean flow velocity over 2-h computation.

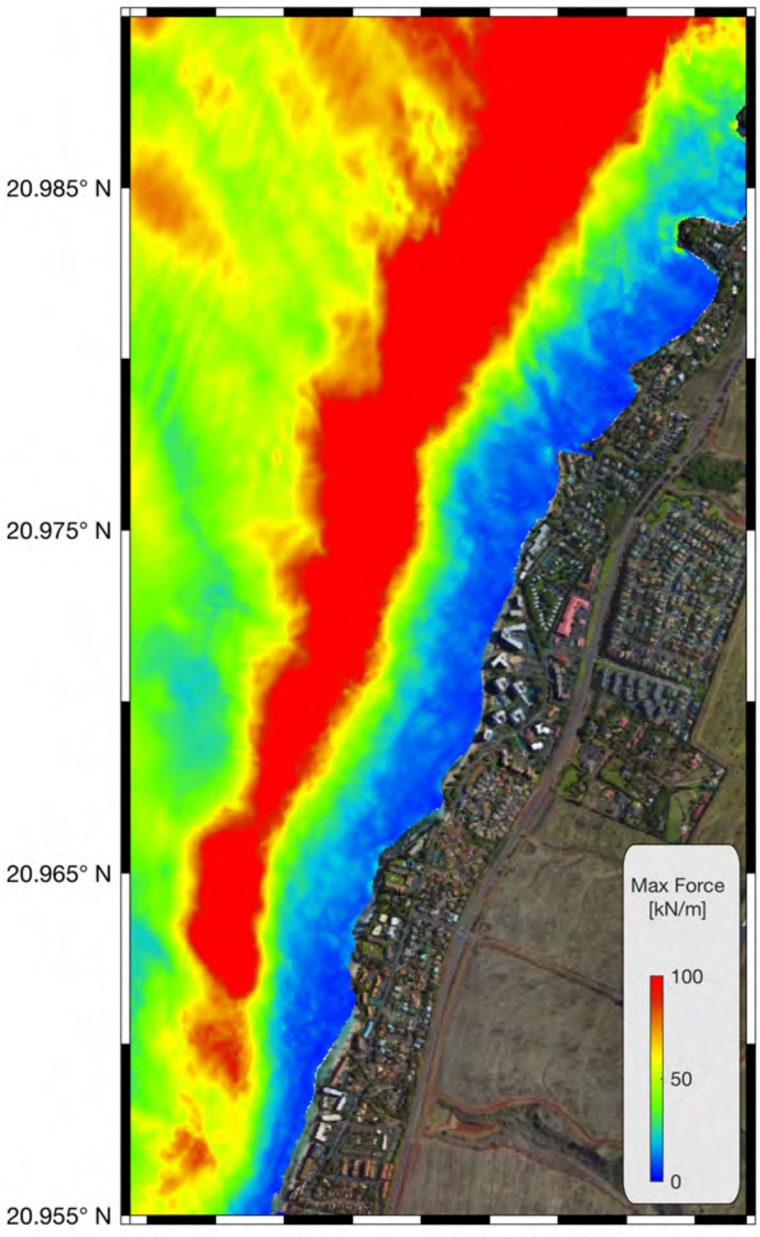

Figure 43: *BOSZ* maximum hydrodynamic force per meter width over 2-h computation.

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Kahana Bay nearshore wave assessment study with the Boussinesq Ocean & Surf Zone model *BOSZ*

(Part II - Results for existing conditions and conceptual groins/nourishment layout)
prepared for Oceanit Inc., Honolulu, Hawaii

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Contents

1 Introduction

This report is the second part of the Kahana Bay nearshore wave assessment study. The first part described the bathymetry preparation, the selection and input of wave conditions for the computations with the phase-resolving Boussinesq-type model *BOSZ* , as well as the computed results for the existing terrain conditions. The bathymetry and topography along the shoreline at the Kahana was derived from data provided by NOAA's Data Access Viewer as described in the previous report.

2 Modification of Bathymetry and Topography data

The conceptual design for the Kahana Beach restoration includes a series of seven Y-groins along the beach front, a reinforced headland at the northern end of the site, as well as substantial beach nourishments.

The sand for the nourishements is extracted from three sand deposits to the SW of Kahana. Figure 1 shows the location of the sand deposits.

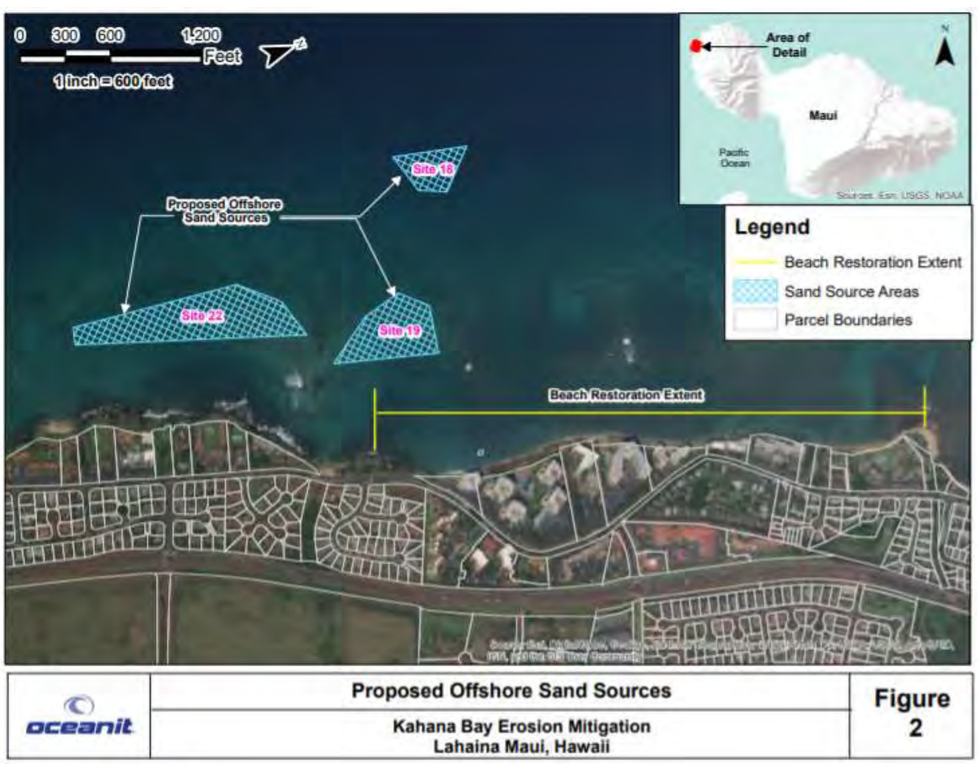


Figure 1: Map of the Kahana site with the three proposed sand sources.

The dredging depths were set to:
Site 18: 2.46 ft
Site 19: 3.44 ft
Site 22: 7.25 ft

The width of the groins is 30 ft at MLLW level and 9ft at the crest. The crest elevation is 6ft above MLLW. Two sets of polygons were provided by Oceanit as shown in Figure 2: polygons delineating the footprint of the toe of the groins as well as polygons, which define the crest.

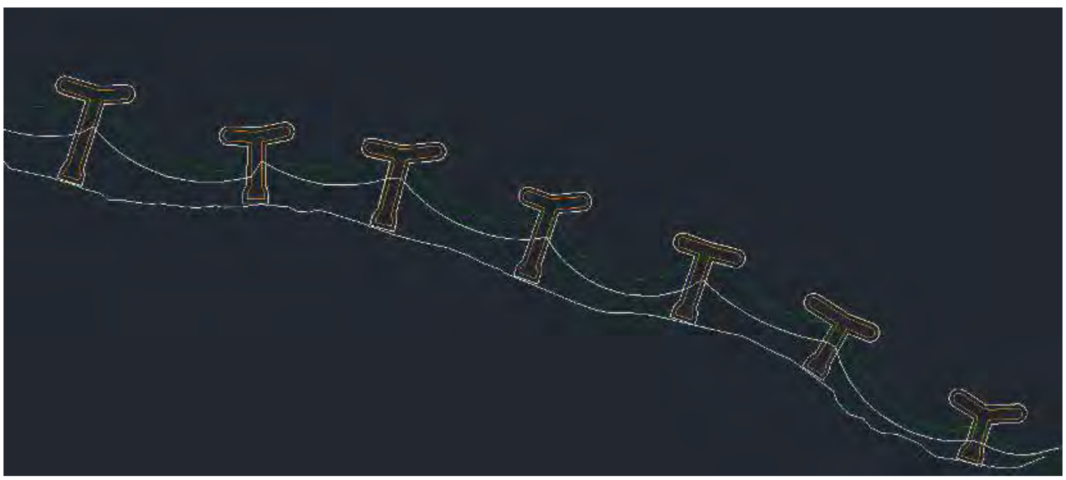


Figure 2: Outlines of the toe and crest perimeters of the seven conceptual groins.

The XY files are given as (T1 to T7 represent the groins from South to North):
T1_toe_wgs84.txt
T2_toe_wgs84.txt
T3_toe_wgs84.txt
T4_toe_wgs84.txt
T5_toe_wgs84.txt
T6_toe_wgs84.txt
T7_toe_wgs84.txt

The crest elevations of the groins are defined by the polygons (again, 1 to 7 indicate the groins from South to North):
Groin1.txt
Groin2.txt
Groin3.txt
Groin4.txt
Groin5.txt
Groin6.txt
Groin7.txt
structure8.txt

Finally, the beach nourishment is accounted for through an additional set of polygons. These polygons were generated by Oceanit from tracing the bathy/topo contour lines of the proposed nourished beach. The assigned elevation values inside the polygons were defined as below:
In the range of contours [-8ft to -5ft], elevation of -6.5ft
In the range of contours [-5ft to -2ft], elevation of -3.5ft
In the range of contours [-2ft to 2ft], elevation of 0ft
In the range of contours [2ft to 5ft], elevation of 3.5ft
In the range of contours [5ft to 9ft or the base of berm], elevation of 7ft

Due to some discontinutities along the shore, there are two separate polygons for the -3.5ft and the 0ft contours (a and b). The polygon files are (the assigned elevation value is indicated in the file name itself):
Poly_-6.5ft_wgs84.txt
Poly_-3.5ft_a_wgs84.txt
Poly_-3.5ft_b_wgs84.txt
Poly_0ft_a_wgs84.txt
Poly_0ft_b_wgs84.txt
Poly_3.5ft_wgs84.txt
Poly_7ft_wgs84.txt

The uppermost polygon is tied to the ocean side of the base of berm. The berm itself is excluded.

2.1 Alteration of bathymetry/topography grid

The objective of this modeling study is to show the wavefield for the future site, i.e. in presence of the seven groins, the reinforced headland, and the excavated sand deposits, for exactly the same wave conditions, which were computed for the present terrain situation.

This requires an alteration of the existing LiDAR bathymetry/topography dataset at the respective locations outlined by the polygons.
The structures are of relatively small size compared to the initially used model input grid resolution of 5m by 5m that was interpolated from an array of scattered LiDAR points.

We therefore decided for a reduction in grid resolution to better resolve the individual groin structures and the flow features around them. The resolution was set to 3.66m by 3.66m, equivalent to 12ft by 12ft. For proper comparison of the results, all previous results from the original bathymetry/topography scenarios were repeatedly computed with 3.66m resolution. The input wave conditions were not altered. The wavegeneration described in the previous report applies to all present and past computations.

The full model input grid of the original bathymetry/topography in 12ft by 12ft resolution is shown in Figure 3. The geographic extent and orientation as well as the maximum offshore water depth of -40m are identical to the previous study where the 5m by 5m grid was used. The only difference between the two model input grids is the resolution.

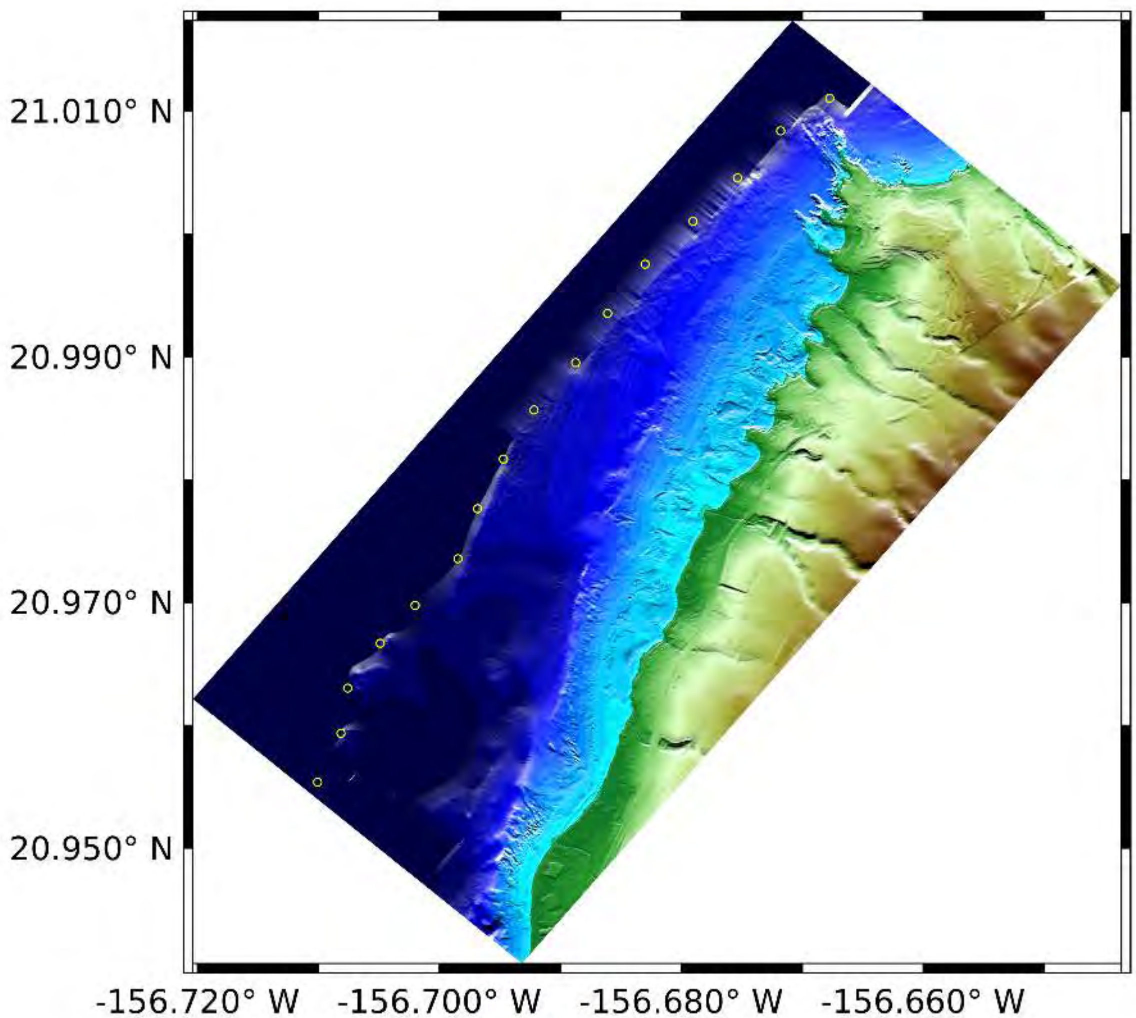
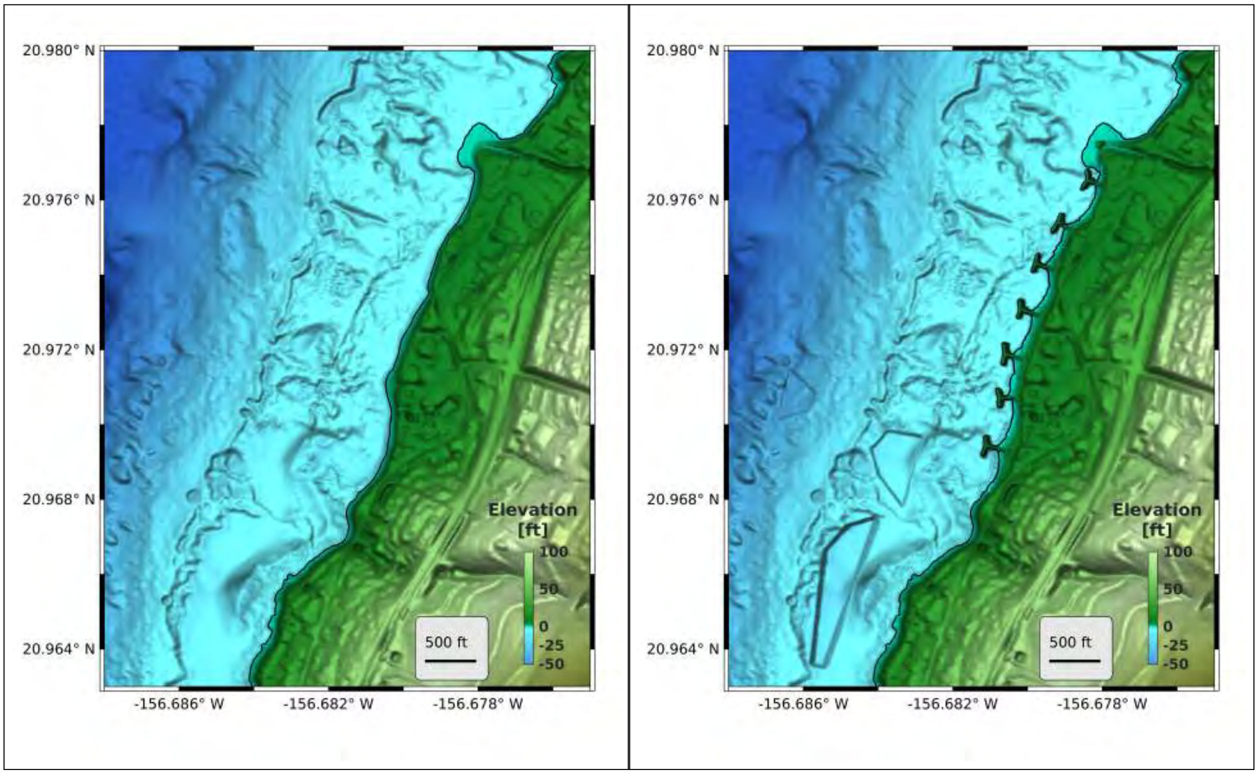


Figure 3: *BOSZ* input grid in 12ft by 12ft resolution (same extend and orientation as 5m by 5m input grid from previous study).

It is only possible to compare the wave processes at the Kahana site between the original and modified bathymetry, if all bathymetric features remain unchanged except for the elevation values around the sand deposits, groins, and nourishment sites. That is why the features were included in a copy of the input grid from Figure 3 instead of into the database, from which the *BOSZ* model grid is interpolated. Figure 4 shows the site around Kahana from both the original and modified input grids.



Original input grid in 12ft by 12ft. (based on idential raw data from previous study)

Modified input grid in 12ft by 12ft incl. groins, dredged sand desposits, and nourished beach.

Figure 4: *BOSZ* input grids for existing and conceptual future bathy/topo at 12ft by 12ft resolution.

The three dredging deposits can be seen in the lower left corner of Figure 4. The original bathymetry depth was reduced by the respective values of ecavation depth. The transition between the excavated areas and the surrounding bathymetry was smoothed to avoid abrupt steps, which would not be realitic.

The elevation of the crests of the groins was set to 6ft above MLLW and a slope of aproximately 2H:1V was approached through interpolation between the crest and toe elevation.

The polygons of the future nourished beach were used to alter the terrain along the still water line of the site. Moderate smoothing between the contours ensured a gradual transition of the elevation values across the area of nourishments.

2.2 Drifter/Tracer module

The latest version of *BOSZ* can compute the Lagrangian motion of individual particles often referred to as drifters, tracers, floats, or drogues. This option is particularly useful for studying currents and for gaining a better understanding of pathlines, i.e. the trajectory of a fluid element in the flow. It is often helpful to be able to trace the path of one or multiple particles.

The Drifter module assumes a massless particles, i.e. no inertial forces. The calculation is straight-forward and solely based on the horizontal velocity components. We use the ordinary differential equation

$$\begin{aligned} \frac{d\mathbf{x}}{dt} &= u(\mathbf{x}, \mathbf{y}, t) \\ \frac{d\mathbf{y}}{dt} &= v(\mathbf{x}, \mathbf{y}, t) \end{aligned} \tag{1}$$

where $\mathbf{x}$ and $\mathbf{y}$ are the particle positions at time t, $\frac{d\mathbf{x}}{dt}$ and $\frac{d\mathbf{y}}{dt}$ are the rates of change in time of the particle positions and *(u,v)* are the flow velocities in the 2D horizontal plane as solved for by the mometum equations. Remember: the flow velocities are NOT depth averaged velocities but instead evaluated around mid depth (z_α-level). Of course, mid-depth depends on the local grid value of the input bathymetry.

Equation 1 is solved using the explicit first-order Euler method at the ebd of each time step as:

$$\begin{aligned} \mathbf{x}_i^{n+1} &= \mathbf{x}_i^n + \Delta t \cdot u(\mathbf{x}_i^n, \mathbf{y}_i^n)^n \\ \mathbf{y}_i^{n+1} &= \mathbf{y}_i^n + \Delta t \cdot v(\mathbf{x}_i^n, \mathbf{y}_i^n)^n \end{aligned} \tag{2}$$

where $\mathbf{x}_i$ and $\mathbf{y}_i$ are the (x,y)-positions of the individual drifters, i.

Since the drifters are moving on meshfree paths, it is necessary to identify their exact positions in each time step in dependency of the discrete and stationary mesh. The changes in the drifter positions happen at very small rates in time , Δt. The drifters are moving along paths, which are different from the centroid locations of the mesh, at which the grid coordinates are known and at which the governing equations are computed.

Therefore, it is necessary to interpolate the velocity components $u(\mathbf{x}_i^n, \mathbf{y}_i^n)$ and $v(\mathbf{x}_i^n, \mathbf{y}_i^n)$ from the known underlying mesh to the exact position of the drifters. This is done through bilinear interpolation of the u- and v-velocity components based on the centroid variables in the ultimate vicinity of the drifters' positions.

Since the drifters are calculated individually, their paths can cross and they could theoretically be located at identical positions in the mesh without causing collision or interaction.

3 Computed results from original and modified grids

In the following, we present a comparisons between the computed results from the original and the modified bathymetry. The *BOSZ* model was run for all four swell events (1-year North, 1-year Northwest, 1-year South swells, as well as 50-year Northwest swell) with both bathymetry grids. As described above, both input grids (see Figure 4) are identical to each other except for the elevation values at the described locations (sand deposits, groins, nourishment). Also, the wave input conditions and the resulting wavemaker source functions for the four swell scenarios are used in the same way for the present and future bathymetry. This ensures that the differences in wave processes along the Kahana site are solely due to the changes in the bathymetry/topography.

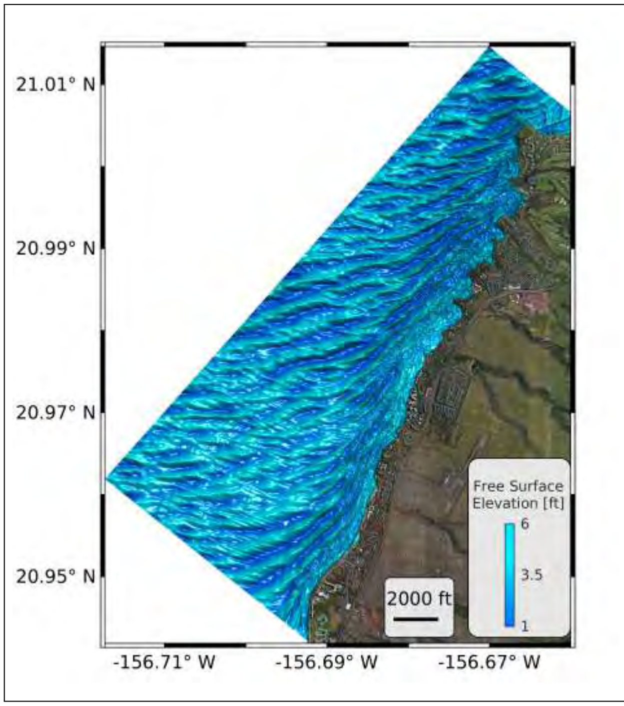
The following sections show the computed results from the four wave scenarios. In detail, a snapshot of the free surface elevation, the significant wave height, the free surface setup due to wave breaking (wave setup due to radiation stress), the mean flow speed with directions, and the mean wave direction for each swell.

The panel on the left side corresponds to the computed results with the original bathymetry in 12ft by 12ft resolution. The right panel shows the same computed quantities but with the modified input grid (also at 12ft by 12ft resolution).

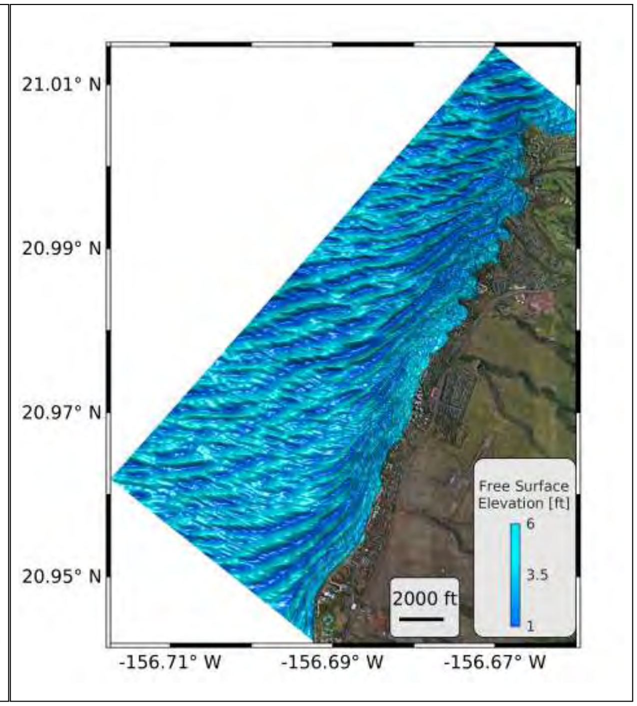
For all quantities, two sets of plots are shown: a general overview of the entire computed domain and a close-up view of the Kahana site. For the close-up view an additional figure is added that shows the pathline of several water particles such as it would be the case for a drifter or drogue without mass. This Lagrangian perspective allows to better assess the efficiency of the groin structures in reducing the local nearshore flow velocity and the wave-driven current patterns. For this study, a tracer was placed in approximately 1ft water depth in the center between two adjacent groins. In total, seven drifters were computed as indicated by black circles in the plots. The dots of different colors represent the pathlines of the individual drifters. The locations of the drifters are shown every minute, i.e. the further the dots are apart from each other, the faster the flow speed at the particular location and in time. More information on how the drifters are computed can be found in 2.2.

Finally, a pair of absolute and relative differences in significant wave height, free surface setup, and mean velocity are shown. It should be noted that the changes look more dramatic than one would assume from a visual comparison. The groins mostly alter the local flow field; however, differences are also occuring at further distance from the site. In the far-field, the groins mostly lead to a local shift in the wave patterns. Consequently, by comparing the values in the respective grid points, the differences appear to be relatively large at a given point of interest.

3.1 Results from 1-year Northwest swell

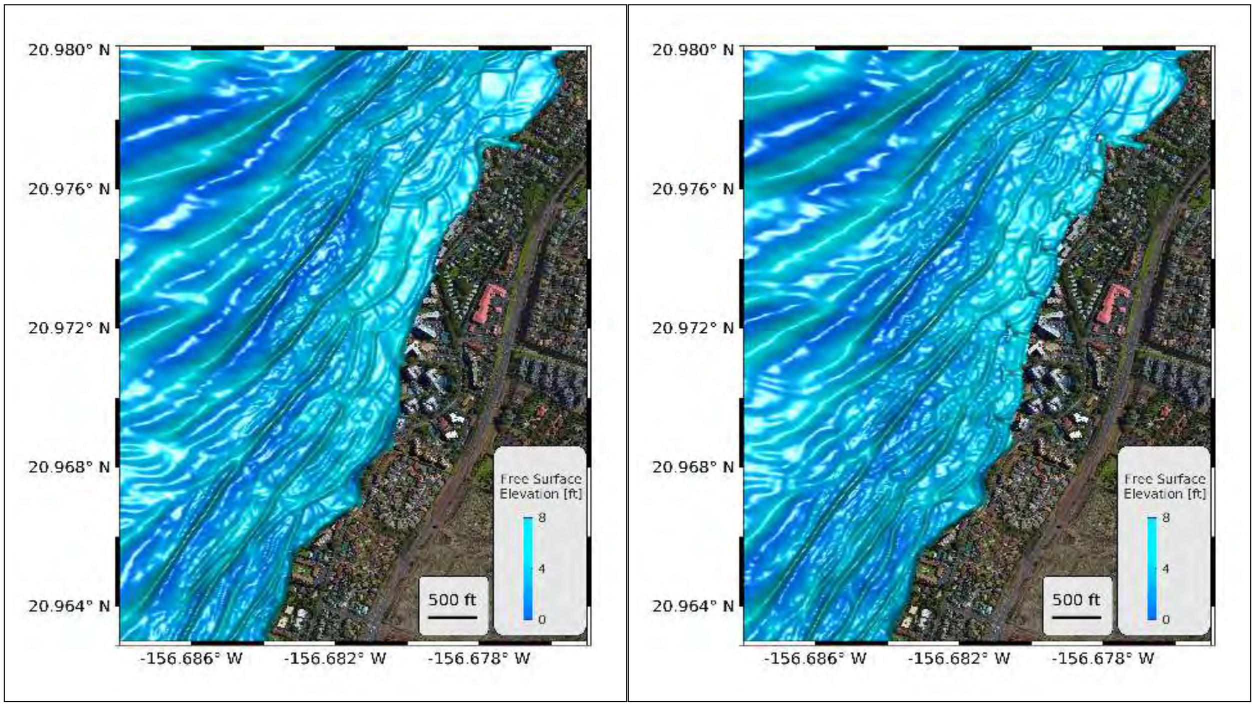


Free surface elevation (original grid)



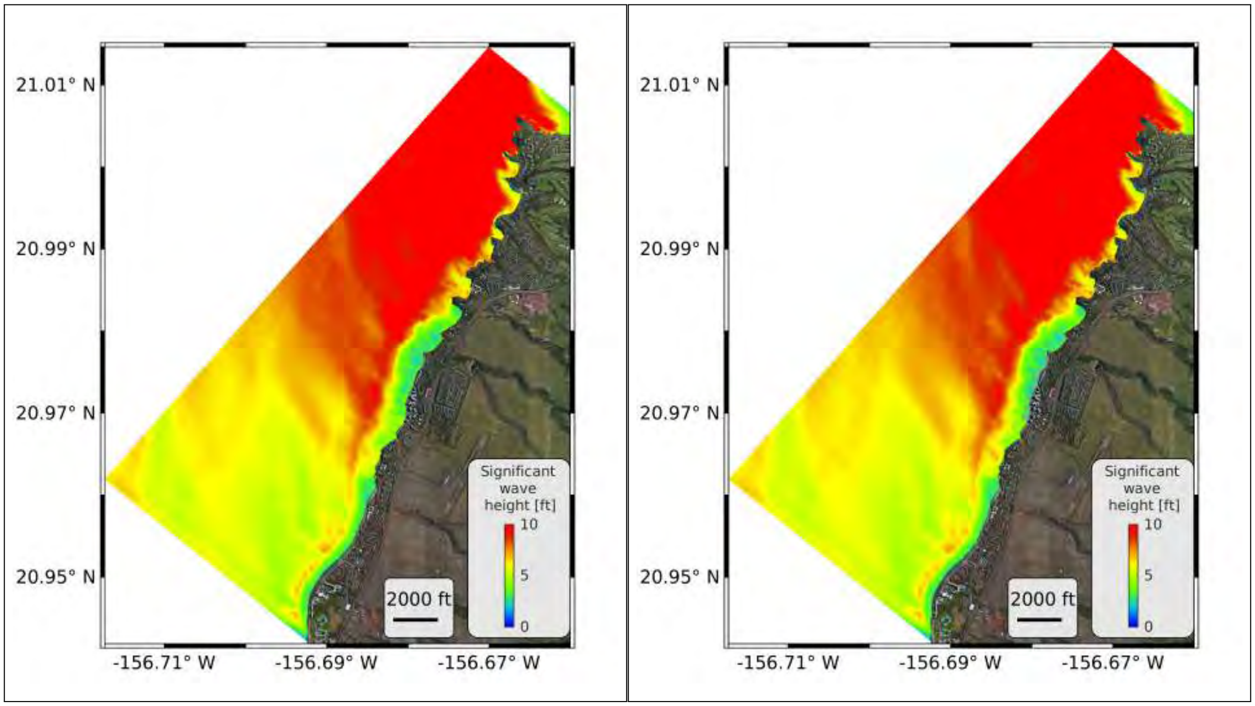
Free surface elevation (modified grid).

Figure 5: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 1-year Northwest swell.



Free surface elevation (original grid) Free surface elevation (modified grid).

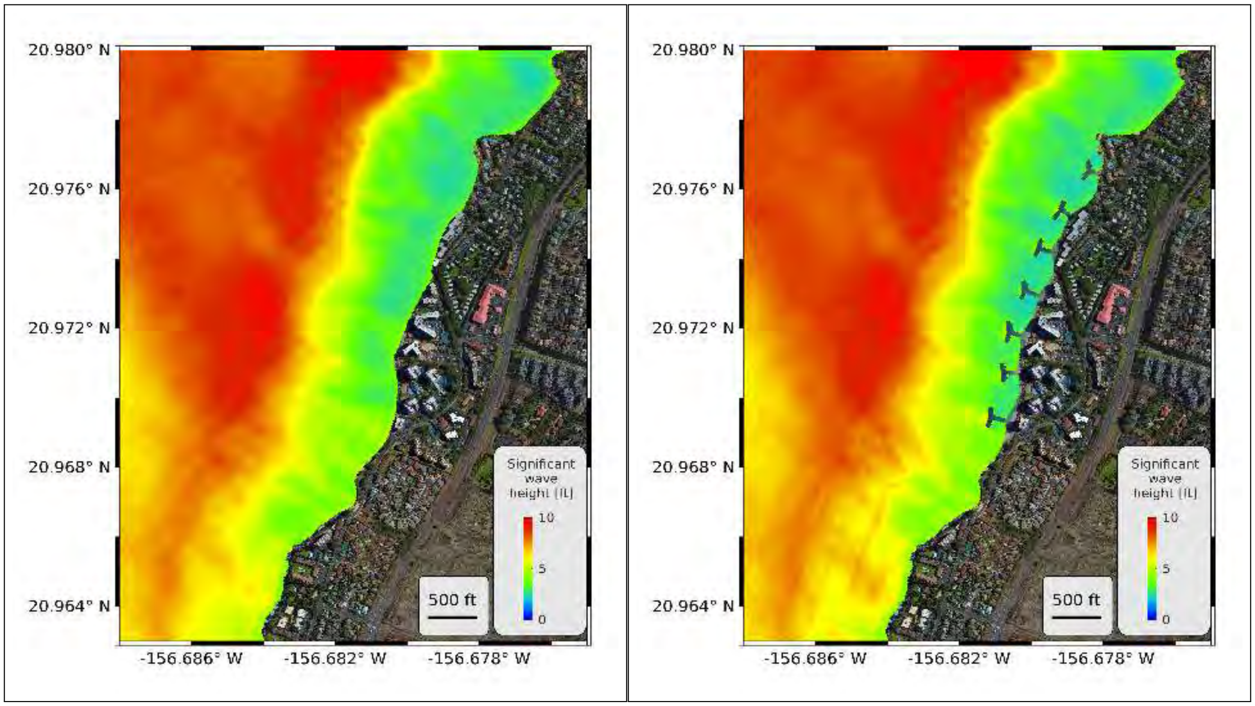
Figure 6: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 1-year Northwest swell.



Significant Wave Height (original grid)

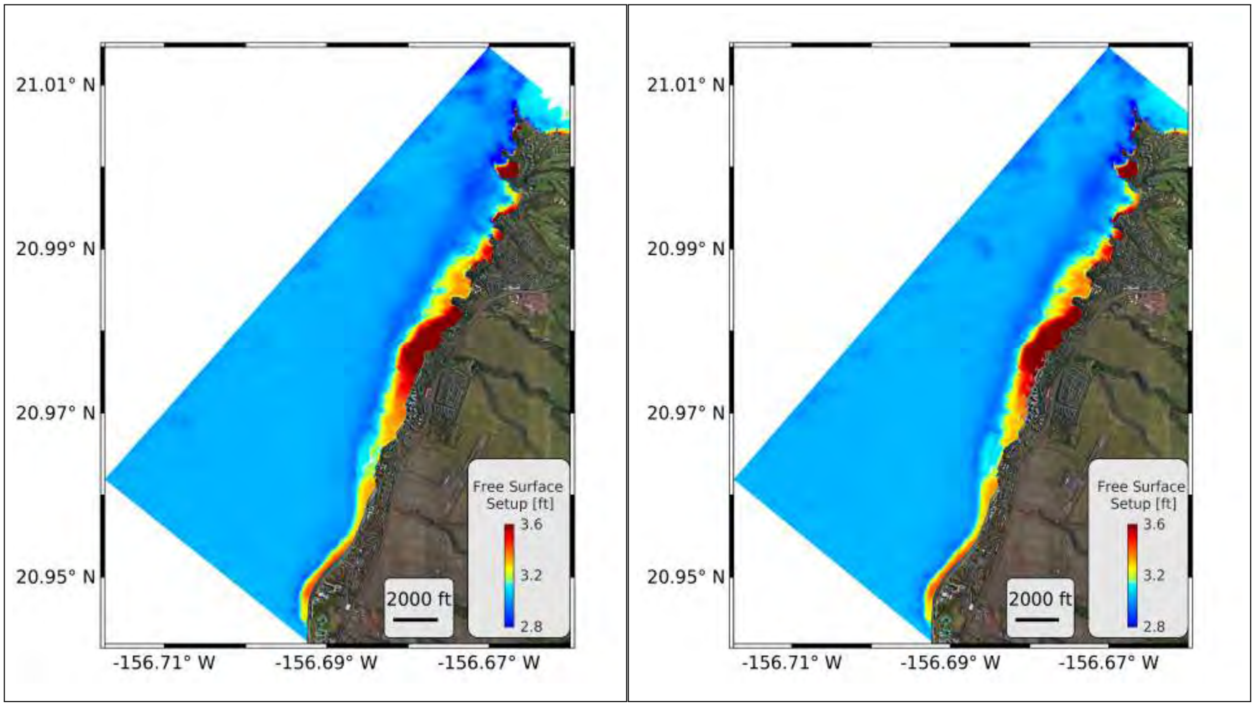
Significant Wave Height (modified grid)

Figure 7: *BOSZ* Significant Wave Height with input wave conditions of 1-year Northwest swell.



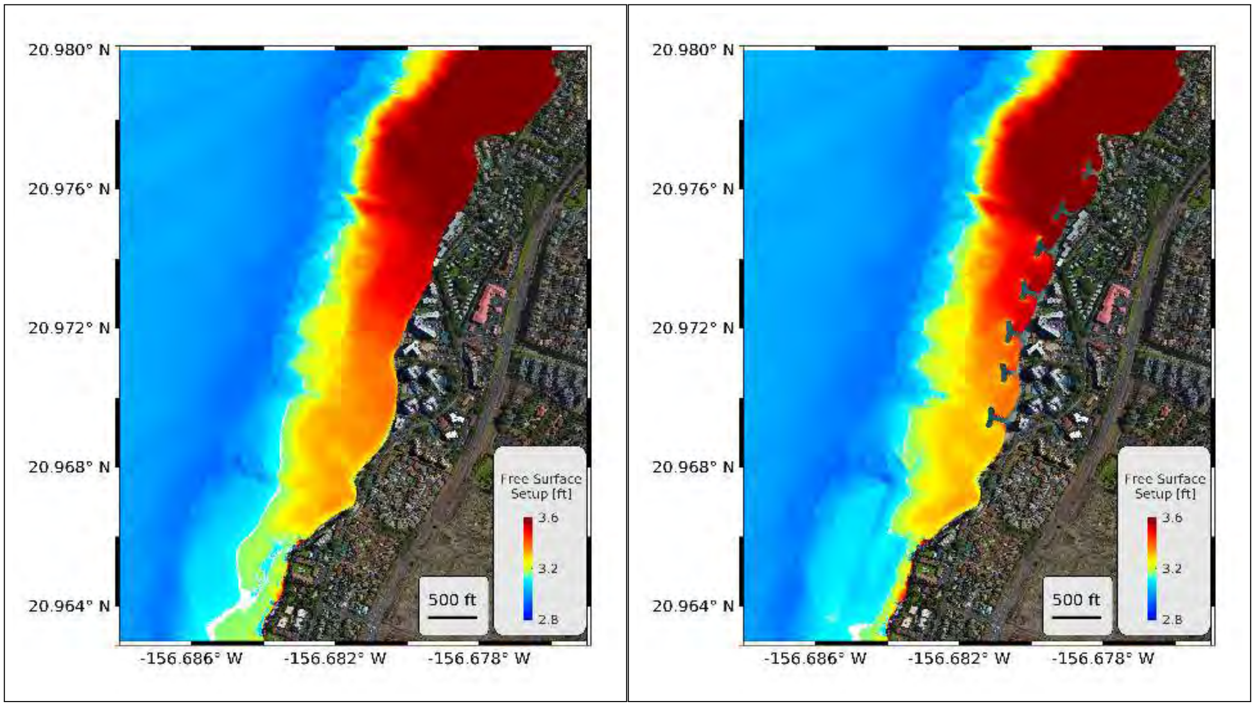
Significant Wave Height (original grid) Significant Wave Height (modified grid)

Figure 8: *BOSZ* Significant Wave Height with input wave conditions of 1-year Northwest swell.



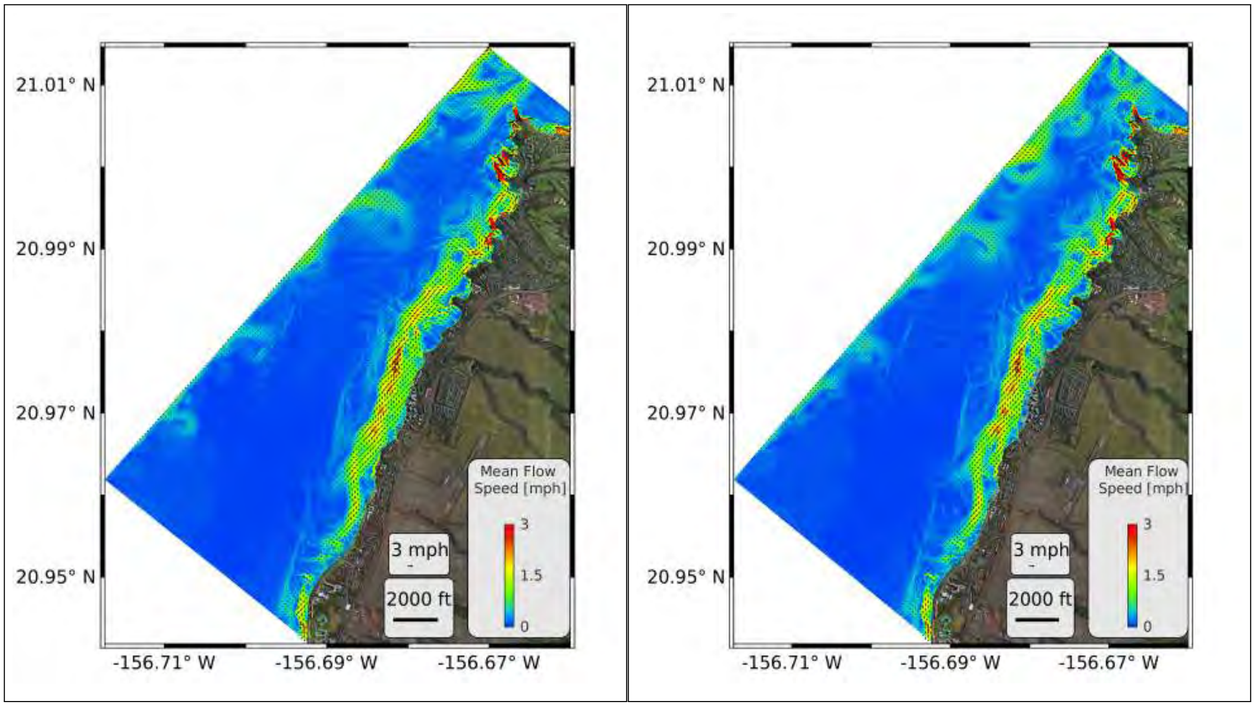
Free surface setup (original grid) Free surface setup (modified grid)

Figure 9: *BOSZ* free surface setup with input wave conditions of 1-year Northwest swell.



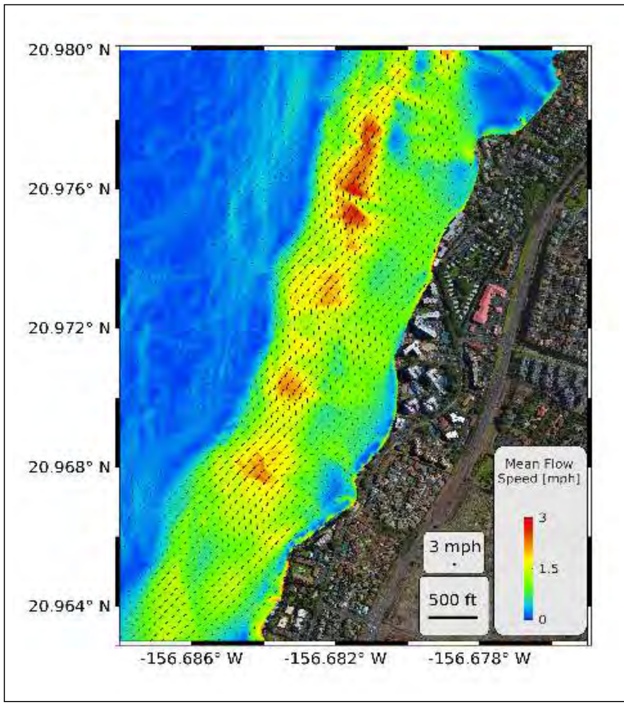
Free surface setup (original grid) Free surface setup (modified grid)

Figure 10: *BOSZ* free surface setup with input wave conditions of 1-year Northwest swell.

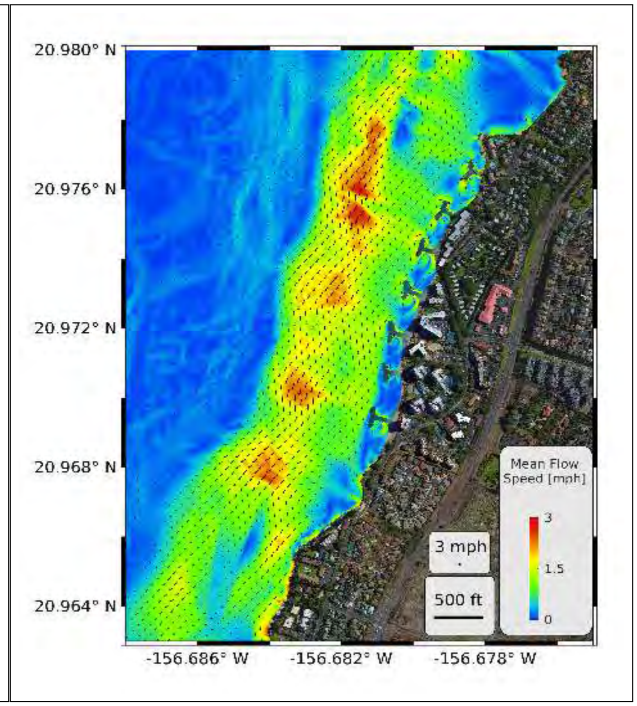


Mean flow velocity (original grid) Mean flow velocity (modified grid)

Figure 11: *BOSZ* mean flow velocity with input wave conditions of 1-year Northwest swell.

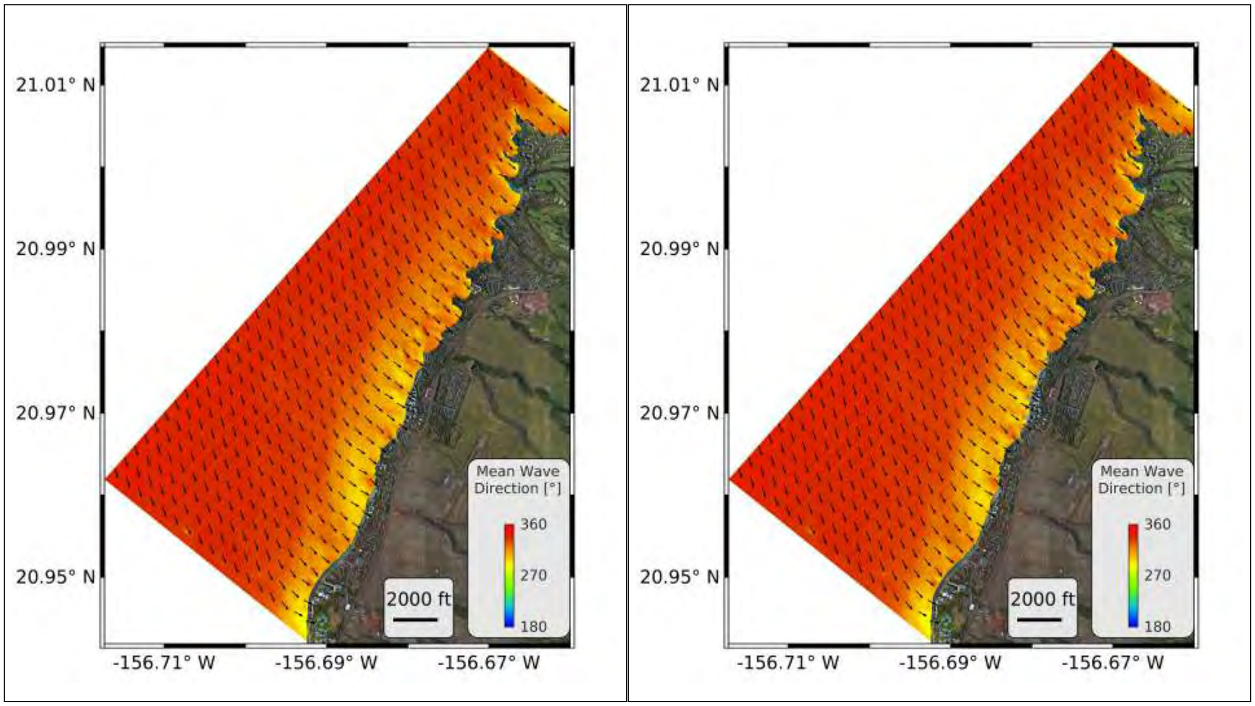


Mean flow velocity (original grid)



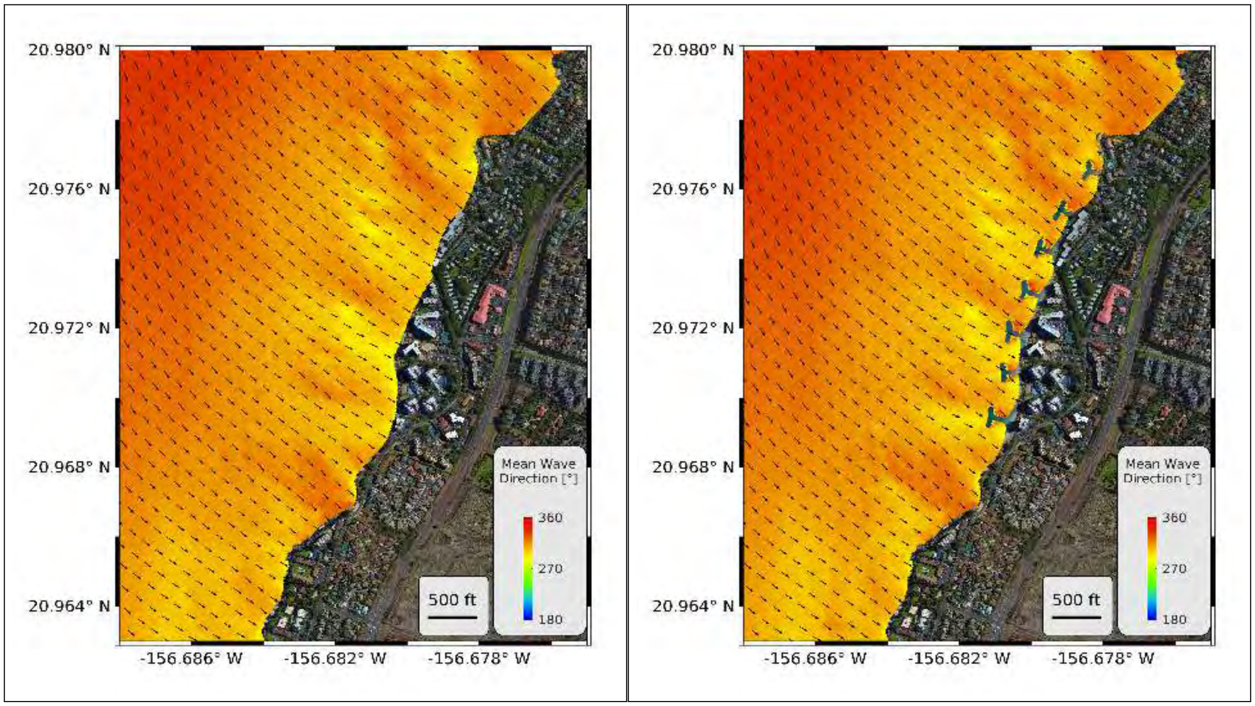
Mean flow velocity (modified grid)

Figure 12: *BOSZ* mean flow velocity with input wave conditions of 1-year Northwest swell.



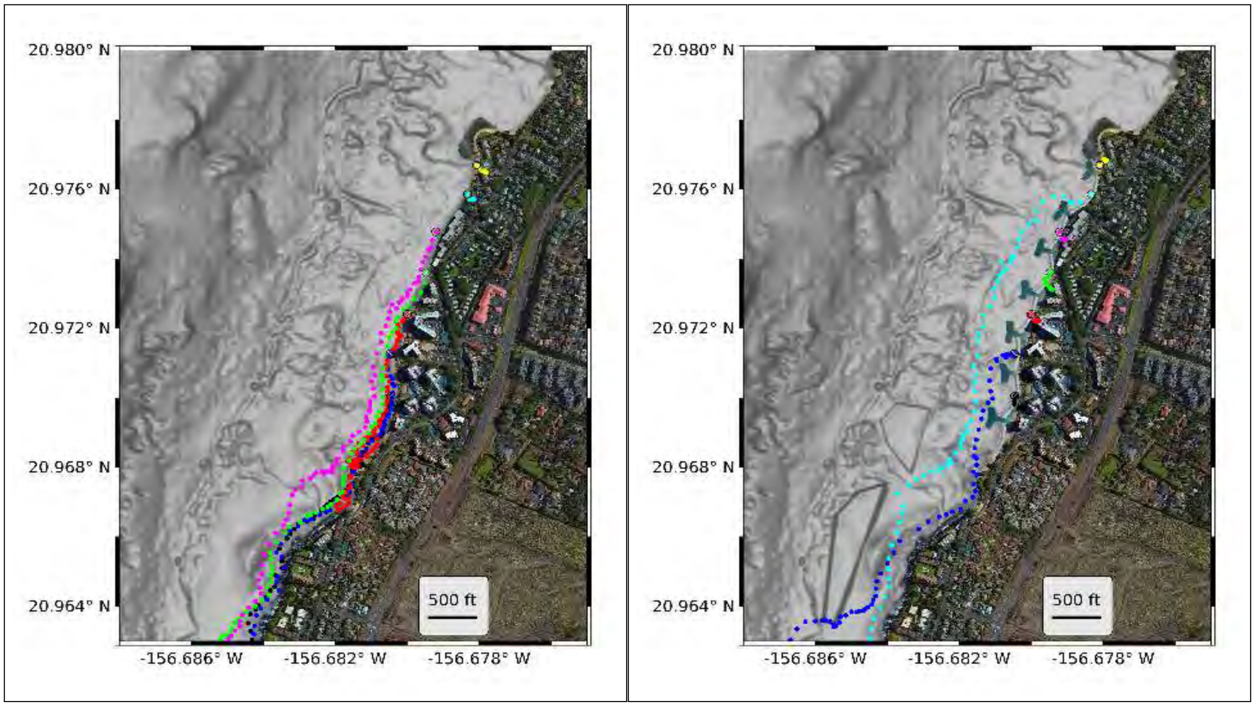
Mean wave direction (original grid) Mean wave direction (modified grid)

Figure 13: *BOSZ* mean wave direction with input wave conditions of 1-year Northwest swell.



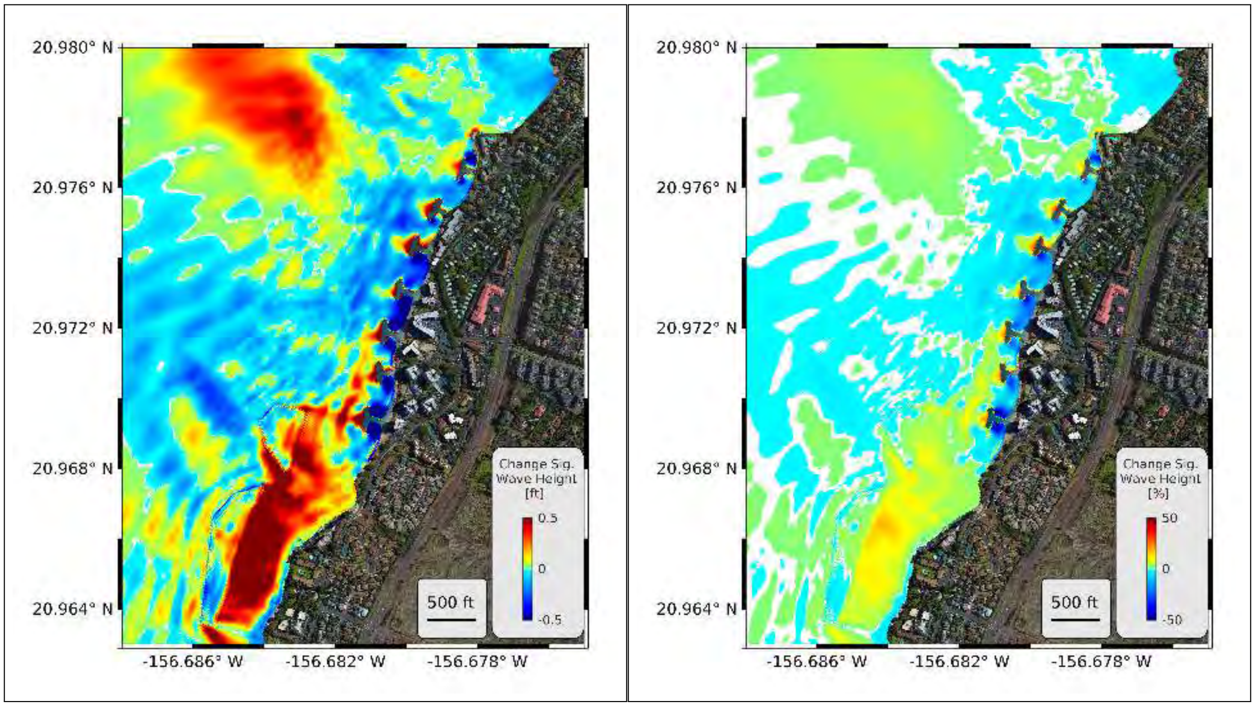
Mean wave direction (original grid) Mean wave direction (modified grid)

Figure 14: *BOSZ* mean wave direction with input wave conditions of 1-year Northwest swell.



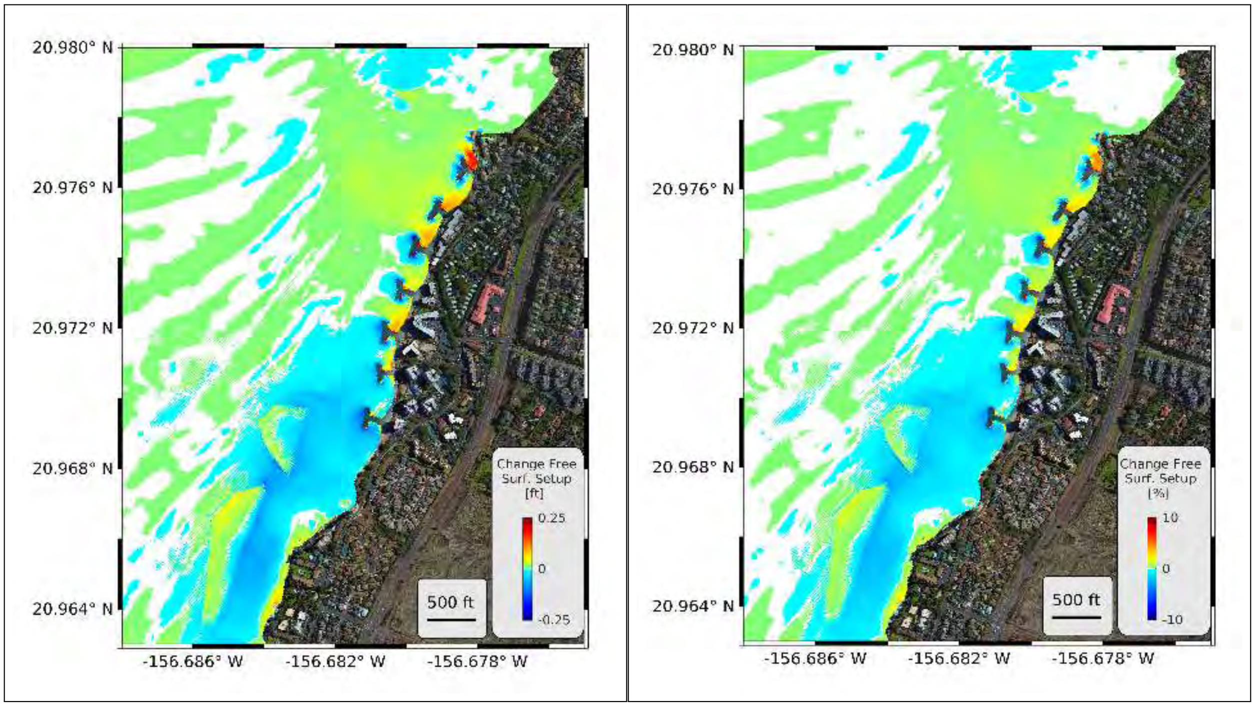
Pathlines of seven tracers (original grid) Pathlines of seven tracers (modified grid)

Figure 15: *BOSZ* pathlines of seven tracers/drogues placed at 1ft depth in the center of two adjecent groins with input wave conditions of 1-year Northwest swell.



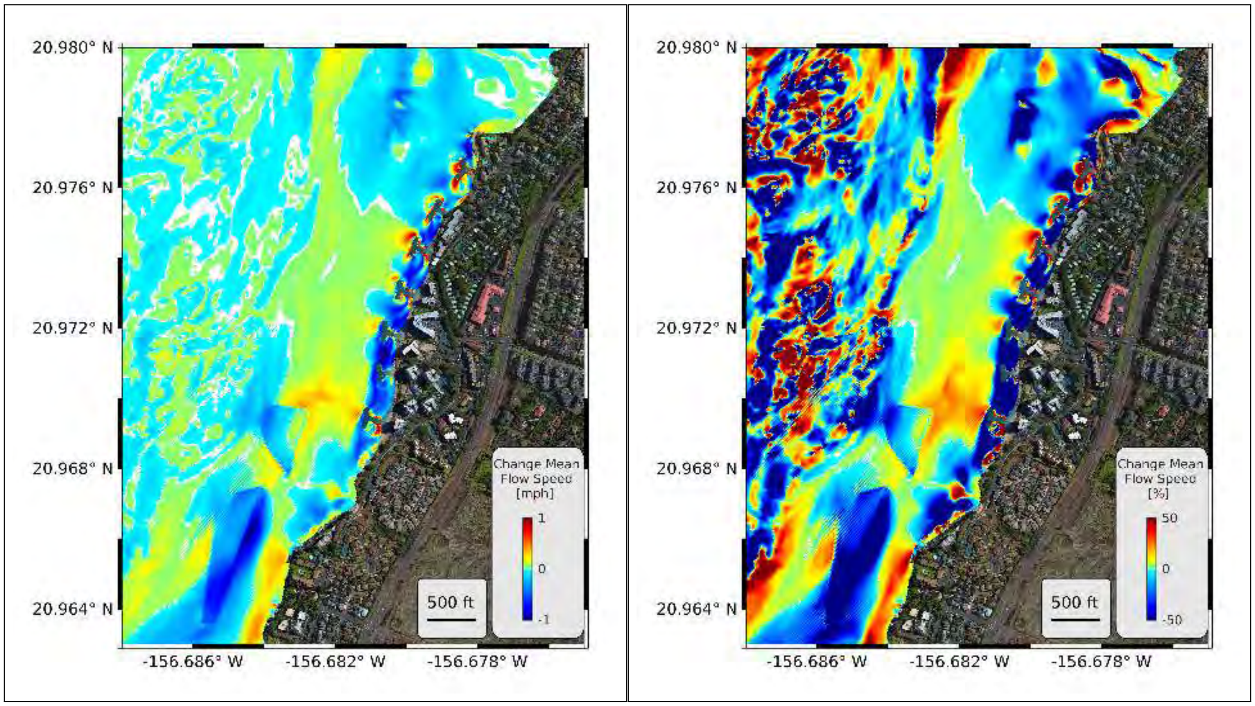
Absolute difference in Hs (original grid) Relative difference in Hs (modified grid)

Figure 16: Difference in significant wave height between original and modified grid with input wave conditions of 1-year Northwest swell.



Absolute difference in setup (original grid) Relative difference in setup (modified grid)

Figure 17: Difference in free surface setup between original and modified grid with input wave conditions of 1-year Northwest swell.

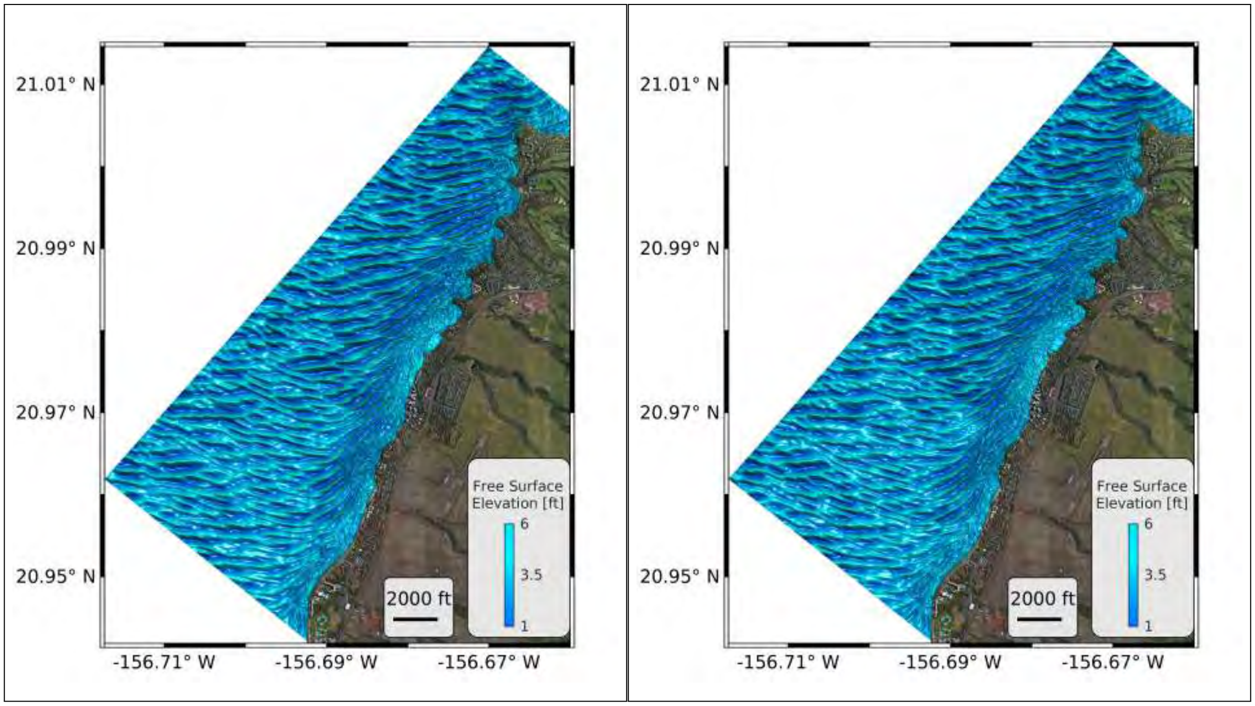


Absolute difference in mean flow velocity (original grid)

Relative difference in mean flow velocity (modified grid)

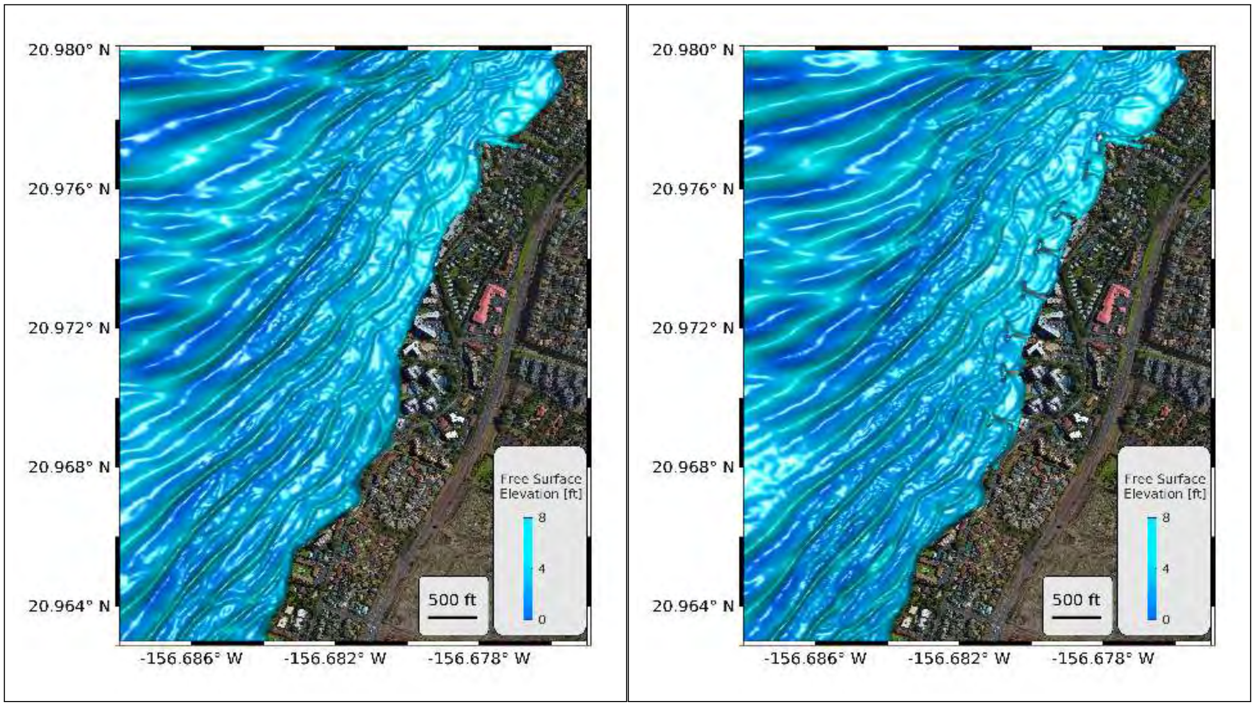
Figure 18: Difference in mean flow velocity between original and modified grid with input wave conditions of 1-year Northwest swell.

3.2 Results from 1-year North swell



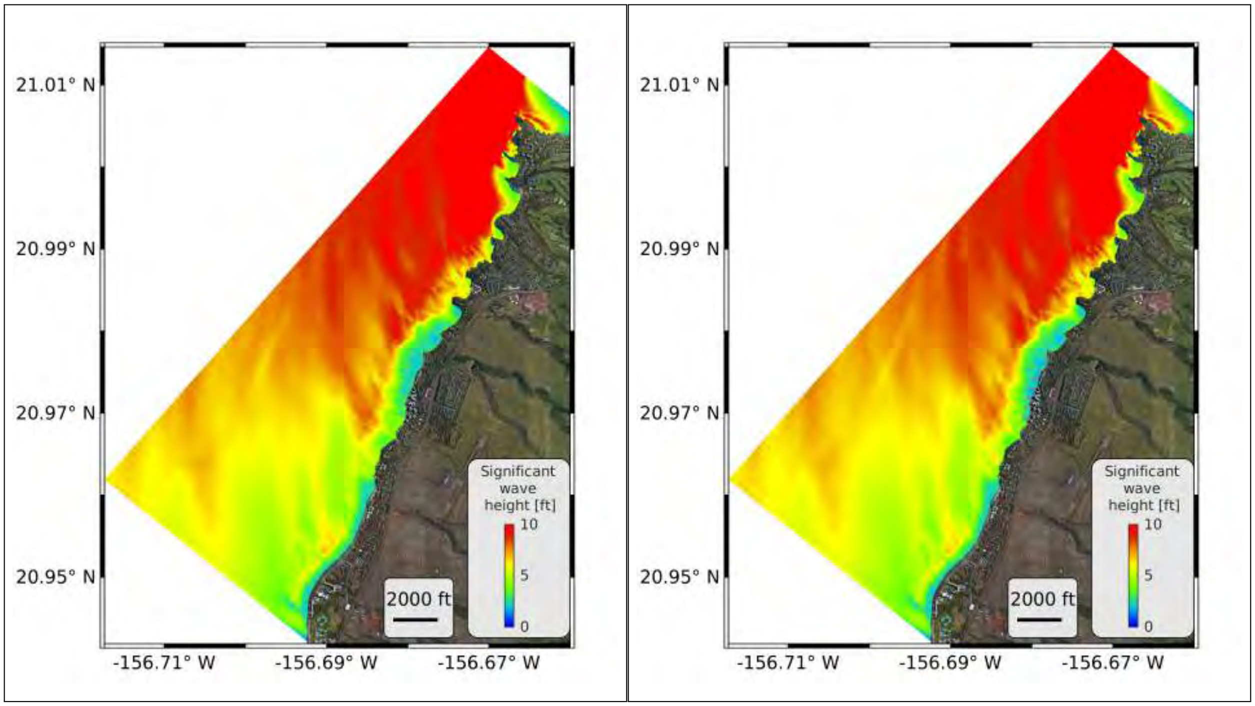
Free surface elevation (original grid) Free surface elevation (modified grid).

Figure 19: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 1-year North swell.



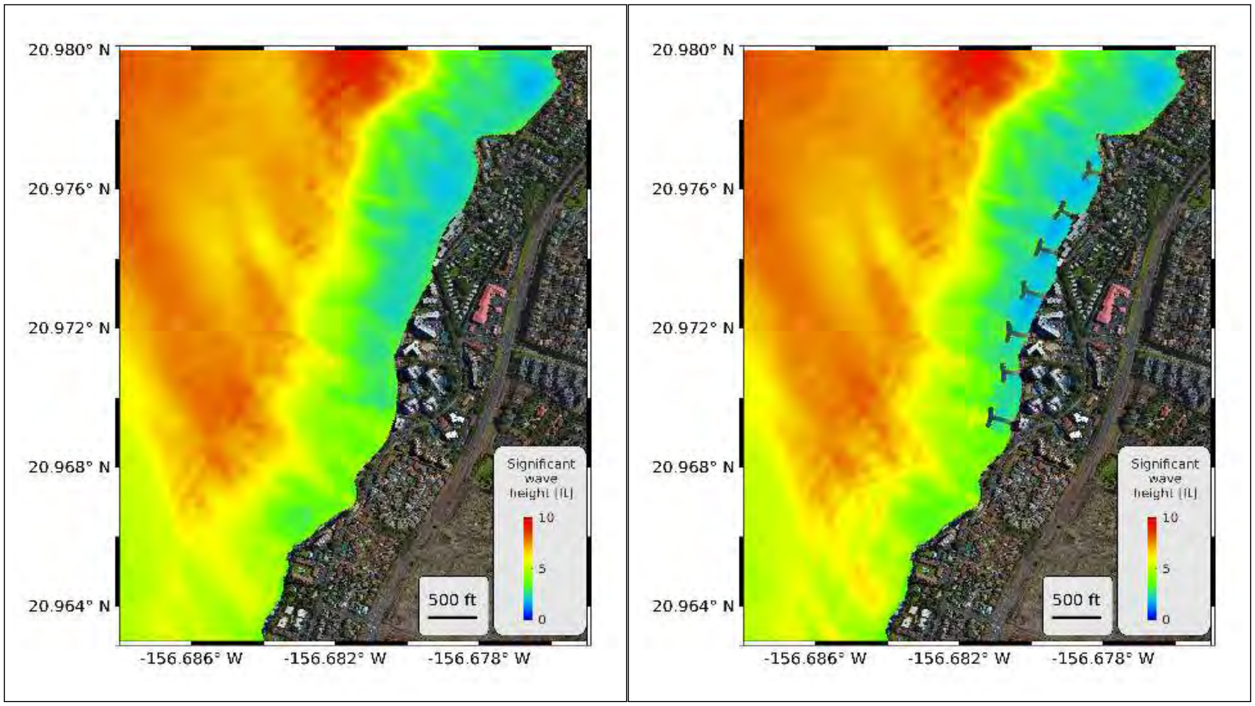
Free surface elevation (original grid) Free surface elevation (modified grid).

Figure 20: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 1-year North swell.



Significant Wave Height (original grid) Significant Wave Height (modified grid)

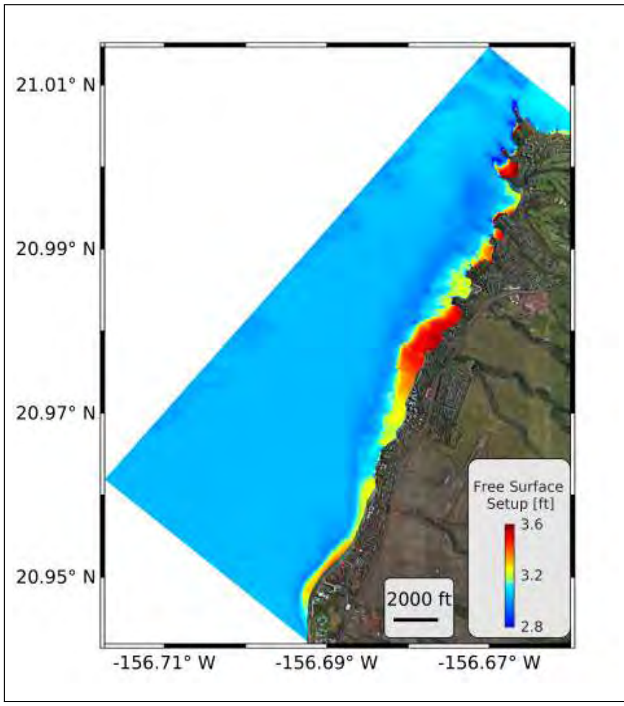
Figure 21: *BOSZ* Significant Wave Height with input wave conditions of 1-year North swell.

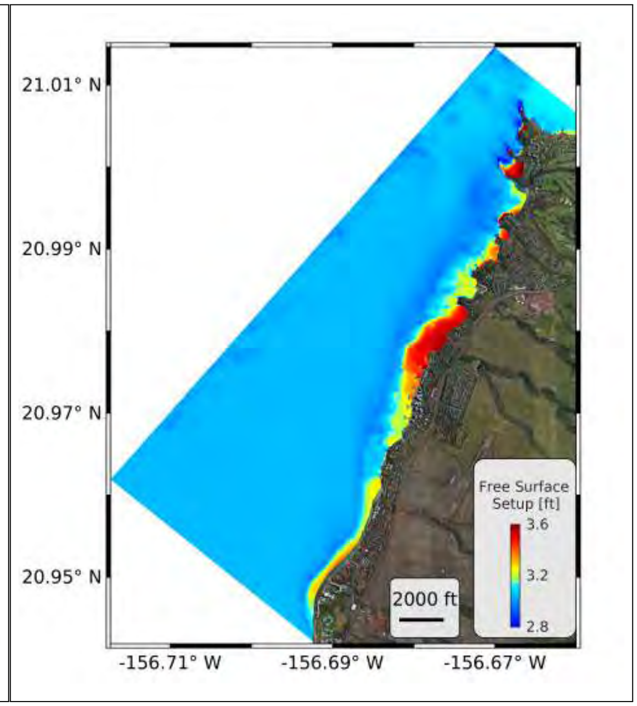


Significant Wave Height (original grid)

Significant Wave Height (modified grid)

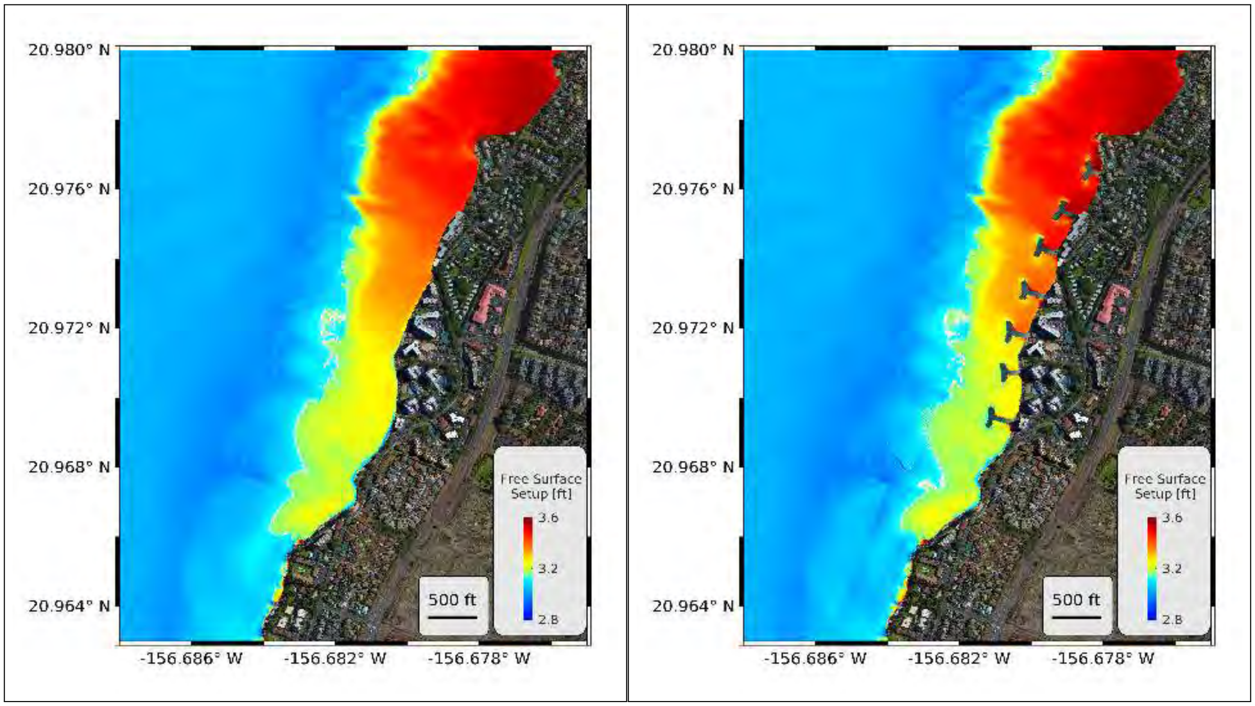
Figure 22: *BOSZ* Significant Wave Height with input wave conditions of 1-year North swell.





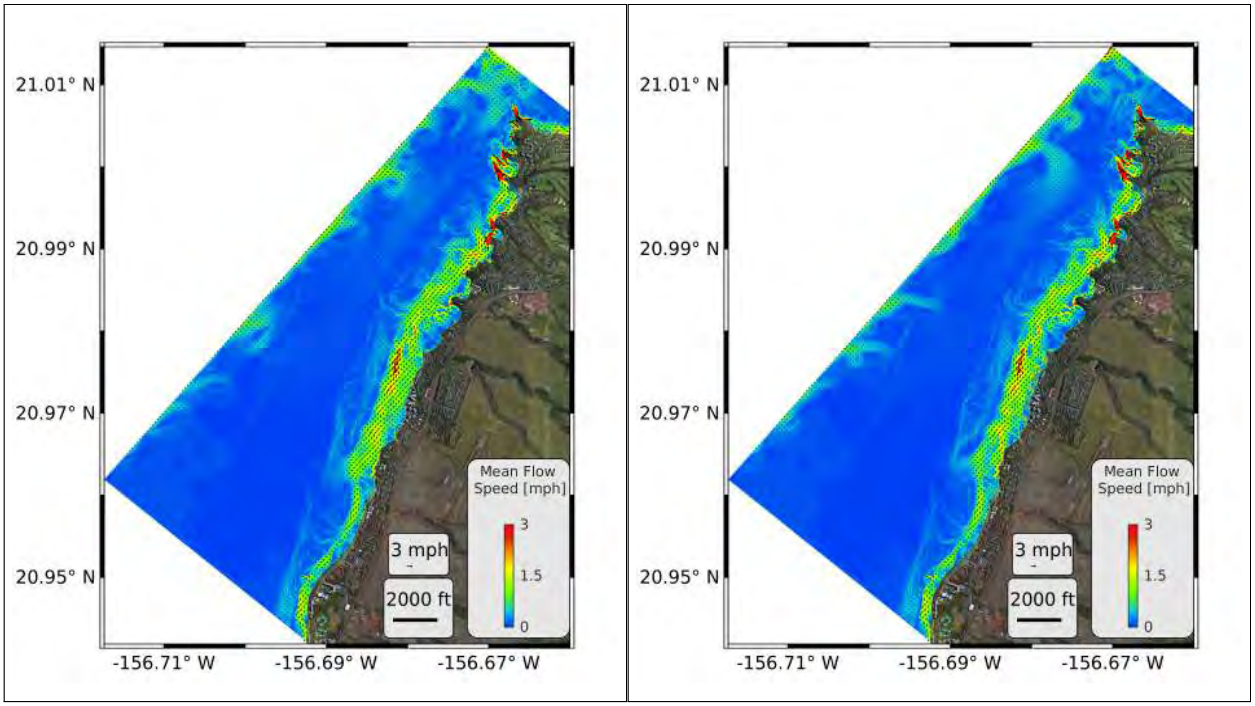
Free surface setup (original grid) Free surface setup (modified grid)

Figure 23: *BOSZ* free surface setup with input wave conditions of 1-year North swell.



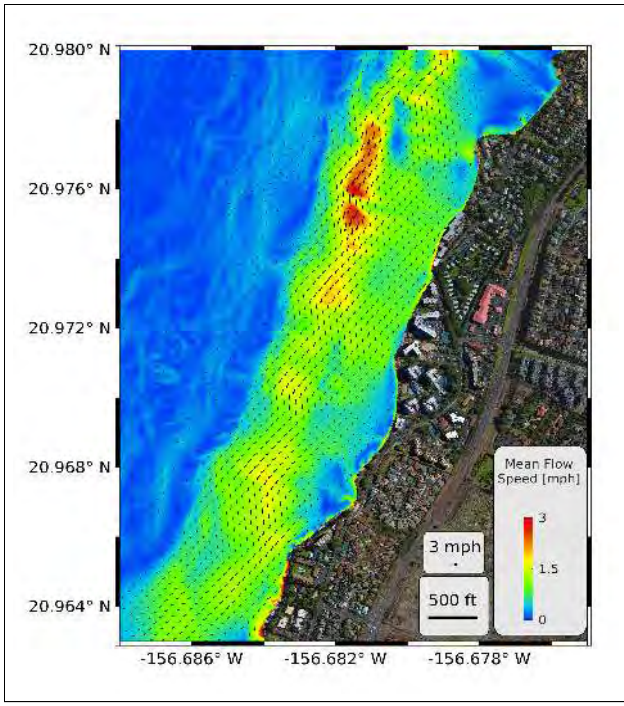
Free surface setup (original grid) Free surface setup (modified grid)

Figure 24: *BOSZ* free surface setup with input wave conditions of 1-year North swell.

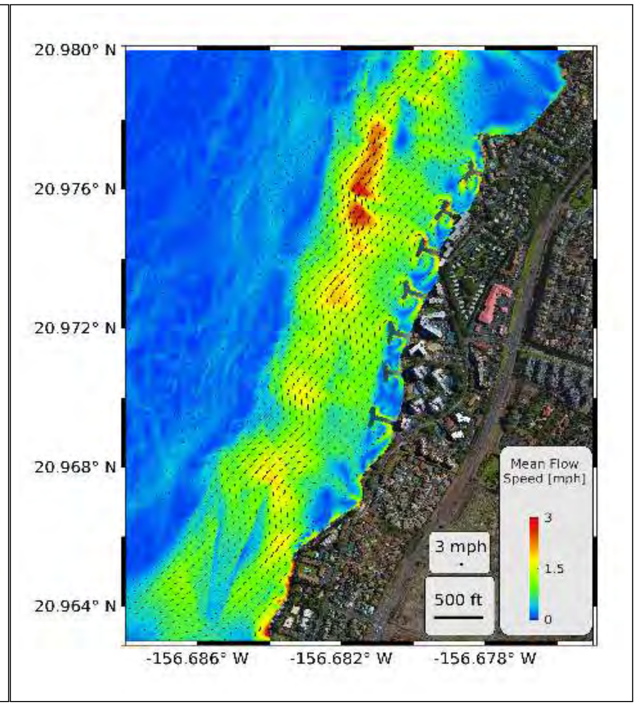


Mean flow velocity (original grid) Mean flow velocity (modified grid)

Figure 25: *BOSZ* mean flow velocity with input wave conditions of 1-year North swell.

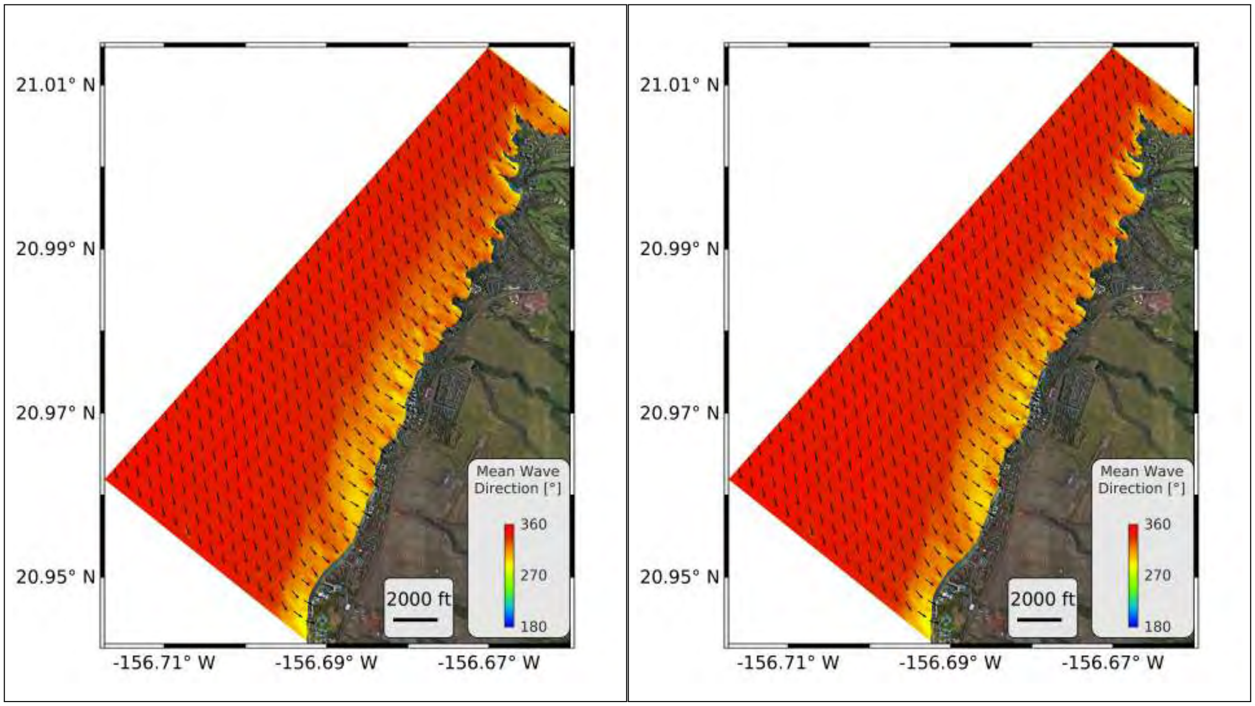


Mean flow velocity (original grid)



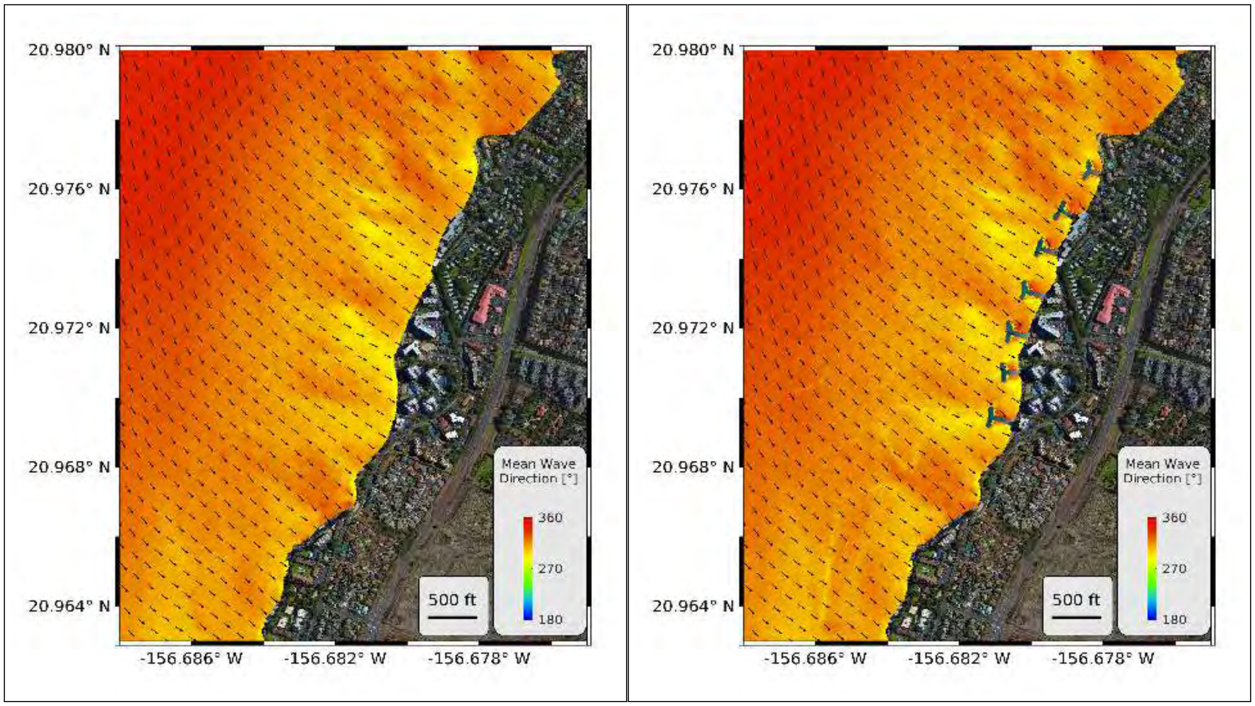
Mean flow velocity (modified grid)

Figure 26: *BOSZ* mean flow velocity with input wave conditions of 1-year North swell.



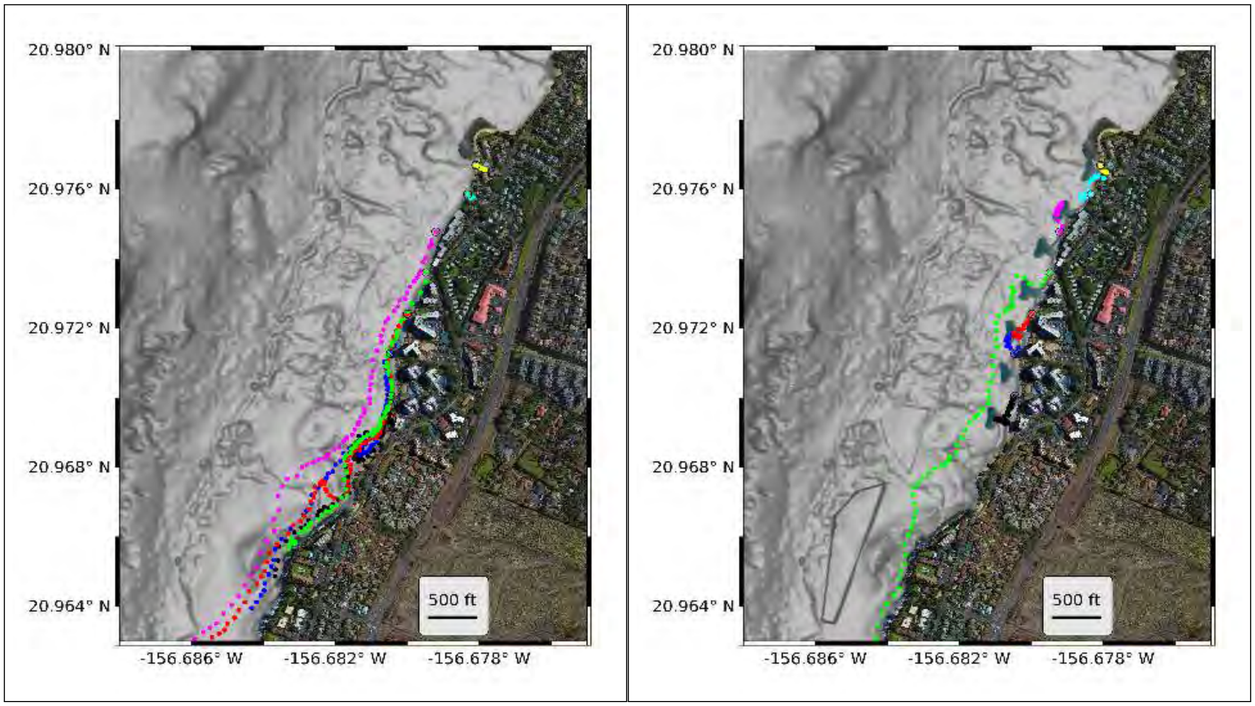
Mean wave direction (original grid) Mean wave direction (modified grid)

Figure 27: *BOSZ* mean wave direction with input wave conditions of 1-year North swell.



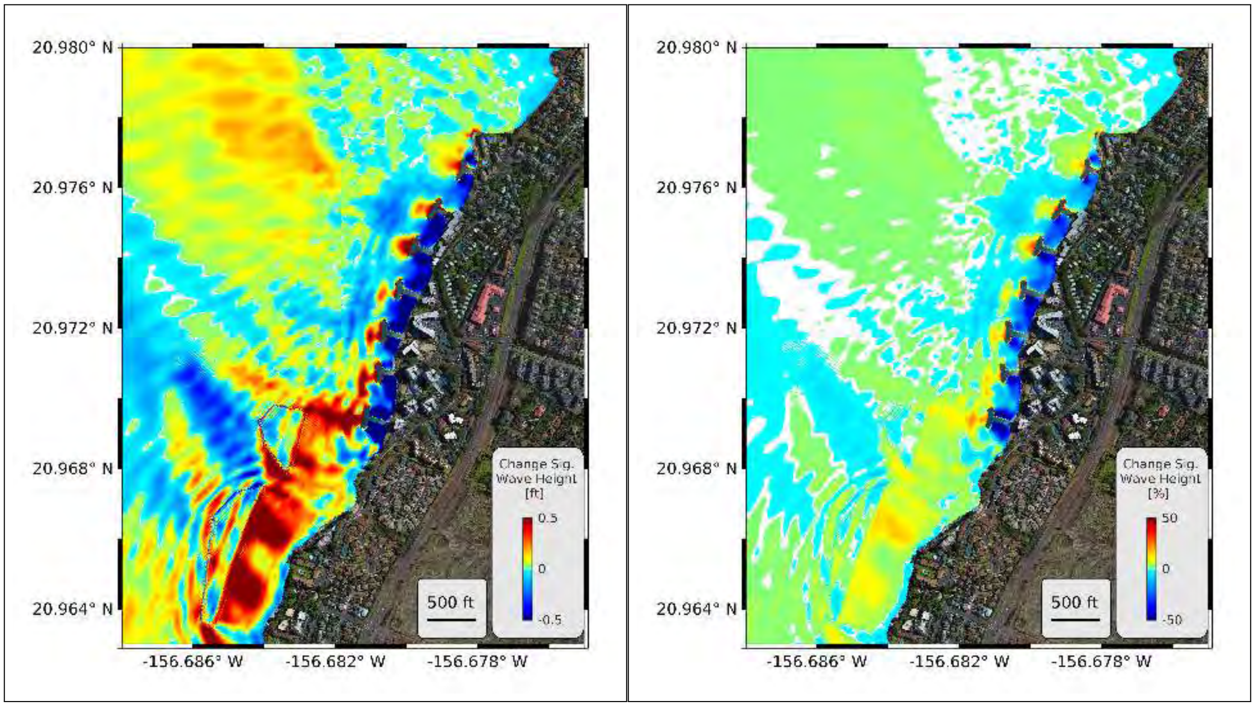
Mean wave direction (original grid) Mean wave direction (modified grid)

Figure 28: *BOSZ* mean wave direction with input wave conditions of 1-year North swell.



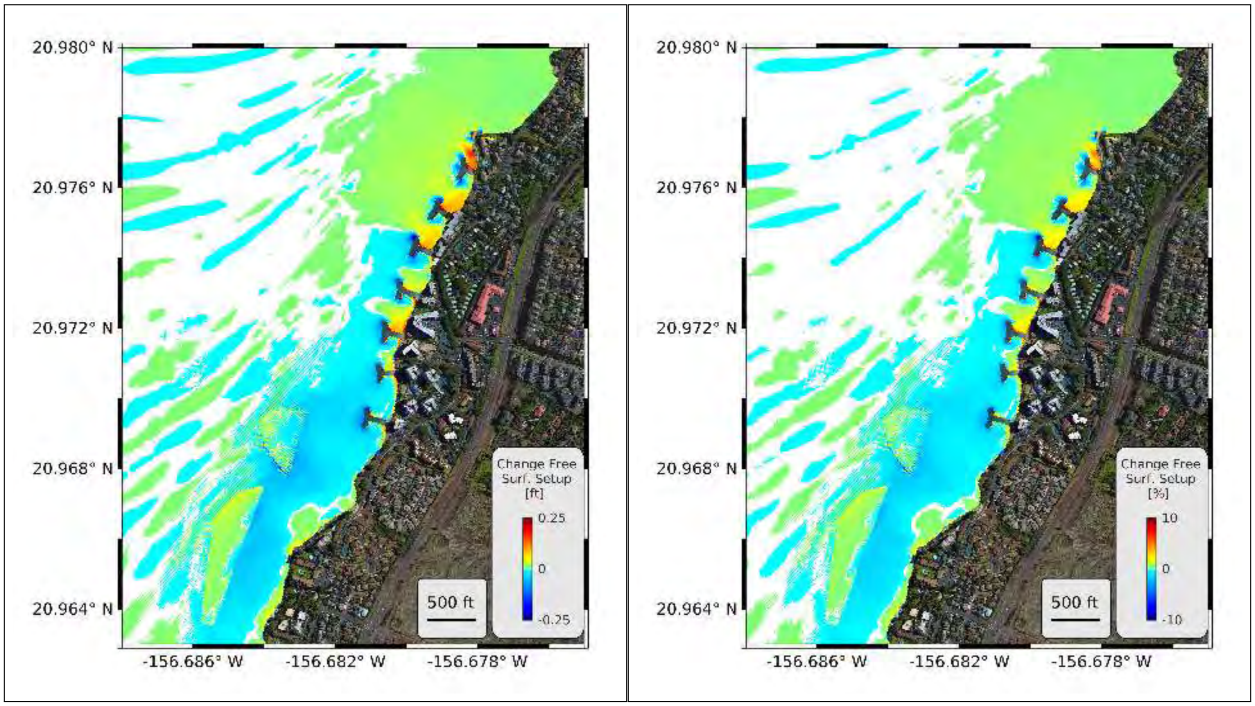
Pathlines of seven tracers (original grid) Pathlines of seven tracers (modified grid)

Figure 29: *BOSZ* pathlines of seven tracers/drogues placed at 1ft depth in the center of two adjecent groins with input wave conditions of 1-year North swell.



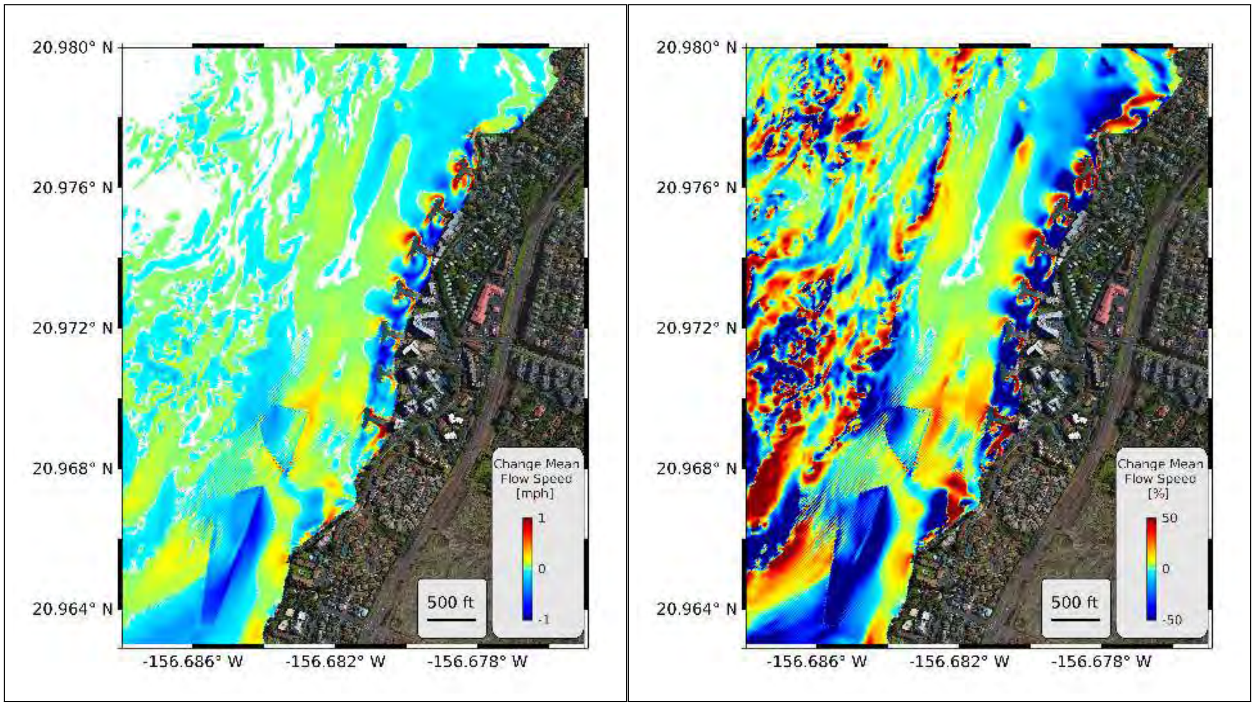
Absolute difference in Hs (original grid) Relative difference in Hs (modified grid)

Figure 30: Difference in significant wave height between original and modified grid with input wave conditions of 1-year North swell.



Absolute difference in setup (original grid) Relative difference in setup (modified grid)

Figure 31: Difference in free surface setup between original and modified grid with input wave conditions of 1-year North swell.

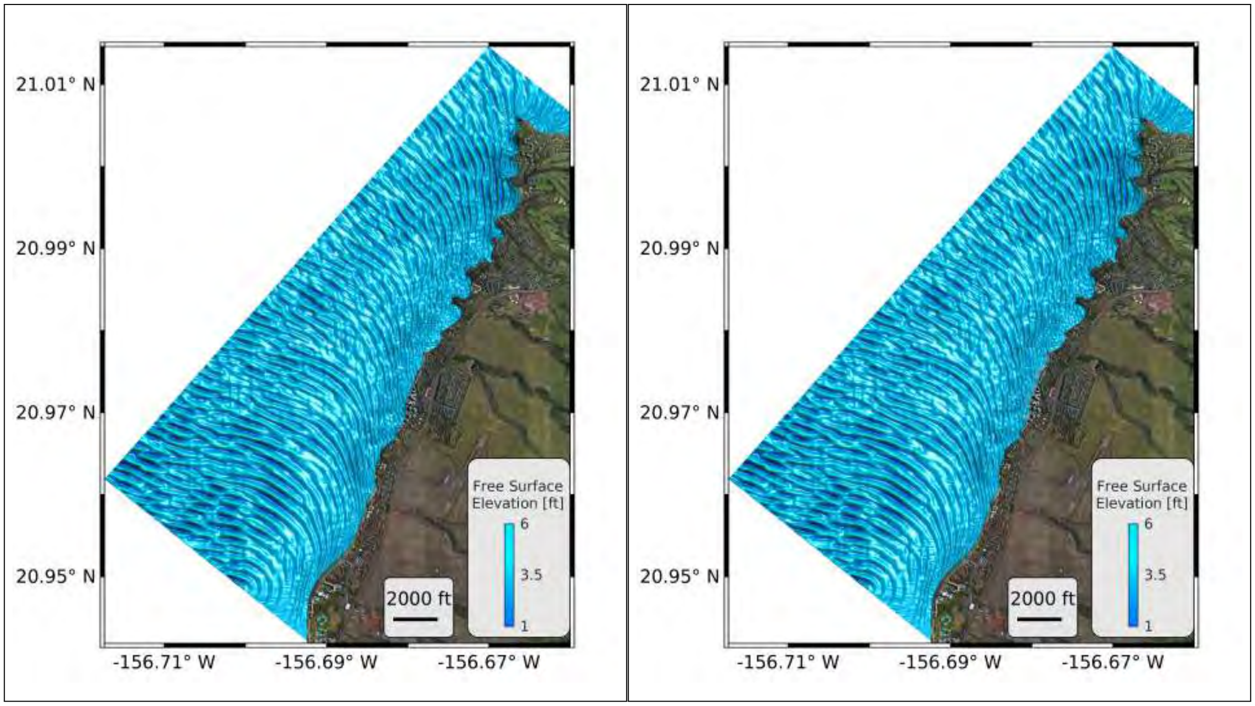


Absolute difference in mean flow velocity (original grid)

Relative difference in mean flow velocity (modified grid)

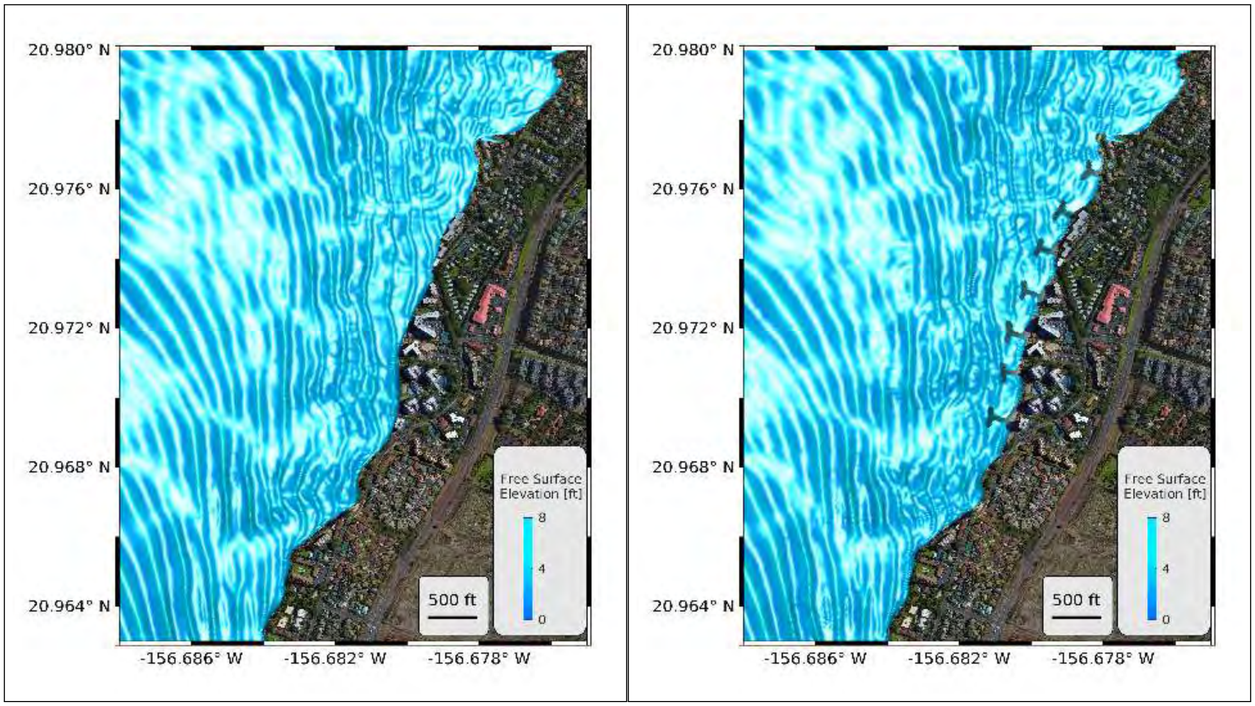
Figure 32: Difference in mean flow velocity between original and modified grid with input wave conditions of 1-year North swell.

3.3 Results from 1-year South swell



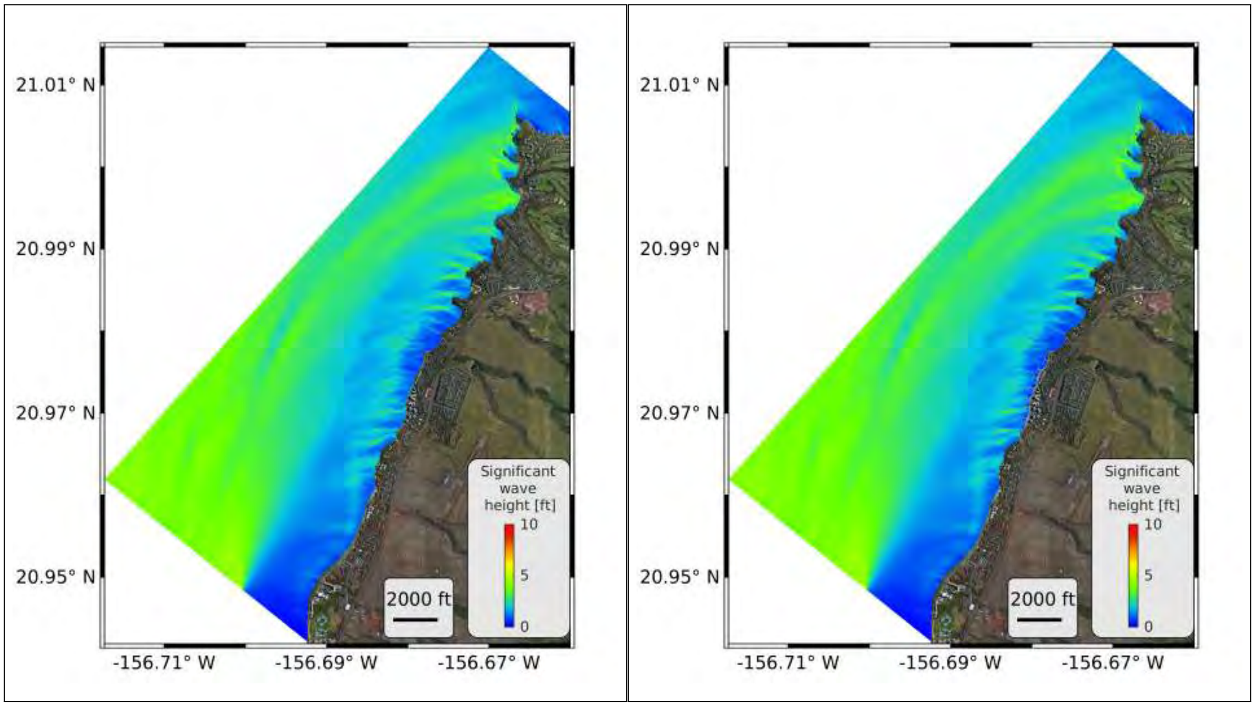
Free surface elevation (original grid) Free surface elevation (modified grid).

Figure 33: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 1-year South swell.



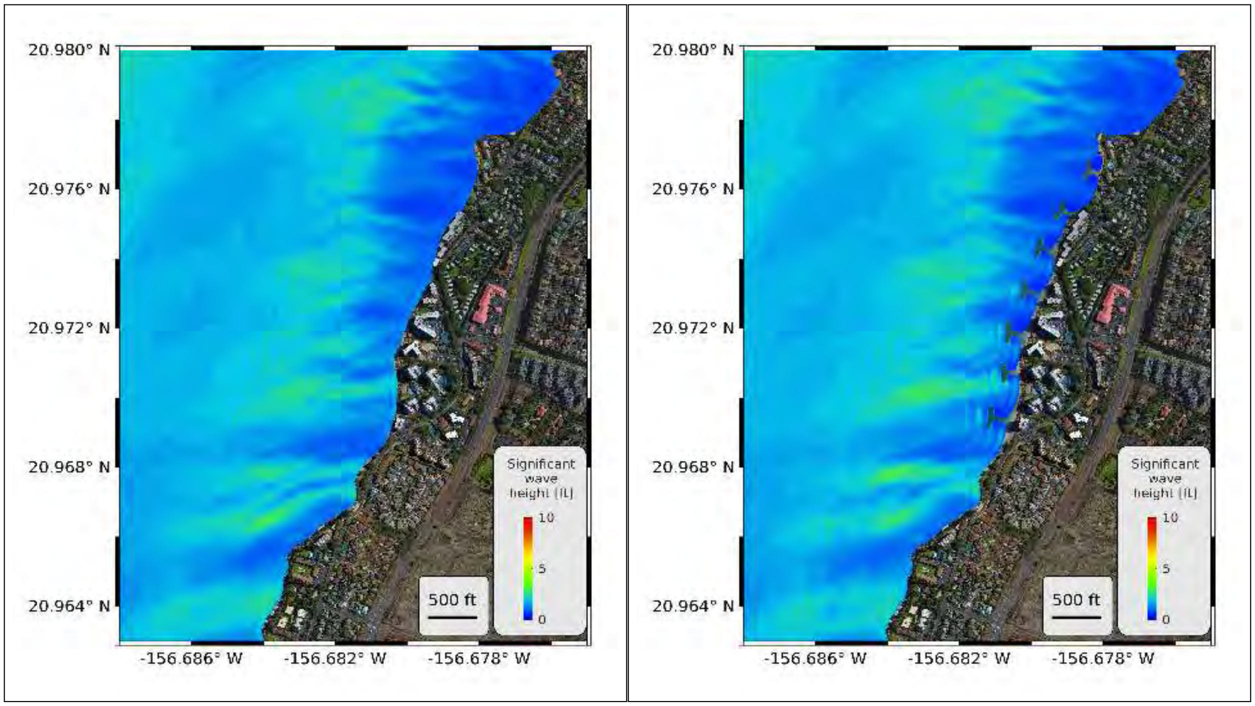
Free surface elevation (original grid) Free surface elevation (modified grid).

Figure 34: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 1-year South swell.



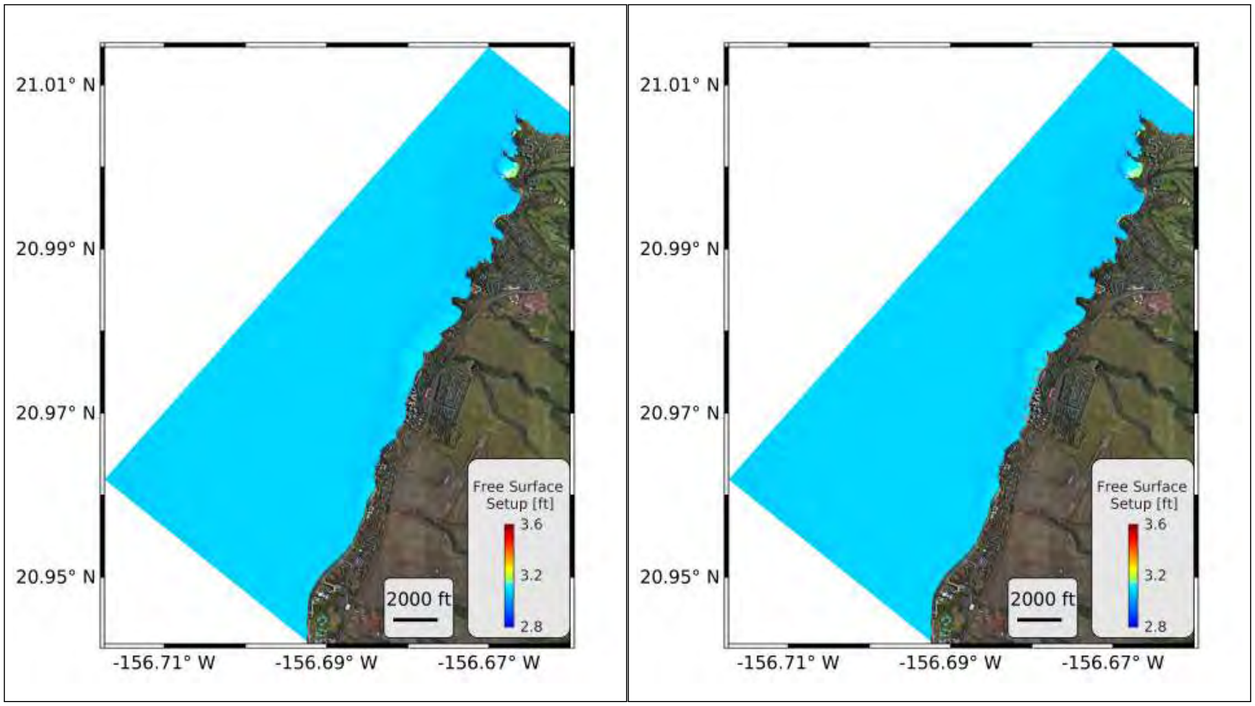
Significant Wave Height (original grid) Significant Wave Height (modified grid)

Figure 35: *BOSZ* Significant Wave Height with input wave conditions of 1-year South swell.



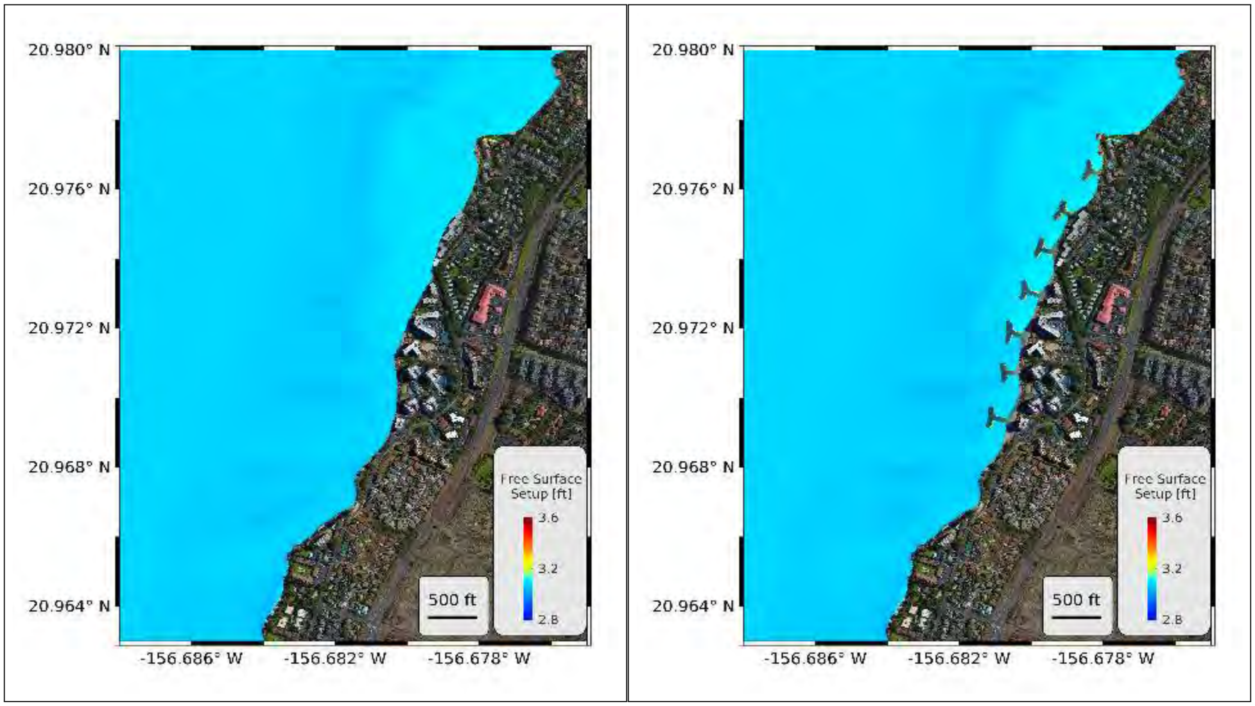
Significant Wave Height (original grid) Significant Wave Height (modified grid)

Figure 36: *BOSZ* Significant Wave Height with input wave conditions of 1-year South swell.



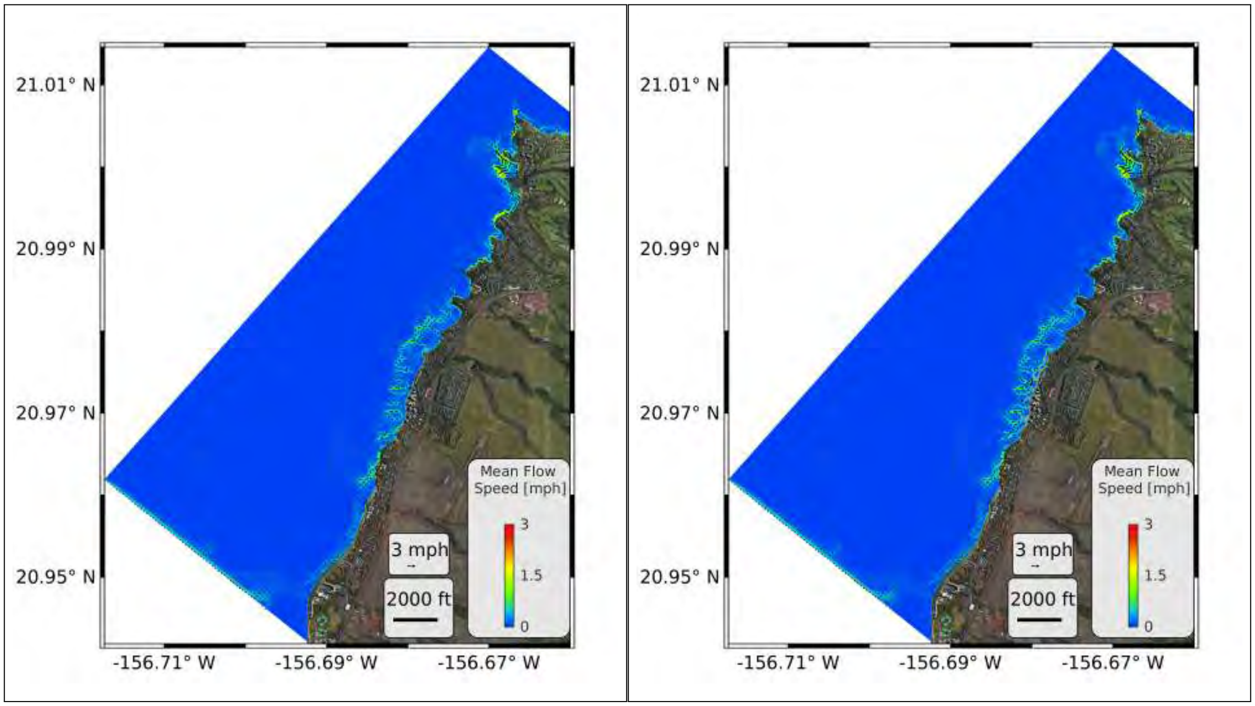
Free surface setup (original grid) Free surface setup (modified grid)

Figure 37: *BOSZ* free surface setup with input wave conditions of 1-year South swell.



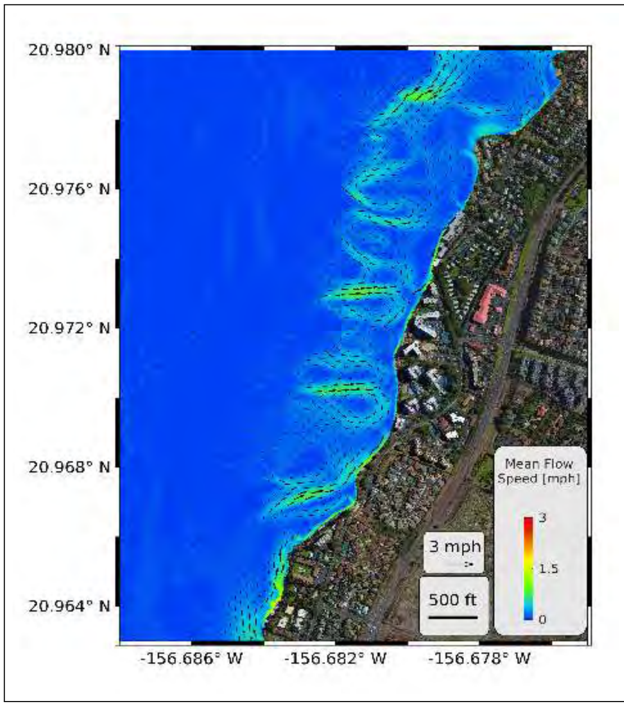
Free surface setup (original grid) Free surface setup (modified grid)

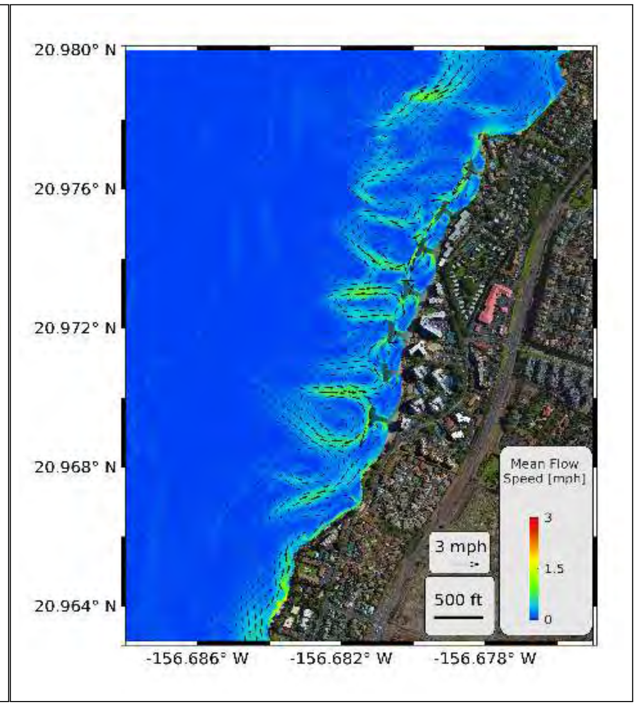
Figure 38: *BOSZ* free surface setup with input wave conditions of 1-year South swell.



Mean flow velocity (original grid) Mean flow velocity (modified grid)

Figure 39: *BOSZ* mean flow velocity with input wave conditions of 1-year South swell.

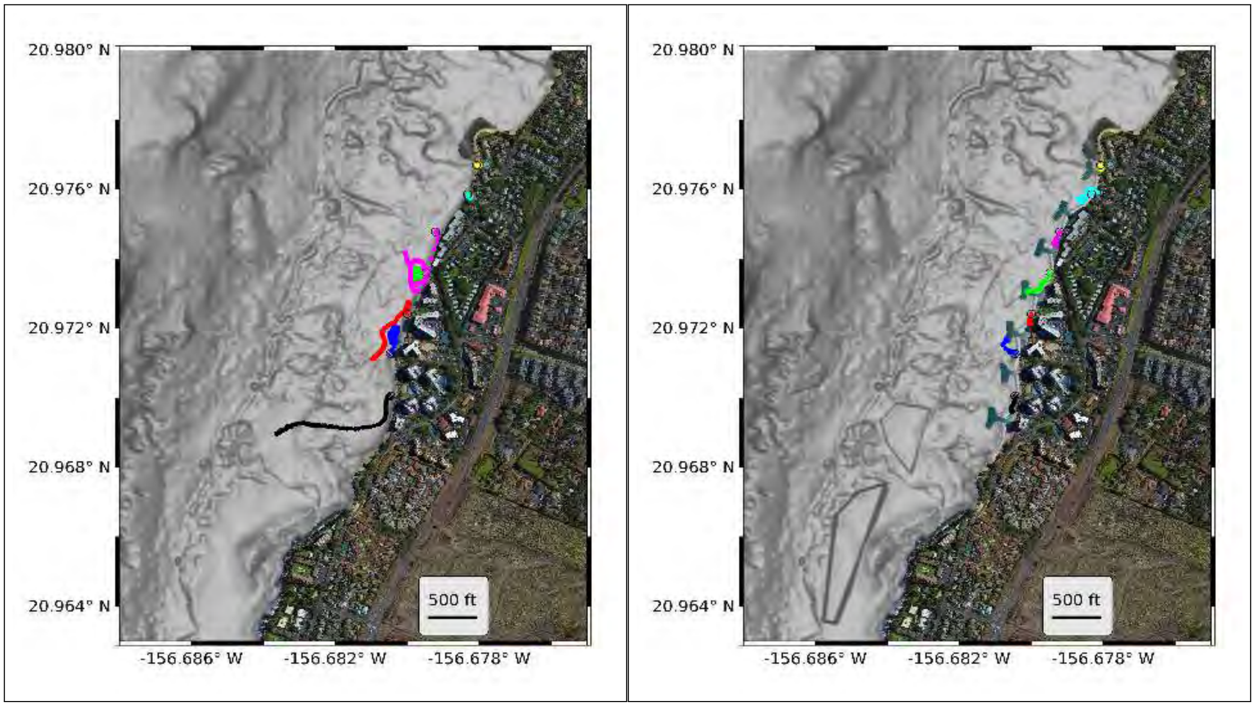




Mean flow velocity (original grid) Mean flow velocity (modified grid)

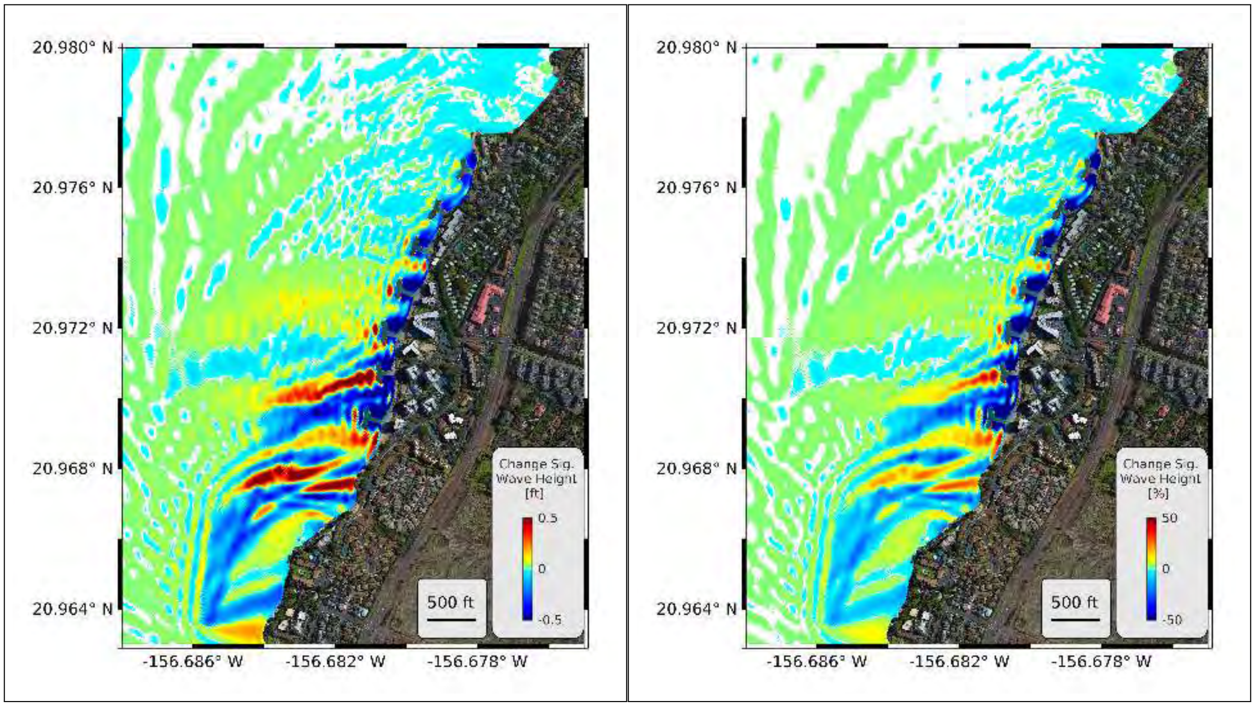
Figure 40: *BOSZ* mean flow velocity with input wave conditions of 1-year South swell.

Results for the mean wave direction of the South swell scenario are omitted because the computation of the quantity requires the main wave input from the offshore boundary. In the case of the South swell, the main wave input is generated at the southwestern boundary.



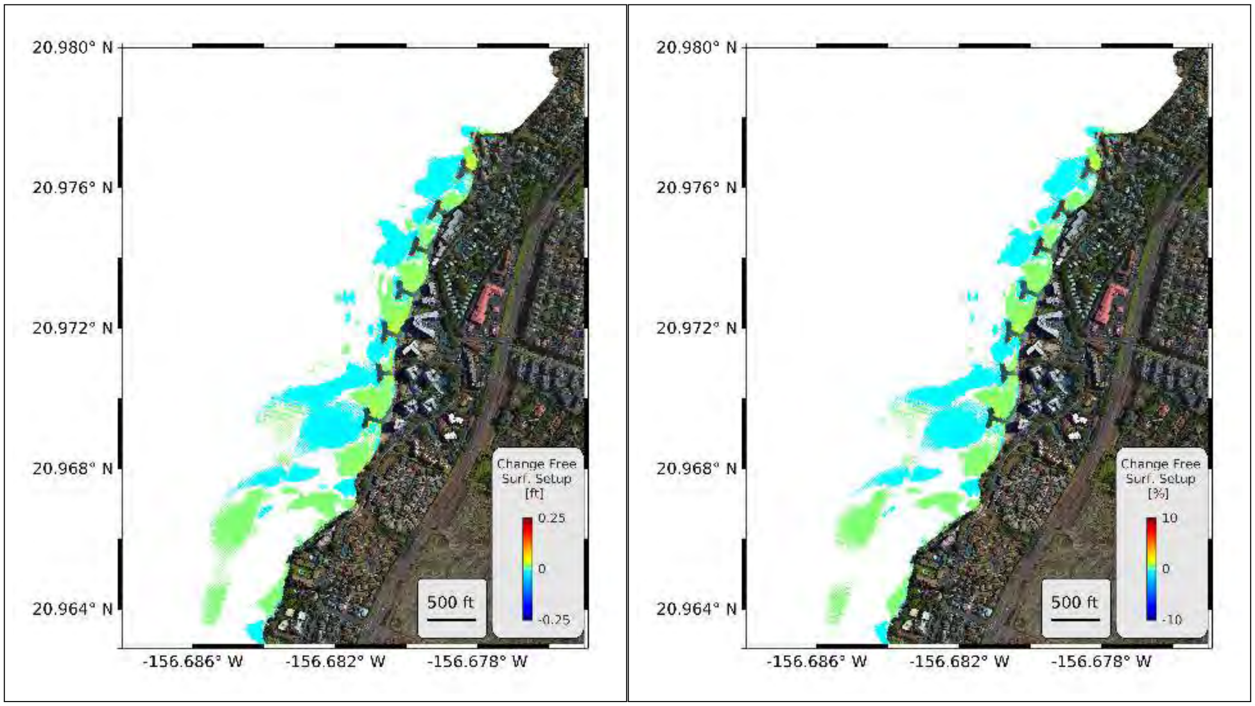
Pathlines of seven tracers (original grid) Pathlines of seven tracers (modified grid)

Figure 41: *BOSZ* pathlines of seven tracers/drogues placed at 1ft depth in the center of two adjecent groins with input wave conditions of 1-year South swell.



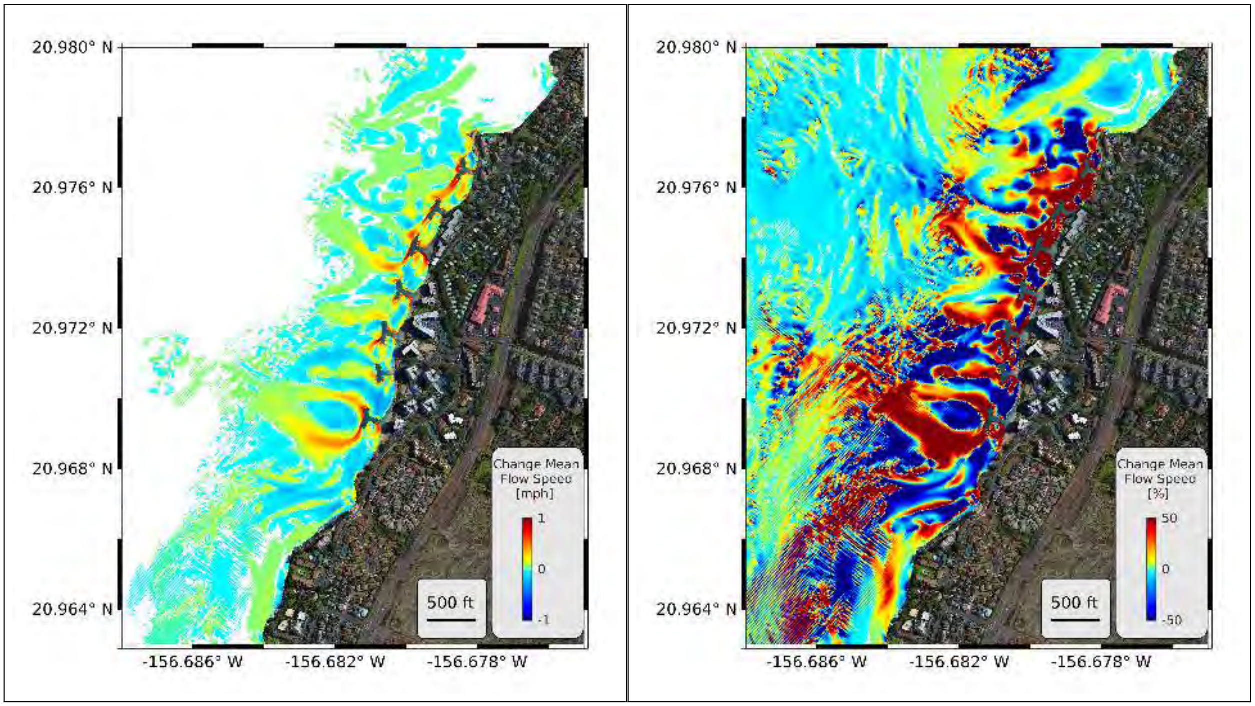
Absolute difference in Hs (original grid) Relative difference in Hs (modified grid)

Figure 42: Difference in significant wave height between original and modified grid with input wave conditions of 1-year South swell.



Absolute difference in setup (original grid) Relative difference in setup (modified grid)

Figure 43: Difference in free surface setup between original and modified grid with input wave conditions of 1-year South swell.

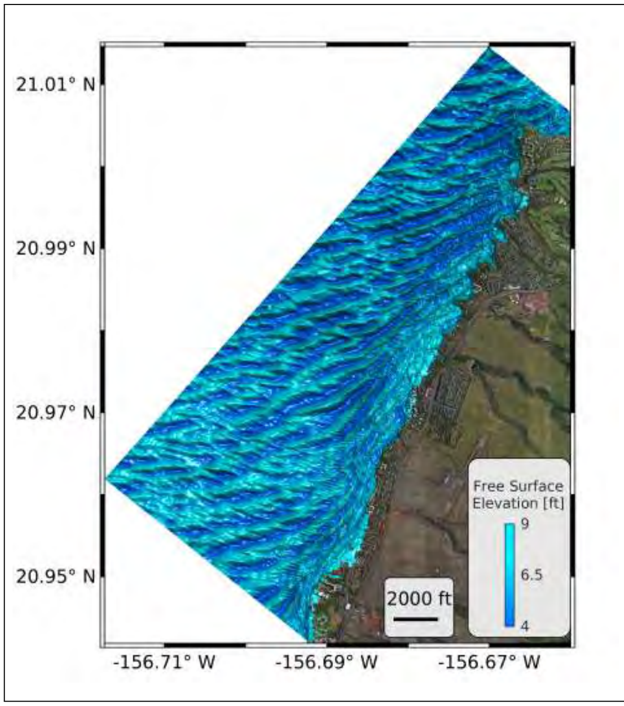


Absolute difference in mean flow velocity (original grid)

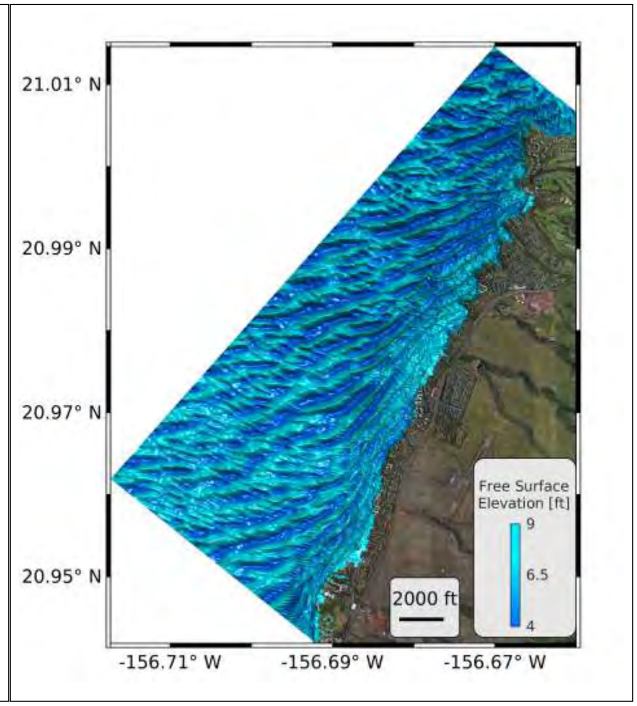
Relative difference in mean flow velocity (modified grid)

Figure 44: Difference in mean flow velocity between original and modified grid with input wave conditions of 1-year South swell.

3.4 Results from 50-year Northwest swell

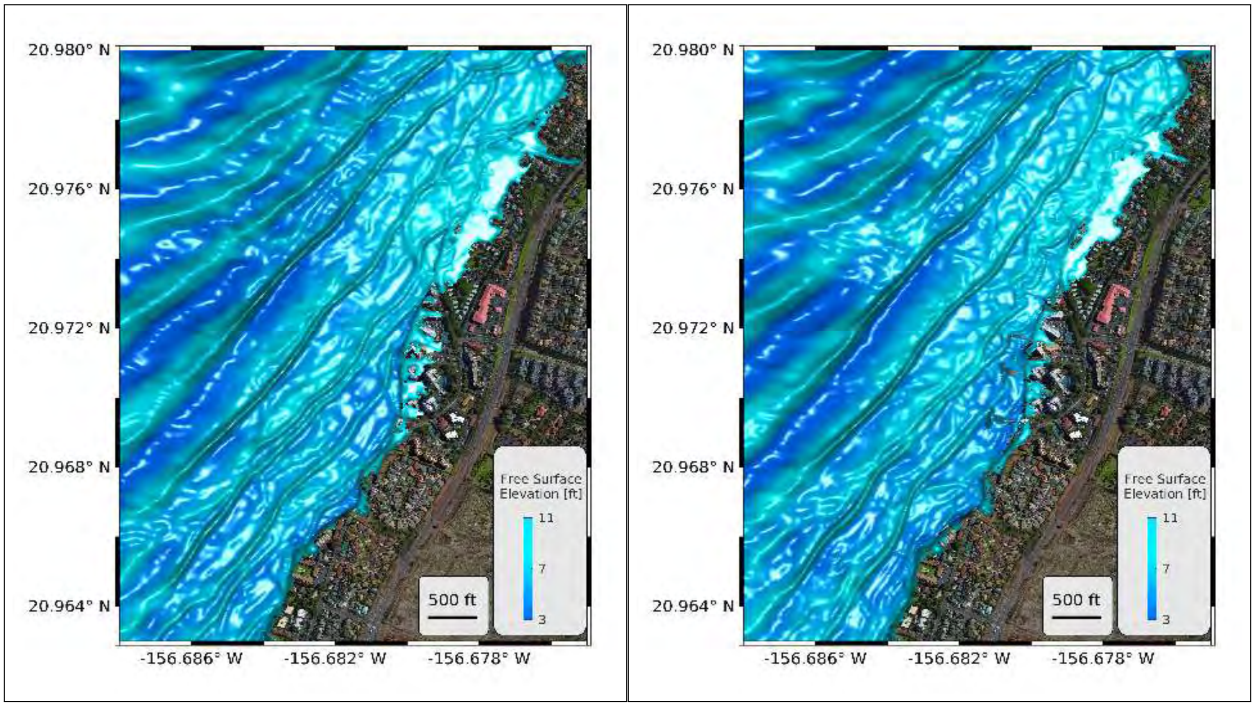


Free surface elevation (original grid)



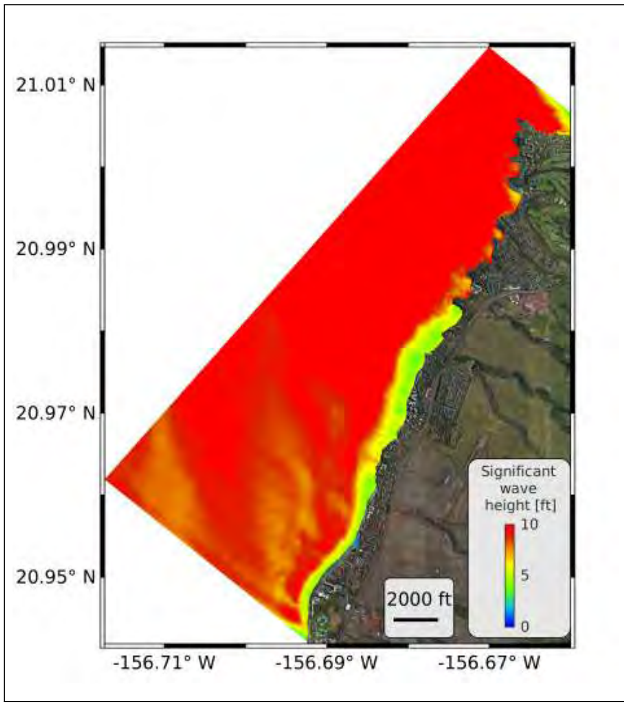
Free surface elevation (modified grid).

Figure 45: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 50-year Northwest swell.

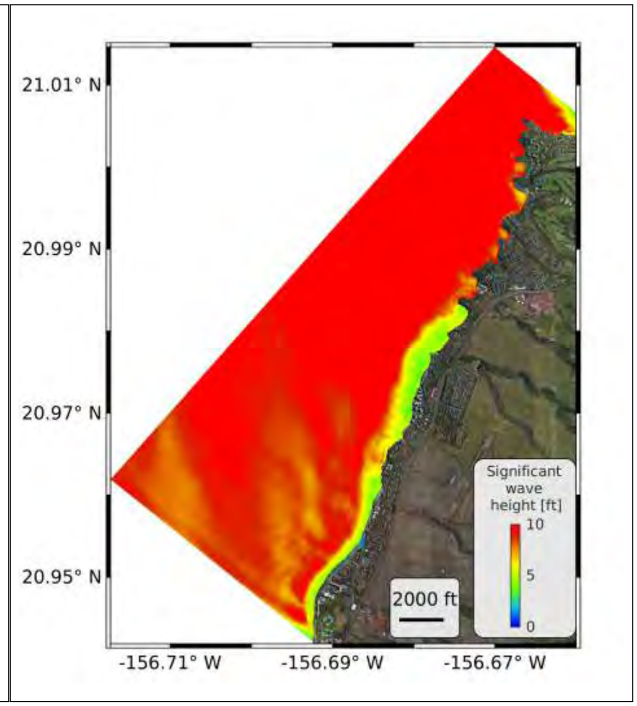


Free surface elevation (original grid) Free surface elevation (modified grid).

Figure 46: *BOSZ* free surface elevation at the end of the computations with input wave conditions of 50-year Northwest swell.

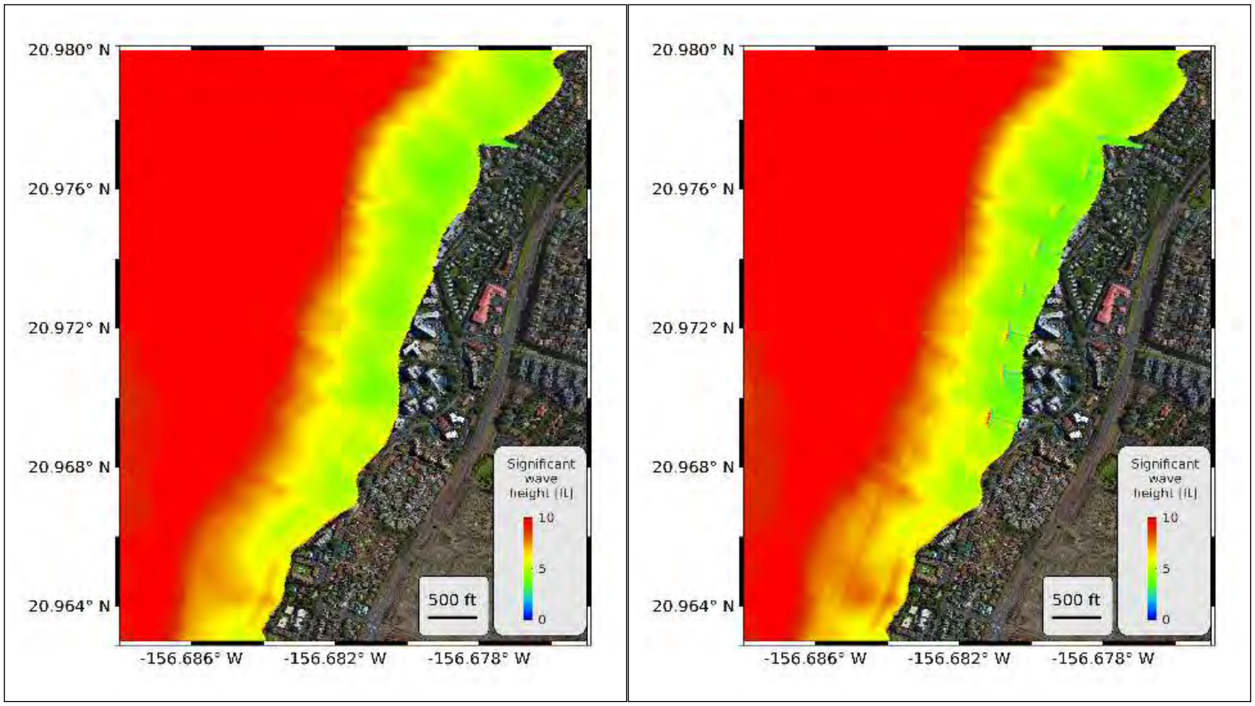


Significant Wave Height (original grid)



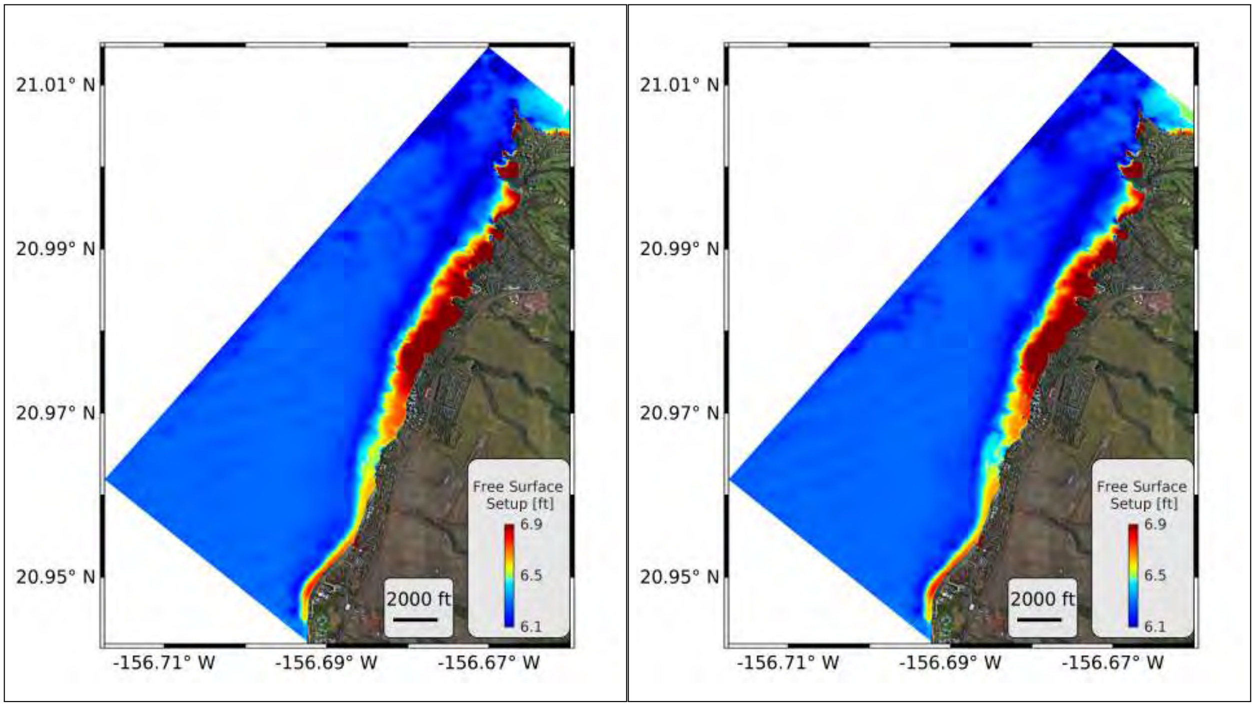
Significant Wave Height (modified grid)

Figure 47: *BOSZ* Significant Wave Height with input wave conditions of 50-year Northwest swell.



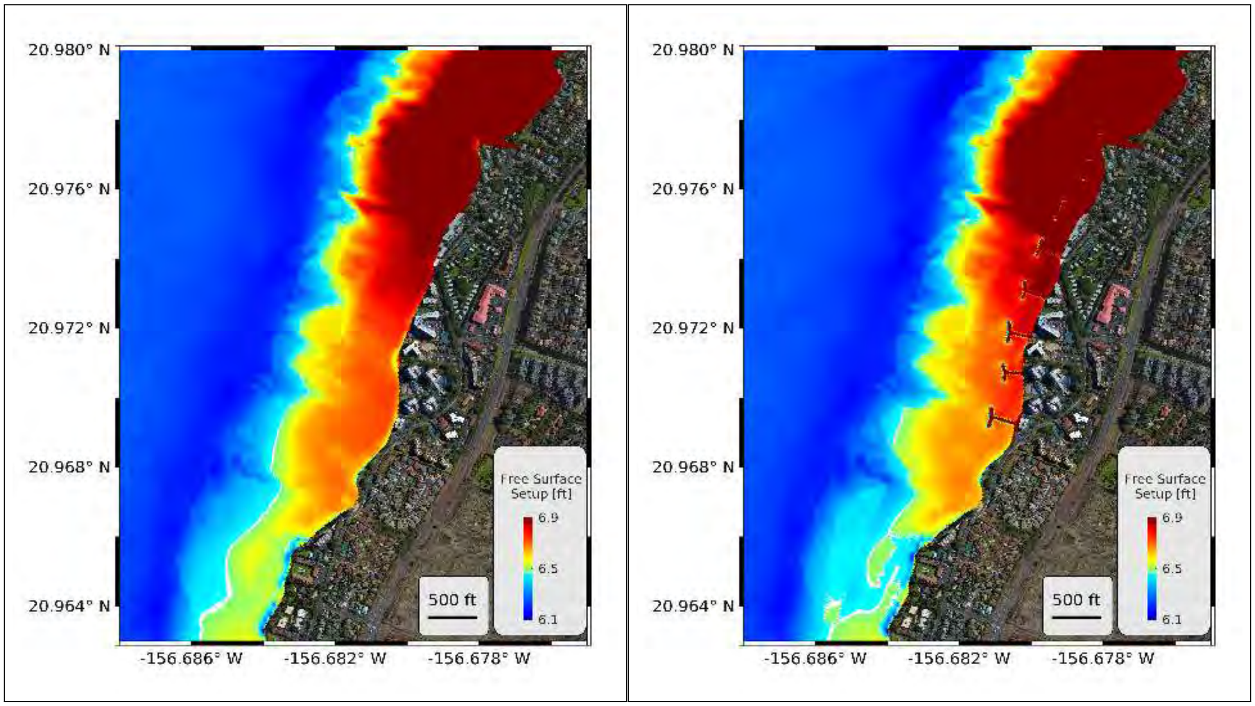
Significant Wave Height (original grid) Significant Wave Height (modified grid)

Figure 48: *BOSZ* Significant Wave Height with input wave conditions of 50-year Northwest swell.



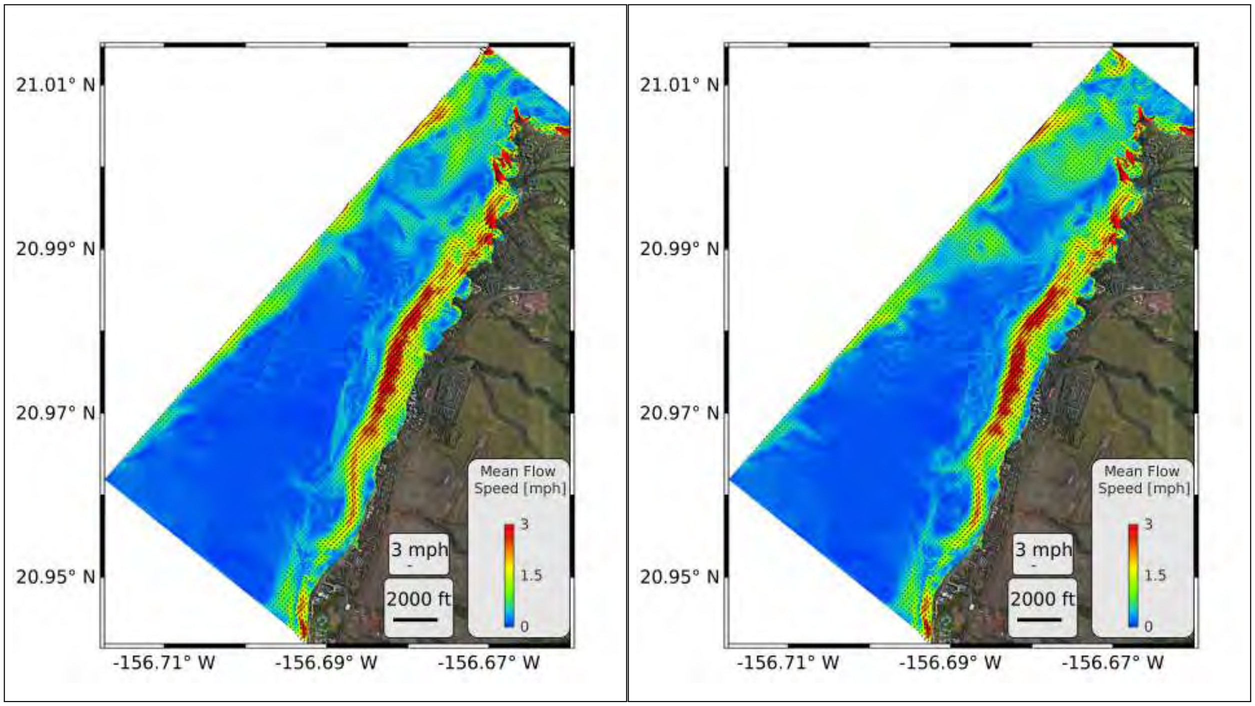
Free surface setup (original grid) Free surface setup (modified grid)

Figure 49: *BOSZ* free surface setup with input wave conditions of 50-year Northwest swell.



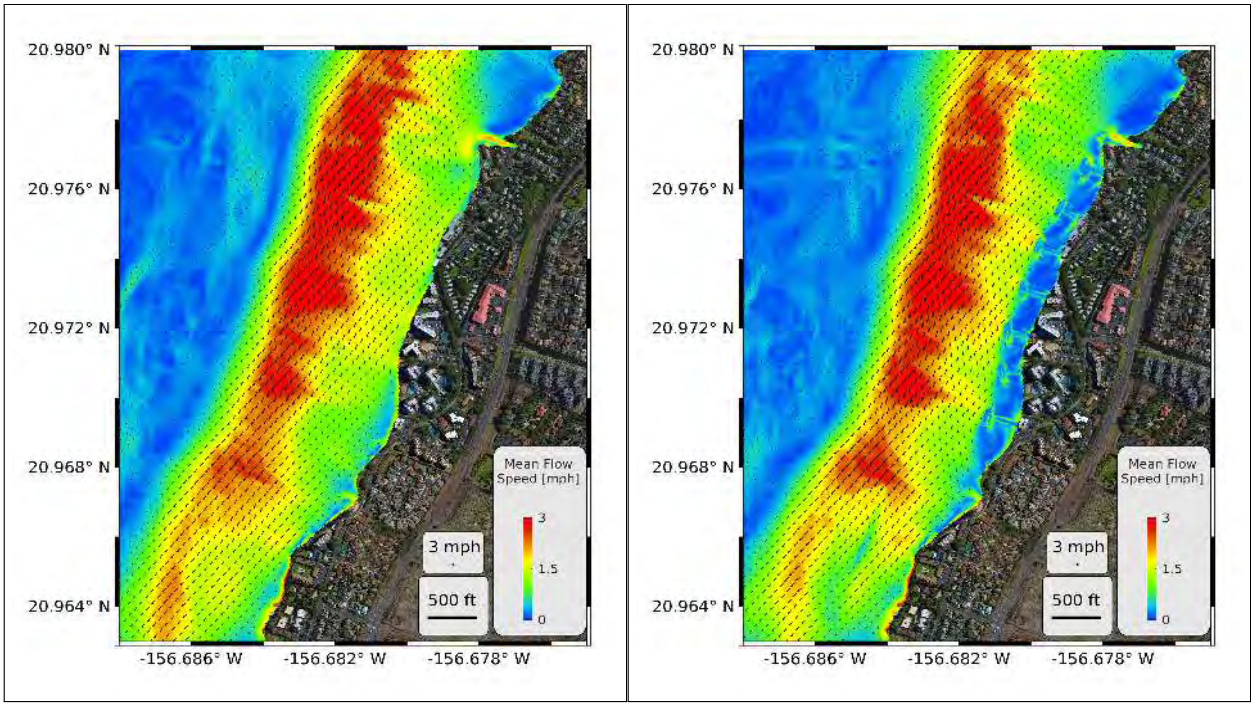
Free surface setup (original grid) Free surface setup (modified grid)

Figure 50: *BOSZ* free surface setup with input wave conditions of 50-year Northwest swell.



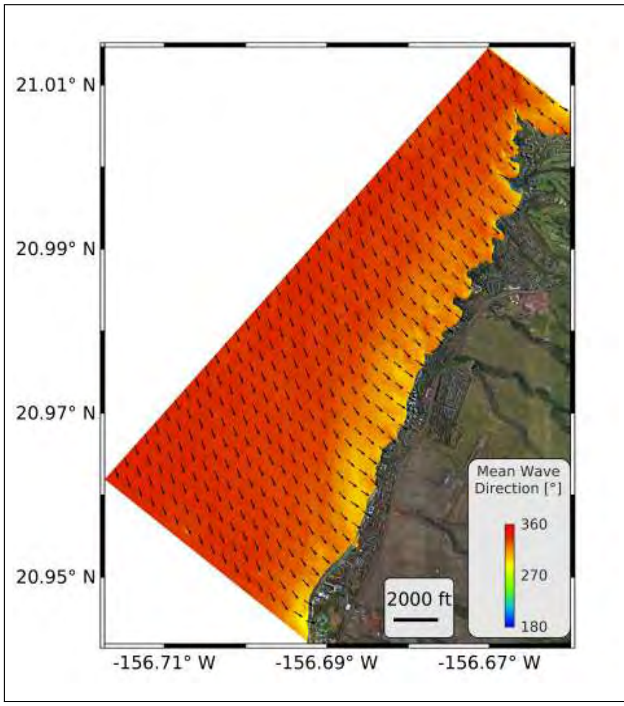
Mean flow velocity (original grid) Mean flow velocity (modified grid)

Figure 51: *BOSZ* mean flow velocity with input wave conditions of 50-year Northwest swell.

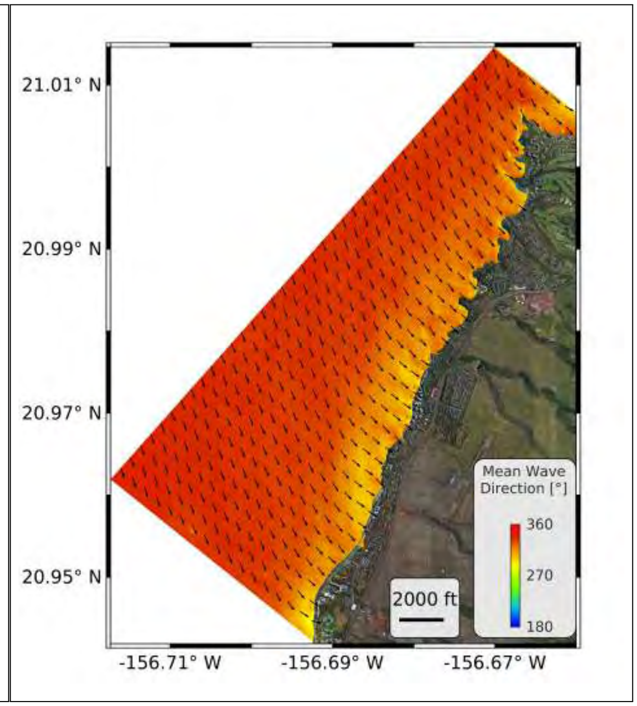


Mean flow velocity (original grid) Mean flow velocity (modified grid)

Figure 52: *BOSZ* mean flow velocity with input wave conditions of 50-year Northwest swell.

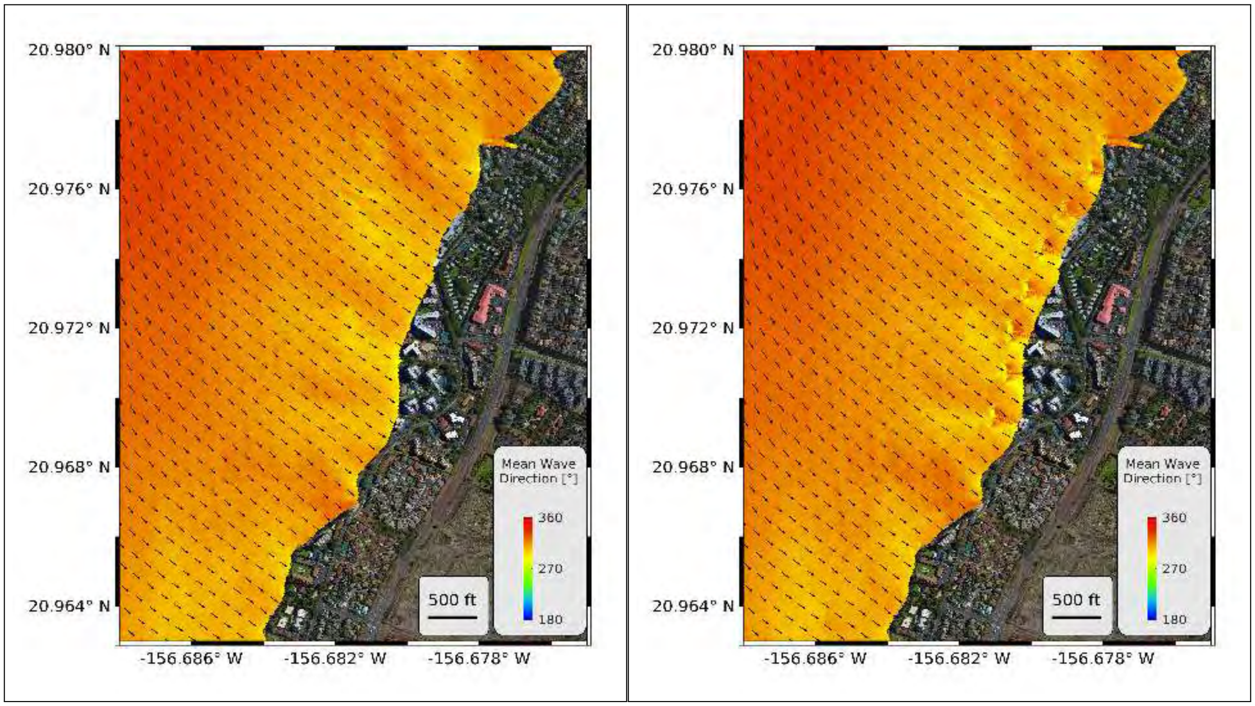


Mean wave direction (original grid)



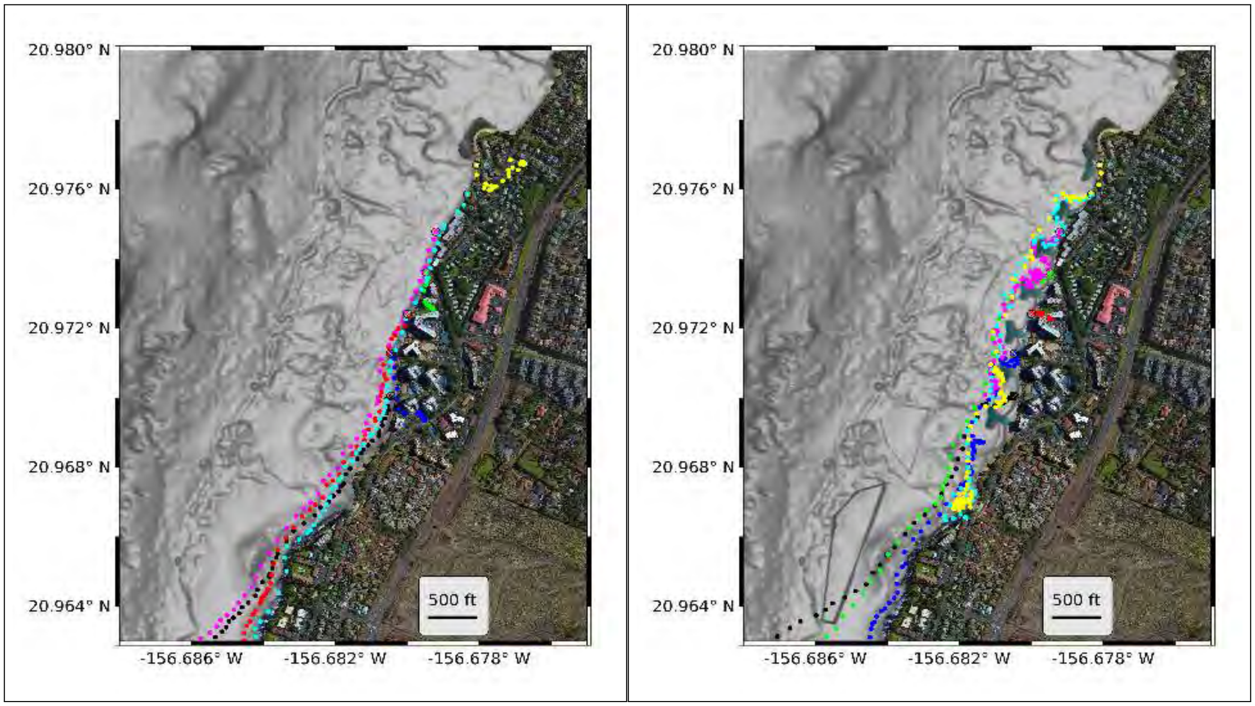
Mean wave direction (modified grid)

Figure 53: *BOSZ* mean wave direction with input wave conditions of 50-year Northwest swell.



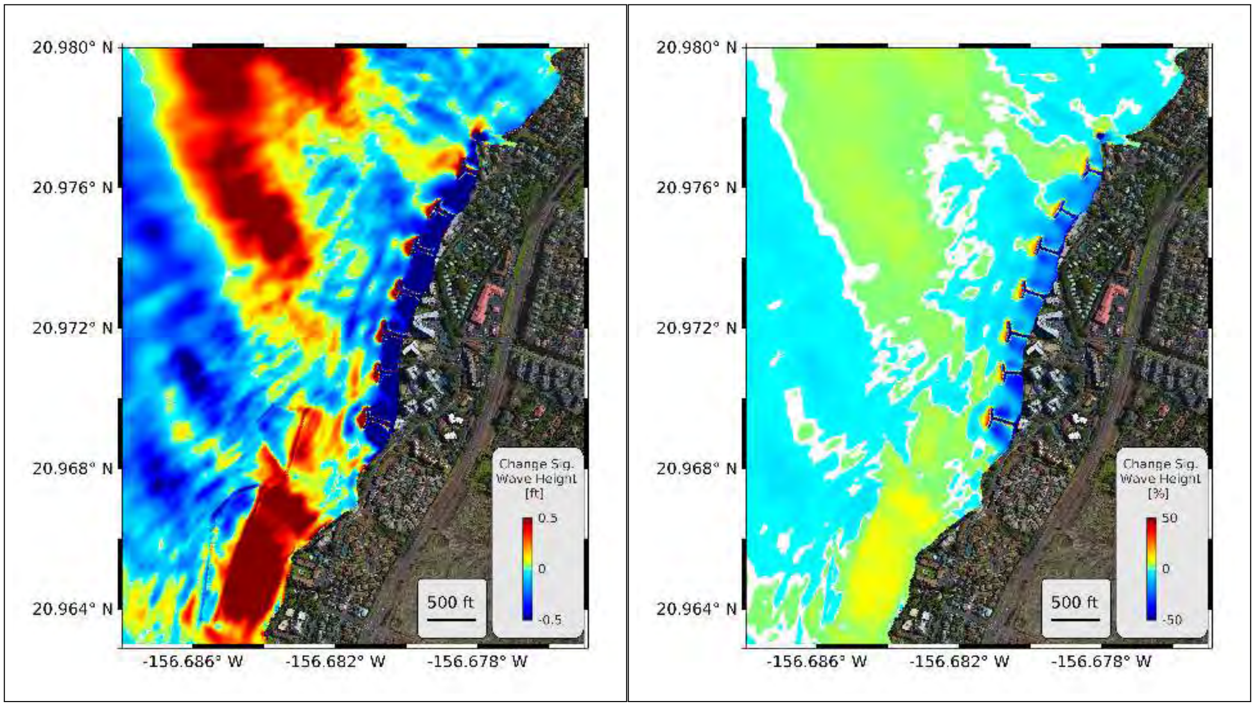
Mean wave direction (original grid) Mean wave direction (modified grid)

Figure 54: *BOSZ* mean wave direction with input wave conditions of 50-year Northwest swell.



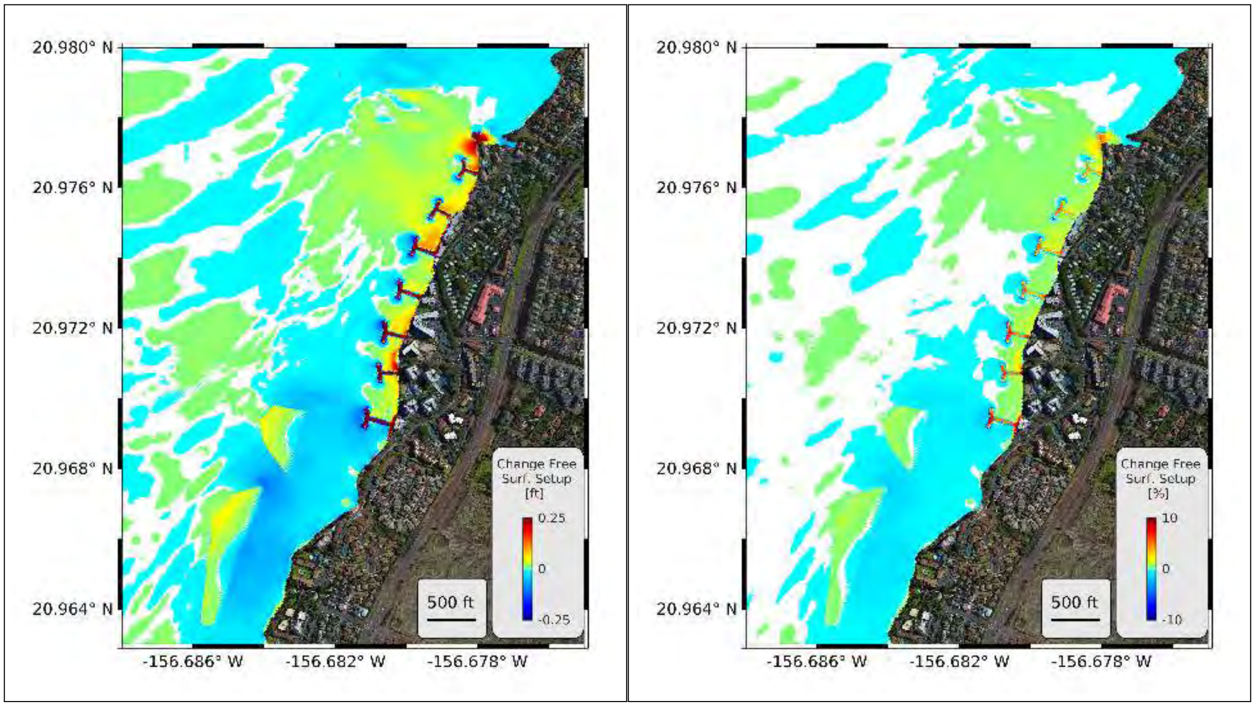
Pathlines of seven tracers (original grid) Pathlines of seven tracers (modified grid)

Figure 55: *BOSZ* pathlines of seven tracers/drogues placed at 1ft depth in the center of two adjecent groins with input wave conditions of 50-year Northwest swell.



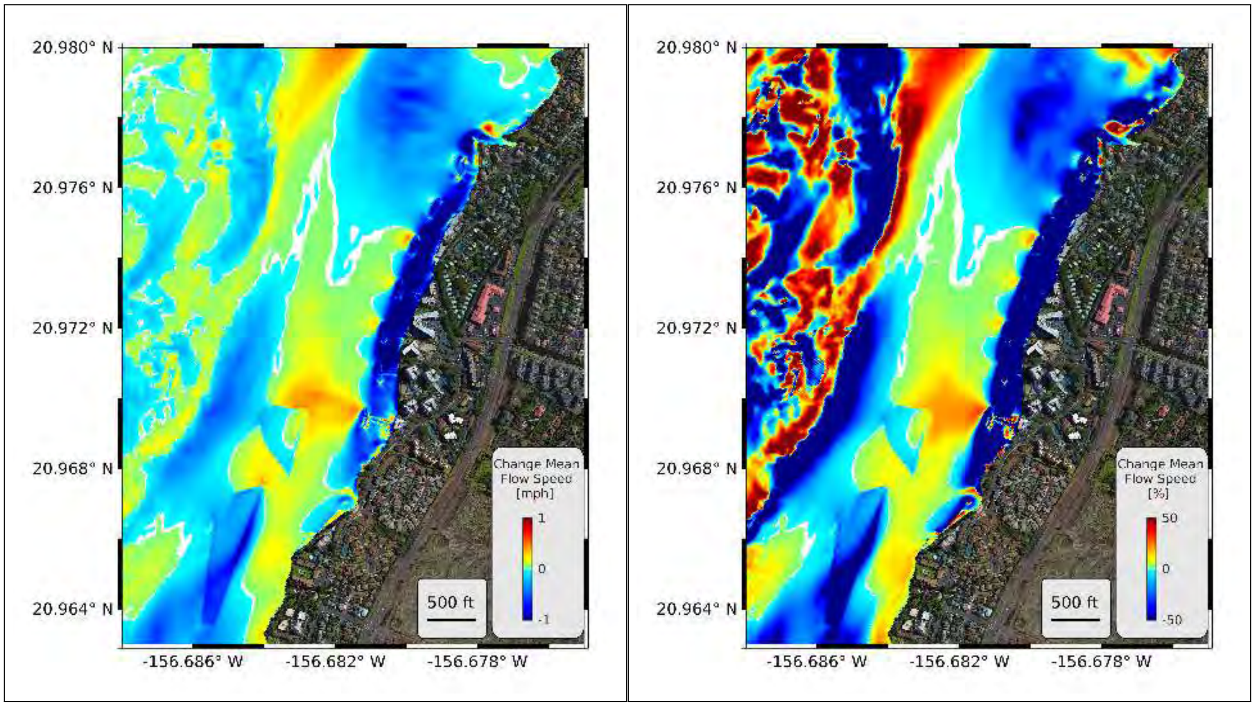
Absolute difference in Hs (original grid) — Relative difference in Hs (modified grid)

Figure 56: Difference in significant wave height between original and modified grid with input wave conditions of 50-year Northwest swell.



Absolute difference in setup (original grid) Relative difference in setup (modified grid)

Figure 57: Difference in free surface setup between original and modified grid with input wave conditions of 50-year Northwest swell.



Absolute difference in mean flow velocity (original grid)

Relative difference in mean flow velocity (modified grid)

Figure 58: Difference in mean flow velocity between original and modified grid with input wave conditions of 50-year Northwest swell.

4 High resolution plots and Animations

All figures from section 3 are available in 400 dpi resolution. The plots are in the main folder `Kahana_BOSZ_figures`, which is divided into five subfolders:

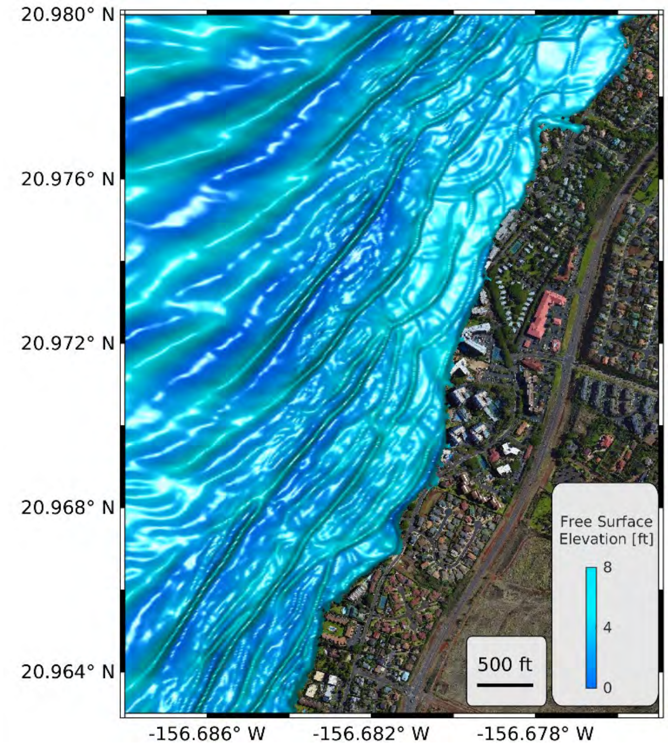
- `grid_3p66m_present`
- `grid_3p66m_groins`
- `Difference`
- `All_animations_present`
- `All_animations_groins`

`All_animations_present` and `All_animations_groins` contain all animations (4 animations per swell, 16 in total for present and groin scenario, respectively).

`grid_3p66m_present` and `grid_3p66m_groins` contain two folders for each swell event (8 in total) with the high resolution figures covering the entire domain and close-up views of the Kahana site, respectively. For example, for the North swell event, these folders are called `figs_N` and `figs_N_small`.

Kahana Bay Nearshore Wave Assessment Study with the Boussinesq Ocean & Surf Zone Model (BOSZ)

Part III – Discussion of Coastal Processes



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February 2021

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ACRONYMS AND ABBREVIATIONS

BOSZ	Boussinesq Ocean & Surf Zone Model
DEM	Digital Elevation Model
Dp	Peak Direction
Ft	Foot/Feet
Hs	Significant Wave Height
MLLW	Mean Lower Low Water
MSL	Mean Sea Level
N	North
NW	Northwest
S	South
Tp	Peak Period

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1. INTRODUCTION

This report is the third part of the Kahana Bay nearshore wave assessment study. The first part describes the bathymetry preparation, the selection and input of wave conditions for the computations with BOSZ model, and the computed results for the existing terrain conditions. The second part focuses on the modeling study for post-project conditions after the proposed action and presents the computed results in comparison with the ones from the existing conditions. The calculations of all scenarios from the first part were repeated in the second part at higher spatial resolution. This report as the third part of the wave assessment study focuses on discussions of the modeling results and their implications on potential impacts of the proposed action. As the modeling of the fifty-year extreme event is for the purpose of structure stability design, only the three one-year return period events are discussed here to evaluate the functionality and the potential impacts of the project design. Moreover, this report includes two additional swell scenarios to provide insights into whether or not the proposed action would change the surf conditions at the S-turns surf spot in vicinity of the project site.

Unless otherwise noted, the Wave Assessment Report Part II is herein referenced as Part II, and all figure numbers herein reference the figures in Part II.

2. WAVE PROCESSES UNDER EXISTING CONDITIONS

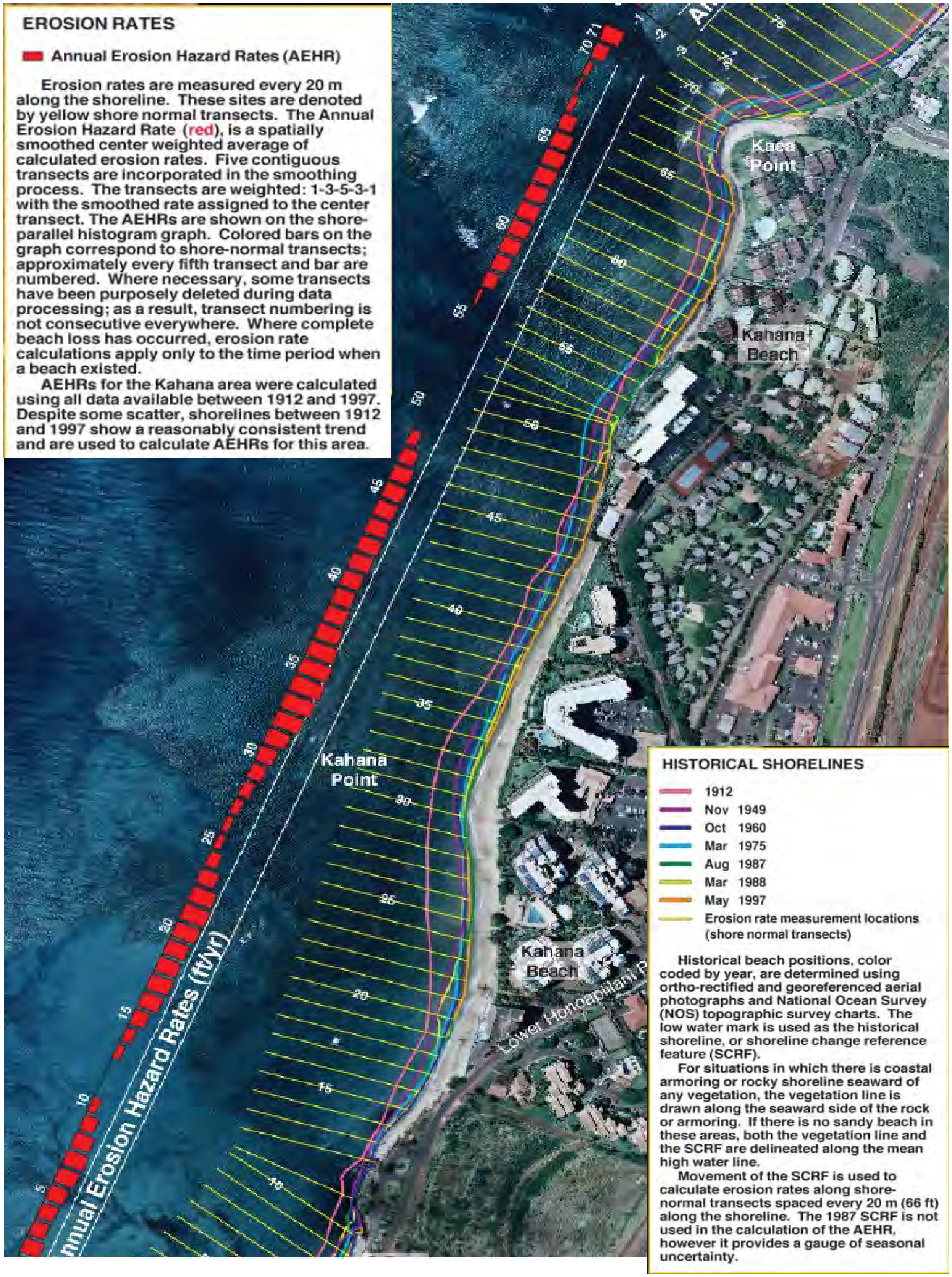
2.1 One-year Northwest Swell

The modeling results from the one-year return period northwest (NW) swell under the existing conditions are provided in Part II, Figures 5 to 18. This swell represents an annual extreme wave event that is typical for the winter season and may cause significant beach recession. The model captures the detailed wave propagation and transformation processes from deep water into the nearshore region. The incident waves approach the shore obliquely with notable shoaling and refraction over the shallow reef sections. Close to the point of wave breaking, the wave crests gradually align with the shoreline. The result of the computed significant wave height in Figure 8 provides an indication of the overall energy distribution at Kahana Bay and along the project coastline. The reef shows strong variations alongshore with deep channels in the bathymetry that focuses the nearshore waves into distinct energy beams toward the shore. The radiation stress resulting from the variation in breaking wave height causes setup and setdown of the mean water level as shown in Figure 10. It should be noted that the color scale in the figure is referenced to the mean lower low water (MLLW) level. The still water level in the computation is 3 feet (ft) above the MLLW, i.e., the actual wave setdown and setup are in the range of -0.4 ft to 0.6 ft. The overall pattern shows the wave setup over the reef decreases towards the South. This is due to an overall decrease of the offshore wave energy from North (N) to South (S) and also an effect of a narrowing reef. High values of wave setup are usually associated with abrupt energetic wave breaking and a subsequent shallow bathymetry between wave breaking point and shore.

The setup and setdown are second-order quantities resulting from the momentum balance due to breaking waves. Longshore variations in wave setup subsequently induce recirculation currents as a process to balance the differences in the nearshore water level. These effects combined with the wave-driven currents resulting from the oblique wave approaching drive a strong southerly longshore current. The strongest wave-driven currents can be observed at the reef edge close to the initiation of wave breaking. Nevertheless, the reef in front of the Royal Kahana hotel and its immediate vicinity exhibits a rather deep and narrow reef section, which causes the energetic waves to reach the shore with only little dissipation. In contrast to other locations along the Hawaiian Islands, the Kahana Bay site lacks a typically wide and shallow reef section, which often acts as an efficient buffer of incoming waves. The project site consequently experiences strong longshore currents close to shore that carry the potential for substantial erosion. The flow pattern suggests that the sand along the eroding stretch of shoreline at Kahana is transported south before returning offshore. The shore fronting the Valley Isle Resort functions as a headland disrupting the longshore current and thus protecting from sand loss at the small beach immediately south. These results are overall consistent with the coastal erosion study conducted by the Coastal Geology Group at the University of Hawaii (Figure 2-1 of this report).

2.2 One-year North Swell

The BOSZ computation results for the one-year N swell are shown in Figures 19 to 32. The waves approach the shore in a slightly more oblique angle compared to the NW swell. The offshore wave height distribution shows distinct wave reflection from the reef bathymetry (Figure 22). The wave breaking processes over the reef produce smaller wave set up along the shore compared to the NW swell due to the smaller incoming waves of the N swell. However, the wave setup distribution and attenuation towards the South are similar. The flow pattern shows a relatively uniform southerly current over the nearshore reef that is consistent with the flow field of the NW swell.



Source: UH, 2016

Figure 2-1: Map showing shoreline erosion rates (ft/yr)

2.3 One-year South Swell

Part II Section 3.4 (Figures 33 to 44) presents the results for the one-year S swell. The S swell represents an annual extreme wave event that is typical during the summer. The swell approaches from a large southerly angle. The individual waves refract over a wide stretch of the insular shelf and nearshore reefs around the western coast of Maui. In contrast to the NW and N swells, the circulation pattern from the S swell scenario is significantly different, as shown in Figure 40. Besides the much smaller incoming wave energy than in the NW and N swell scenarios, the stronger refraction processes also lead to a decrease in wave height over the reef and close to shore. Consequently, the nearshore currents are rather weak at the project area with less distinct flow direction. Whereas the mean flow direction in the NW and N swells are rather unidirectional, the flow patterns of the S swell are irregular and mostly concentrated around the channels in the reef with distinct rip currents. Particularly, the very weak flow speed along the shoreline lead to the assumption of only very little sand movement and that even the rip currents along the channels in the reef would unlikely transport significant amounts of beach sand offshore. Figure 41 shows minimal motion of nearshore drifters even under the present shoreline conditions, whereas the drifter paths in the NW and N swells indicate a strong southerly flow regime even close to shore.

3. WAVE PROCESSES UNDER POST-PROJECT CONDITIONS AND THEIR POTENTIAL IMPACTS

The proposed action, which involves offshore sand extraction, beach nourishment, and T-head groin structures was incorporated in the BOSZ computations through modification of the input bathymetry and topography (see Part II for the detailed description of the methodology). The modifications only affect the sites of sediment extraction, the beach zone where nourishment is planned, and the sections covered by the T-groins. The depth values of the digital elevation model (DEM) are identical in all other areas of the numerical domain. The calculations of all swell scenarios were then repeated with the modified DEM to decern potential changes in the wave and current patterns induced by the proposed action. The wave and current outputs from the BOSZ computations can provide insights into potential impacts of the proposed action to neighboring beaches and properties. The results for each swell event are shown in the right panels of the same figures as for the existing conditions.

3.1 One-year Northwest Swell

As shown in Figure 12, the placement of T-groins effectively deflects the longshore current seaward, which reduces the likelihood of beach loss. While the nearshore drift is sensitive to the proposed structures, no significant change is shown in the current patterns offshore of the structures. The results also show that the proposed sand extraction slightly slows the flow pattern locally at the dredging site, but no significant change in the overall circulation condition is shown over the adjacent reef area.

In addition, a closer investigation on the possible change of wave and current conditions at neighboring beaches and properties along the shoreline is needed. The beach immediate north of the project site is bounded by the headland at south, which would be reinforced in the proposed project, and the adjacent headland about 1,100 ft to the north. From the modeling results, the structures show their effects starting from the reinforced headland to the downdrift area. The wave and current conditions are almost identical under the existing and the post-project conditions, which is mostly due to the very similar overall wave field and the induced wave setup. The groins mainly affect the flow field in the immediate vicinity of the structures without interfering with the general flow field and longshore currents over the reef.

The drifter computations clearly show that some flow particles would be retained and even washed up onshore within some circulation cells between the groins. Particles that are moved out of the circulation cells move at much slower speed compared to the drifter particles under the existing conditions. Both observations suggest that the groin structures would efficiently keep the nourished sediment in place – even under energetic swell conditions.

For the downdrift area of the project site, the natural headland of the Pohaku Park forms a shore-bound circulation cell with the last groin, which favorably extends the functionality of the last groin and protects the beach in between. S-turns beach has a complex circulation pattern due to the underlying reef and bathymetry. The rip current in the reef channel under the existing conditions suggests likely sand loss from the beach during large NW swell events (Figure 12). The computed results under the post-project conditions show no significant change of the rip current pattern.

The sand extraction at Site 22 increases wave height due to sudden wave shoaling from changes in bathymetry, but only immediately offshore from the dredging pocket. It is safe to assume that this effect will weaken over time due to a natural leveling of the sediment in the extraction area. It should be noted that the altered DEM reflects the extraction site as a rather steep and sudden transition as it would be the case immediately after the extraction operation. The transition would naturally smooth out over time. The nearshore zone directly *makai* of the project properties is not affected as shown in Figure 8.

3.2 One-year North Swell

The effects of the proposed action for the one-year N swell are similar to that for the one-year NW swell, and therefore will not be discussed further in this report. It can be noted that the circulation cells induced by the groins would even have higher efficiency in retaining fluid particles as shown in Figure 29 by the tracer computations.

3.3 One-year South Swell

The groin structures significantly reduce the wave heights inside the cells due to wave diffraction (Figure 42). Further, the rip current patterns are shifted slightly offshore due to the buffering effect of the structures (Figure 40). The complementary effects of the two indicate the efficacy of the structures for erosion control during S swells, which is also evidently shown by the tracer computations in Figure 41. The proposed action does not significantly change the wave and current patterns from the existing conditions outside the project site, as indicated from the direct comparisons of the results in Figures 33 to 44.

4. SURF IMPACT STUDY

The nearby surf break offshore Pohaku Park (or S-Turns) is very popular among surf community and attracts both local residents and tourists. To assess the impact of the proposed action to the surf conditions at S-Turns, two additional scenarios, a one-year northwest swell with 50% energy intensity and a typical northwest swell with smaller *Hs* and *Tp*, were modeled for both existing and post-project conditions for direct comparison.

4.1 One-year northwest swell with 50% energy intensity

The reduced-energy northwest swell was computed at MSL (1.1 ft above MLLW) and is more representative of the typical surfing conditions on a daily basis. The resulting wave field shows significant wave heights of ~3.5 ft near the surf spot.

From the comparison between the left and right panels of Figures 59 to 72, there is no significant change shown in wave breaking due to the proposed action. These findings were highlighted by the computed results of surface elevation (Figure 60) and wave height (Figure 62). The minor increase in wave height in the nearshore from the sand extraction Sites 22 and 19 possibly provide benefits to surfing conditions and could lead to favorable conditions during small swell events. See Part II Section 3.6 for more detailed results.

4.2 Northwest Swell with 5ft Wave Height and 14-second Peak Period

The figure numbers in this section do not reference Part II but this report itself.

The second scenario modeled represents a quality surfing condition, which in this case is a typical northwest swell with wave height of 5 ft and peak period of 14 seconds (sec). The computation was based on a low tide level of 0.5 ft above MLLW. This scenario was not included in the Wave Assessment Report Part II, and therefore the figures from the results are included in this Part III.

The swell was modeled for the present bathymetry and the modified bathymetry that reflect the proposed action. The two bathymetry inputs are identical to the ones used for Part II of the study but at even higher spatial resolution. The computational grid size was reduced to 6.5 ft (vs. 12 ft used for Part II) to obtain a more detailed representation of the wave crests. Two animations of free surface elevation from the existing conditions and the post-project conditions were generated to provide a direct comparison of typical wave-by-wave processes. The animations show a 2-min duration of wave propagation towards the end of the computation of a total 2 hours and 10 min.

Figures 4-1 and 4-2 show snapshots of wave propagation at 45 sec and 90 sec around the S-Turns area. As seen in the upper panels, the wave crests are tracked and indicated by black dots along a shore-normal transect denoted by a dashed white line, which runs along the edge of the reef approximately where the surfers ride the wave. The values of the free surface elevation and the corresponding Iribarren number (also known as surf similarity parameter) at the wave crest positions are shown in the lower panels of the figures. The non-dimensional Iribarren number (ξ_b) is widely used in the surfing community as an indicator of the type of wave breaking such as spilling, plunging, collapsing, or surging. An Iribarren number in the range of 0.4 to 2.0 corresponds to a plunging breaker and value below 0.4 indicates a spilling breaker.

The results from the existing conditions and the post-project conditions show near-identical wave heights, wave phases, and breaker types, i.e., the proposed action does not show negative impacts on surfing quality at the surf spot under the modeled NW swell scenario. The computations indicate that the waves at the surf spot break energetically. A surfer would experience a spilling breaker (ξ_b<0.4) for some locations along the shore-normal transect and a plunging breaker (ξ_b>0.4) in other sections with typical overturning waves in the form of "tubes" or "barrels". This confirms that the input waves are representative for favorable surf conditions at the spot.

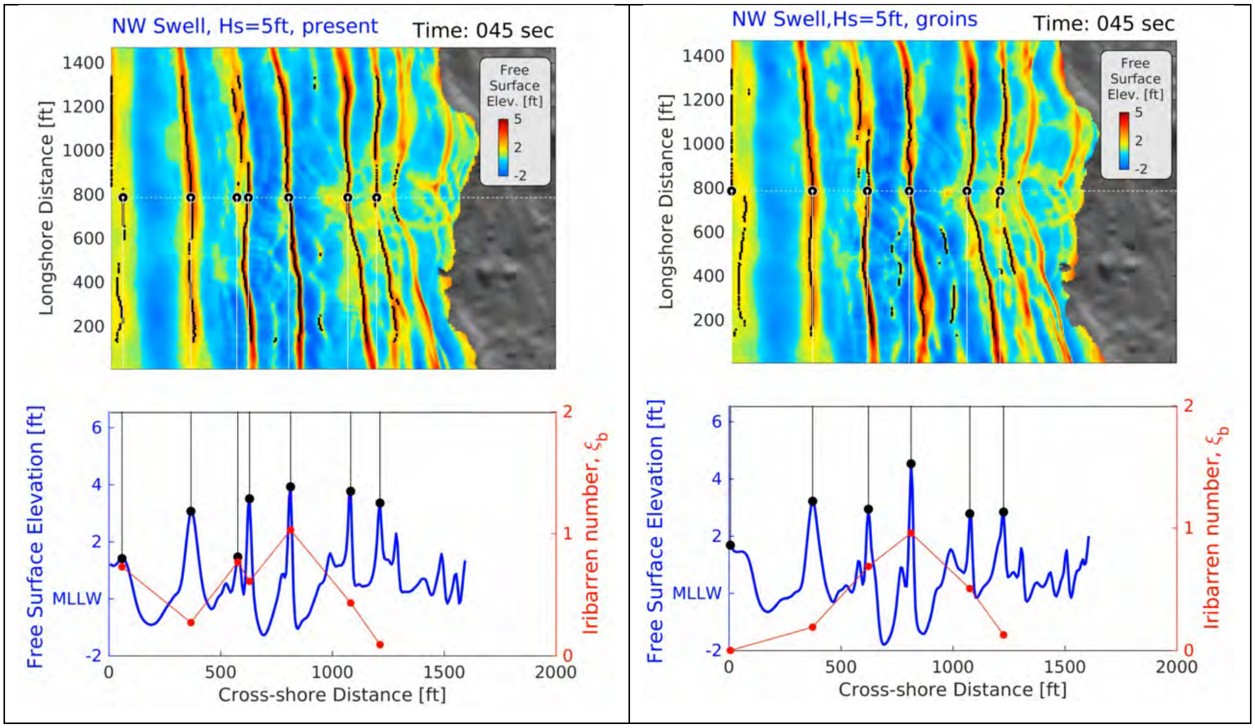


Figure 4-1: Wave propagation at 45 seconds around the S-Turns area under existing conditions (left) and post-project conditions (right)

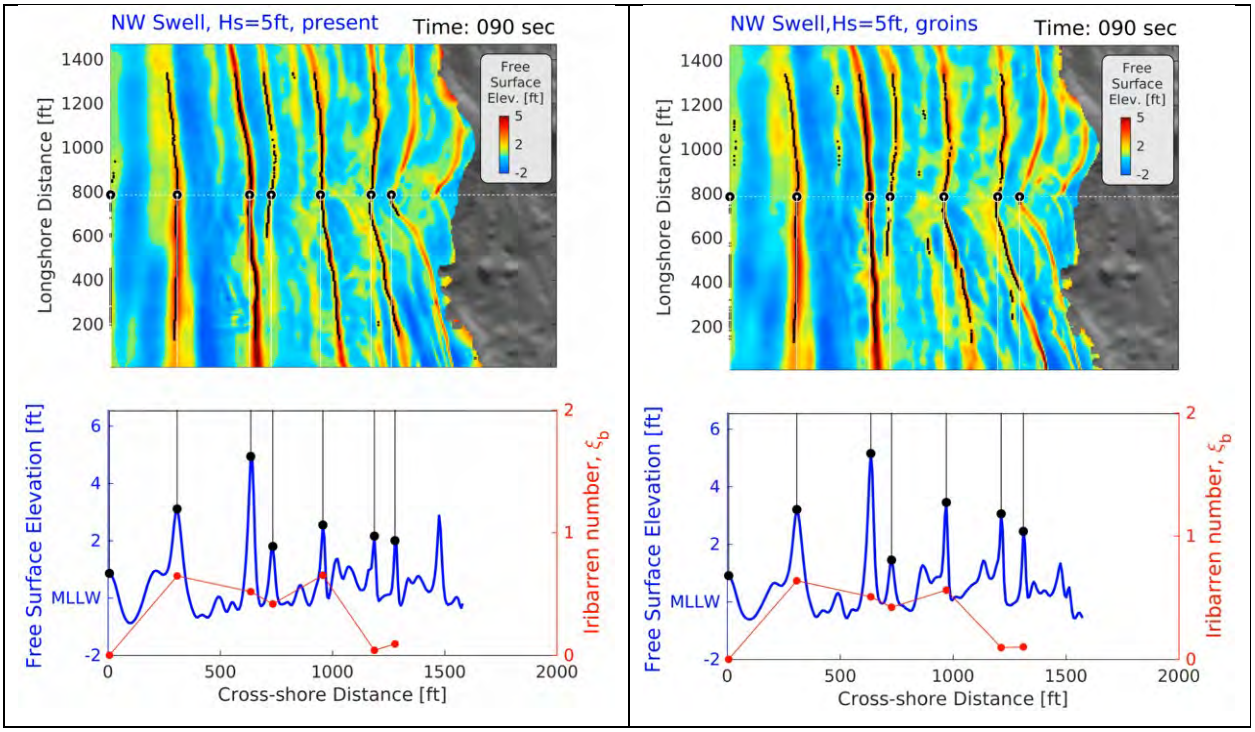


Figure 4-2: Wave propagation at 90 seconds around the S-Turns area under existing conditions (left) and post-project conditions (right)

5. CONCLUSIONS

A multi-scale model system driven by three one-year return period swell events has provided the wave conditions for the project design of beach erosion mitigation at Kahana Bay. The one-year swells (NW, N, S swells) correspond to annual extreme events during winter or summer that may cause significant beach erosion. Wave-breaking induced setup and the oblique direction of the incident waves generate distinct and uniform southerly longshore currents from the NW and N swells. The S swell produces circulation cells along the project coastline with some rip current along the reef's channels that could possibly transport beach sand offshore.

The modeling effort with the incorporated project design provides evaluation of the efficacy of the proposed design and its potential impacts. The placement of the structures efficiently disrupts the longshore current to retain the beach sand during NW and N swells and protects the beach sand against the rip current patterns from S swells. In addition, the proposed action does not induce significant changes on wave and current patterns outside the project site, which underlines that no negative impact to the neighboring beaches and properties is expected.

Two additional wave conditions that represent desirable surfing conditions were modeled to assess whether or not the proposed action, especially the sand extraction, would impact the surf break at the S-Turns location. The direct comparison between the existing conditions and the post-project conditions of free surface elevation and surf similarity parameter shows no significant negative impact to the surf quality of the S-Turns spot.

6. REFERENCES

University of Hawaiʻi, 2016. Shoreline Study Erosion Maps. Hawaiʻi Erosion website, Coastal Geology Group, UH at Mānoa. Accessed August 2018. Available at: http://www.soest.Hawaiʻi.edu/coasts/erosion/Maui/index.php

Appendix B:

Kahana Bay Sand Study

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Kahana Bay Sand Study
July 2020

Prepared for:
Kahana Bay Steering Committee

Prepared by:
Ecological Monitoring and Analysis LLC
And Oceanit Coastal Corporation

EXECUTIVE SUMMARY

Kahana Bay in West Maui, Hawaii comprises approximately 3,700 feet of shoreline located between Kahana Stream (to the north) and Pohaku Point to the south. The beach undergoes seasonal erosion and accretion with a net loss of sand. The estimated average shoreline loss is between 0.5 to 1.9 feet per year. Maui County and Kahana Bay Steering Committee (KBSC) plan to stabilize the beach by replenishing sand from offshore and building stabilizing structures. This study focuses on evaluating the suitability of sand from several offshore sources for the beach replenishment.

To evaluate the quality of sand available for a regional scale beach replenishment project in the Kahana Bay region of West Maui, a two-day research cruise was conducted. The work focused on three submarine sand patches near to the project area. These prospective sand sources are referred to as P18 (further offshore and in deeper water), P19 (nearshore in shallow water) and P22 (nearshore in shallow water). At each prospective sand source, studies were conducted to document the thickness of the sand deposit, the quality of the sand in the deposit and characteristics of the benthic biota within and adjacent to the deposit. The volume of sand in each deposit was calculated from areal extent of the sand deposit and from the average thickness of the sand layer. Samples of sand from the project area beach were also collected to test the suitability of the sand sources placement on the project shoreline.

Biological communities at sand sources were variable. Benthic infaunal invertebrate communities appeared to be most rich and abundant in the sand at P18, with numerous burrows, fecal castings and small tubes observed. Very few benthic infaunal organisms were observed at P19 and P22, however Capitellid worms were disturbed during jet-probe work at these sites.

Jet-probe measurements of sand deposit thickness showed that P18, P19 and P22 had an average thickness of 2.4, 3.4 and 7.2 feet, respectively. Plumes were generally formed in deposits deeper than 2 to 3.2 feet and were present at all sites. Plumes generated during jet-probing at P19 and P22 were heavier than the plumes formed at P18.

Sand at the surface of the borrow sites P19 and P22 was typical of light tan coral sand. With depth below the deposit surface, sand had slightly darker coloration. P18 had uniformly darker sand than at other sites.

Sand from P19 was tested for arsenic and organochlorine pesticide contamination and had background levels of arsenic and undetectable levels of organochlorine pesticides.

Grain size analysis of beach sand and multi-increment samples from P18, P19 and P22 demonstrated that P19 and P22 met all State of Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands criteria for sand suitable for beach nourishment. Sand from P18 was finer than sand at the other sites.

Using the conservative dredge footprints, proposed in the present study, the two nearshore sand deposits (P19 and P22) are together estimated to contain ~130,000 cubic yards (cy) of sand. An 80% recovery rate would yield ~104,000 cy of sand.

The sand from the sources were found to be acceptable for the proposed beach replenishment.

TABLE OF FIGURES

TABLE OF TABLES

ABBREVIATIONS

BGS	Below Ground Surface
$CaCO_3$	Calcium Carbonate
DAR	Hawaii Division of Aquatic Resources
DLNR	Hawaii Department of Land and Natural Resources
DOH	Hawaii Department of Heath
DU	Decision Unit
EPA	United States Environmental Protection Agency
GPS	Global Positioning System
HI	Hawaii
KBEIS	Kahana Bay Environmental Impact Statement Sand Study
KBRSS	Kahana Bay Regional Sediment Survey
KBSC	Kahana Bay Steering Committee
Lat	Latitude
Lon	Longitude
MI	Multi-Increment
M&N	Moffatt and Nichol
OCCL	Hawaii DLNR Office of Conservation and Coastal Lands
RTE	Rising Tide Engineering
RK	Royal Kahana
RKSS	Royal Kahana Sediment Search
SCUBA	Self -Contained Underwater Breathing Apparatus
SSBN	Small Scale Beach Nourishment
STDEV	Standard Deviation
TMK	Tax Map Key
±	Plus or minus
≤	Less than or equal to
≥	Greater than or equal to

Units of weight and measure

ft	feet or foot
ml	milliliter
yd	yards or yard
cy	cubic yards
yd^3	cubic yards
m	meter or meters
m^2	square meters
m^3	cubic meters
km	kilometers
cm	centimeter 1/100th of a meter
mm	millimeter 1/1000th of 1 meter
micron	micron 1/1000th of a mm
g	gram
kg	kilogram 1000 grams
Phi	-log base 2 of sediment grain size in mm

Introduction

Site Description

Kahana Bay comprises approximately 0.7 miles (mi; 1.1 kilometers; km) of shoreline in West Maui between Kahana Stream (to the north) and Pohaku Point (to the south; **Figure 1**). It is a site of chronic shoreline erosion accompanied by seasonal erosion and accretion of beach sand. Shoreline loss has been estimated from analysis of prominent shoreline features in georeferenced aerial imagery. Various use of imagery, shoreline features and indicators of shoreline change has resulted in shoreline erosion rate calculations ranging from a loss of 0.5 to 1.9 ft/year at Kahana Bay (Fletcher et al., 2003; County of Maui, 2016). Along this stretch of coastline, the width of the beach can vary greatly throughout the year. The beach shows a consistent pattern of accretion in summer and erosion in winter. Since fixed-camera based beach monitoring began in 2015 at the Royal Kahana Condominiums, the beach in the northern bay has eroded and returned nearly every year (**Figure 2**). Further, during high-tides, episodes of high wave runup, or low beach volume, shoreline erosion has been indicated by the release of a red plume which is transported south-ward in the bay (**Figure 3**). To combat the erosion, many property owners have placed geotextile bags or seawalls. These installations have slowed the erosion of shoreline.

Purpose and Need

The Kahana Bay Steering Committee (KBSC), in consultation with the Maui County Planning Department, is planning to restore, rehabilitate and preserve the sandy beach along the bay. The plan includes nourishing the beach with 50,000 to 100,000 cubic yards (cy) of sand from previously identified offshore borrow areas and widen the beach by an average of 50 feet. The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The beach nourishment project would widen the beach to between 35 and 150 ft, with an average with of ~50 ft. The improved beach would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by residents and visitors.

The Hawaii Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Land (OCCL) has instituted strict guidelines for the quality of sand that can be used in beach nourishment (HI DLNR, 2005):

1. Beach fill sands shall not contain more than six (6) percent (%) fines, defined as the #200 sieve (0.074 mm);
2. No more than 50% of the fill sand shall have a grain size diameter less than 0.125 mm, as measured by the #120 sieve;
3. Beach fill sands shall not exceed 10% coarse sediment, defined as the #4 sieve (4.76mm);
4. The size distribution for the proposed fill sand shall fall within 20% of the existing beach sediment, as measured by cumulative percent finer-than or coarser-than values;
5. In cases where the beach fill grain size distribution curve is uniformly finer than the existing beach, the overall ratio of fill to existing sediment shall not exceed 1.5;
6. Beach fill shall be dominantly composed of naturally occurring carbonate beach or dune sand; and

7. Beach fill shall be free of contaminants of any kind including excessive silt, sludge, organics, turbidity, 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.

These rules are intended to ensure that the placed sand matches the grain-size distribution of existing beach sand and is contaminant-free.

For the current beach restoration plan, adequate sources of sand need to be identified and their suitability for the proposed actions needs to be clearly demonstrated. This Sand Quality Study seeks to evaluate the suitability of offshore sand for potential use in a regional scale beach restoration project.

This effort is focused on determining the suitability of sand from previously identified offshore sand deposits for replenishment of Kahana Bay Beach. In addition, biological resources within the sand source was evaluated to assess impacts.

Previous Studies

The chronic shoreline erosion has led to two previous sand search studies that sought to characterize the available volume and suitability of nearshore sand for placement on the beach in Kahana Bay. These studies are described below. In 2015, the Royal Kahana Condominiums (RK) contracted Rising Tide Engineering (RTE) to evaluate the availability of sand suitable for nourishment of the beach in front of their property. This led to the exploration and of identification of five sand deposits in the immediate vicinity of the RK property (P15 through P19; **Figure 4;** RTE, 2015), approximately in the middle of Kahana Bay. The Royal Kahana Sediment Search (RKSS) was conducted in June 2015. It collected surface grab samples from all five identified sites, and measured sand depth by probing with a thin metal rod. Sand samples from the beach were collected in four profiles of the beach using two-inch core tubes. All 20 offshore sand samples (five from P15, four from P16, one from P17, three from P18 and seven from P19) were used for grain size analysis. The RKSS identified one priority site for the SSBN, due to the compatibility of the sand, available volume, proximity to the project site and uncomplicated logistics of sand recovery.

In 2016, the possibility of a regional scale beach nourishment project pushed the Royal Kahana's SSBN to the back burner, and the county coordinated Moffatt and Nichol's (M&N) effort to characterize the sand availability for the Kahana Bay Regional Sediment Survey (KBRSS; County of Maui 2016). This project utilized a sub-bottom profiler, diver operated jet-probe and 6-inch (15 cm) diameter vibracore to evaluate regional sediment availability. A sparse survey of major sand deposits in the region was made by towing the sub-bottom profiler along the major axes of each deposit. Subsequently, four sand deposits in the south end of Kahana Bay were given more focus: P18, P19, P22 and P23 (further to the south, not shown). At these deposits, the sub-bottom profiler was towed in orthogonal tracks to completely cover the footprint of the sand fields as identified from aerial photographs. At seven selected sites, were collected. At each vibracore site, diver operated jet-probing was also conducted to validate sand depth and quality. One surface grab sample from P22 was also collected and analyzed. No sediment from the vibracores has been analyzed to date. This study identified four possible donor sites (P18, P19, P22 and P23), selecting P22 and P19 as priority sites, with ~270,000 cy (206,000 m^3) of sand between the two.

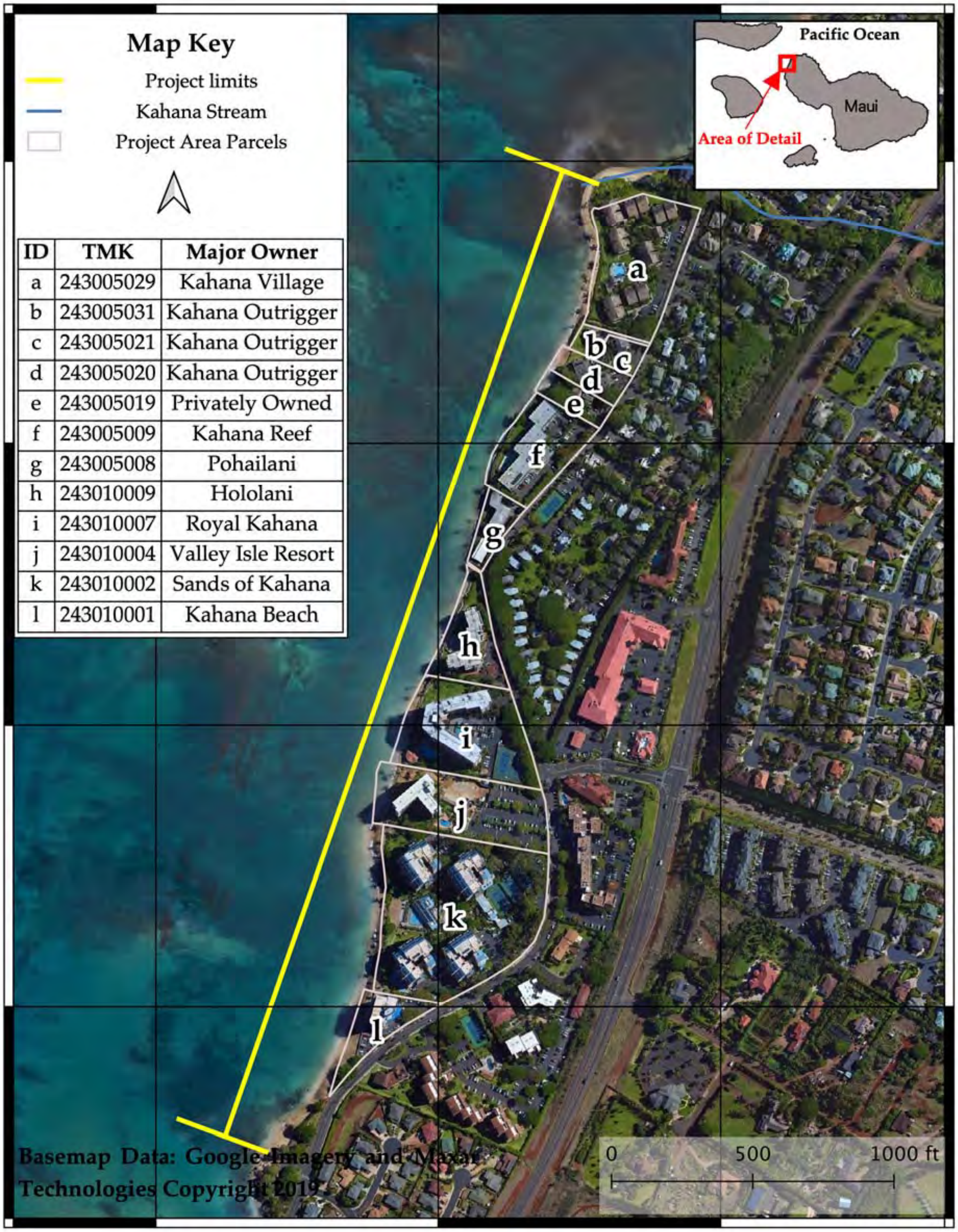


FIGURE 1 PROJECT AREA

Parcels in the Kahana Bay project area are outlined in white and identified in the table by Tax Map Key (TMK) and major owner. Yellow lines indicate the limits of the project shoreline.

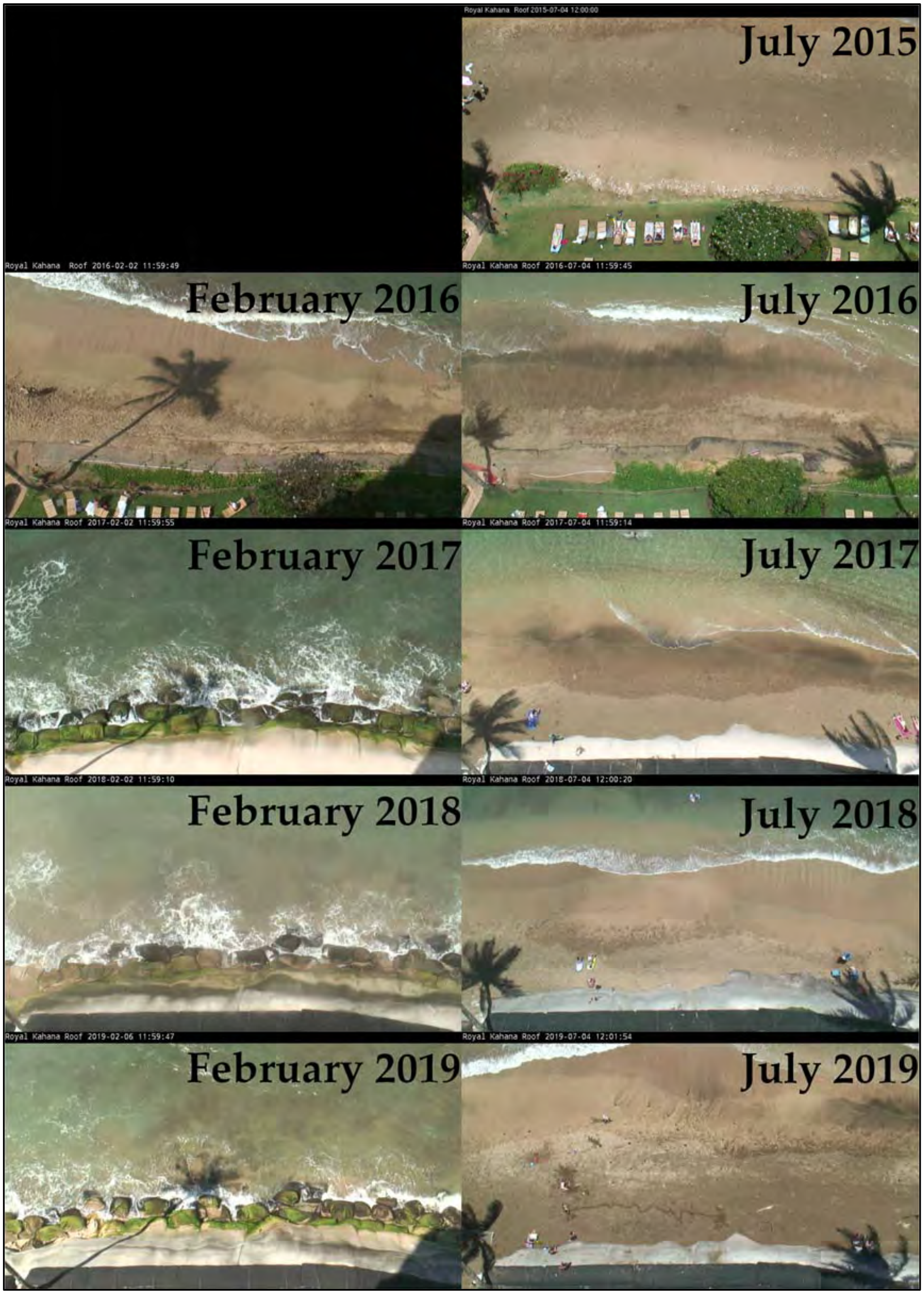


FIGURE 2 CHANGES IN SAND AREA OF THE PROJECT BEACH OVER TIME

Photographs taken from fixed-camera monitoring of the shoreline in front of the Royal Kahana Condominiums show that the beach at that location follows the general pattern of fall-winter erosion, and spring-summer accretion.

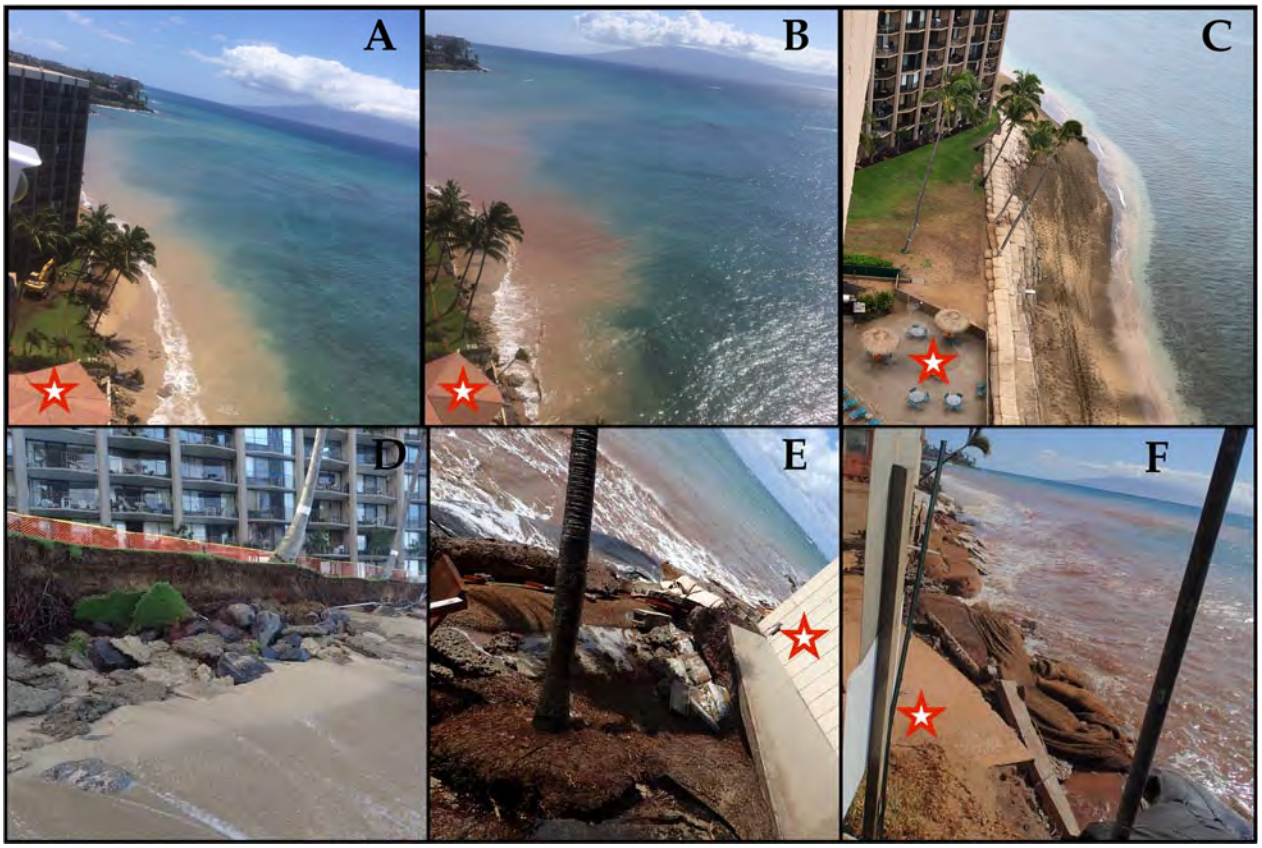


FIGURE 3 SHORELINE EROSION IN KAHANA BAY
Rapid shoreline erosion in April 2016 proceeded from sand loss (A) to shoreline loss (B) over the course of less than one day. Shoreline was eroded in front of The Valley Isle Resort and Royal Kahana Condominiums (D, E, F). Here, rubble and landscaping material from the cement deck makai of the beach cabana at the Royal Kahana Condominiums can be seen on the remains of the beach. Damage to the Royal Kahana cabana led to its eventual removal. The cabana and its former site are indicated by red stars in panels A, B, C, E and F. Note active placement of shoreline protection in A, loss of cabana (B:C) and coordinated geotextile shoreline protection (C).

From this previous work, three sand deposits, P18, P19 and P22, can be easily identified as strong possibilities for the regional scale beach nourishment project, based on their proximity to the project area, preliminary characteristics and likely volumes. (P23, located far to the south of Kahana Bay is less attractive, based on its distance from the project area.) Disparities in previous methodological approaches to estimating areal extent of sand fields, available sand volume and sand suitability require further data to confirm the quality and volume of the sand available for placement on the beach. Specifically, more attention to sand quality and quantity is needed.

ELEMENTS OF SAND QUALITY

There are several considerations to validate the suitability of sand for the proposed beach nourishment. The regulatory definitions of how the sediment grain size distribution and composition of sand used in a beach nourishment compares to the existing beach sand are the first consideration. The beach and candidate sand borrow sites each have large areal extents. Due to their size, there may be significant differences in sand composition across the resource. For example, the sand at the beach toe is generally much coarser than sand at the beach berm. In this case aeolian (wind-driven) transport of sand can lead to accumulation of finer sand in the high beach, while turbulent wave action may remove fine particles from the beach toe. Thus, along the profile of the beach there may be very different sediment grain size composition. Similar heterogeneity in deposition processes may exist along a shoreline, or across a submerged sand-field. Sand borrow sites may be vertically stratified reflecting the history of depositional energy and depth in the ocean.

To adequately describe the spatially complex sand populations at the project shoreline and in prospective sand borrow sites, numerous samples across the area of each site must be taken. In this study we use the Multi-increment[1] (MI) sampling approach to characterize the beach and sand sites (see also ITRC 2012 and HDOH, 2018). In short, this technique identifies a total sample volume of interest, called a decision unit (DU). A DU is an area where a decision is to be made regarding the extent and magnitude of contaminants with respect to the environmental concerns posed by the contaminants (HDOH, 2018). Numerous small samples, or "increments" are collected throughout that sample volume in order to capture its full range of natural variation. These small samples are pooled into a single MI composite sample that is analyzed for the variable of concern. In the present case, the DUs are the volumes of sand present in each sand source and on the beach. The MI sites are uniformly distributed across the areal extent of each sand source. Sand samples collected at each MI site include a vertical sand core. Thus, the volume of sand is represented in each MI sample for each DU.

Grain-size distribution: A MI sample approach was followed to compare sand quality between each sand field and the project beach. Each sand field was considered to be a separate DU, as was the project beach. Numerous small samples were collected from the volume of sand contained within each DU. These samples were combined into a single MI sample for each DU and analyzed for grain size distribution. This MI sample is statistically representative of the range of sand variability within the DU. This strongly rational approach is helpful to make unambiguous decisions about grain size distributions for large volumes of sand.

Composition: Many beaches in Hawaii are composed of calcium carbonate sands formed from mixtures of skeletons and shells from coral, coralline algae, calcareous green algae, foraminifera, echinoderms and mollusks in various proportions, along with weathered lava rock (e.g. Moberly et al., 1963; Gibbs et al., 2001). The distribution of these sand components can strongly affect the characteristics of the beach as a whole. According to regulations the calcium carbonate content of sand from the borrow sites should match the character and quality of the sand on the beach. The analysis used here determines the bulk quantity of calcium carbonate present in the sand sample but does not seek to determine the biological sources of the sand grains or to segregate the populations of calcite and aragonite sand that are formed by different chemical processes in the organisms that make calcium carbonate skeletons.

Generally, *Halimeda* comprises a small fraction of beach sand, but the sand placed on the beach during that project was taken from a *Halimeda* reef and had relatively high content of *Halimeda* sand. It is not presently known what the threshold for *Halimeda* content in nourishment sand may be. Sensitivity to *Halimeda* content will provide context, if not action levels. Benthic habitat maps indicated possible nearby *Halimeda* habitat (NCCOS 2007).

[1] Multi Increment is a registered trademark of EnviroStat, Inc.

Coloration: Not all sand on Hawaiian beaches has the same white to brown coloration. Some differences in sand color may arise from the source material of the beach. For example, weathered basalt rock can have a natural dark color, and the presence of olivine crystals may give sand a green caste. Sand coloration can also reflect recent bio-geochemical history. Sand taken from below the sediment water interface can have low exchange of its porewater with overlying ocean. Changes in the biogeochemical processes in areas of low exchange can lead to hypoxic and anoxic conditions. Sand in these areas may be discolored by the deposition of reduced iron and manganese on the sediment grains. Previous projects in the Hawaiian Islands have made use of such deeper sands and found that the coloration lightened after exposure to sun and air (Sea Engineering 2010).

Contamination: West Maui was used for sugar cane and pineapple farming in the early 20th century. Fertilizers and pesticides can be persistent in the soil and gradually proceed via groundwater into the ocean. Both arsenic and organochlorine pesticides are possible contaminants resulting from this land-use history. Monitoring stations at Kahana Stream and Pohaku Point, sampled by Hui O Ka Wai Ola (https://www.huiokawaiola.com/data.html) both indicate elevated levels of nitrogen, phosphate and turbidity. While turbidity is highest at Kahana stream, nitrogen and phosphate are highest at the south end of the bay, suggesting nutrient rich fresh-water seeps, which could bring with them other legacy contaminants from farming.

Biological Communities: Hard substrate flanking the sand sources may provide habitat for coral and algal communities. Soft sediment within the proposed sand borrow sites also may host benthic infaunal communities of great, but somewhat cryptic biodiversity—many infaunal worms have very similar gross morphology and require microscopic inspection to determine species and sometime family. An in-depth benthic habitat study of areas likely to be affected by the proposed action had been planned at the time of this survey and was conducted in July 2019. As a supplement the benthic habitat study, and to provide a sense of the benthic infaunal communities at each MI sample site, divers recorded qualitative habitat observations during their work and inspected push-cores of surface sediment for macro-infauna.

Study Objectives

Sand Quality and Volume

- Define decision units
    - Make jet-probe observations
        - sand depth measurements
        - sub-surface characteristics
- Collect sediment cores and beach grab samples
    - qualitative observation of color and sediment characteristics
    - quantitative sediment grain size distribution
    - analysis of grain size distribution
    - analysis of $CaCO_3$ compositions
    - test for sand contamination (i.e., arsenic and organochlorine pesticides)

Biological Community

- Qualitative macro-invertebrate assessment
- Qualitative Assessment of biological communities near sample sites

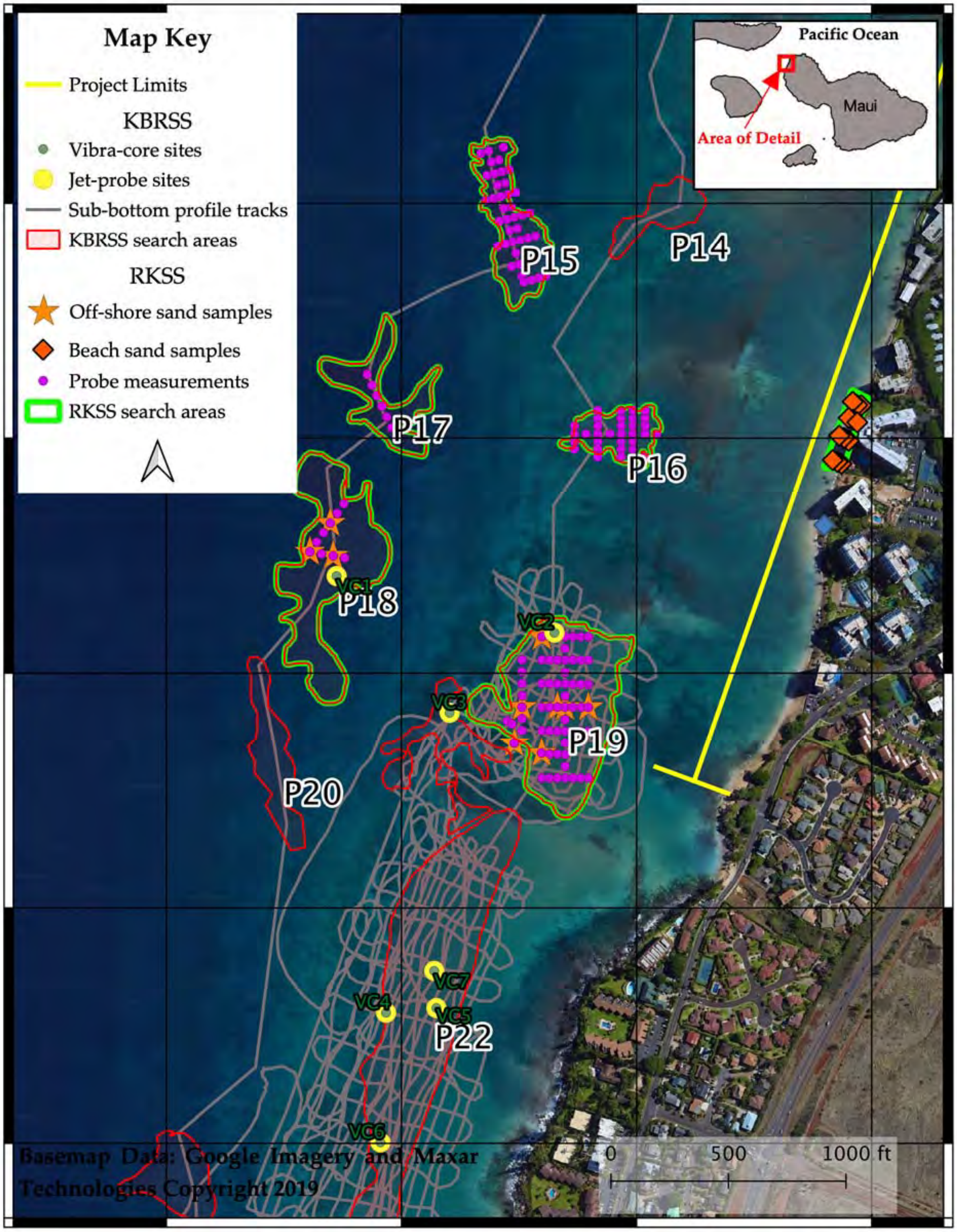


FIGURE 4 MAP OF PREVIOUS STUDY DATA

Locations of data collection from previous sand survey work. RKSS = Royal Kahana Sand Search; KBRSS = Kahana Bay Regional Sediment Survey

METHODS

SAND QUALITY AND VOLUME

Data used to identify sand deposits: Prospective sand fields were identified by previous sand search cruises using a combination of LiDAR, satellite imagery and benthic class maps from NOAA (Rising Tide Engineering 2015; County of Maui, 2016; PIFSC, 2016; NCCOS, 2007; OCM Partners, 2013). Using the numbering adopted by the M&N study (County of Maui, 2016) and their calculated volumes, three priority sand deposits were identified for sand quality and volume validation for the present work: P18, P19 and P22. These sites had each been characterized previously by either the Kahana Bay Regional Sediment Survey (KBRSS; County of Maui, 2016) or Royal Kahana Sand Survey (RKSS; Rising Tide Engineering, 2015) and met sand volume and logistic requirements for inclusion in the planning of a regional scale beach nourishment. The sand deposits are located to the southern end of Kahana Bay within between 800 and 2500 feet (ft) (~250 to 800 m) of the project shoreline (**Figures 4 and 5).** There is some variability in the aerial extent of individual sand deposits; these discrepancies are explored in the discussion.

Polygon 18 (P18) is between 1600 and 2300 ft (~500-700 meters) from shore and located in 25-36 ft (7.7-11.1 m) of water; from satellite imagery it looks continuous with deeper sand deposits. Its horizontal extent is estimated from 5.5 acres (~2.2 to 6.6 hectares; RKSS, KBRSS, respectively) and volume estimated from ~11,600 to 69,000 cy (~8,900 to 52,700 m^3; RKSS, KBRSS, respectively).

Polygon 19 (P19) is the closest to the project site, situated between ~500 and 1200 ft (150 and 350 meters) from the shoreline. It is located in 5 to 20 ft (~1.5 to 5.9 m) of water and has as estimated horizontal extent of ~7.5 to 14 acres (~3.0 to 5.7 hectares; RKSS, KBRSS, respectively). Previous work has estimated its total sand volume from ~18,600 to 71,000 cy (~14,200 to 54,200 m^3; RKSS, KBRSS, respectively)**.**

Polygon 22 (P22) is located to the south of Kahana Bay beginning at Pohaku point and extending ~2,000 ft (~600 m) to the southwest; it is very close to the surf break known as S-Turns. The sand field forms a 150 to 330 ft (50 to 100 m) wide band near to the shore, in water from ~6 to 15 ft (2 to 4.5 m) deep. It has an estimated area of 28.5 acres (~11.5 hectares; KBRSS) and total sand volume of ~205,000 cy (~156,700 m^3; KBRSS).

DECISION UNIT LOCALIZATION

BEACH SAND DECISION UNITS

The Kahana project area includes approximately 0.7 mi (1.1 km) of shoreline. There are sections of this bay that have beach only seasonally. At the time of the present study (June 2019) the beach was not continuous between the Kahana Reef and the Hololani properties. The beach sampling plan was developed to capture composite surface sand samples representative of the beach formations in the project area. Due to the break in the beach, the project shoreline was divided into north and south sections because of concern that they belonged to separate littoral cells. The shoreline was broken into 5 sections of between 150 and 250 m each (**Figure 5**). Sections 1 and 2 fell in the North DU. Sections 3 through 5 formed the South DU.

SAND SOURCE DECISION UNITS

Sand source DUs were defined as the amount of sand contained within a likely dredge footprint for each source. Thus, they included the horizontal extent of a simplified proposed polygon that would constrain dredge operations and a dredge floor depth of the mean sand thickness determined for each sand field. Note that the dredge footprint used in the present work is different than the irregular margins used to describe sand patches in previous sand studies. This more conservative approach focuses on the areas within each sand source that could be easily utilized by standard dredging operations.

A 50 m square grid was overlaid on the dredge limits proposed for each sand source DU to representatively sample its horizontal extent and optimize overlap with sites sampled in previous studies. Global Positioning System (GPS) coordinates for MI samples were defined by the centroid of each grid cell. A total of 21 MI sites was pre-identified: four in P18, eight in P19 and nine in P22 (**Table 1**; **Figure 5**).

JET-PROBE MEASUREMENTS

A jet-probe was used to make sand thickness measurements at each MI site where a core was taken. The probe consisted of an 8 ft (2.4 m) long 1.5-inch diameter steel probe with a 1/4 turn ball-valve shutoff. The barrel of the probe was graduated in 7.9 inch (0.2 m) increments. A 50 ft length of 2-inch fire-hose was used in shallow water at sites P19 and P22, while 100 ft of hose was used at P18. The water jet was provided by a high-pressure gas powered centrifugal pump (6,360 gallons per hour) on the boat deck.

Sand thickness measurements were made by positioning the probe on the sea-bed and opening the valve. The water jet excavated sand around the barrel end, allowing the probe to sink into the sediment. If resistance was met, the probe was lifted slightly and driven downward. When the probe could not be worked deeper into the sediment, the final depth was recorded. Characteristics of the sediment ejected by the probe, the plume that formed (if any) and potential reason for refusal were recorded. Sand thickness measurements were made in replicates of five.

SEDIMENT CORE COLLECTION

On the 10th and 11th of June 2019 a series of dives were made to collect sand cores. Dives were made from a 32 ft Radeon boat operated by Bergmeyer Marine (Paia, Maui). Vessel GPS was used to locate individual sites; a weight with a float was used to mark the position of the MI site, and the vessel was anchored nearby to facilitate work with cabled equipment.

Two self-contained underwater breathing apparatus (SCUBA) divers used a battery powered, remote-operated SDI mini-vibracore, equipped with a 3.5-inch clear polycarbonate barrel to collect sand cores. A dive belt with 20 pounds of weight was used to apply downward force on the corer as it penetrated the substrate. Divers helped to guide the core tube into substrate by twisting and rocking the device. Once recovered, cores were measured and photographed on the boat deck prior to transfer to translucent polypropylene core sleeves. In addition, qualitative descriptions of sand core stratification, color, composition and features were made on deck and from photographs taken at the time of core collection.

Multi-increment samples for each DU were prepared as follows: All cores from each sand source were subsampled by removing a fixed amount of material from the top and the bottom of the core sleeve, leaving the remaining core in-tact. These subsamples were then combined to form the MI sample for that DU. The MI composite samples for each of the three sand sources were transferred to AECOS Inc. (Kaneohe, HI) for sediment grain size and composition analysis.

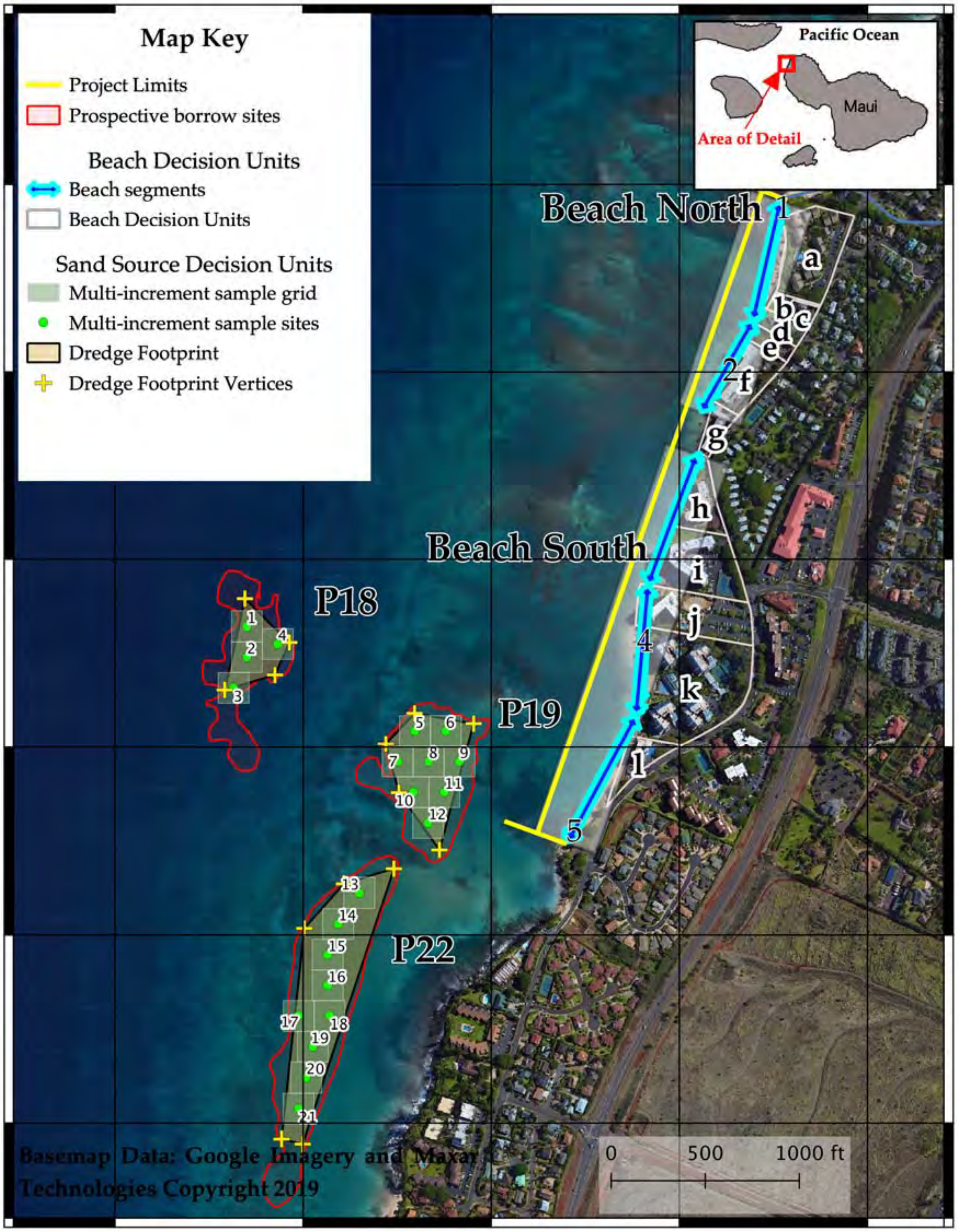


FIGURE 5 PROJECT AREA DECISION UNITS

Two decision units were established for the beach: one in the north of Kahana Bay, one in the South. Three decision units were established for offshore sand sources: One at P18, one at P19 and one at P22. Each sand source was sampled on a 50m grid to collect multi-increment samples, which were composited and analyzed to represent that decision unit.

TABLE 1 PROPOSED MULTI-INCREMENT SITES

Latitude (lat), longitude (lon) of multi-increment (MI) sites within each off-shore sand source decision unit (DU)

Decision Unit and Multi-increment™ Site Location

DU	MI Site	Lat	Lon	Water Depth From LiDAR [ft]	Water Depth From LiDAR [m]
P19	S1	20.97109	-156.68635	-43.5	-13.3
	S2	20.97064	-156.68635	-39.7	-12.1
	S3	20.97019	-156.68656	-39.0	-11.9
	S4	20.97083	-156.68587	-35.0	-10.7
P18	S5	20.96955	-156.68373	-10.8	-3.3
	S6	20.96955	-156.68325	-7.7	-2.3
	S7	20.96910	-156.68400	-12.1	-3.7
	S8	20.96910	-156.68352	-9.0	-2.7
	S9	20.96910	-156.68304	-10.0	-3.0
	S10	20.96865	-156.68376	-9.7	-3.0
	S11	20.96865	-156.68327	-8.6	-2.6
	S12	20.96820	-156.68353	-7.1	-2.2
P22	S13	20.96718	-156.68460	-8.9	-2.7
	S14	20.96672	-156.68493	-9.3	-2.8
	S15	20.96627	-156.68509	-9.7	-2.9
	S16	20.96582	-156.68509	-10.2	-3.1
	S17	20.96537	-156.68554	-13.4	-4.1
	S18	20.96537	-156.68506	-11.1	-3.4
	S19	20.96492	-156.68532	-11.8	-3.6
	S20	20.96447	-156.68543	-11.0	-3.3
	S21	20.96402	-156.68554	-10.6	-3.2

BEACH SEDIMENT COLLECTION

Beach sand samples were collected on the 10th and 11th of June 2019 and later composited at Oceanit's office (Honolulu, HI). Sand from the berm, mid-beach and beach toe were collected along 15 to 20 transects from the North beach DU and 15 to 20 transects from the South beach DU. Samples from the north end of the beach (units 1 and 2; **Figure 5**) were composited into a single MI sample, with two ounces (~50 mL) taken from each individual grab sample. Samples from the south end of the beach (units 3 through 5) were composited into a second sample following the same procedure. These samples were transferred to AECOS Inc. for grain size analysis and calcium carbonate composition. Mean grain size was calculated using algorithms from the rysgran package in the statistical platform R (rysgran is an implementation of the SysGran program; Camargo, 2006; R, Version 3.1.1), following the methods of

Folk and Ward (1957). Mean sediment grain size is reported in mm and in the dimensionless phi scale for ease of comparison among studies. Phi is equal to the negative log base 2 of the grain diameter (D), divided by a reference diameter (D_0) of the same units.

$$\phi = -\log_2 D/Do$$

Grain Size and Calcium Carbonate Composition Analysis

All sediment grain size analyses were conducted by AECOS using standard grain size sieve sizes of 4.00, 2.00, 1.00, 0.500, 0.355, 0.250, 0.125, 0.075 and 0.063 millimeters. Sediment calcium carbonate composition was evaluated by AECOS in duplicate, using a volume displacement method with 0.5 g samples from the composites (Appendix B).

Sediment Contaminant Analysis

P19 fronts the mouth of the large drainage outfall at the northern end of the project site and therefore was expected to have the highest probability of runoff pesticide contamination from terrestrial sources, if any. A single surface grab sample was collected from P19 at S6 in an 8-oz (236 ml) glass jar and stored on ice. The sample was transferred to AECOS Inc. to test for total arsenic analysis using the EPA 6010D method, and organochlorine pesticides, using the EPA 8081B method.

Biological Community

Qualitative Site Assessment

Divers made a qualitative biological assessment at each MI sampling site. This included general observations of the habitat composition and any organisms encountered during the sampling work.

Benthic Infauna

Divers also assessed the macro-benthic infauna at each site using a 6.5-inch (~16.5 cm) diameter push-core. The push-core was driven six-inches (~15 cm) into the sediment, capturing a ~196 cubic-inch (~3.4 quarts; ~3.2 liters) volume; divers dug a shallow pit next to the core and inserted a plate beneath the core to retain sediment while it was extracted. In the water, the core was gently sieved through a coarse sieve (0.0929 inch; 2.36 mm). Material retained on the sieve (e.g. animals, evidence of animals, or sediment) was documented.

Summary of General Description of Field Work

On the 10th and 11th of June 2019 a series of dives were made to collect sand cores and sand thickness measurements. Dives were made from a 32 ft Radeon boat operated by Bergmeyer Marine (Haiku, Maui). Vessel GPS was used to navigate to the pre-determined GPS coordinates of individual sites; a weight with a float was used to mark the position of the MI site, and the vessel was anchored nearby to allow work with cabled equipment. At each MI site, divers entered the water and first collected and sieved the benthic invertebrate push-core and made the qualitative site assessment. Next, the jet-probe was used to measure sand depth and have a sense of how long a core could be recovered. Jet probe measurements were made within a 10 ft radius of the site marker. Finally, the SDI-mini vibracore was used to extract a sediment core from undisturbed benthic sediment within 10 ft of the site marker. Cores were documented and transferred to Oceanit Laboratories, where MI samples were later taken, composited and sent for analysis.

Results

Sand Quality and Volume

Sand Source Overview and Qualitative Biological Assessment

P18

Sites visited at P18 (S1, S2 and S4) were located in 36 to 46 ft (11 to 14 m) of water. The sand at the surface was notably finer and darker than at P19 and P22. It was also characterized by fine ripple structure and populations of small benthic infaunal invertebrates. Lack of surge or current made work easy and may be responsible for the stable sediment that allowed establishment of the infaunal communities. Numerous burrows, small tubes, large and small fecal castings, gastropod trails and pits were documented at the sediment surface. Photographic videographic and narrative descriptions of the habitat, tubes and site characteristics were by a UH benthic infauna expert; their opinion was that based on the superficial evidence, these communities likely included tube dwelling Oweniidae, Sabellidae and Chaetopteridae (Villers, *personal communication*). The size of some fecal castings may indicate the presence of Enteropneusts (likely, *Ptychodera flava*) and members of the Arenicoidae. The Oweniids and Chaetopterids are both tube building detritivores. Sabellids are tube building filter feeders. Other animals seen at the surface included the common box crab (*Calappa hepatica*), the lined sea hare, and unidentified miter snail. Occasional *Halimeda* plants were anchored in the sand itself.

Outside of the sand-field dredge area, nearby hard substrate included colonies of *Pocillopora meandrina*, *Pocillopora grandis*, *Porites lobata* and numerous *Halimeda spp*. Reef fish aggregated near the coral heads and were generally too far away to identify. Fish spotted near sample sites included Hawaiian dascillus (*Dascyllus albisella*), the Hawaiian white spotted toby (*Canthigaster jactator*) and a single peacock flounder (6-8 inches *Bothus mancus*), which was seen near Site 4.

P19

At P19, divers visited all eight planned MI sites (S5-S12) in water depth ranging from 9 to 12 ft (2.8 to 3.7 m). The sand field was coarse, light-tan, mostly carbonate sand with coarse unidirectional ripple structure. Divers experienced substantial surge, but very little current. Some sample sites were within sight of emergent reef or rock substrate. In one area, *Halimeda* was anchored to solid substrate buried under a thin veneer of sand.

Within the sand-field, the lined sea-hare was present and abundant in some areas. Typical fishes at the site included yellow strip goatfish (*Mulloidichthys flavolineatus*) and bluefin trevally (*Caranx melampygus*) that were attracted to the plume generated by the jet-probe, keeltail needlefish (*Platybelone argalus)* were also present. During jet-probing, it was common to disturb polychaete worms from the sediment. These worms ranged from 1 to 1.5 ft (0.3 to 0.5 m) in length, had thin bodies with a spiraled anterior end. They emerged when the jet-probe descended below 1 to 1.5 ft (0.3 to 0.5 m) and were encountered at low densities—1 or 2 per jet-probe hole. A UH benthic infauna expert, after reviewing field photographs and site characteristics suggested that they were most likely members of the Capatellidae, but that lower level identification would require microscopic examination of collected animals (Villers, *personal communication)*.

TABLE 2 KAHANA BAY EIS SAND QUALITY

Sediment grain-size, quality and calcium carbonate content were determined for each sand borrow site decision unit (DU). Water depth, sediment core length and jet-probe data (mean and standard deviation (STDEV) sand thickness, reason for refusal and plume characteristics) are shown for each site. For sand samples composited across each DU, mean grain size (phi and microns) and percent calcium carbonate content.

Sand Quality At Project Decision Units

Decision Unit	MI Site	Core Length [ft]	Sand Depth [ft]		Jet-probe		Water Depth [ft]	Mean Grain Size Description				Calcium Carbonate Content [%]
			Mean	STDEV	Refusal	Plume		ϕ	mm	Verbal	Sorting	
P18	S1	2.0	3.9	0.6	hard and rubble	light/small	45	1.96	0.257	Medium sand	Moderately well sorted	83
	S2	1.3	1.2	0.1	hard	light/small	43					
	S4	1.2	2.3	0.5	hard	light/small	37					
P19	S5	2.4	3.5	0.4	hard	light	12	0.15	0.898	Coarse sand	Moderately sorted	86
	S6	3.5	5.2	1.2	gravel/rubble	thick/heavy	9					
	S7	1.6	-	-	gravel/rubble	medium	12					
	S8	1.3	1.1	0.2	hard	light	10					
	S9	2.0	2.5	1.1	hard	light	11					
	S10	1.8	3.7	0.3	gravel/rubble	thick/heavy	10					
	S11	2.5	4.5	0.7	gravel/rubble	thick/heavy	10					
	S12	2.5	4.0	0.5	grave/rubble	thin	10					
P22	S13	2.8	6.7	0.5	gravel/rubble	light/small	9	0.63	0.645	Coarse sand	Moderately sorted	94
	S14	2.3	-	-	-	-	11					
	S15	2.0	7.6	0.3	soft	moderate	11					
	S16	-	7.8	0.1	soft	moderate	12					
	S17	-	-	-	-	-	-					
	S18	1.7	5.8	1.0	gravel/rubble	moderate	14					
	S19	-	-	-	-	-	-					
	S20	3.7	7.9	0.0	soft/none	moderate/heavy	11					
	S21	2.0	7.7	0.3	soft/none	moderate	10					
Beach	North	-	-	-	-	-	-	0.22	0.857	Coarse sand	Poorly sorted	55
	South	-	-	-	-	-	-	-0.21	1.153	Very coarse sand	Poorly sorted	19

Outside of the sand-field dredge area, coral was present, but hard substrate was far enough away from the sample sites so that corals were not easily identifiable. Branching forms such as *P. meandrina* and *P. eydouxi* and massive forms such as *P. lobata* appeared to be present and are characteristic of this area. Macro-algae was also present on emergent rock.

P22

At P22 divers visited six of the nine proposed MI sample sites in water ranging from 8 to 14 ft (2.7 to 4.3 m). Time constraints led to skipping S16, S17 and S19 so that S20 and S21, at the southern end of the sand source could be visited instead. This ensured that samples were collected from the full length of the proposed dredge limits. P22 was characterized by coarse tan sand with an even, wide ripple structure. Although there was very little current, there was strong surge, which worsened as surface wind-waves developed.

Within the site, at nearly all jet-probe sites, the Capitellid worm seen at P19 was also disturbed from the sediment. Throughout P22 the lined sea-hare was present; their mucus trails were abundant along the surface of the sand. At S22 a medium-large horned helmet (*Cassis cornuta*) was also spotted traversing the sand field. Fish were not noted at P22.

No coral or algae were visible from any of the sample locations.

Sand Quality

Beach Sand Samples

Beach sand samples were collected and composited into two volumes, one representing the northern end of Kahana Bay and a second representing the southern end of Kahana Bay. The grain size distribution indicated that sand from the northern end of the beach was finer than sand from the southern end with a mean grain size of 0.857 compared to 1.153 mm (**Table 3**; 0.15 compared to -0.21 phi, respectively) indicative of coarse and very coarse sand, and both sand samples were poorly sorted. The sand from the northern end of Kahana beach had a greater calcium carbonate ($CaCO_3$) content (53%) than sand from the southern end of Kahana beach (19%; **Table 2**). Laboratory results are included in Appendix C.

OFFSHORE SAND CORES

In total, 17 cores (three from P18, eight from P19 and six from P22) were collected. Sand from the top and bottom of these cores was composited into three samples, one representing each sand source. Recovered cores were variable in length and ranged from 1.2 to 3.7 ft (**Figure 6**). In general, sand was lightest at the surface and became somewhat darker with depth below ground surface (BGS). Individual photographs of most of the cores taken are included in Appendix B.

Figure 6 Sand Core Images
Coloration of sand captured in core barrels changed with depth and among sites (left). Site P18 had the darkest sand of all sites and was uniformly grayish throughout the core barrel. P19 and P22 had a similar pattern with light-tan coral sand at the surface, slightly darker sand beginning between 12 and 24 inches BGS, blending into even darker sand with depth. Sand appeared to be somewhat coarser at the bottom of cores than at the top (right).

P18 Sand Cores

Three cores were collected from P18, one each from S1, S2 and S4. Cores ranged from 1.2 to 2.0 ft in total length (mean = 1.5 ± 0.42 ft STDEV; between 0.36 and 0.61 m; mean = 0.46 ± 0.13 m; n = 3; **Table 3**). They were each composed of fine gray sand that was uniform in color throughout the core. The average grain size of the composited sample from P18 was 0.297 mm (phi = 1.96; **Table 2**, **Figure 7; Appendix B**), indicative of medium-grained sand. Sand from P18 was somewhat finer than sand from all other sites (both north and south beach samples, as well as P19 and P22). P18 also had the best sorted sand of all samples collected (i.e. the grain size distribution was the narrowest). Calcium carbonate content of the MI sample was 83% (Appendix C).

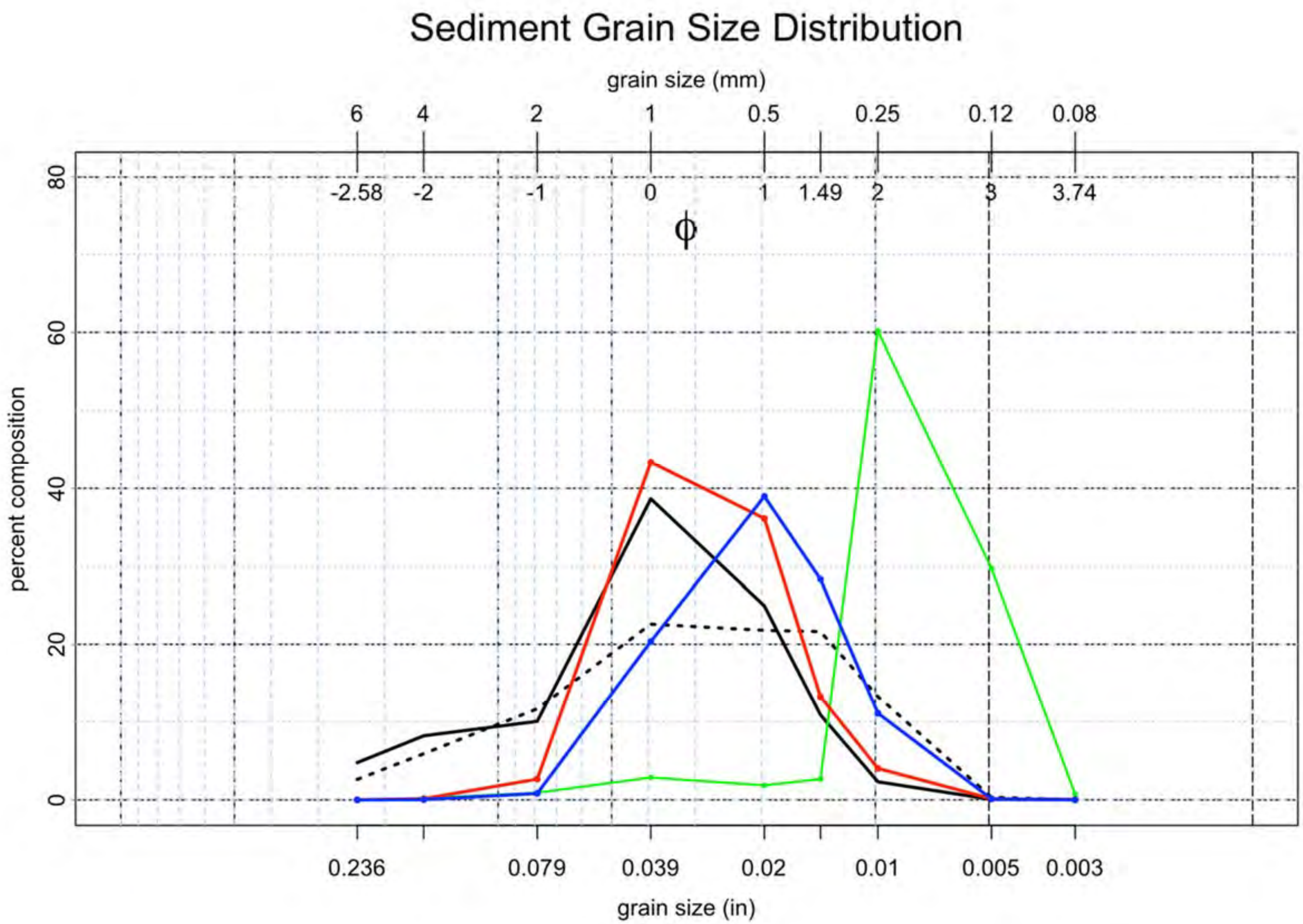


FIGURE 7 KBEIS GRAIN SIZE DISTRIBUTION COMPARISON

Sediment grain size distribution from the beach DU is shown by the black line (South) and the dotted black line (North). The green line shows grain size distribution for P18, while red and blue lines show grain size distribution for P19 and P22, respectively.

P19 Sand Cores

Cores were collected from all eight of the MI sites in P19. They ranged in length from 1.3 to 3.6 ft (mean = 2.2 ± 0.69 ft STDEV; between 0.4 and 1.1 m; mean = 0.67 ± 0.21; n = 8). Sand throughout the patch was similar: medium-grained, light-tan sand with shell, *Halimeda* and coral fragments. In cores, sediment became darker with depth; the lightest surface layer was found in the top six inches below the sediment surface (from 0 to 15 cm BGS), darkening slightly between 6 and 18 inches (15-45 cm) bgs, and appearing to be still darker and slightly coarser below 18 inches (45 cm) (**Appendix B**). Grain size analysis of the MI composite sample for P19 indicated that it was of generally similar composition to both beach samples, but better sorted. Mean particle size was 0.898 mm (0.15 phi), indicative of coarse sand. The calcium carbonate content of the MI sample was 86% (**Table 2; Figure 7; Appendix C**).

P22 Sand Cores

Sand cores collected from P22 were between 1.6 to 3.6 ft (mean = 2.4 ± 0.7 ft STDEV; between 0.5 and 1.1 m; mean = 0.73 ± 0.22 m; n = 8; **Table 2**). In the field, grain size appeared very similar to P19, but much coarser than P18. In most cores, grain size was fairly consistent from top to bottom, and the color darkened somewhat below 0.45-0.9 m below the surface (**Appendix B)**. Some cores appeared to coarsen somewhat with depth as well. Grain size distribution in the MI sample from P22 was similar to P19 and both beach samples (**Figure 7**). Mean grain size was 0.645 mm (0.63 phi), indicative of coarse sand. The calcium carbonate content of the composite sample was 94% (**Table 2; Appendix C**).

Offshore Jet-Probe Sand Depth and Quality

P18 Jet-Probes

Across P18, 15 jet-probe depth measurements were taken. Mean sand thickness was 2.5 ft (± 1.2 ft STDEV; 0.75 m ± 0.37 m; **Table 2**), with a minimum depth of 1 - 4.6 ft (0.3 m - 1.4 m). Jet-probe refusal was due to contact with solid substrate, and in some cases a layer of rubble or gravel, however the jet-probe didn't bring any rubble sized particles (or larger) to the surface.

During jet-probing, a dark gray plume initially formed and quickly settled, with a lighter white/gray plume persisting and staying close to the sea-floor (**Figure 8**). The largest ejected particles were 0.4 to 0.6 inches (1 to 1.5 cm) and included *Halimeda*, shell fragments and calcareous worm-tube fragments. These particles appeared to be much more abundant than in the ejected material at P19 and P22, but the contrast between the dark sand and light shells may have also accentuated their presence.

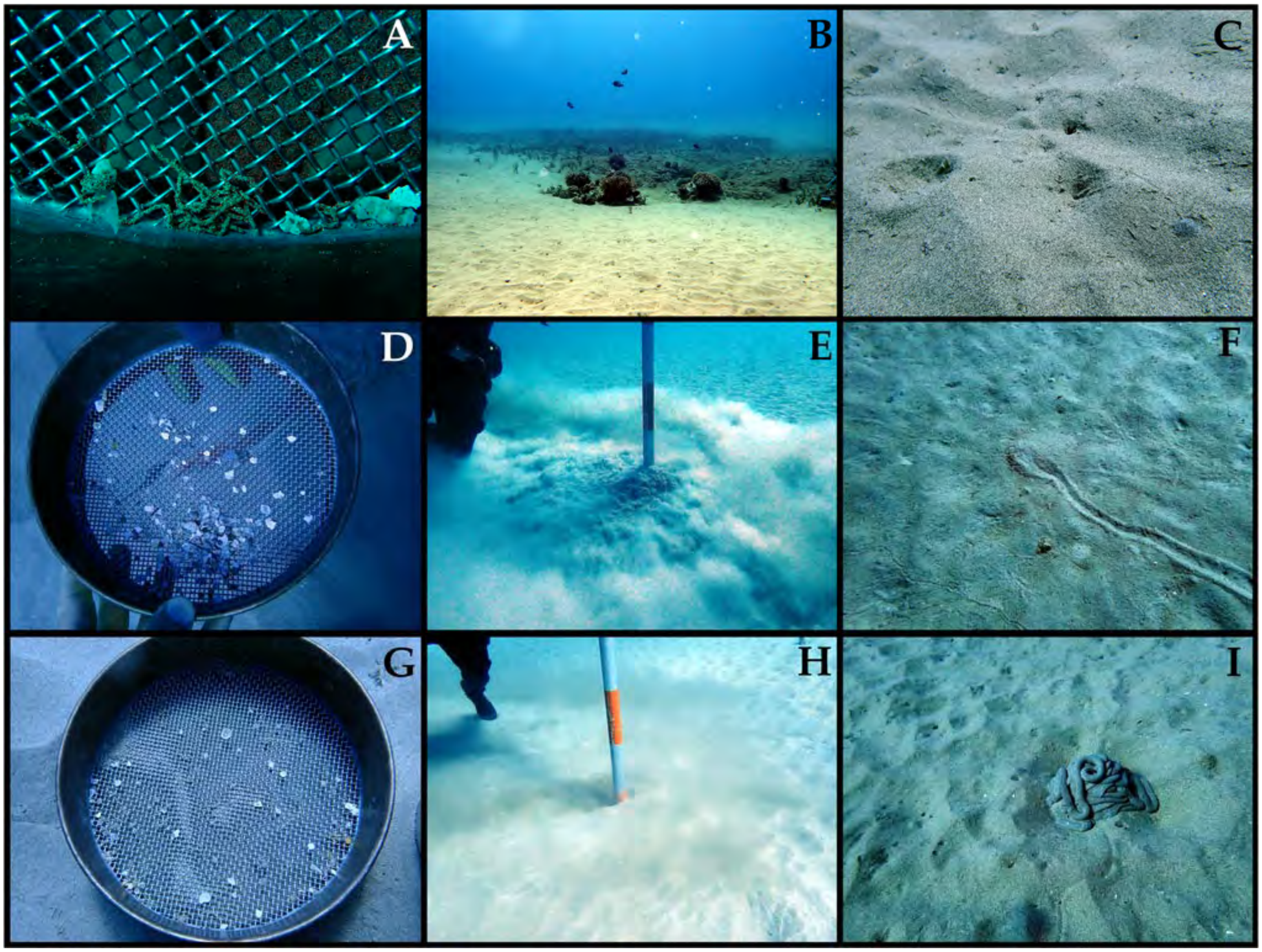


FIGURE 8 JET-PROBE EXPLORATION OF P18
Hard substrate near MI sites which hosted communities of coral and macro-algae (B). Benthic invertebrate population was distinct from nearshore sand sources (C, F, I), many more tubes and burrows. Plumes were thin and low to the substrate (E, H), sediment was uniformly darker than nearshore, but had no strong anoxic layer. *Halimeda* flakes and shell fragments were present in invertebrate cores (A, D, G), as were tubes and a shrimp.

P19 JET-PROBES

Across P19, 35 jet-probe measurements were conducted. A mechanical issue led to a shortened dive at S7, and jet-probe data were not collected. Sand thickness measurements at P19 indicated variable sand depths, with an average of 3.4 ft (± 1.3 ft STDEV; min= 0.98; max = 1.9; 1.05 ± 0.41 m STDEV; min = 0.3; max = 1.9 m; **Table 2**). Shallow sand depths were accompanied by hard probe refusal—hitting consolidated substrate; in deeper sand, probe refusal indicated the presence of gravel or rubble. Despite this, few gravel or rubble sized particles were excavated during jet-probing—the largest sediment particle reaching the surface was the diameter of a nickel (**Figure 9**). In shallow sand deposits, there was very little plume that formed, but in deeper sand, a white/gray plume was ejected below two ft (~0.6 m). Plumes were heavy, dispersing slowly and reducing visibility to less than 1.5 ft (~0.5 m) at times. Heaviest plumes formed when the probe reached depths below ~3 ft (~1 m) BGS, when trying to push the probe through a layer of coarse substrate. Typically, the largest ejected particles were no larger than a pea and included shell and coral fragments; *Halimeda* flakes and shell fragments were commonly present in ejecta, but not abundant. Although the plumes made it difficult to visualize the color of ejected sand, it was generally darker than surface sediment, but not approaching dark gray. Capitellid worms were often disturbed from the sediment during jet-probing at this site (**Figures 9C, 10**).

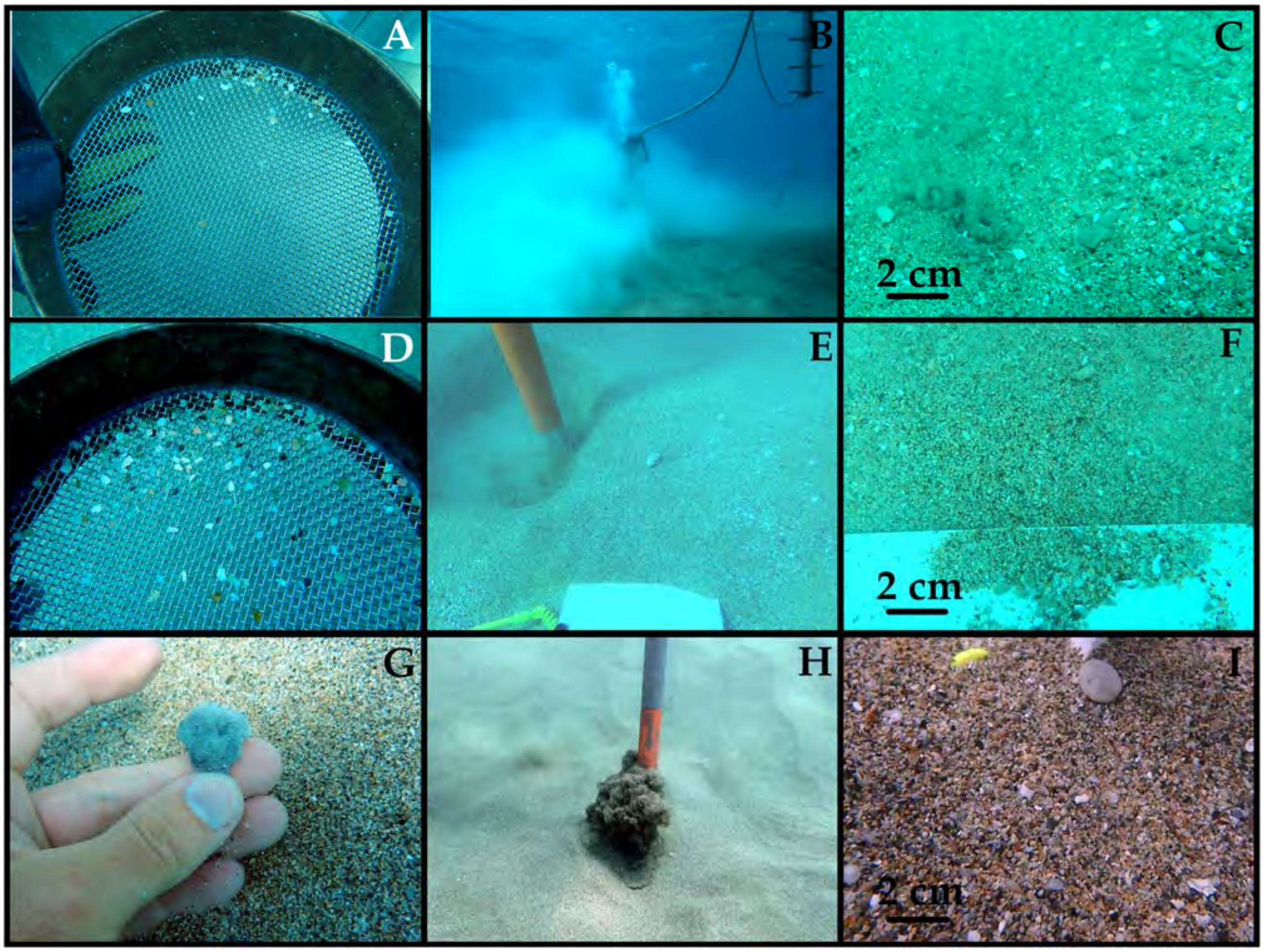


FIGURE 8 JET-PROBE EXPLORATION OF P19

A thick plume formed below 0.6 m (B, but this was the strongest plume formed); shallower excavation had little to no plume (E). Shell fragments and *Halimeda* were present in the benthic push-core (A, D). Sediment grain size was generally coarse-sand, larger inclusions were present, but not abundant (C, F, I G). Capetellid polychaetes were excavated by the jet-probe at most sites in P19 (eg, C).

P22 JET-PROBES

Across P22, 30 jet-probe measurements were made; here sand depth and quality were much less variable than at other sites. The probe penetrated the sediment quickly and without resistance. The average probe depth was 7.25 ft (± 0.9 ft STDEV; 2.21 ± 0.27 m; **Table 2**). At depths greater than 6.6 ft (2 m), friction against the probe barrel slowed penetration, but often the probe could be inserted up to the ball-valve 8.5 ft (2.6 m) with no signs of gravel or rubble resisting further penetration.

A light plume formed at most jet-probe sites and typically began accumulating when the probe reached ~ 2 to 3 ft (0.6-1.0 m). Much of the plume settled out quickly, but a light cream colored plume persisted low in the water column. Visibility was not as strongly affected as at P19 (**Figure 9 vs Figure 11**).

FIGURE 9 CAPITELLID POLYCHAETE WORM
Representative image; not from current work

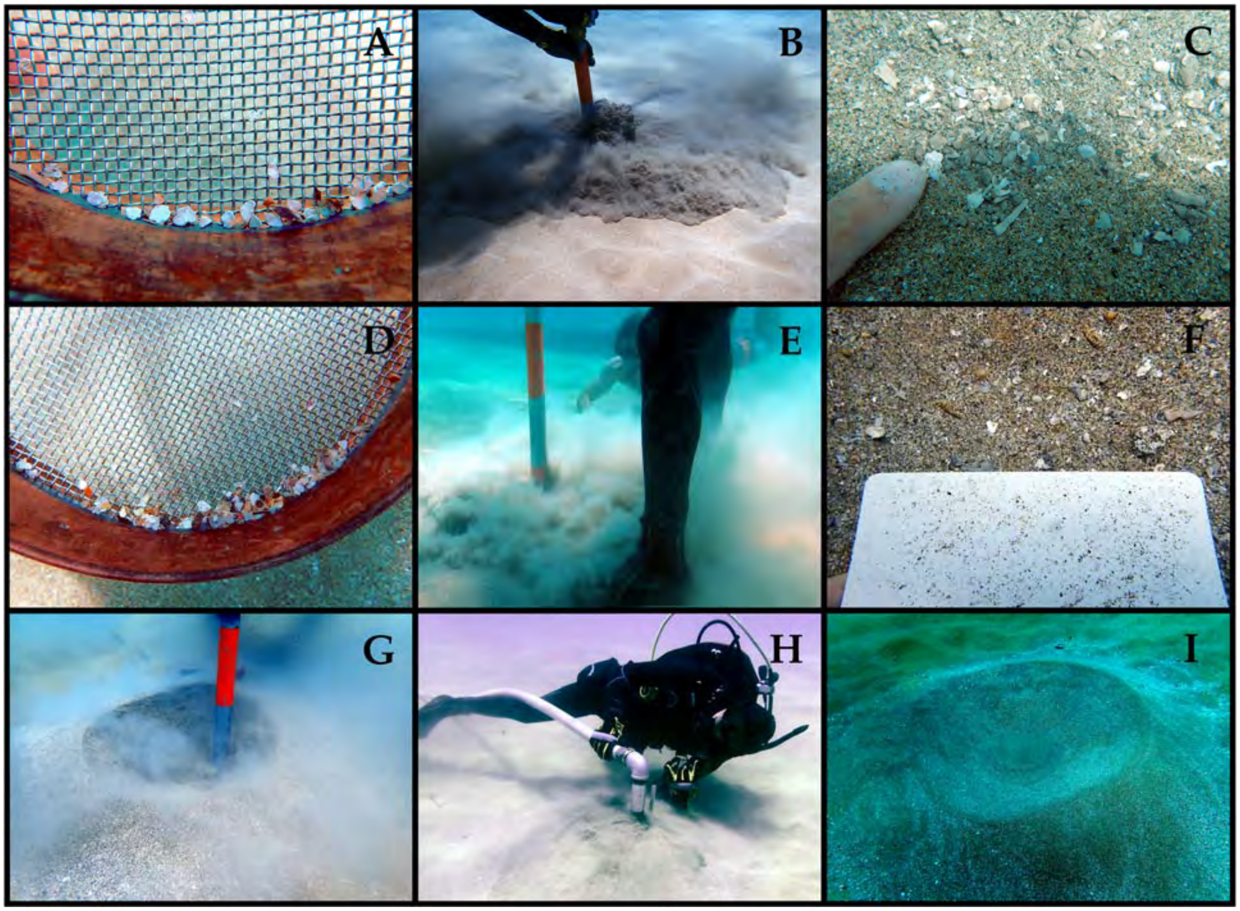


FIGURE 10 JET-PROBE EXPLORATION OF P22
Plume was light and generally stayed close to sea-floor (B, E, G). *Halimeda* and shell fragments were present, but not abundant in the push-core and jet-probe ejecta (A, D, F). Larger particles were ejected from the jet-probe hole and were the consistency of coarse sand with shell fragments (C, F, I). Sand depth was greater than probe length (H).

Material ejected from the jet-probe holes was similar to the surface sand initially. Below 2 ft (0.6 m), sediment tended to darken, this appeared to be from sediment discoloration, rather than a shift in substrate composition toward basalt. Light cream-colored shell fragments and *Halimeda* flakes from deeper in the jet-probe holes stood out brightly against the darker, deeper ejecta. Substrate ejected when the probe was below ~3.3 ft (1 m) tended to be coarser sand with larger inclusions, but still resembled coarse sand, not gravel. At S21, ejected material was somewhat different from other sites and appeared to have higher basalt content; however, no large particles were ejected. Most ejecta was no larger than coarse sand, largest particles were shell fragments and pea-sized rocks (**Figure 11**).

Volume at Offshore Sand Sites

Estimated sand volume at each proposed sand source is reported in Table 3. Using dredge limits proposed for this project (i.e. mean sand depth and simplified dredge footprint; **Figure 5**), the available sand volume at each sand source was estimated. The three sites together had a total volume of ~130,000 cy (~100,000 m^3) of sand (**Table 3**). Sand from site P19 and P22 were both a better match to sand collected from the beach; together the proposed dredge limits for those sites contained ~120,000 cy (93,000 m^3). Total available volume may be greater at P22, where divers routinely encountered sand that was thicker than the probe could measure.

Table 3 Offshore Sand Volume

Sand volume was estimated for each priority sand source using jet-probe depth measurements and proposed dredge limits. Total sand source area (full polygon, FP) and dredge footprint area are shown. Dredge volume is calculated from the mean sand thickness and dredge footprint area. Reduced yield estimates of volume are also calculated at 80% and 50% of mean volume.

Kahana Bay Sand Study—Sand Volume Calculated from Dredge Limits and Jet-Probe Data—Metric

Source	Sand Thickness [m]					Full Polygon Area		Dredge Footprint Area		Dredge Volume [m^3]		
	Mean	STDEV	Min	Max	n	[m^2]	[ha]	[m^2]	[ha]	Mean	80%	50%
P18	0.75	0.37	0.30	1.40	3	22,226	2.22	8,330	0.83	6,236	4,989	3,118
P19	1.05	0.41	0.30	1.90	7	30,171	3.02	18,169	1.82	19,077	15,262	9,539
P22	2.21	0.27	1.40	2.40	6	48,512	4.85	33,393	3.34	73,799	59,039	36,899

Kahana Bay Sand Study—Sand Volume Calculated from Dredge Limits and Jet-Probe Data—English

Source	Sand Thickness [ft]					Full Polygon Area		Dredge Footprint Area		Dredge Volume [cy]		
	Mean	STDEV	Min	Max	n	[yd^2]	[acres]	[yd^2]	[acres]	Mean	80%	50%
P18	2.46	1.21	0.98	4.59	3	26,582	5.49	9,963	2.06	8,157	6,526	4,078
P19	3.44	1.34	0.98	6.23	7	36,084	7.46	21,730	4.49	24,952	19,962	12,476
P22	7.25	0.88	4.59	7.87	6	58,020	11.99	39,938	8.25	96,525	77,220	48,262

n = number of samples, m = meters, ha = hectares, ft = feet, y = yards, cy = cubic yards STDEV = standard deviation

Sediment Contamination

A single surface grab sample was collected from S6 at P19. It was selected because of its proximity to shore and because it fronts the large drainage opening on the north end of the site. Lab results found an arsenic level of 20 mg/kg but did not detect any organochlorine pesticides (**Appendix C**). Hawaii DOH specifies arsenic action levels of ≤ 24 mg/kg as background contamination in non-industrial and non-agricultural areas (HDOH, 2011). The level found in the benthic sediment sample fell within the background levels specified.

Benthic Infauna Push-core

P18 Push-Core

The sifted push-cores recovered numerous fine worm-tubes and tube fragments. The worms themselves were not retained on the sieve, suggesting that they escaped below the core, or their soft bodies were destroyed during sieving. Worm tubes were most abundant at S4, with 50 to 60 tube fragments retained. *Halimeda* flakes were common in all three cores at P19. At S1, 100-150 *Halimeda* flakes were retained on the sieve, however S2 and S4 had fewer than a dozen each. At S4, a ~0.5 inch (1 cm) jumping sand shrimp (*Trachypenaeopsis cf. mobilispinis*) was captured on the sieve and several escaped before they could be measured; they appeared to be between 0.4 and 0.8 inches (1 and 2 cm).

P19 Push-Core

Push cores taken at P19 recovered very few organisms. Two small 0.6 to 0.8 inch (1.5-2 cm) jumping sand shrimp were found at S10. More typically, *Halimeda* flakes and shell fragment were retained on the sieve (numbering between 10 and 15). At S6 and S9 *Halimeda* flakes were very abundant in the push-core, numbering more than 100. Despite the omnipresence of the Capitellid worms at jet-probe sites, these were never recovered in the cores here—most likely because the cores were too shallow to capture these organisms, which emerged from jet-probe excavations below ~1 ft (0.3 m).

P22 Push-Core

Sieving of the push-cores at P22 found one 0.8-1.2 inch (2-3 cm) jumping sand shrimp at S16, and several fragments of worm-tubes at S15 and S14; a fragment of the Capitellid worm that was typical of this habitat was captured in the S15 push-core. At all sites, push-cores also captured *Halimeda* flakes and shell fragments. Their abundance was variable, and nearly absent at S13, S16 and S21; however, between 150 and 200 *Halimeda* flakes and shell fragments were found in the core at S18.

Discussion

The present survey used MI sampling techniques to establish beach and prospective sand source sediment grain size distributions. Further data, including jet-probe, sediment contamination analysis and biological assessment, was collected to help determine the volume and quality of sand available at priority sand sites near Kahana Bay. Sand quality and suitability for beach nourishment activities is defined by HI DLNR based on grain size criteria. In addition to these criteria, the data collected in the present survey attempted to address concerns of benthic infauna populations within priority sand sources, amount of sand originating from the calcareous green algae, *Halimeda,* and the nature of plumes arising from disruption of *in-situ* sediment deposits.

Biological Community

The hard substrate near each sand source is colonized by benthic algae and invertebrates. The mobile substrate of sand patches also contains organisms adapted to life in that location, such as shrimp, crabs, polychaetes, often occupying burrows well below the surface level. Frequently, sediments in deeper water are less affected by surface waves, and thus have more stable vertical structure. This can allow dense aggregations of tube and burrow building infauna to become established. Although the scope of the present work did not involve enumeration and categorization of the benthic infaunal community at sand sources, observations of the infaunal invertebrate populations living at the sediment/water interface of P18 had representatives from many biological functional groups. At P19 and P22, where surface sand is regularly disturbed by wave activity, many tube-building worms cannot become established. Instead, larger infauna that live deeper in the sediment are better suited to this habitat. Meiofauna also find success living in the spaces among sand grains, which tend to be larger in coarse grained and less-well sorted deposits. The worms we encountered at these sites were large (approximately 1 to 1.6 ft; 0.3 to 0.5 m), not tube building, and not densely aggregated (estimated less than four per m^2).

Any extraction of sand will take with it infaunal invertebrates. Rates of recovery are different among species after such disturbances. In the absence information on the specific communities present at each, it must be accepted that general ecological processes, such as disturbance history, dispersal, growth-rates, recruitment, and successional dynamics will govern the rate of recovery.

The proposed dredge limits for each site simplify the contours of the natural sand deposits for the logistics of a sand-harvesting operation. Thus, they are simple polygons and fit within the perimeter of each sand field. The areal extent of the dredge limits proposed here, and used to calculate sand volume, include ~40%, ~60% and ~70% of the P18, P19 and P22 sand deposits, respectively, visible in satellite imagery. At P22, the “full” polygon was drawn smaller than the sand field that is visible from satellite imagery following an 8-ft depth contour in the nearshore (see **Figure 5**).

Beach Sediment Grain Size

Characterizing the grain size distribution of the target beach is fundamental to establishing the guidelines for acceptable sand sources. Kahana Bay beach characteristics change throughout the year and can be filled and emptied more than once per calendar year. In the time between the Royal Kahana Sand Survey (RKSS, 2015) and the present survey (KBEIS, 2019) the entire beach sand volume may have changed over several times.

During its execution, the RKSS took ~2.5 ft (~0.75 m) core samples (berm, middle and toe) from four profiles of the beach fronting the Royal Kahana Condominiums (**Figure 4**). Each core was mixed and analyzed as a single sample (n = 12 samples total). There was a large range in mean grain size of individual cores (0.653 to 2.975 mm; 0.61 to -1.57 Φ; data not shown); here we compare the average grain size distribution for each of the four RKSS transects with the present results (**Figure 12**). By averaging grain size across individual transects, these data are more similar to the findings of the present work (**Table 4**). Average grain size measured in the RKSS was 0.921 mm (0.12 Φ), which falls in between the KBEIS North and South DUs from the present study. While the MI sample approach generates a number that is closer to a grand average across the entire beach, and likely more repeatable (i.e. multiple MI composites would have low variance), the analysis of multiple individual samples allows researchers and management agencies to visualize the heterogeneity of the resource, which can also be desirable, if somewhat more costly.

Sand Source Grain Size Distribution

Sand has been collected from offshore sand sources in previous work. In 2015, the RKSS collected three surface grab-samples from P18 and seven surface grab-samples from P19, summarized in **Table 4** these samples were individually analyzed. The RKSS did not consider P22 as a potential sand source for their project, due to its distance from the Royal Kahana Condominiums, as well as the relative proximity of other sand sources with suitable volume for a SSBN. The KBRSS collected one surface grab sample from P22 and seven vibracore cores. Only the sample from P22 has been analyzed for grain size.

RKSS samples from P18 had a mean sediment grain size of 0.162 to 0.172 mm (2.61 to 2.53 Φ); the samples were well-sorted fine sands, somewhat finer that found in the composited sample from the present study (0.256 mm; 1.96 Φ; **Table 4, Figure 13**).

Samples from RKSS P19 ranged from 0.423 to 0.887 mm (1.24 to 0.17 Φ), compared to 0.898 mm (0.15 Φ) for P19 in the present study (**Table 4, Figure 14)**.

The KBRSS sample from P22 (**Table 4**) was somewhat finer than the present composite sample, 0.260 vs 0.645 mm (1.95 vs 0.63 Φ), and more resembled the KBEIS sample from P18 than any other sample (**Table 4, Figure 15)**.

The grain size distribution of most sediment collected at P22 and P19 pass rules one through four of the DLNR-OCCL sand suitability guidelines. The surface grab sample from P22 collected during the KBRSS 2017 does not meet rule 4 and is generally finer than beach sand. Similarly, samples from P18 are uniformly finer than beach sand.

The present study has found slightly larger grain sizes at each location than previous studies. This is likely due to the sampling methodology, which not only included many more samples, but also composited sediment taken from the top and bottom of each core. Although core subsamples were not analyzed separately, jet-probes and core inspections suggested that sand deposits became coarser with depth. Nevertheless, most of these offshore sand samples fit within the ± 20% envelope of beach grain size measured from either the RKSS sample or the present work.

The present MI approach to documenting the grain size distribution at potential sand sources successfully integrated a large number of samples from the three-dimensional space comprising the sand considered for placing on the beach. The grain size distribution of MI samples from P19 and P22 meet all DLNR-OCCL guidelines for use in beach nourishment at the project beach. It is also likely that sand from P18 could be used as a component of the final beach nourishment plan; the volume used from this site may be restricted through interpretation of the DLNR-OCCL overfill guidelines (as per DLNR-OCCL, 2005).

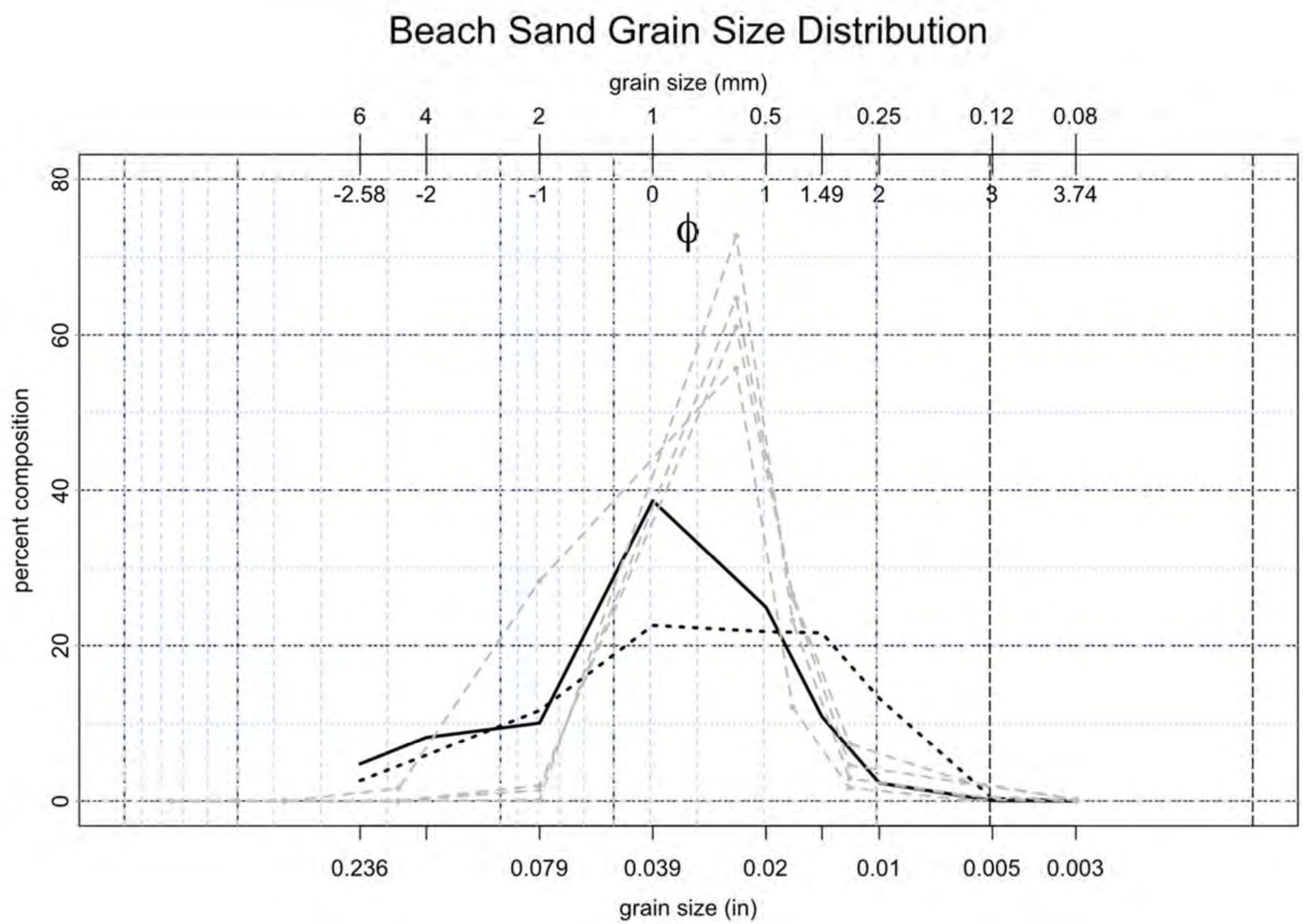


FIGURE 11 BEACH SAND GRAIN SIZE DISTRIBUTION COMPARISON AMONG STUDIES
North and South beach decision unit sand grain size distributions are shown by the solid and dotted black lines, respectively. Averaged grain size distributions for each transect of the RKSS are shown in gray. mm = millimeters; in = inches ; RKSS = Royal Kahana Sand Search

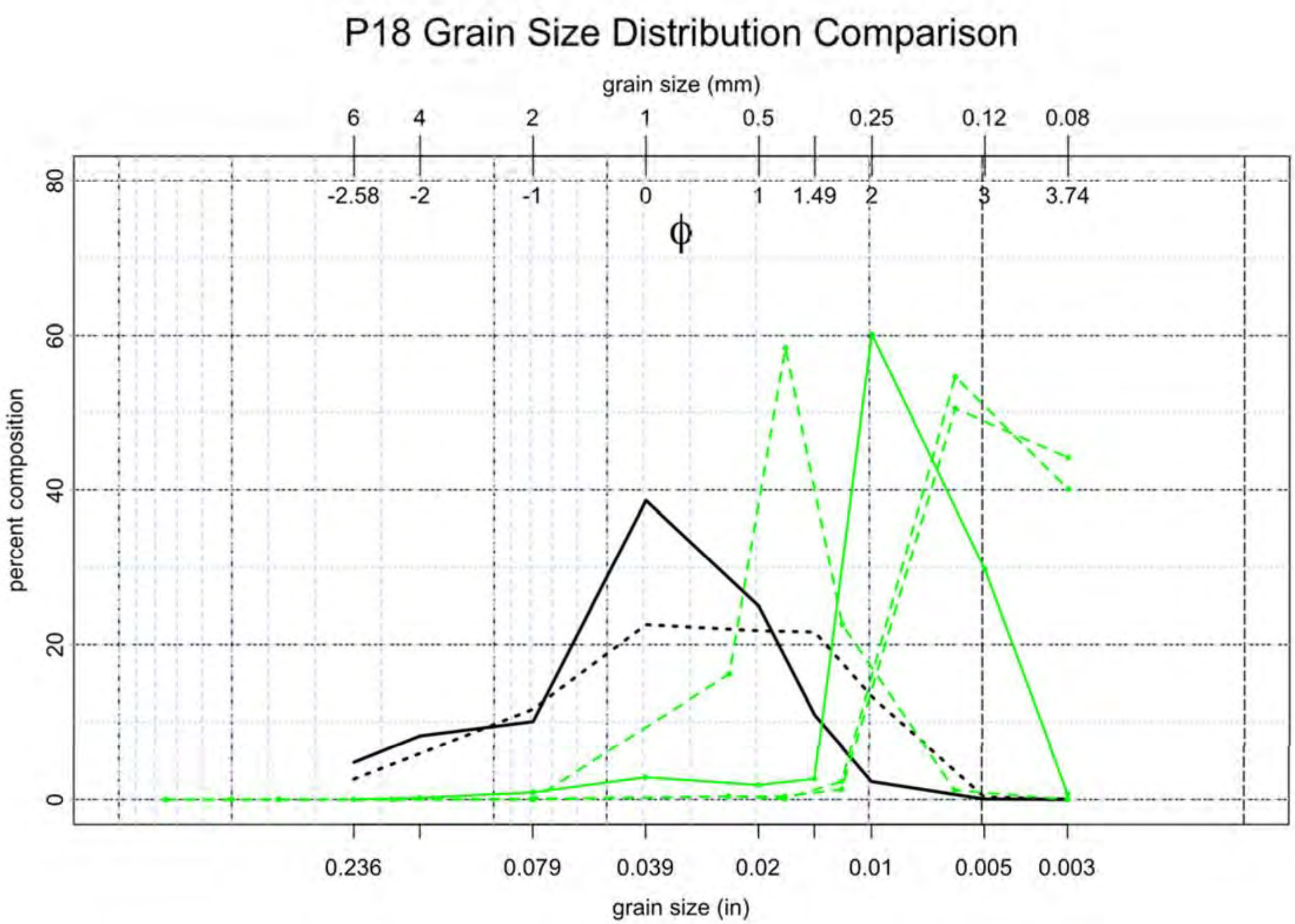


FIGURE 12 SAND GRAIN SIZE DISTRIBUTION COMPARISON AT P18

North and South beach decision unit sand grain size distributions are shown by the solid and dotted black lines, respectively. The heavy green line shows the KBEIS P18 MI sample, while the dotted green lines show samples from the RKSS. mm = millimeters; in = inches; RKSS = Royal Kahana Sand Search

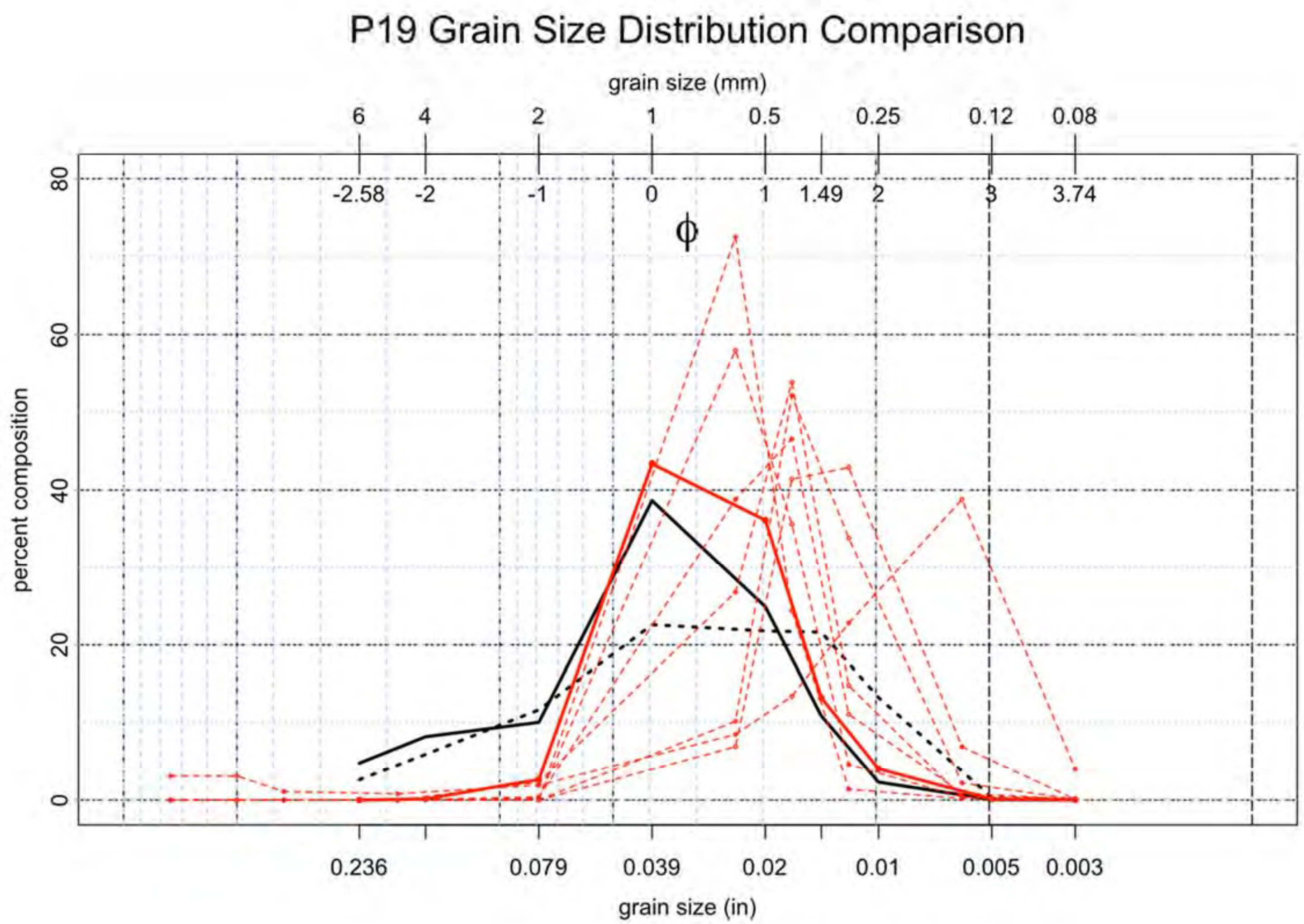


FIGURE 13 SAND GRAIN SIZE DISTRIBUTION COMPARISON AT P19

North and South beach sand grain size distributions are shown by the solid and dotted black lines, respectively. The heavy red line shows the KBEIS P19 MI sample, while the dotted red lines show samples from the RKSS. mm = millimeters; in = inches; RKSS = Royal Kahana Sand Search

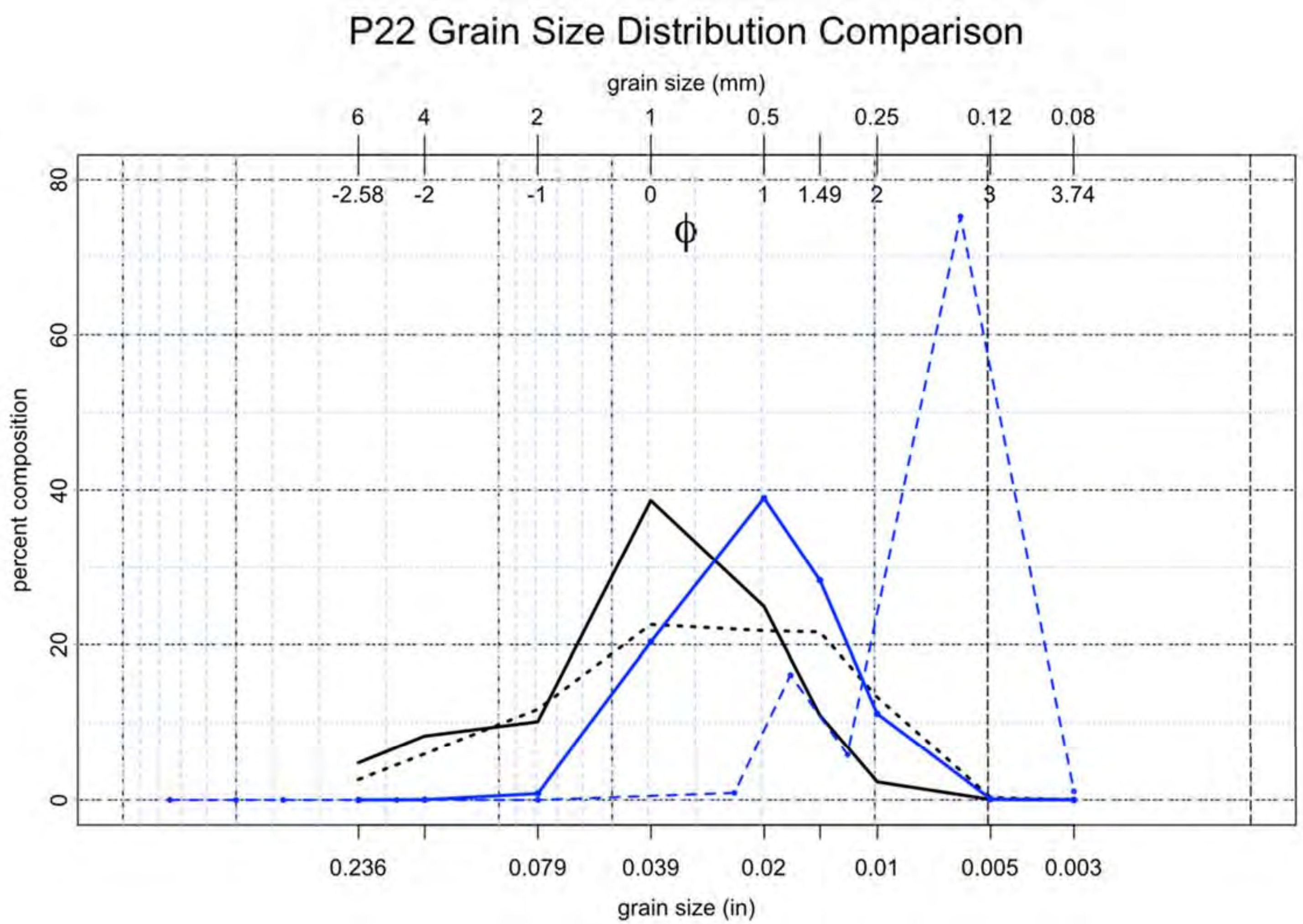


FIGURE 14 SAND GRAIN SIZE DISTRIBUTION COMPARISON AT P22

North and South beach sand grain size distributions are shown by the solid and dotted black lines, respectively. The heavy blue line shows the KBEIS P22 MI sample, while the dotted blue line indicates the sample collected in the KBRSS.
mm = millimeters; in = inches; KBRSS = Kahana Bay Regional Sediment Survey

Calcium Carbonate Composition

The sand on the beach and in the sand sources is dominantly calcium carbonate in most areas (**Table 2**). The notable exception is the southern beach decision unit where the $CaCO_3$ content was only 19%. This may indicate a source of weathering basalt, such as the rock piles in front of Pohaku point. It is also noteworthy that high terrigenous sand content is often observed in Kahana Bay, especially at the Royal Kahana Condominiums (**Figure 16** and also **Figure 2**). Nevertheless, 19% $CaCO_3$ content across a large composite sample that includes beach toe, berm and mid-beach is very low. This may merit further investigation. Notwithstanding the differences between the south bay and the rest of the samples, each of the potential sand borrow sites is comprise of between 83 and 94% $CaCO_3$ and meets criteria #6 of the SSBN guidelines.

Table 4 Mean Sediment Grain Size and Sorting

Data collected in previous studies presented with data from this survey for each of the priority borrow sites. For the present study samples were taken from the north (N) and south (S) of the project beach. Grain size is presented in units of millimeters (mm), the phi scale (Φ) and Wentworth Class Description.

Mean Sediment Grain Size and Sorting					
Site	**Study**	**Φ**	**mm**	**Description**	**Sorting**
P18	KBEIS	1.96	0.257	Medium sand	Moderately well sorted
	RKSS	2.62	0.163	Fine sand	Moderately well sorted
	KBRSS	-	-	-	-
P19	KBEIS	0.15	0.898	Coarse sand	Moderately sorted
	RKSS	0.70	0.617	Coarse sand	Moderately sorted
	KBRSS	-	-	-	-
P22	KBEIS	0.63	0.645	Coarse sand	Moderately sorted
	RKSS	-	-	-	-
	KBRSS	1.95	0.260	Medium sand	Moderately well sorted
Beach	KBEIS N	0.22	0.857	Coarse sand	Poorly sorted
	KBEIS S	-0.21	1.153	Very coarse sand	Poorly sorted
	RKSS	0.12	0.921	Coarse sand	Moderately sorted
	KBRSS	-	-	-	-

RKSS = Royal Kahana Sand Search, KBRSS = Kahana Bay Regional Sediment Survey, KBEIS = Present work

Sediment Contamination

The sand sample tested for arsenic and organochlorine pesticides found background levels of the former, and undetectable levels of the latter. Legacy agriculture in West Maui may contribute nutrients and industrial chemicals (like pesticides) to surface and ground water. To date, there is little evidence of significant persistent pollution along this shoreline. Streams flow intermittently and can release heavy silt plumes. Erosion of the shoreline can also release terrigenous fines into the nearshore water. Both of these are episodic and intensive. The nearshore wave environment interacts strongly with beach and shallow nearshore sand deposits, washing them of fines, and keeping the upper layers well oxygenated. Further, visual inspection of the sand sources and jet-probe holes did not indicate the presence of any heavy organic contamination.

We found that there were very few fine particles in KBEIS sand samples. Less than 1% of sediment at all sites, except P18, passed the 0.125 mm sieve, and less than 0.31% passed the 0.063 mm sieve. The lack of fines in the surface sands was also reflected in dynamics of jet-probe plume formation. Probing the top 2 to 3.3 ft (0.6-1.0 m) of sand did not generate a fine, persistent plume at P19 or P22. Below this threshold, jet-probing could result in significant plume formation. Coloration of the plume (gray to white) indicates that it is composed of $CaCO_3$, rather than deposited terrestrial clay or silt, which would be red, or brown.

FIGURE 15 CALCIUM CARBONATE CONTENT
Waves segregate populations of darker terrigenous sand and lighter calcium carbonate sand (left). A thin layer of terrigenous sand can be deposited over coral sand; here a 2-4 mm excavation reveals the tan coral sand beneath the surface layer (right).

It has also been speculated that the presence of *Halimeda* sand can be a contaminant in the sand, making sands with high *Halimeda* content less suitable for beach restoration. It may degrade more quickly than sand composed of coral, shell and foraminifera. Large shell fragments and *Halimeda* flakes did show up in the benthic-invertebrate push-cores and were visible in the sand ejected from jet-probe holes. Generally, the number of flakes captured was between one and two dozen. In several locations it may have been as high as 100-150. Sieve contents were scored quickly, so photographs of these sieves may bear further analysis to determine how much of the material can be definitively identified as shell and how much *Halimeda.* The abundance of *Halimeda* flakes in the sand populations at P18, P19 and P22 appeared to be low. Even at P19, which was the closest to significant populations of benthic macro-algae, it was not obvious that *Halimeda* made significant contributions to the sand composition.

SAND THICKNESS

Measurements of the thickness of sand-deposits among the present and previous studies are relatively similar and certainly fall within the variability that has been observed across the region. Each study as used different techniques for gauging the thickness of sand deposits and differences among the techniques make direct comparisons difficult. Further, it is likely that the thickness of sand deposits changes over the time-scale of years, as the margins of sand patches are different among satellite images.

RKSS used a thin metal rod to gauge sand thickness. It had mechanical limitations and was ineffective for measuring depth below 2.6 ft (0.8 m). It yielded sand thickness estimates of 1.3 to 1.6 ft (0.4 and 0.5 m) for P18 and P19, respectively.

The KBRSS relied on a sub-bottom profiler, a sensor that was towed on a 20-30 ft line to keep it out of the wash from the boat propellers, to map the thickness of deposits in Kahana Bay. Average depths from the sub-bottom profiler have been back-calculated from the area and volume values presented in the report (**Table 5;** County of Maui, 2016). KBRSS also used a jet-probe to make several measurements at P18, P19 and P22 that were intended to validate sub-bottom profiler data. The KBRSS jet-probe data indicated lesser sand thickness than we found in the present study, or than was interpreted from sub-bottom profile data. The difference in jet-probe data are likely due to equipment differences in the jet-probe and high-pressure pump used in each study. KBRSS used a one-inch hose for the jet-probe, and the present study used a two-inch hose. The difference in drag between the hoses undoubtedly provided more jetting power in the present work; this may also explain the difference in plume formation, which was much stronger in the present study that during the KBRSS. KBRSS sand deposit thickness data are similar to data collected in the present study, with the exception of P22, where KBEIS average sand thickness was 1.6 times the KBRSS findings.

Sand Volume

Sand volume estimates among the present and previous studies have varied widely (**Table 5**). Both methodological difference in sand thickness measurement, and estimation of the sand fields play a part in these discrepancies.

Preliminary work for the RKSS identified sand deposits by tracing the margins of sand fields visible in satellite photos and cross referencing the shapes with LiDAR data and NOAA benthic habitat class maps. These polygons had intricate margins (**Figure 17**), and the full area contained within them was used to estimate the volume of sand present. RKSS estimated a yield of ½ the total volume to account for dredge inefficiencies. The KBRSS relied on similar polygons for planning boat tracks to ensure that the sub-bottom profiler methodically surveyed the resource. When sand source area was calculated the KBRSS appears to have expanded the original search polygons to include all of the sub-bottom profiler tracks (compare **Figure 4** and **17**). This explains why the sand-area estimates from the KBRSS are much greater than those in the RKSS or the present study. Consequently, their volume estimates were also substantially higher than any other study. In the present work, the dredge limits were explicitly stated in the definition of DUs and only included parts of the sand fields that contained persistent sand deposits, as determined from satellite imagery and LiDAR (again **Figure 17**).

Rather than using the full silhouette of the sand source (RKSS) or including the area around the sand source (KBRSS), the proposed dredge limits used in the present study shrink the considered area to be well within the limits of the existing footprint of persistent sand deposits. Thus, the sand volume estimates produced in the current study are more conservative and reflect the reality of dredge logistics and actual sand field size.

TABLE 5 COMPARISON OF SAND DEPOSIT THICKNESS AND VOLUME AMONG STUDIES

The Royal Kahana Sediment Search (RKSS) used a steel rod to gauge sand thickness and calculated sand source area from the intricate margins traced on aerial imagery. The Kahana Bay Regional Sediment Search use a sub-bottom profiler (SBP) and jet-probe (JP) to gage sediment thickness, sand source area include all boat tracks near the sites. The present Kahana Bay Sediment Study (KBEIS) used jet-probe to gage sediment thickness and a simplified dredge footprint to estimate the area of each sand source that might be dredged.

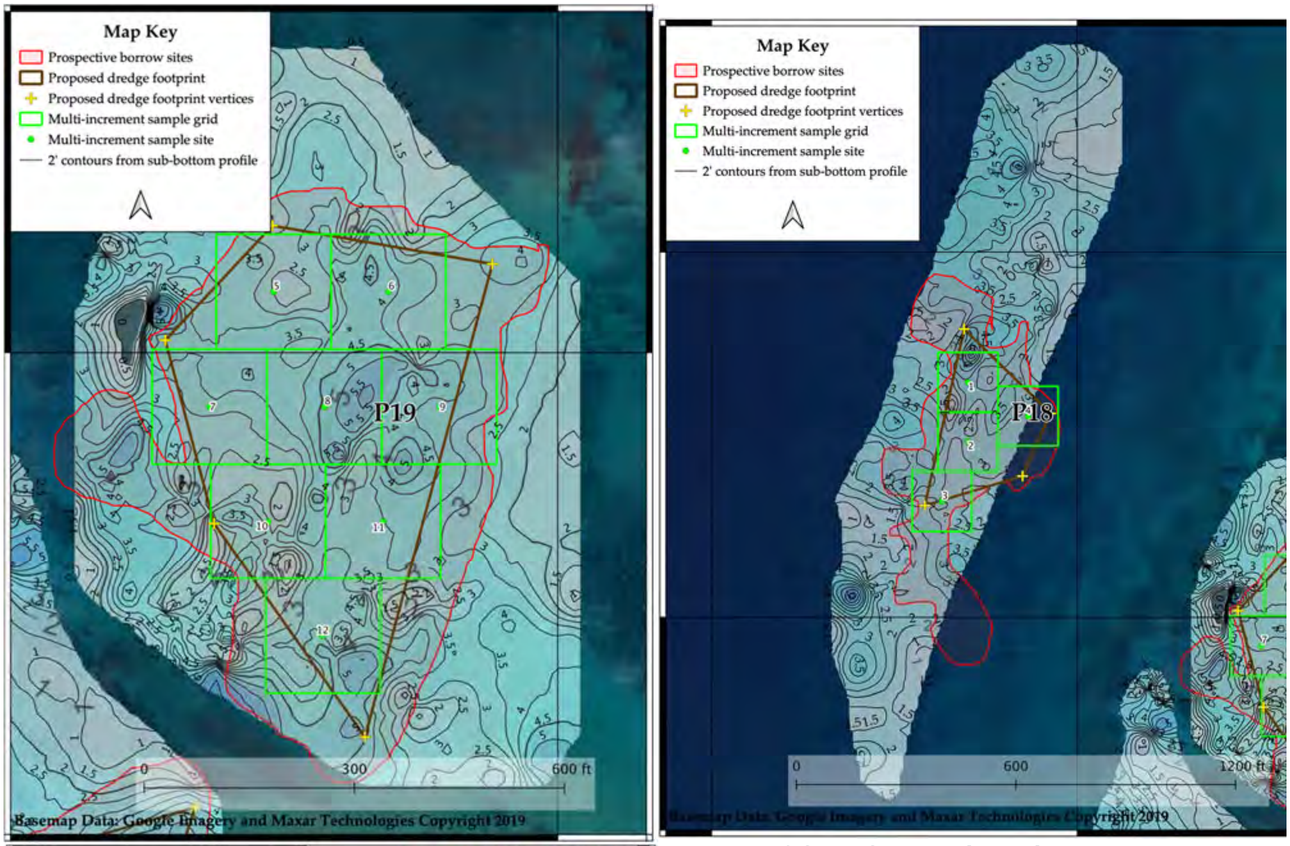
Comparison of Sand Thickness and Volume Estimates—Metric

	Average Thickness [m]				Area [m²]			Volume [m³]			
	RKSS	KBRSS JP	KBRSS SBP	KBEIS	RKSS	KBRSS	KBEIS	RKSS	KBRSS JP	KBRSS SBP	KBEIS
P18	0.40	0.43	0.79	0.75	22,289	66,369	8,330	8,900	28,300	52,800	6,200
P19	0.47	0.38	0.95	1.05	30,257	57,061	18,169	14,200	21,700	54,300	19,100
P22	-	1.45	1.36	2.21		115,336	33,393		167,600	156,700	73,800

Comparison of Sand Thickness and Volume Estimates—English

	Average Thickness [ft]				Area [yd²]			Volume [cy]			
	RKSS	KBRSS JP	KBRSS SBP	KBEIS	RKSS	KBRSS	KBEIS	RKSS	KBRSS JP	KBRSS SBP	KBEIS
P18	1.31	1.40	2.61	2.46	26,657	79,376	9,963	11,700	37,000	69,000	8,200
P19	1.54	1.25	3.12	3.44	36,187	68,244	21,730	18,600	28,400	71,000	25,000
P22	-	4.77	4.46	7.25		137,941	39,938		219,200	205,000	96,500

m = meters, ft = feet, yd = yards, cy = cubic yards



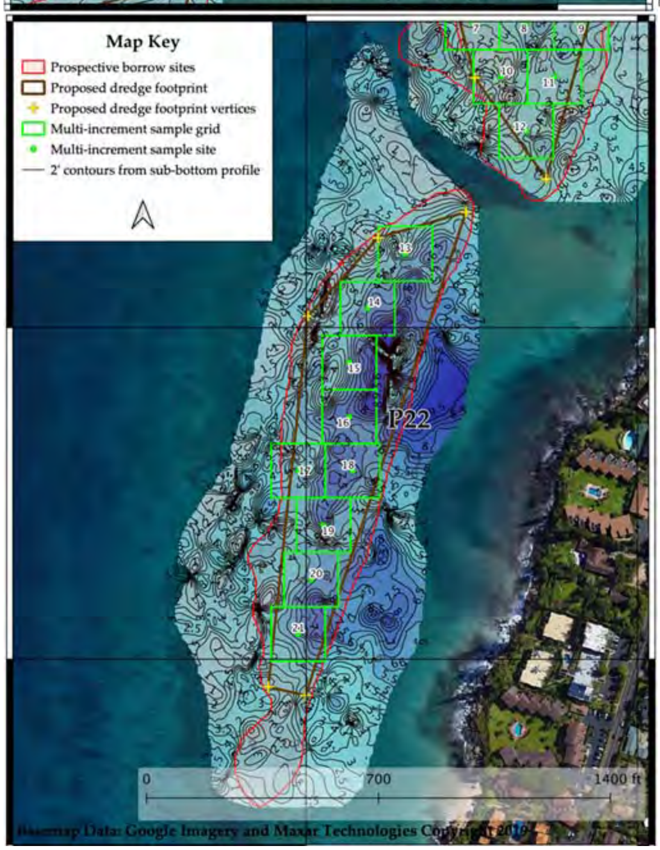


FIGURE 16 SAND SOURCE AREA AND VOLUME COMPARISON

Areal extents of prospective sand sources were calculated from full the silhouette of the sand field (red lines), sub-bottom profiler data envelope (blue field, with contours) proposed dredge footprint (brown line) in the RKSS, KBRSS and present work, respectively. KBRSS = Kahana Bay Regional Sediment Survey; RKSS = Royal Kahana Sand Search.

Key Findings

Sediment Grain Size
Sand from P19 and P22 met all DLNR-OCCL criteria for grain size similarity with the project beach. Sand from P18 had uniformly finer sediment grain size than the beach but may still be suitable for use on the project beach.

Calcium Carbonate Composition
The calcium carbonate composition of beach sediments was unequal at the time of sampling. The sand collected in the south of the bay had only 19% calcium carbonate, compared with 55% at the north end and 83%, 86% and 94% at P18, P19 and P22 respectively.

Contamination
P19 had below background levels of arsenic and undetectable levels of organochlorine pesticides.

Sand Deposit Thickness
P22 had much thicker layer of sand = (~7.25 ft) than P19 or P18 (3.4 and 2.4 ft, respectively).

Volume
Using the conservative dredge footprints proposed in the preset study, the two nearshore sand deposits are estimated to contain ~130,000 cy of sand. An 80% recovery rate would yield ~104,000 cy of sand.

Sand Color
Sand at the surface of the borrow sites was typical of light tan coral sand. With depth below the deposit surface sand had slightly darker coloration.

Sand Composition
Gravel and coral rubble were rarely encountered during the jet-probe study at P18, P19 or P22, suggesting low gravel content in the deposits. No material larger than an inch surfaced. Pea-sized gravel shell and coral fragment were not uncommon.

Plume Formation
Plumes were generally formed in deposits deeper than 2 to 3.2 ft (0.6 to 1 m) and were present at all sites. Plumes generated during jet-probing at P19 and P22 were heavier than the plumes formed at P18.

***Halimeda* content**
All sites had some *Halimeda* content in the cores. Absolute abundance of *Halimeda* flakes in sand is hard to gauge—numbers of in-tact fronds were generally low, but decayed fronds are hard to detect without microscopic inspection.

Benthic Infauna
Biological communities at sand sources were variable. Benthic infaunal invertebrate communities appeared to be most rich and abundant in the stable sand at P18, with numerous burrows, fecal castings and small tubes documented. Very few benthic infaunal organisms were observed at P19 and P22, however Capitellid worms were disturbed during jet-probe work at these sites.

CONCLUSIONS

In support of a possible regional scale beach nourishment project in Kahana Bay, the purpose of this study was to evaluate the quality and volume of sand at three prospective borrow sites, with regard to DLNR-OCCL's standards for beach nourishment sand. In this study we quantitatively evaluated grain size distribution, calcium carbonate composition, contaminant levels, sand deposit thickness and available sand volume. In the course of the study we also qualitatively evaluated aspects of sediment composition and tendency toward plume formation, sand color and biological community at and near the sand sources.

Analysis of sediment grain size distribution from cores collected in each of the prospective borrow sites showed that P19 and P22 met criteria for matching the sand collected on the project beach. Sand from P18 was finer. At each site, surface sand was light colored and composed of coral and shell (83-94% $CaCO_3$). In jet-probe ejecta and cores, sand was lightly discolored with depth. At the time of sampling, however, the $CaCO_3$ content of the beach sand was lower than P18, P19 or P22. Arsenic and organochlorine pesticide content was only tested at P19 but was within background levels for the former and undetectable for the latter.

The measurements of sand deposit thickness in the present study utilized a direct measurement technique that provides high confidence measures by including site by site replication. Sand thickness measurements were generally in agreement with previous work; differences in methodology among studies make direct comparison of these measurements difficult.

By proposing a dredge footprint that reflects the logistics of sand harvesting, the present study has made the most conservative estimate of sand source area relative to previous work, and consequently estimates lower and more likely available sand volumes compared to previous sand studies. The sand volume estimates, calculated from dredge footprint area and sand deposit thickness, indicate that there is ~130,000 cy of sand available in P19 and P22, and inclusion of P18 would add another 8,000 cy of available sand if acceptable.

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Appendix A – Decision Unit and Sampling Locations

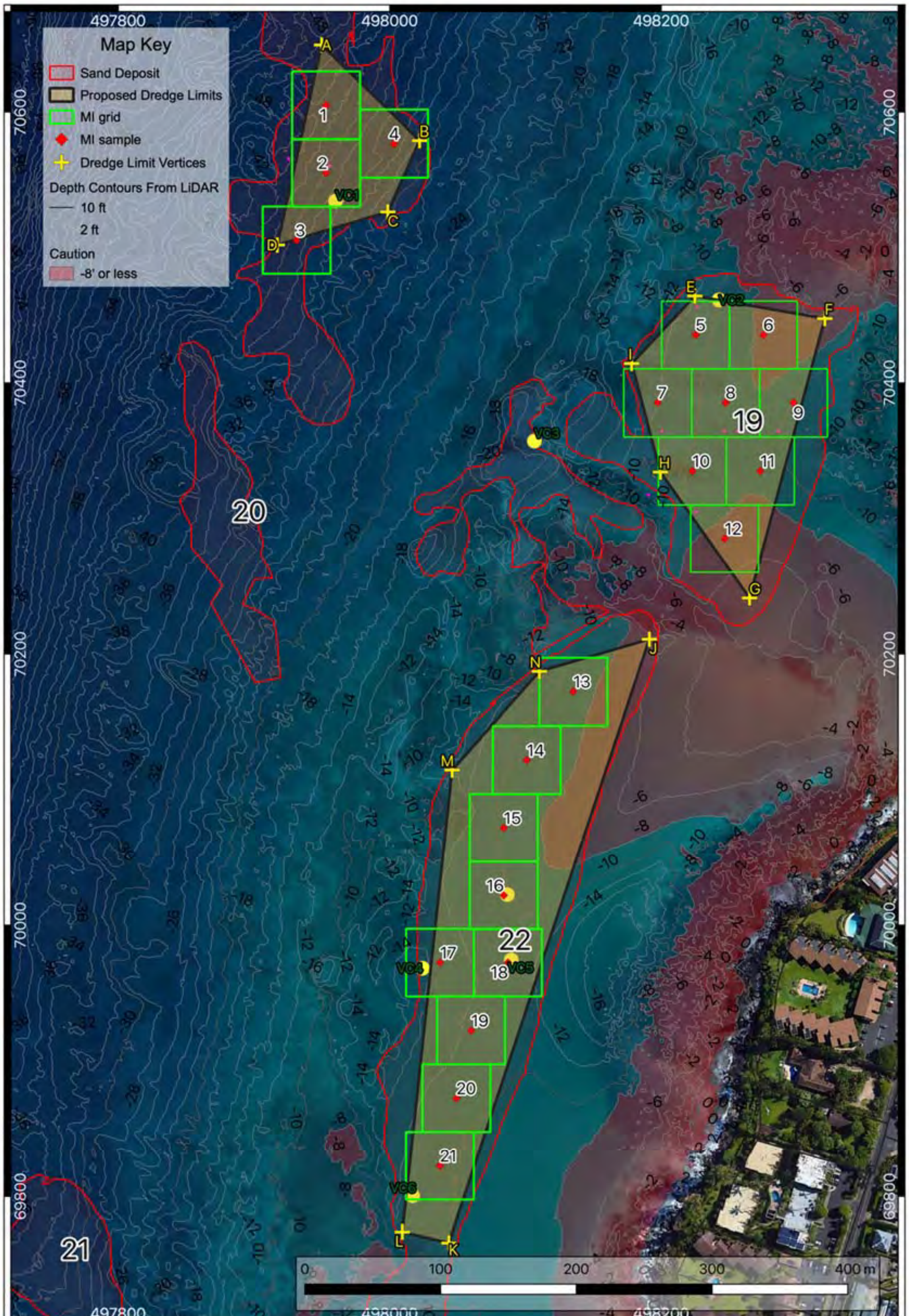
Jet-probe measurements were made at each visited MI site. In Table A1, coordinates, and water depth are reported for each multi-increment sample site in each decision unit. Sites marked with * were not sampled.

At each MI site, 5 jet-probe sand thickness measurements were taken. Notes were made on material ejected from the jet-probe hole, as well as coloration and the reason for probe refusal. Qualities of any plume that formed are also recorded. Other operational and site notes are also recorded.

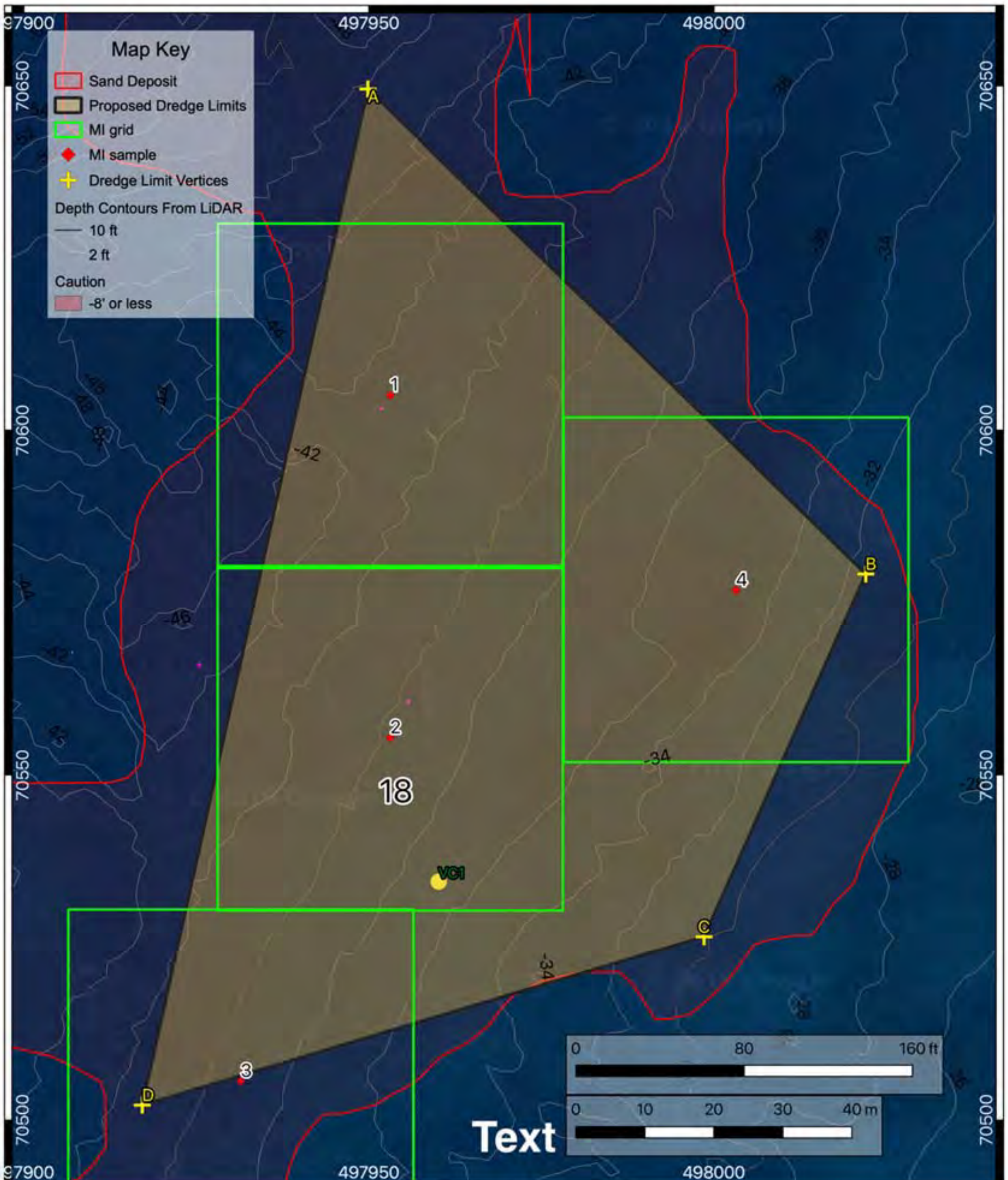
Jet-probe logs were recorded on dive slates, photographed and transferred to the digital note sheets presented here.

Decision Unit and Multi-increment™ Site Location

DU	MI Site	Lat	Lon	Water Depth From LiDAR [ft]	Water Depth From LiDAR [m]
P18	S1	20.97109	-156.68635	-43.5	-13.3
	S2	20.97064	-156.68635	-39.7	-12.1
	S3*	20.97019	-156.68656	-39.0	-11.9
	S4	20.97083	-156.68587	-35.0	-10.7
P19	S5	20.96955	-156.68373	-10.8	-3.3
	S6	20.96955	-156.68325	-7.7	-2.3
	S7	20.96910	-156.68400	-12.1	-3.7
	S8	20.96910	-156.68352	-9.0	-2.7
	S9	20.96910	-156.68304	-10.0	-3.0
	S10	20.96865	-156.68376	-9.7	-3.0
	S11	20.96865	-156.68327	-8.6	-2.6
	S12	20.96820	-156.68353	-7.1	-2.2
P22	S13	20.96718	-156.68460	-8.9	-2.7
	S14	20.96672	-156.68493	-9.3	-2.8
	S15	20.96627	-156.68509	-9.7	-2.9
	S16	20.96582	-156.68509	-10.2	-3.1
	S17*	20.96537	-156.68554	-13.4	-4.1
	S18	20.96537	-156.68506	-11.1	-3.4
	S19*	20.96492	-156.68532	-11.8	-3.6
	S20	20.96447	-156.68543	-11.0	-3.3
	S21	20.96402	-156.68554	-10.6	-3.2



Sand Study at Kahana Bay, Maui
Ecological Monitoring and Analysis



Proposed Dredge Limits

Polygon	ID	Lat	Lon
18	A	20.97148835	-156.68638217
18	B	20.97085319	-156.68568832
18	C	20.97037774	-156.68591356
18	D	20.97015636	-156.68669639

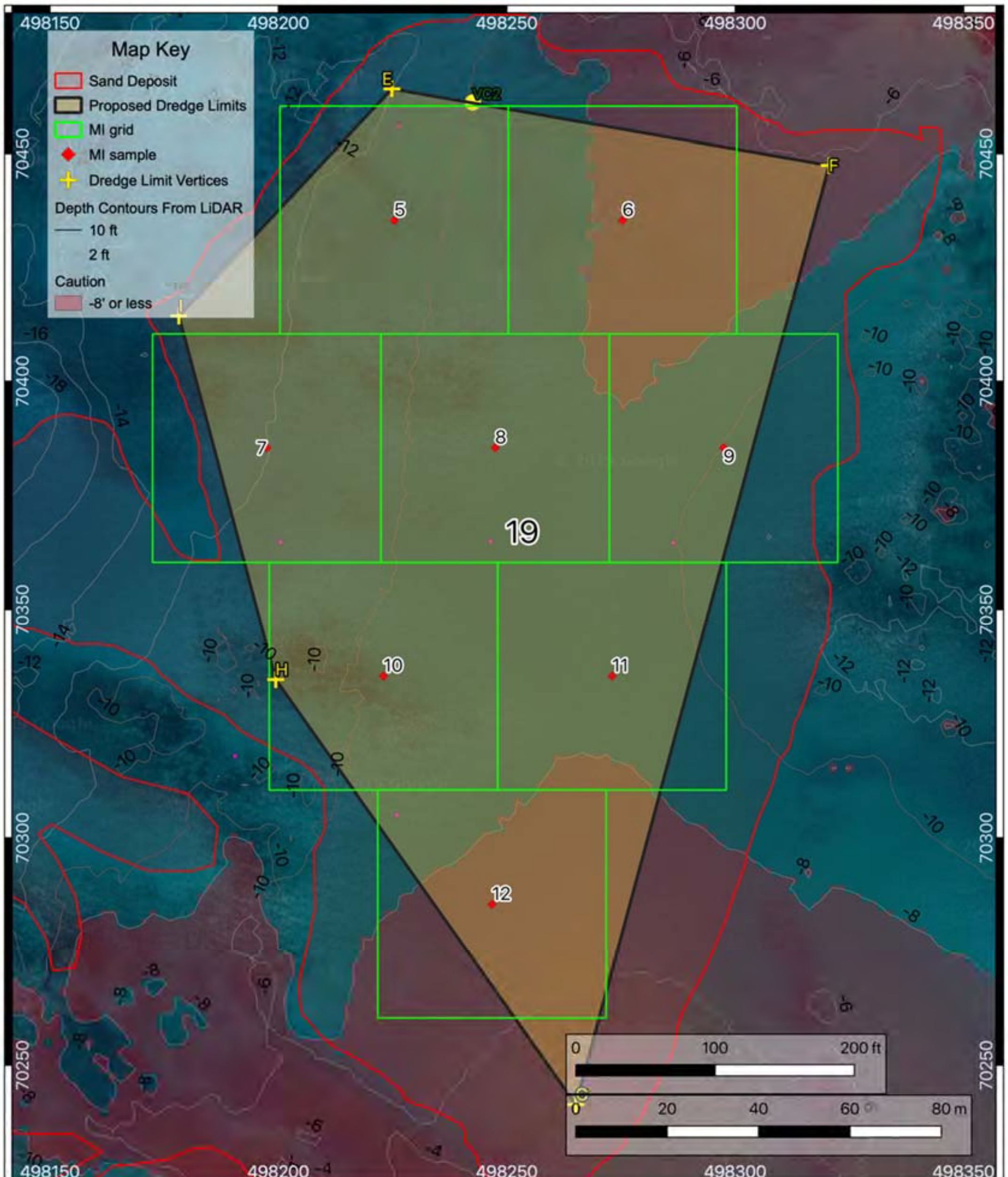
Multi-Increment Sample Locations

Polygon	Site	Lat	Lon
18	1	20.97108659	-156.68635082
18	2	20.97063786	-156.68635093
18	3	20.97018769	-156.68655904
18	4	20.97083176	-156.68586907

Notes:

NAD83(PA11) / Hawaii zone 2 EPSG:6629

Sand Study at Kahana Bay, Maui
Ecological Monitoring and Analysis



Proposed Dredge Limits

Polygon	ID	Lat	Lon
19	E	20.96981411	-156.68373775
19	F	20.96966343	-156.68281707
19	G	20.96780187	-156.68335015
19	H	20.96864360	-156.68398199
19	I	20.96936383	-156.68418598

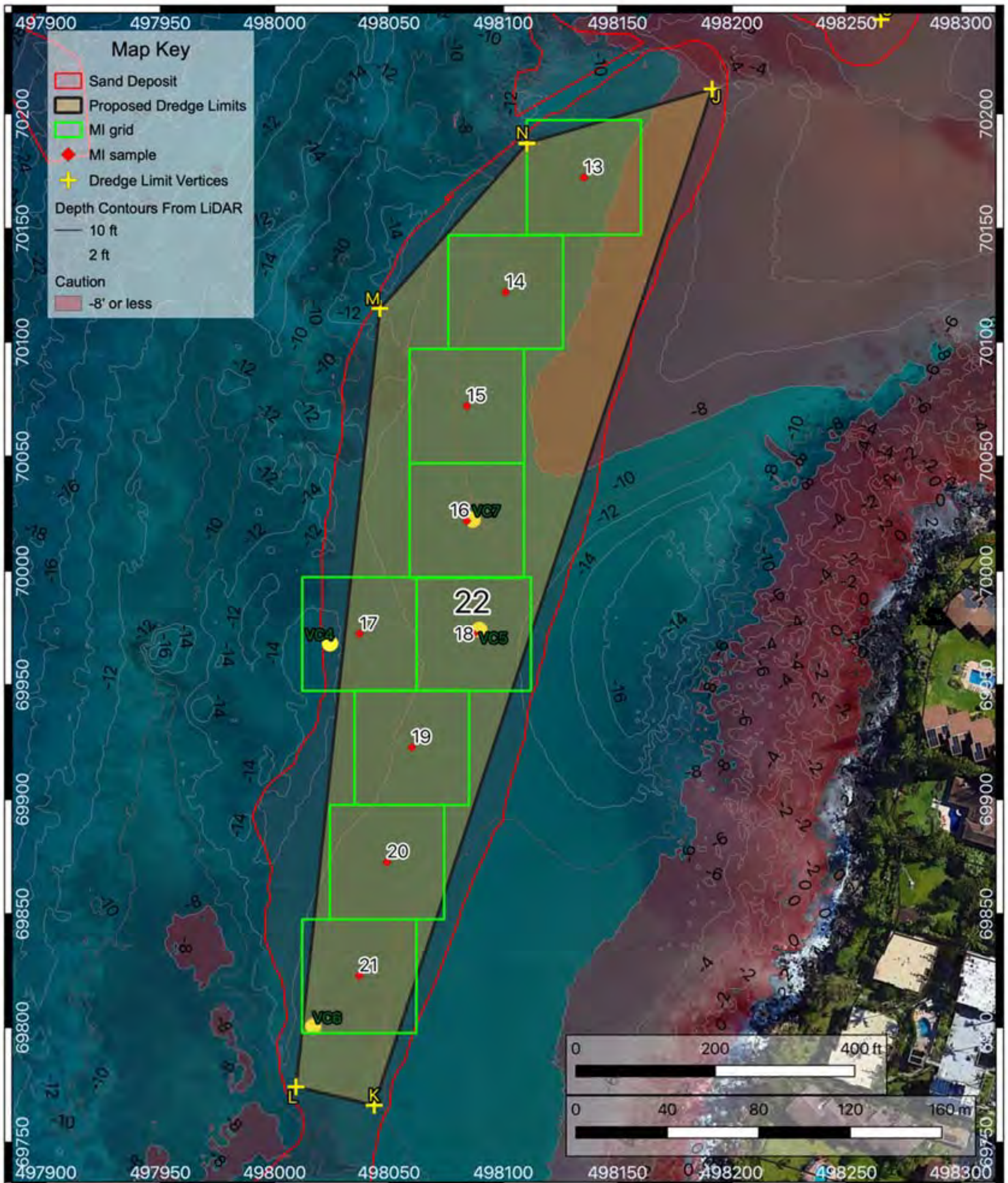
Multi-Increment Sample Locations

Polygon	Site	Lat	Lon
19	5	20.96955422	-156.68373266
19	6	20.96955426	-156.68325204
19	7	20.96910254	-156.68400086
19	8	20.96910258	-156.68352008
19	9	20.96910258	-156.68303919
19	10	20.96865050	-156.68375532
19	11	20.96865060	-156.68327410
19	12	20.96819934	-156.68352681

Notes:

NAD83(PA11) / Hawaii zone 2 EPSG:6629

Sand Study at Kahana Bay, Maui
Ecological Monitoring and Analysis



Proposed Dredge Limits

Polygon	ID	Lat	Lon
22	J	20.96752644	-156.68406008
22	K	20.96350681	-156.68548047
22	L	20.96357987	-156.68580954
22	M	20.96665761	-156.68545696
22	N	20.96731205	-156.68483921

Multi-Increment Sample Locations

Polygon	Site	Lat	Lon
22	13	20.96717753	-156.68459881
22	14	20.96672375	-156.68492854
22	15	20.96627157	-156.68509154
22	16	20.96581938	-156.68509137
22	17	20.96537134	-156.68554284
22	18	20.96537160	-156.68506170
22	19	20.96492204	-156.68532240
22	20	20.96447053	-156.68542660
22	21	20.96401880	-156.68554332

Notes:

NAD83(PA11) / Hawaii zone 2 EPSG:6629

Sand Study at Kahana Bay, Maui
Ecological Monitoring and Analysis

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*18*
Lat	*20.971087*	**Site**	*1*
Lon	*-156.686351*	**Start Time**	*8:04:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*8:27:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*13.72*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*100*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.14*
Wind (dir/spd)	*E 9 (11) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

light wind, no swell, no current

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Limestone bench nearby, with some coral an Halimeda. Fish visible over/around coral. Too far to ID. Sand appears very stable. Many worm tubes, holes, fecal castings of various sizes visible. Many trails of snails or crabs also visible. Fine ripple structure of sand. Sand much finer than at nearshore sites.

Probe #	Sediment Depth [m]
1	0.90
2	1.40
3	1.20
4	1.20
5	1.20
6	-

Sand Quality

Surface	*fine dark tan coral/shell sand*
At Depth	*fine darker sand*

Jet-Probe Notes

A dark gray plume initially formed and quickly settled, with a lighter white/gray plume persisting and staying close to the sea-floor; numerous shells and Halimeda flakes were visible in the ejecta. Inclusions appeared to be mostly composed of Halimeda. Largest ejected particles were 1-2cm, and included Halimeda, shell fragments and maybe calcareous worm-tube fragments. These particles were much more abundant than seen in the ejected material at polygon 19. Hard bench nearby with coral and large areas of Halimeda. Refusal was a mixture of hard and gravel/rubble, however the jet-probe didn't bring any rubble sized particles (or larger) to the surface.

Animals Observed

Numerous worm holes, small tubes, large castings, gastropod trails, small fecal castings, some pits, common box crab (Calappa hepatica) and unidentified miter snail. Pocillopora meandrina; Pocillopora eydouxi; Porites lobata and Halimeda spp.

Invert Core Notes

Many Halimeda flakes and small shells/shell fragments (100-150)

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*1.18*
std [m]	*0.18*
Refusal	*hard and rubble*
Plume	*small plume*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*18*
Lat	*20.970638*	**Site**	*2*
Lon	*-156.686351*	**Start Time**	*9:00:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*9:22:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*13.11*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*100*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.22*
Wind (dir/spd)	*E 9 (11) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

light-moderate wind, no swell

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Sediment appears very stable. Some Halimeda living in soft sediment, not anchored to hard substrate at all. Many tubes of different sizes. Dune structure fine ripples.

Probe #	Sediment Depth [m]
1	0.40
2	0.30
3	0.35
4	0.40
5	0.38
6	-

Sand Quality

Surface	*fine dark tan coral/shell sand*
At Depth	*fine darker sand*

Jet-Probe Notes

As at site 1, a dark white/gray/brown plume was released and stayed close to the sea-floor. It settled quickly. Halimeda flakes and shells visible in ejecta, but less abundant than at site 1. Refusal was hard, sand was much finer than nearshore sand and only in a thin deposit over the hard substrate.

Animals Observed

Similar to site 1, many worm holes, small tubes, castings and trails.

Invert Core Notes

Few Halimeda flakes and shell fragments, also 5-6 soft worm tubes fragments, gelatinous, not fibrous.

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*0.366*
std [m]	*0.04*
Refusal	*hard*
Plume	*small plume*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*18*
Lat	*20.970832*	**Site**	*4*
Lon	*-156.685869*	**Start Time**	*9:52:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*10:08:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*11.28*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*100*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.27*
Wind (dir/spd)	*E 9 (11) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

light-moderate wind, no swell

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Sand habitat as at 1 and 2. Nearby coral contained ringed sap sucking slug (Plakobranchus ocellatus), Hawaiian dascillus (Dascyllus albisella), Pocillopora meandrina, Halimeda incrassata, sponge (vagabond?) and peacock flounder (6-8 inches Bothus mancus), Hawaiian white spotted toby (Canthigaster jactator)

Probe #	Sediment Depth [m]
1	0.50
2	0.60
3	0.80
4	0.80
5	0.80
6	-

Sand Quality

Surface	*fine dark tan coral/shell sand*
At Depth	*fine darker sand*

Jet-Probe Notes

Sparse coral reef nearby on hard substrate, accompanied by Halimeda. Deeper sand (below 50cm) much more gray, but with fewer Halimeda and shell inclusions than site 1 or 2.Sand jumping shrimp could be seen trying to rebury themselves in the holes left by jet-probe; also tubes of several types of worms, the fine ones we saw in the sieve, and also larger tubes. Appeared to be several per square cm, and tubes were at least 5cm deep, some much longer.

Animals Observed

Similar to site 1, many worm holes, small tubes, castings and trails.

Invert Core Notes

Few Halimeda flakes. Many parts of soft worm-tubes (50-60), with fine sand grains on the outside of the tube; one small jumping sand shrimp (~1 cm).

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*0.7*
std [m]	*0.14*
Refusal	*hard*
Plume	*small plume*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.969554*	**Site**	*5*
Lon	*-156.683733*	**Start Time**	*9:20:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*9:57:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*2.74*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Probe #	Sediment Depth [m]
1	1.10
2	1.20
3	0.90
4	1.00
5	1.10
6	-

Jet-Probe Notes

Probe quickly met hard refusal, with light brown/gray plume; 20cm + worm A exposed by jet-probe; small shells and Halimeda flakes visible in bottom-of-hole-ejecta.

Weather

Tide [m]	*0.24*
Wind (dir/spd)	*E 8 (10) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

very light swell, no wind, moderate surge but no current

Sand Samples

Sample Lables

Photographs

Animals Observed

worm A, lined sea-hare (Stylocheilus striatus)

Benthic Habitat Notes

Sandy area with rocky outcrops nearby; coarse sand.

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

Few (10-15) Halimeda flakes visible in invertebrate core, but no animals.

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*1.06*
std [m]	*0.11*
Refusal	*hard*
Plume	*light*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.969554*	**Site**	*6*
Lon	*-156.683252*	**Start Time**	*10:26:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*10:43:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.35*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.27*
Wind (dir/spd)	*E 8 (10) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

no wind, light swell, moderate surge, no current

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Probe #	Sediment Depth [m]
1	1.15
2	1.90
3	1.30
4	1.45
5	1.55
6	2.1

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Jet-Probe Notes

Gray/white plume emerged below 0.8m, an area that felt like gravel/rubble on the jet-probe; probe could be inserted below 1m, but required repeated re-insertion and working it down, this formed a giant plume that was slow to disperse and reduced visibility to 1-2 feet. Could not see or photograph material ejected from bottom of hole. Lack of current made plume very slow to disperse. Worms (A) exposed during jet-probing.

Animals Observed

worm A, lined sea-hare, small school of bluefin trevally (Caranx melampygus) stopped by to check out the plume

Invert Core Notes

Halimeda flakes only (10-15)

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*1.575*
std [m]	*0.36*
Refusal	*gravel/rubble*
Plume	*thick/heavy*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.969103*	**Site**	*7*
Lon	*-156.684001*	**Start Time**	*11:52:00 AM*
Boat	*Prontosaurus*	**Stop Time**	—
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.35*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.27*
Wind (dir/spd)	*NE 12 (12) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

gusty wind, switching north/south, light swell, moderate surge, no current

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Reef rock with algae visible underwater but not super close; Boat nearly dragged jet-probe over rocky outcrop, but the probe was pulled in before it caused any trouble.

Probe #	Sediment Depth [m]
1	-
2	-
3	-
4	-
5	-
6	-

Jet-Probe Notes

Boat pushed by wind; snapped line and power cable for SDI-mini vibe. Returned to boat to reset anchor and deal with cable end; did not jet-probe.

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

Halimeda flakes and small shells (60-70)

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*0*
std [m]	*0.00*
Refusal	*hard*
Plume	*light*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.969103*	**Site**	*8*
Lon	*-156.683520*	**Start Time**	*11:09:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*11:19:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.35*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Probe #	Sediment Depth [m]
1	0.30
2	0.30
3	0.30
4	0.40
5	0.40
6	-

Jet-Probe Notes

Thin/sparse plume formed, light-gray to milky white; refusal hard, abrupt.

Weather

Tide [m]	*0.28*
Wind (dir/spd)	*NE 12 (12) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

wind building, light swell, moderate surge, no current

Sand Samples

Sample Lables

Photographs

Animals Observed

worm A, lined sea-hare

Benthic Habitat Notes

Reef rock nearby with Halimeda and other algae; no visible coral. Surface sand coarse and well-washed.

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

Few Halimeda flakes and small shells.

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*0.34*
std [m]	*0.05*
Refusal	*hard*
Plume	*light*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.969103*	**Site**	*9*
Lon	*-156.683039*	**Start Time**	*10:58:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*11:09:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.35*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.28*
Wind (dir/spd)	*NE 12 (12) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

no wind, light swell, moderate surge, no current

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Reef rock emergent from seafloor ~10-20m away, no obvious algae or coral visible from that distance. Coarse sand at surface, appears to be well-washed.

Probe #	Sediment Depth [m]
1	0.50
2	0.30
3	0.90
4	1.10
5	1.00
6	-

Jet-Probe Notes

Grayish plume formed below 20-30cm. It wasn't as fine, abundant or persistent as Site 6, settling out more quickly. Some small coral rubble, shells and Halimeda flakes visible hard refusal. Some small shells, coral rubble and Halimeda flakes visible in ejecta from bottom of hole; largest rubble the size of a nickel. Sand discolored below 30cm--light gray, with bright white shell inclusions.

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

Halimeda flakes and small shells (100-150)

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*0.76*
std [m]	*0.34*
Refusal	*gravel/rubble*
Plume	*medium*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.968651*	**Site**	*10*
Lon	*-156.683755*	**Start Time**	*1:40:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*2:05:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.66*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.20*
Wind (dir/spd)	*NE 12 (12) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

wind stabilized; growing wind-swell; stronger surge, still no strong current

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

There is one place with a few fronds of fibrous macro-algae, indicating something stable. But no emergent rock, or numerous algae.

Probe #	Sediment Depth [m]
1	1.20
2	1.20
3	1.10
4	1.20
5	1.00
6	-

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Jet-Probe Notes

Thick plume light gray to white, slow to settle. Mostly forming with probe below 60-80 cm. Some rubble/shells from bottom of hole; largest rubble the size of a quarter, most smaller than a pea. Ejected material was mostly sand of similar composition to surface sand, only with a few larger particles mixed in.

Animals Observed

worm A, lined sea-hare, 2 small shrimp (small jumping sand shrimp (Trachypenaeopsis cf. mobilispinis)?)

Invert Core Notes

2 1.5-2 cm greenish shrimp; Few Halimeda flakes and shell fragments (10-15)

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*1.14*
std [m]	*0.09*
Refusal	*gravel/rubble*
Plume	*thick/heavy*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.968651*	**Site**	*11*
Lon	*-156.683274*	**Start Time**	*2:18:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*2:35:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.05*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Probe #	Sediment Depth [m]
1	1.60
2	1.40
3	1.40
4	1.00
5	1.40
6	-

Jet-Probe Notes

Strong plume formed below 80 cm, milky white, refusal was not hard, felt like gravel or rubble, rocky outcrops near site, some coral and macro-algae, ejecta included Halimeda flakes, and few small shells and small coral fragments 2 or 3 cm; ejecta only slightly gray, mostly same color as surface sand, light tan.

Weather

Tide [m]	*0.20*
Wind (dir/spd)	*NE 12 (12) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

gusty wind and growing swell; surge, but no strong current

Sand Samples

Sample Lables

Photographs

Animals Observed

worm A, lined sea-hare

Benthic Habitat Notes

0

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

nothing

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*1.36*
std [m]	*0.22*
Refusal	*gravel/rubble*
Plume	*thick/heavy*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/10/19*
Client	*Oceanit*	**Polygon**	*19*
Lat	*20.968199*	**Site**	*12*
Lon	*-156.683527*	**Start Time**	*2:50:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*3:10:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*2.74*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.00*
Wind (dir/spd)	*NE 12 (12) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

gusty wind and growing swell; surge, but no strong current

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Medium/coarse well washed sand in neat ripples/dunes.

Probe #	Sediment Depth [m]
1	1.20
2	1.40
3	1.30
4	1.20
5	1.00
6	-

Jet-Probe Notes

Thin plume formed, gray/brown. Ejected sands darker than surface sand and seemingly more coarse, than at other sites in this polygon. Several nut-shells (kukui?) were exposed during jet-probing. Although sands were coarser, no large solids (other than the nut shells) emerged during probing. Largest particles were not larger than a pea. Refusal felt like rubble.

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

few Halimeda flakes and shell fragments

Deck Crew

Oceanit Team	*Michael Foley, Taylor Chock*
Boat Crew	*Captain: Erik Bergmeyer Crew: Tim*

Jet-Probe Summary

Avg Depth [m]	*1.22*
std [m]	*0.15*
Refusal	*grave/rubble*
Plume	*thin*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.967178*	**Site**	*13*
Lon	*-156.684599*	**Start Time**	*11:09:00 AM*
Boat	*Prontosaurus*	**Stop Time**	*11:50:00 AM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*2.74*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.35*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

building wind, no swell, no current, strong surge

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no visible coral or algae.

Probe #	Sediment Depth [m]
1	2.00
2	2.00
3	1.80
4	2.20
5	2.20
6	-

Jet-Probe Notes

Very little resistance to jet-probe. It penetrated 2m without trouble. Maybe gravel at depth prevented further penetration, but sound/feeling on probe was indistinct. A light plume formed, but nothing like at polygon 19. Sand from deeper (below 60cm) had grayer composition in contrast to light tan at surface. Shells and small gravel from deeper appeared bright against ejected sand. Ejecta was no larger than dime to nickel, but mostly coarse sand. Appeared to be more shell and very little Halimeda. Also many dark grains, could be olivine, or anoxia?

Animals Observed

Worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

0

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*2.04*
std [m]	*0.17*
Refusal	*gravel/rubble*
Plume	*small*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.966724*	**Site**	*14*
Lon	*-156.684929*	**Start Time**	*12:17:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*12:33:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.35*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.38*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

building wind, no swell, no current, very surgey

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Probe #	**Sediment Depth [m]**
1	-
2	-
3	-
4	-
5	-
6	-

Jet-Probe Notes

no jet probe

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

fewer than 20 Halimeda and shell flakes; 2 ~2cm fragments of worm tube.

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*0*
std [m]	*0.00*
Refusal	*na*
Plume	*na*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.966272*	**Site**	*15*
Lon	*-156.685092*	**Start Time**	*12:39:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*12:45:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.35*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Probe #	Sediment Depth [m]
1	2.20
2	2.30
3	2.40
4	2.40
5	2.30
6	-

Weather

Tide [m]	*0.38*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

building wind, no swell, no current, very surgey

Jet-Probe Notes

Very little resistance to probe. Below 40-60cm dark ejecta visible, quickly settling out of suspension. Below ~1 meter, plume began to form, slow to dissipate/settle out. Light/cream colored. Shells, Halimeda and coral fragments visible in ejecta. Ejected material more gray than surface sand, and appearing to be more coarse with more shell and rubble. None of ejected material appeared larger than a nickel, having the consistency of very coarse sand, not gravel. One fragment (2cm) of sand encrusted worm tube was also visible in the eject.

Sand Samples

Sample Lables

Photographs

Animals Observed

worm A, lined sea-hare

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

25-30 Halimeda and shell flakes; several fragments of sand-encrusted worm tube; fragment of Worm A

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*2.32*
std [m]	*0.08*
Refusal	*soft*
Plume	*moderate*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.965819*	**Site**	*16*
Lon	*-156.685091*	**Start Time**	*1:06:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*1:19:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.66*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.38*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

building wind, no swell, no current, very surgey

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Probe #	Sediment Depth [m]
1	2.30
2	2.40
3	2.40
4	2.40
5	2.40
6	-

Jet-Probe Notes

Very easy to probe. Generally, full barrel entered without any effort. Light plume formed deeper than 0.8m, but was quick to settle, or didn't rise in he water column far enough to interfere with visibility. One jet-probe met resistance ~1m, but moved past it and reach full depth. Sand was as above, coarse, deeper sand with small shells and coral bits, no ejected material larger than pea sized. Deeper sand of darker color, appears to be hypoxia, not mineral difference.

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

small shrimp 2-3cm/Halimeda fragments

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*2.38*
std [m]	*0.04*
Refusal	*soft*
Plume	*moderate*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.965372*	**Site**	*18*
Lon	*-156.685062*	**Start Time**	*1:31:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*1:49:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*4.27*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.36*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

somewhat windy, no swell, no current, very surgey

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Probe #	Sediment Depth [m]
1	1.60
2	1.40
3	1.80
4	2.20
5	1.90
6	-

Jet-Probe Notes

Easy penetration, light gray plume formed below ~1.4 meters when jetting. Wasn't enough to significantly reduce visibility. Deeper sand somewhat darker/more gray and appearing to be coarser, containing coral and shell fragments with some Halimeda flakes. At least the largest particles were larger than at the surface. These stood out brightly in the gray sand, and largest particles ranged from 1-2 centimeters typically. A few pieces of coral approximately quarter sized could be found.

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

150-200 Halimeda and shell fragments

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*1.78*
std [m]	*0.30*
Refusal	*gravel/rubble*
Plume	*moderate*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.964471*	**Site**	*20*
Lon	*-156.685427*	**Start Time**	*2:05:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*2:20:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.96*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.34*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	*-*

Met Notes

somewhat windy, no swell, no current, very surgey

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Probe #	Sediment Depth [m]
1	2.40
2	2.40
3	2.40
4	2.40
5	2.40
6	-

Jet-Probe Notes

Moderate light gray plume formed; after 5 jet-probes was interfering with visibility. Easy full-length probe penetration, so there was no real refusal. Similar to other sites in Polygon 22, sand below 50-60cm was darker with shell and Halimeda inclusions. Some coarser material ejected from depth, but nothing larger than nickel sized, and mostly just coarse sand.

Animals Observed

worm A, lined sea-hare

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

60-70 Halimeda and shell fragments

Deck Crew

Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

Jet-Probe Summary

Avg Depth [m]	*2.4*
std [m]	*0.00*
Refusal	*soft/none*
Plume	*moderate+*

Jet Probe Log

Project	*Kahana Bay EIS Sand Confirmation*	**Date**	*6/11/19*
Client	*Oceanit*	**Polygon**	*22*
Lat	*20.964019*	**Site**	*21*
Lon	*-156.685543*	**Start Time**	*2:32:00 PM*
Boat	*Prontosaurus*	**Stop Time**	*2:40:00 PM*
Divers	*Kyle Aveni-Deforge, Mike Rudenko*	**Water Depth [m]**	*3.05*

Deployment Conditions

Probe Length	*2.4 [m]*	*1.5 [in] dia*
Pump Type	*High Pressure Centrifugal*	
Discharge (max)	*6360*	*[gal/hr]*
Hose Length	*50*	*[ft]*
Hose Diameter	*2*	*[in]*

Weather

Tide [m]	*0.32*
Wind (dir/spd)	*NE 14 (14) [mph]*
Swell (dir/ht)	*S 1-2 [ft]*
Current (dir/spd)	-

Met Notes

somewhat windy, no swell, no current, very surgey

Sand Samples

Sample Lables

Photographs

Benthic Habitat Notes

Coarse sand; even ripple structure; no coral or algae visible.

Probe #	Sediment Depth [m]
1	2.20
2	2.30
3	2.40
4	2.40
5	2.40
6	-

Jet-Probe Notes

Jet-probe penetrated full length easily. Below 1m a light gray plume was released; it was moderate, didn't rise high in the water column or obstruct vision. It was persistent in the bottom 2 feet of the water column, and not as thick or persistent as at site 20. Ejected material was somewhat different from other sites, and appeared to have more lava rock/olivine. No large particles ejected. Most ejecta was no larger than coarse sand, largest particles were shell, but also pea-sized rocks.

Animals Observed

Horned Helmet (Cassis cornuta)

Sand Quality

Surface	*coarse tan shell and coral*
At Depth	*coarser gray/tan shell and coral*

Invert Core Notes

~10 shell fragments maybe no Halimeda; 1-2 pieces appear to be olivine/lava rock

Deck Crew

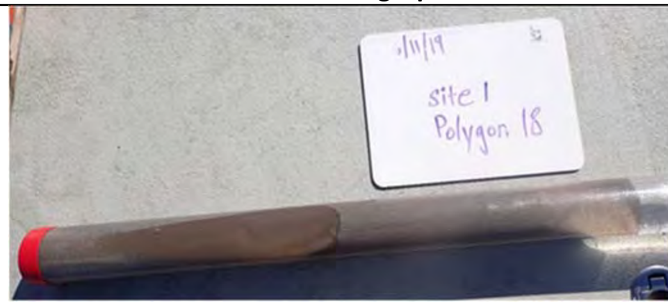
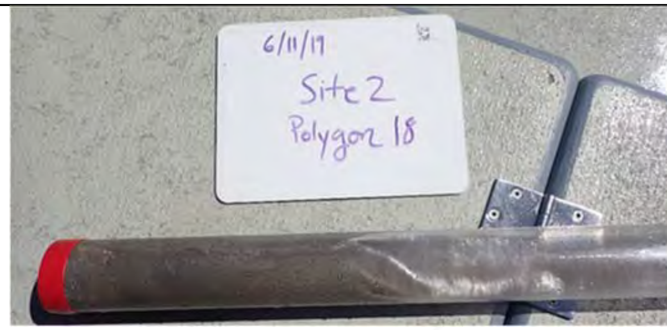
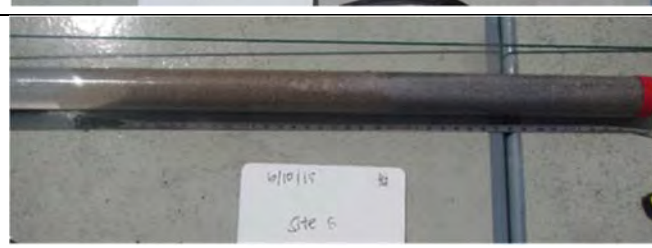
Oceanit Team	*Michael Foley*
Boat Crew	*Captain: Erik Bergmeyer* *Crew: Bennet*

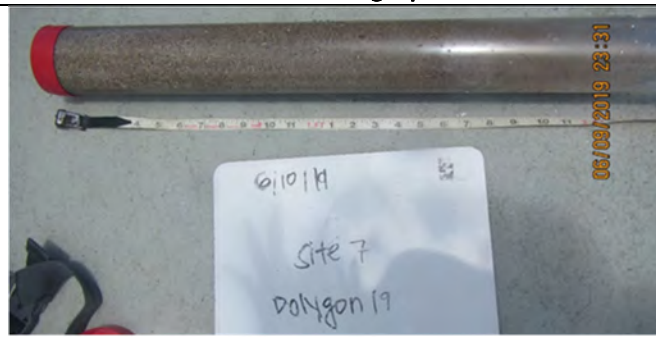
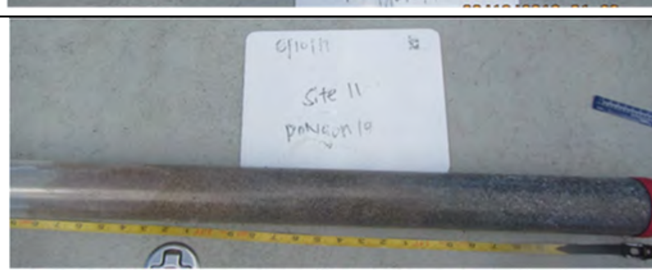
Jet-Probe Summary

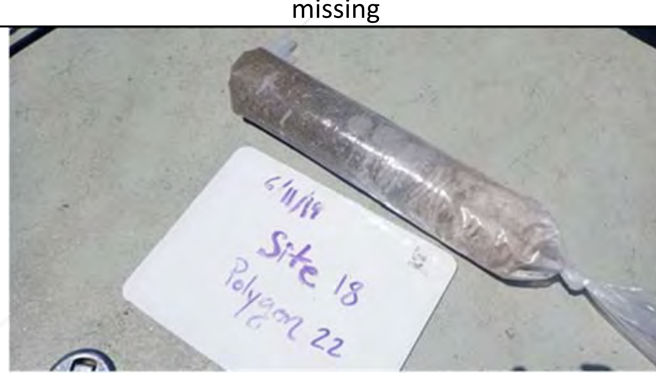
Avg Depth [m]	*2.34*
std [m]	*0.09*
Refusal	*soft/none*
Plume	*moderate*

Appendix B – Sand Core Photographs

Sand Core Photography

<table>
<tr><th>Polygon</th><th>MI site</th><th>Sand Photograph</th></tr>
<tr><td rowspan="3">P18</td><td>S1</td><td>
</td></tr>
<tr><td>S2</td><td>
</td></tr>
<tr><td>S4</td><td>
</td></tr>
<tr><td rowspan="2">P19</td><td>S5</td><td></td></tr>
<tr><td>S6</td><td></td></tr>
</table>

Polygon	MI site	Sand Photograph
P19	S7	
	S8	
	S9	
	S10	
	S11	

Polygon	MI site	Sand Photograph
P19	S12	
P22	S13	
	S14	
	S15	missing
	S18	
	S20	
	S21	missing

Polygon	MI site	Sand Photograph
Beach	North	
	South	

Sand samples compared

Appendix C – Laboratory Data

MI samples from the three potential sand sources (P18, P19 and P22) and two beach segments (north and south) were submitted to AECOS Inc. for sediment grain size analysis. A subsample was taken from these MI samples for analysis of calcium carbonate composition.

A separate sample collected from P19 was submitted for analysis of contaminants, include arsenic and organochlorine pesticides.

Raw data reported from the lab are presented in the following pages.

AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104 · Kaneohe, HI 96744
Telephone: (808) 234-7770 · Fax: (808) 234-7775 · aecos@aecos.com

CLIENT: Oceanit
828 Fort Street Mall, Suite 600
Honolulu HI 96813
ATTN: Taylor Chock

AECOS Job No.:	631
REPORT DATE:	7/12/2019

GRAIN SIZE ANALYSIS RESULTS

Date Sampled: 6/10-11/19
Date Received: 5/22/2018

Analyzed by: cl, dc, rk
Sample Type: sediment

AECOS Log No.: **38016**

Fraction dry weight (g)

size (mm)	>4.00	4.00 - 2.00	2.00 - 1.00	1.00 - 0.500	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063	TOTAL
phi	-2	-1	0	1						pan	
P18	0.00	0.10	0.41	1.29	0.84	1.20	27.15	13.40	0.32	0.42	45.13
P19	0.00	0.10	1.96	31.95	26.61	9.75	2.97	0.10	0.02	0.21	73.67
P22	0.00	0.03	0.71	17.81	34.09	24.77	9.71	0.11	0.00	0.27	87.50
BS-N	2.45	5.53	10.93	21.14	20.40	20.24	12.40	0.30	0.02	0.19	93.60
BS-S	6.83	11.73	14.40	55.29	35.67	15.59	3.30	0.08	0.03	0.19	143.11

Fraction Percent (%) - calculated

size (mm)	>4.00	4.00 - 2.00	2.00 - 1.00	1.00 - 0.500	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063	TOTAL
phi	-2	-1	0	1	0	0	0	0	0	pan	
P18	0.00	0.22	0.91	2.86	1.86	2.66	60.16	29.69	0.71	0.93	100.0
P19	0.00	0.14	2.66	43.37	36.12	13.23	4.03	0.14	0.03	0.29	100.0
P22	0.00	0.03	0.81	20.35	38.96	28.31	11.10	0.13	0.00	0.31	100.0
BS-N	2.62	5.91	11.68	22.59	21.79	21.62	13.25	0.32	0.02	0.20	100.0
BS-S	4.77	8.20	10.06	38.63	24.92	10.89	2.31	0.06	0.02	0.13	100.0

Percent Finer by Weight (%)

size (mm)	4.00	2.00	1.00	0.500	0.355	0.250	0.125	0.075	0.063
P18	100.00	99.78	98.87	96.01	94.15	91.49	31.33	1.64	0.93
P19	100.00	99.86	97.20	53.83	17.71	4.48	0.45	0.31	0.29
P22	100.00	99.97	99.15	78.80	39.84	11.53	0.43	0.31	0.31
BS-N	97.38	91.47	79.80	57.21	35.42	13.79	0.54	0.22	0.20
BS-S	95.23	87.03	76.97	38.33	13.41	2.52	0.21	0.15	0.13

J. Mello, Laboratory Director

Page 1 of 1

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CLIENT: Oceanit
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

ATTENTION: Taylor Chock 808-531-3017
tchock@oceanit.com

FILE No.: 631
REPORT DATE: 07/12/19
PAGE: 1 of 2

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Sediment
DATE SAMPLED: 06/10
Project: Kahana Bay 201823

***AECOS* LOG No.:** 38016
DATE RECEIVED: 06/13/19

SAMPLE ID⇨ / ANALYTE ⇩	P19-56			Method Number / Reporting Limit (for sample 1 / 2 / 3)	Analysis Date / Analyst ID
Arsenic (mg/kg)	20			EPA 6010D 2.1 / 0.45	06/20-12/19 TA
Total Organochlorine Pesticides (µg/kg)	Not Detected			EPA8081B / varies, see report	06/18-26/19 TA

All results are reported on a dry weight basis.

TestAmerica Job Number: 440-243921-1

J. Mello

J. Mello, Laboratory Director

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tchock@oceanit.com

FILE No.:	631
REPORT DATE:	04/05/19
PAGE:	2 of 2

AECOS REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: Sediment
DATE SAMPLED: 06/10-11/19
Project: Kahana Bay 201823

AECOS LOG No.: 38016
DATE RECEIVED: 06/13/19

ANALYTE (UNITS)	Calcium Carbonate (%)				
Analysis Date/ Analyst ID ⇒	06/25/19 cl				
METHOD	Vol. displacement				
MRL/MDL	1				
SAMPLE ID ⇓					
P18	83				
P19	86				
P22	94				
BS-S	19				
BS-N	55				

Grain size results are provided on a separate report.

Appendix C:

Marine Resource Assessment and

Water Quality Survey

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AECOS No. 1584B

Marine resource assessment and water quality survey for Kahana Bay Erosion Mitigation Project, Kahana Bay Maui

Prepared by:

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October 30, 2019
Revised March 22, 2021

Marine resource assessment and water quality survey for Kahana Bay Erosion Mitigation Project, Kahana Bay Maui[1]

October 30, 2019 *AECOS* No. 1584B
Revised March 22, 2021

Stacey Kilarski, Allen Cattell, and Eric Guinther
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[1] Report prepared for Oceanit to become part of the pubic record for project entitlements.

Introduction

The Kahana Bay Steering Committee (KBSC) represents nine oceanfront condominiums and one *kuleana* parcel along the Kahana Bay coastline of West Maui (Figure 1). In consultation with the Maui County Planning Department, the KBSC has developed an approach to restore, rehabilitate, and preserve the sand beach along the Bay by nourishing it with sand transported from previously identified offshore borrow areas ("Project"). *AECOS*, Inc. was contracted by Oceanit to conduct marine biological and water quality surveys for the Project. Our field surveys were completed in June 2019 and this report details the findings of those surveys.

Project description

The Project involves nourishing the beach with 50,000 to 100,000 cubic yards (cuyd) of sand transported from previously identified offshore borrow areas.

The placed sand will be retained by installing beach stabilization structures possibly in the form of a series of seven "T"-shaped groins (Figure 2) extending approximately 80 m (260 ft) out from the shore (this design is the "Proposed Action"). The beach nourishment project will widen the beach to between 10 and 46 m (35 and 150 ft; approximately 15 m [50 ft] in average width). Beach sand will be retrieved from borrow areas identified as "Site 18", "Site 19", and "Site 22." A barge or pipeline will be used to move the sand to shore (see Figure 3). Sand source Site 18 is located approximately 610 m (2,000 ft) offshore and is estimated to contain 8,100 cuyd of sand. Sand source Site 19 is located closer to shore—approximately 150 m (500 ft)—and holds approximately 25,000 cuyd of sand. Sand source Site 22 is located some 120 m (400 ft) offshore and contains approximately 96,500 cuyd of sand (Oceanit, 2019). An alternative to the Proposed Action is beach nourishment without stabilization structures (referred to as the "Alternative Action").

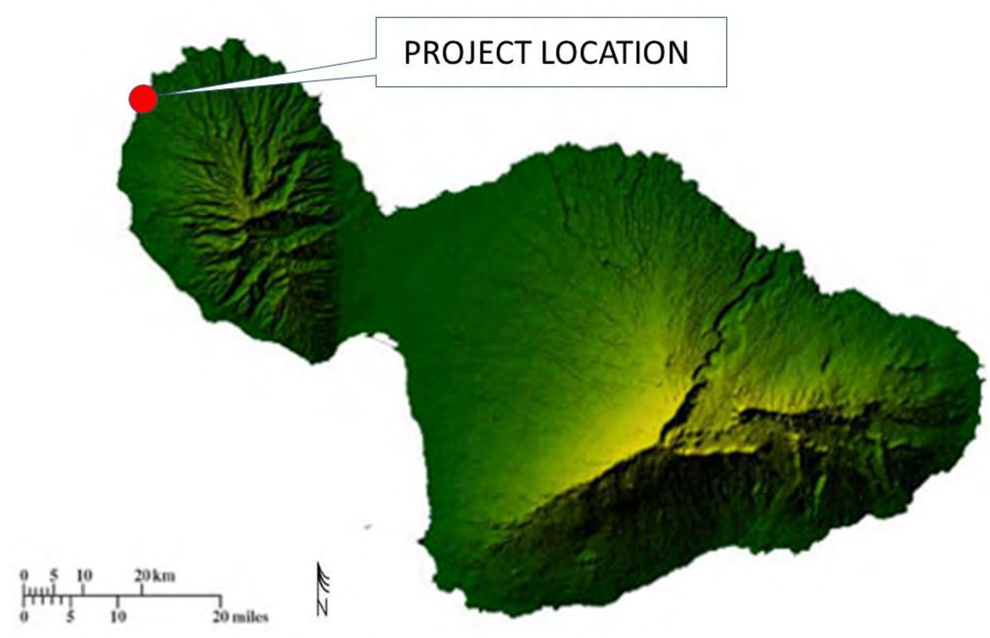

Figure 1. Kahana Bay Project area.

Offshore dredging of sand deposits will be accomplished using either hydraulic suction pumping or mechanical dredging. A hydraulic suction dredge system would entail staging a hydraulic pump system on a barge that is anchored above the sand deposit using a booster pump with a downsized hose to maintain adequate pressure and flow velocities. Sand would be pumped up into a rigid suction pipe then through a pipeline to shore. Due to the presence of reef areas, barge access from the ocean to the beach may not be feasible. Earth moving equipment will build a temporary settling basin on or near the beach to dewater the sand/water slurry prior to placement along the beach (Oceanit, 2019).

Mechanical dredging would consist of scooping and lifting sand from the seafloor using an excavator or a clamshell bucket attached to a crane positioned on an anchored barge. Bucket sizes could vary from 1 cuyd to 20 cuyd and would be left open to dewater as the bucket is lifted from the water. The excavated sand would be deposited on a second barge for transport to the shore. At the shore, the sand would be loaded into dump trucks and transported to the beach, where grading to the design beach profile would occur (Oceanit, 2019).

Beach stabilization structures would be constructed starting from the land and extending into the sea. Equipment will drive over the portion of the structure constructed above water to place material seaward until the structure is completed.

Site Description

Kahana Beach is located along the coastline of West Maui, north of Honokōwai and south of Nāpili. Kahana Beach is approximately 1,100 m (3,600 ft) long and is bounded by Kahana Stream mouth to the north and Pōhaku ("S-Turns") Park (Kāpua Bay) to the south. Sediment carried by Kahana Stream has contributed to the formation of Kaʻea Point: a sand fringed headland at the north end of the Project area (Hawaiʻi Watershed Atlas, 2008). Kahana Bay has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront resources, buildings, infrastructure and amenities. The shoreline along Kahana Bay has receded at an average rate of about one foot per year (Fletcher et al, 2003; Oceanit, 2019).

Marine Environment in Project Vicinity

The shore of Kahana Bay is identified as sand beach of predominately calcareous material ("sb") in *AECOS* (1981, Maps 37 and 38). Farther offshore occurs hard bottom ("rb") and complex reef bottom consisting of a mixture of limestone boulders and outcrops, sand ("rc"), consolidated limestone ("rcl") and sand channel and sand patches without outcrops of hard bottom ("sc"; *AECOS*, 1979; Figures 4 and 5).

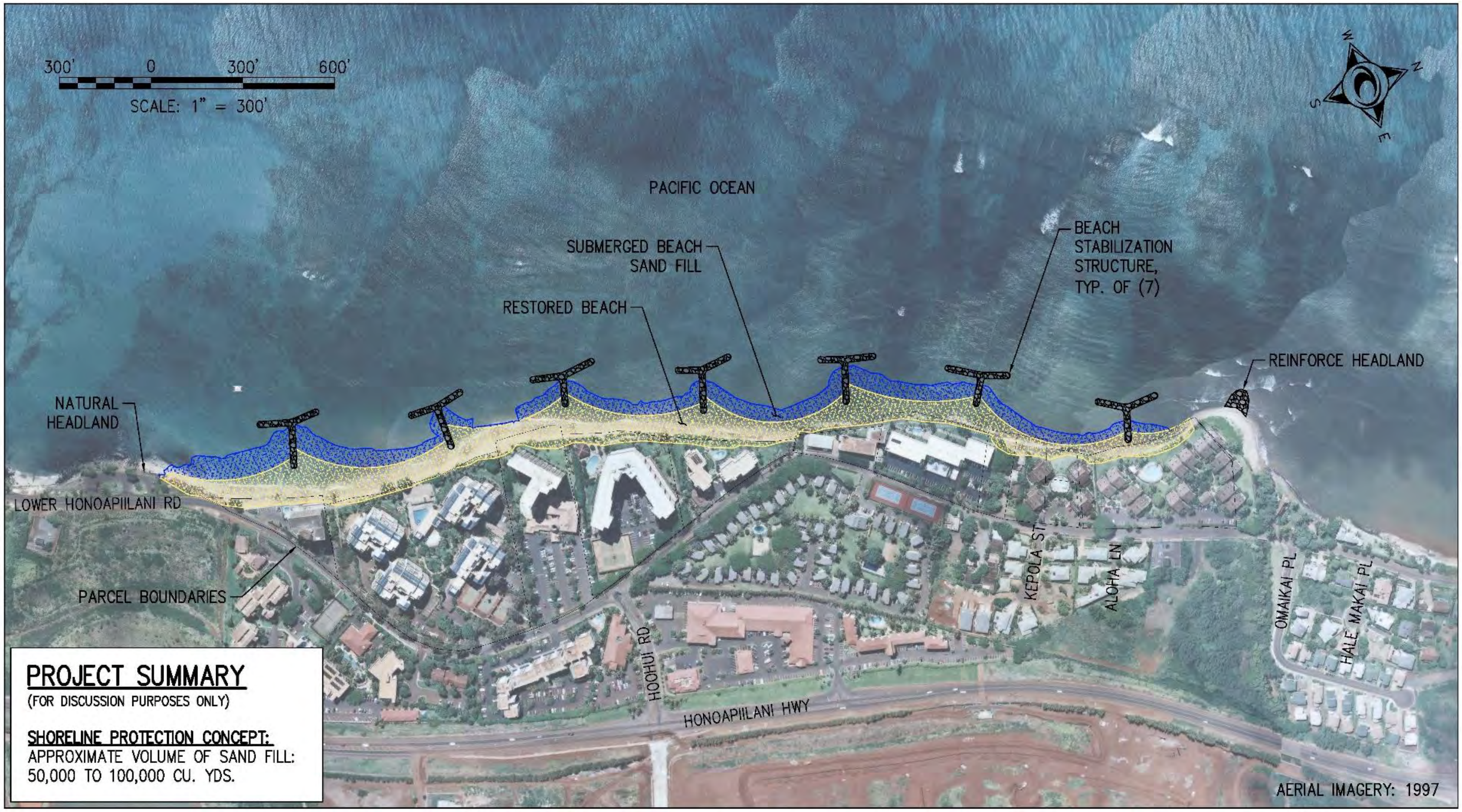

Figure 2. Proposed Action conceptual design for Kahana Bay (Oceanit, 2021).

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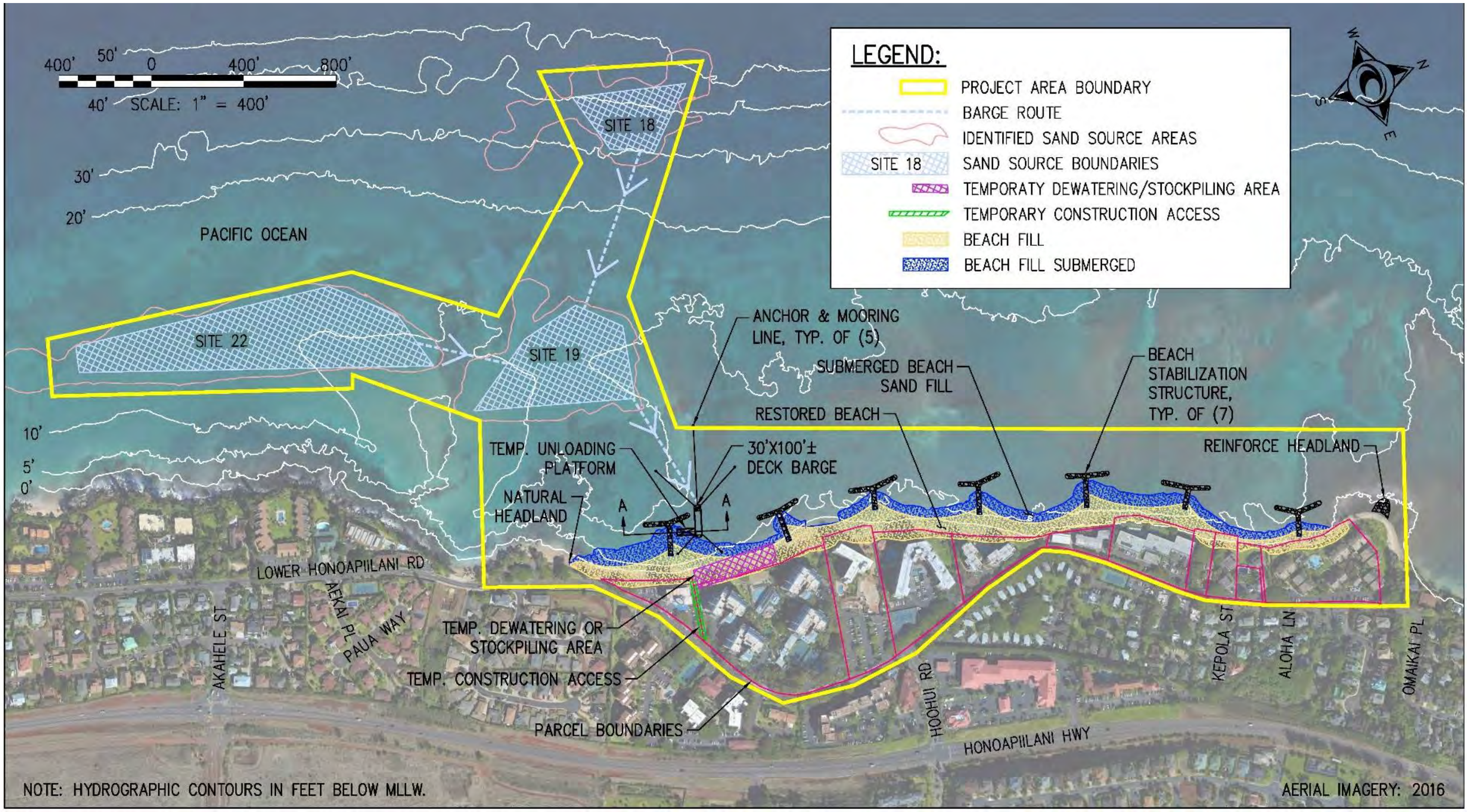

Figure 3. Project area boundary, sand source areas, and barge or pipeline route for Project (Oceanit, 2021).

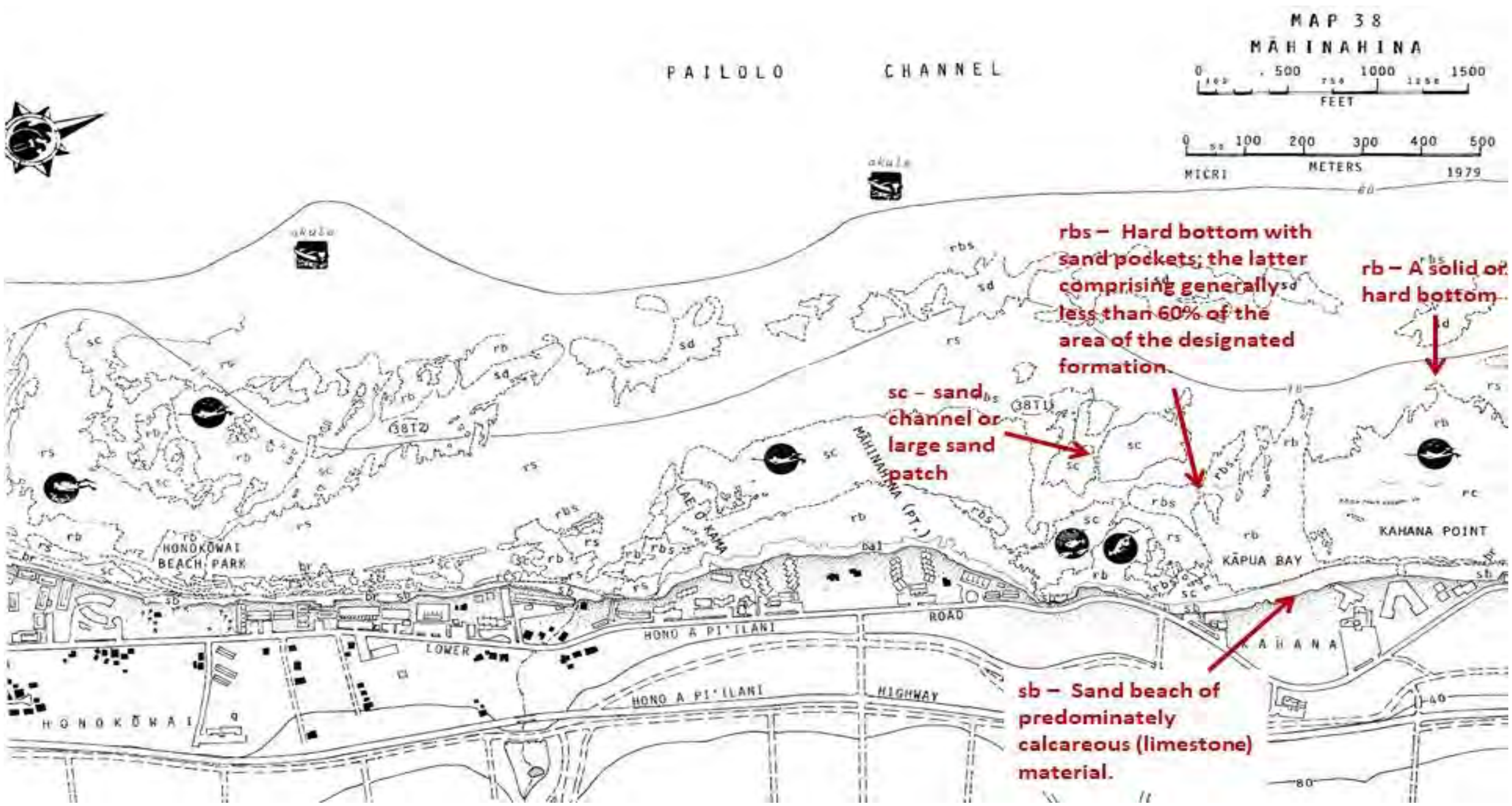

Figure 4. Map 38 of Kahana vicinity from *Maui Coastal Zone Atlas* (*AECOS*, 1979).

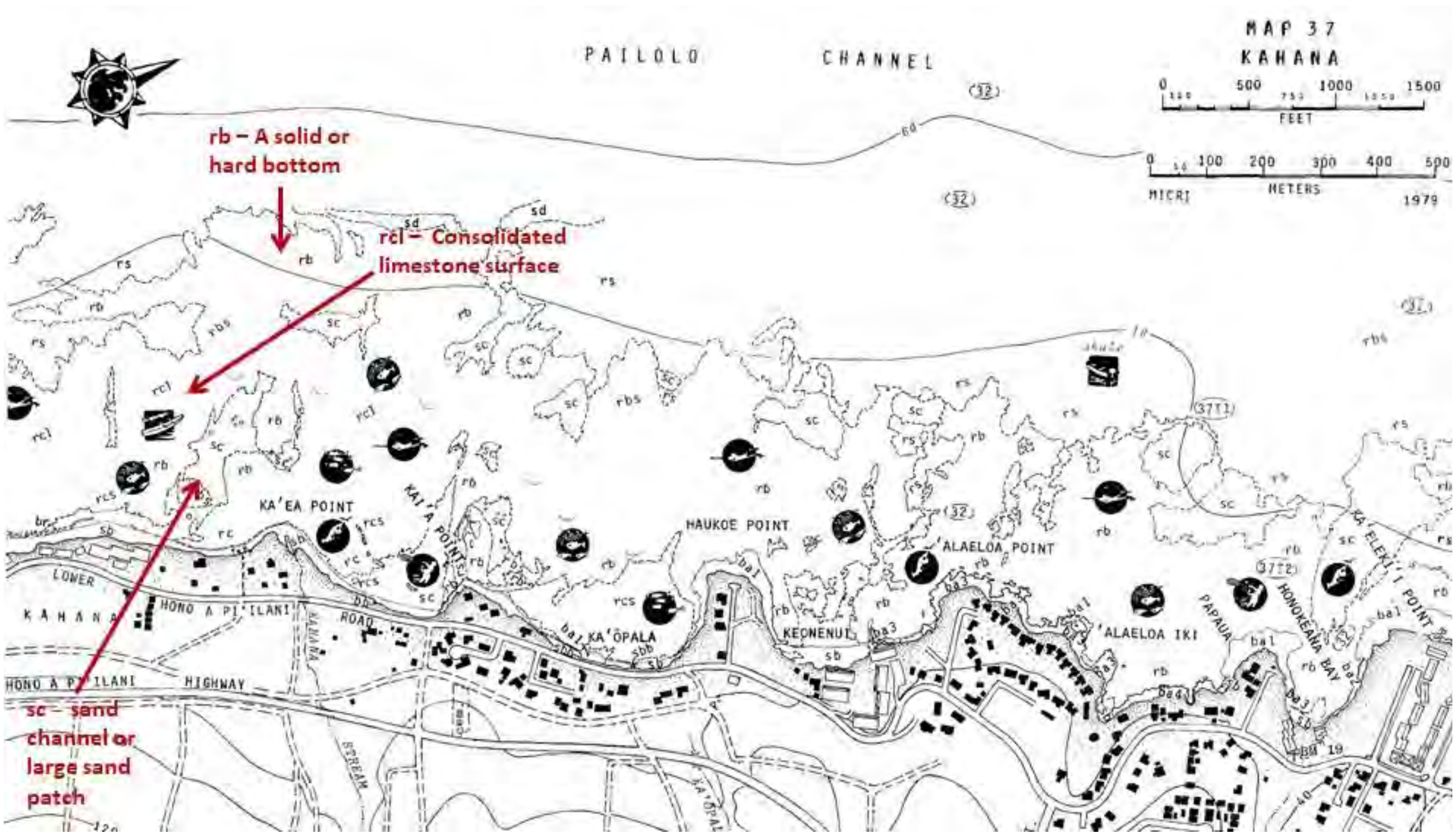

Figure 5. Map 37 of Kahana vicinity from *Maui Coastal Zone Atlas* (*AECOS*, 1979).

NOAA-NOS benthic habitat and geomorphological maps (Battista et al., 2007) identify the geomorphological structure types in the Project area as unconsolidated sediment (i.e., sand) and coral reef/hard bottom, with 10-90% macroalgae cover and 10 to 50% turf algae cover (Figure 6).

Figure 6. Kahana Bay bottom habitat characterization (Battista et al, 2007).

Methods

Water Quality

Water quality sampling was conducted on three consecutive days (June 21 through June 23, 2019) at stations located 2 m and 10 m out from shore along three transects ("S1", "S2", and "S3") set perpendicular to shore in the Project area (Figure 7).

Figure 7. Location of nearshore water quality sampling transects for the Project and two historic and ongoing water quality monitoring sites. (RPO = Pōhaku; RKV = Kahana Village)

Temperature, salinity, pH, and dissolved oxygen (DO) were measured *in situ*. Water samples were collected, chilled, and returned to the *AECOS* laboratory for additional analyses (*AECOS* Log No. 38082). The following parameters were measured from the collected samples: salinity, turbidity, ammonia, nitrate+nitrite, total nitrogen (total N), total phosphorus (total P), and chlorophyll α. Table 1 lists the instruments and analytical methods used for these field and laboratory analyses.

Conditions relative to the sampling event of June 21 included winds from 0 to 5 mph and 0.3-m (1-ft) waves breaking along the shore. Predicted tide for that date was a high (+0.95 ft) at 0503 hours, falling to a low (0.03 ft) at 1102 hours, and rising to a high (2.01 ft) at 1705 hours (relative to datum of mean lower low water [MLLW]: Lahaina ID TPT2799; NOAA-NOS, 2019).

Nearshore samples collected in the morning of June 22 were under the following conditions: at 0600, winds were calm, 10% scattered clouds, no rain, and a 0 to 0.3-m (0 to 1-ft) shore break. Predicted tide was high (+0.88 ft) at 0548 hours, falling to a low of +0.21 ft at 1134 hours, rising to a high of +1.88 ft at 1943 hours relative to MLLW (NOAA-NOS, 2019).

Table 1. Analytical methods and instruments used for water quality analyses.

Analysis	Method	Reference	Instrument
Temperature	SM 2550B	SM (1998)	YSI Model 550 DO meter thermistor
Salinity	SM 120.1	SM (1998)	YSI 85 Meter
pH	SM 4500H+	SM (1998)	pH pHep HANNA meter
Dissolved Oxygen	SM 4500-O G	SM (1998)	YSI Model 550 DO meter
Turbidity	EPA 180.1, Rev. 2.0	USEPA (1993)	Hach 2100Q Turbidimeter
Ammonia	Kérouel and Aminot (1997)	USEPA (1997)	Seal AA3 Autoanalyzer, colorimetric
Nitrate + Nitrite	Grasshoff	Grasshoff et al. (1999)	Seal AA3 Autoanalyzer, colorimetric
Total Nitrogen	Grasshoff 9.6.3	Grasshoff et al. (1999)	Seal AA3 Autoanalyzer, UV
Total Phosphorus	Grasshoff 9.1.5	Grasshoff et al. (1999)	Seal AA3 Autoanalyzer, UV
Chlorophyll α	SM10200H(M)	SM (1998)	Fluorometer

Conditions pertaining during the morning nearshore sampling event on June 23 were as follows: at 0800 hours, cloud cover was 20%, no rain, and light winds. Predicted tide was high (+0.83 ft) at 0656 hours, falling to a low(+0.41 ft) at 1209 hours, and rising to a high (+1.88 ft) at 1943 hours relative to MLLW (NOAA-NOS, 2019). An additional set of water samples was obtained for the three sand source areas (Stations “T18”, “T19”, and “T22”; Figure 8) on the morning of June 21, 2019.

Biological Survey

From June 19 through June 23, 2019, *AECOS* biologists conducted surveys to inventory marine assemblages in the nearshore waters off the Project, as outlined in the *Marine resource assessment and water quality survey plan* (*AECOS,* 2019). Biologists used SCUBA and snorkel gear to collect data on bottom type, coral colony size-frequency (size, diversity, new recruits, large colonies, health); diversity, density, and biomass of fishes; identification and categorization (common vs. uncommon) of algae (including crustose coralline algae) and seagrass; and non-coral macro-invertebrates greater than 3 cm.

Survey Areas and Transect Placement

The baseline biological survey collected data in four areas: (1) the nearshore reef off Kahana Beach delineated as the anticipated area of potential effect of the Project; (2) each of seven proposed groin locations; (3) three offshore sand borrow areas, and (4) barge route or pipeline corridors.

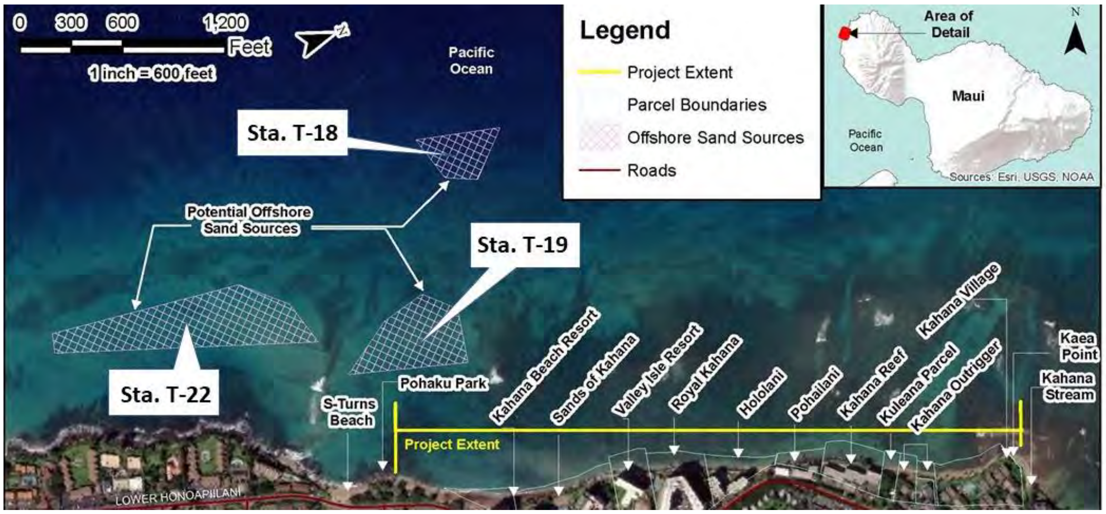

Figure 8. Location of sand source water quality sampling stations for Kahana Beach Erosion Project.

<u>Nearshore Environment</u> — The Project area was delineated by Oceanit and determined to be all areas that could potentially be affected by construction activities and all areas that could be affected by sediment transport and water motion after the Project is completed. The NOAA-NOS benthic habitat map (Battista et al., 2007) was used to identify the dominant physical structural composition of the bottom within the Project area (see Fig. 4) considering two basic geomorphological types: 1) unconsolidated sediment (i.e., sand), and 2) hard bottom. Prior to the survey, three survey stations for each habitat type were selected using a stratified random approach: a random number generator was used to identify x- and y-coordinates on a grid generated by Adobe© Photoshop© placed over the habitat map until three stations on hard bottom and 3 stations on unconsolidated bottom were designated.

<u>Groins</u> — Seven survey stations were established at each of 7 potential groin locations (Figure 9; "G1" through "G7"). At each station, an 80-m transect was run perpendicular from the beach crest and terminating near the end of the future groin footprint. A hand-held GPS unit was used to locate beach crest start points, and then used to record coordinates of transect start points shown in Table 2.

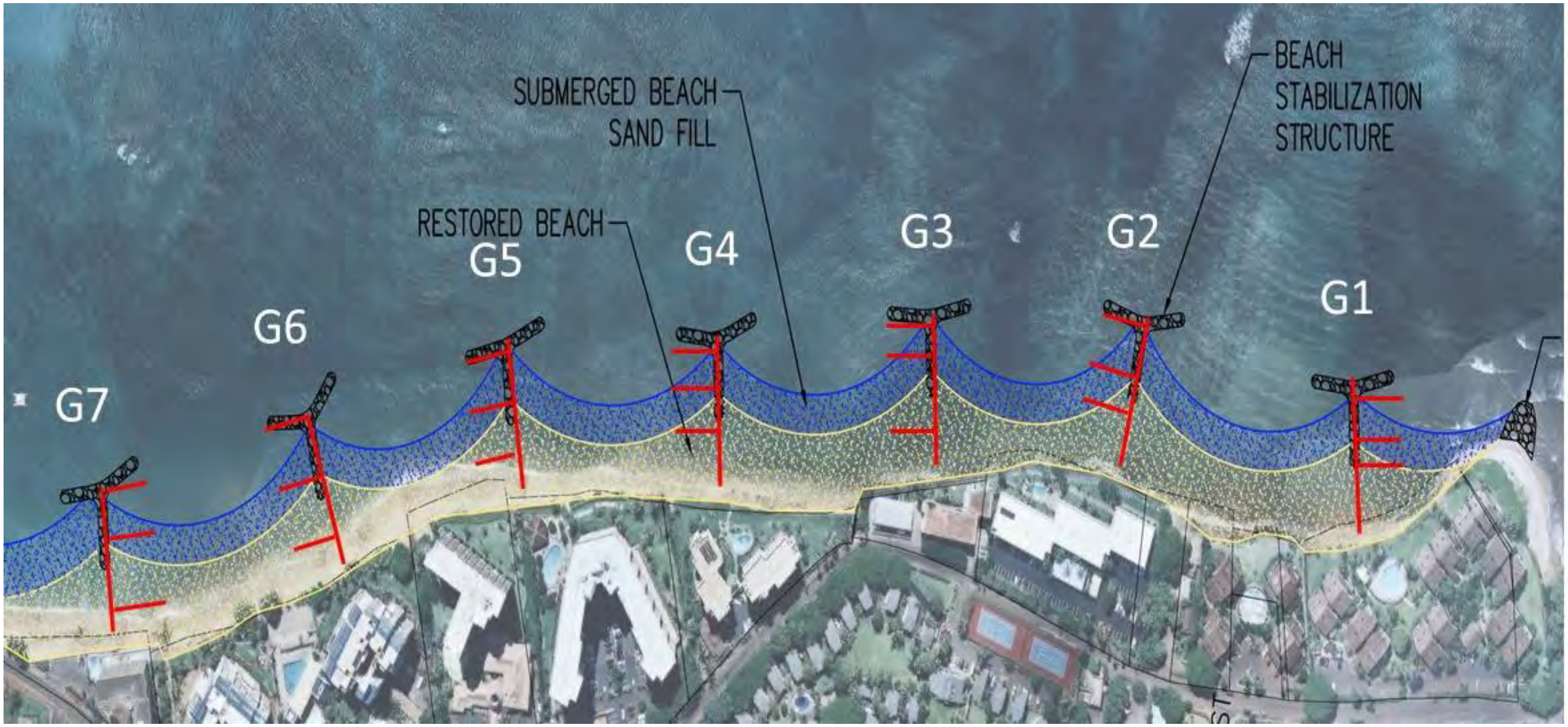

Figure 9. Locations of 80-m and 25-m transects on groin layout. This groin layout was the initial design concept. Minor changes in groin positions (see Fig. 2) were made after our surveys were conducted.

Table 2. Coordinates for 80-m transect start point on the beach crest for each proposed groin location.

Station	Coordinates	
Groin 1	20° 58.161'N	156° 40.824'W
Groin 2	20° 58.240'N	156° 40.811'W
Groin 3	20° 58.308'N	156° 40.797'W
Groin 4	20° 58.377'N	156° 40.777'W
Groin 5	20° 58.452'N	156° 40.750'W
Groin 6	20° 58.508'N	156° 40.720'W
Groin 7	20° 58.582'N	156° 40.679'W

A survey of benthic composition was undertaken along each 80-m "groin" transect and each 80-m transect also served as a "spine" for establishing three 25-m transects set parallel to shore. The three 25-m transects were placed in relation to each of 3 zones: 1) close to shore (future restored beach zone, roughly 20 to 40 m from the beach crest), seaward of the shore (underwater sand fill zone, roughly 40 to 60 m from beach crest), and at the T-head of each groin (approximately 60 to 80 m from beach crest). Transect placement along the spine was based on a randomly selected position within each zone and to either the left or right of the spine (a stratified random approach). Figure 9 shows the 80-and 25-m transect locations for the groin stations. The 25-m transects were surveyed for bottom complexity, benthic composition, coral abundance, coral size class distribution, and fish abundance, diversity, and biomass, as described below.

<u>Offshore sand borrow sites</u> — Biologists initiated a survey of the three offshore sand borrow sites (Site 18, Site 19, and Site 22; Figure 10) with a swim over the sand body to confirm the area as sand bottom and to identify adjacent hard bottom areas that could be impacted by dredging. A 25-m transect was surveyed along the perimeter of each sand borrow area (one per site) to obtain quantitative data benthic composition, coral abundance and size class distribution, macro-invertebrates, bottom complexity, and fish assemblage. These transect locations were determined in the field, focusing on directly adjacent hard bottom areas.

<u>Offshore barge/pipeline routes</u> — Three barge/pipeline routes associated with the offshore sand borrow areas were surveyed: "T18 to T19", "T22 to T19", and "T19 to shore" (see Figs. 3 and 8). Biologists surveyed the proposed barge/pipeline routes for benthic composition, coral abundance and size class

distribution, macro-invertebrates, bottom complexity, and fish assemblage on one survey transect station in each of the three barge/pipeline routes. 25-m transects were extended seaward following the course of the corridor, and surveys followed the 25-m belt transect methodologies, described below.

Bottom complexity

The chain-link rugosity measurement method (McCormick, 1994) was used to determine rugosity, a measure of the physical complexity of the bottom. Rugosity was calculated from the ratio between two field measurements: the length of a transect (straight-line distance; in this case 10 m) and the length of a fine metal chain draped across the bottom (and into holes, depressions, and crevices) between transect ends. The chain used was a light-weight brass chain marked at 0.5-m intervals. A rugosity index for each transect was derived by dividing the length of the chain needed to cover the 10-m distance.

Benthic Composition

A 1m^2 quadrat frame was placed at 10-m intervals along the 80-m transects and at 5-m intervals along the 25-m transects. The quadrat consisted of PVC tubing fitted with nylon line spaced 10 cm apart, forming a square grid with 81 internal intersections. A subset of 25 randomly selected intersections was marked and used for substrate identification. The bottom under each of these intersections was identified as being in one of the following categories: CCA, macro-algae, sand, sand covered limestone, bare limestone, live coral, algal turf, macro-invertebrate or other (beach sand or basalt boulder). Benthic percent cover was calculated for each transect by dividing the total number of points for a category by the total number of points sampled.

Coral Abundance and Size Class Distribution

A one-meter belt survey of coral colonies was conducted on each transect. All corals found within 0.5 m to either side of the transect line were counted. Coral abundance was determined as the number of individuals observed for each transect normalized to number of individuals per 10 m^2. Coral heads encountered were identified to species and assigned to a size class (1- to 5-cm; 6- to 10-cm; 11- to 20-cm; 21- to 40-cm; 41- to 80-cm; 81- to 160-cm; or >160-cm) based on the largest horizontal dimension of the colony. Coral size-class distribution was determined for each coral species recorded. Percent morbidity (amount of coral colony not alive) and any signs of disease were also recorded.

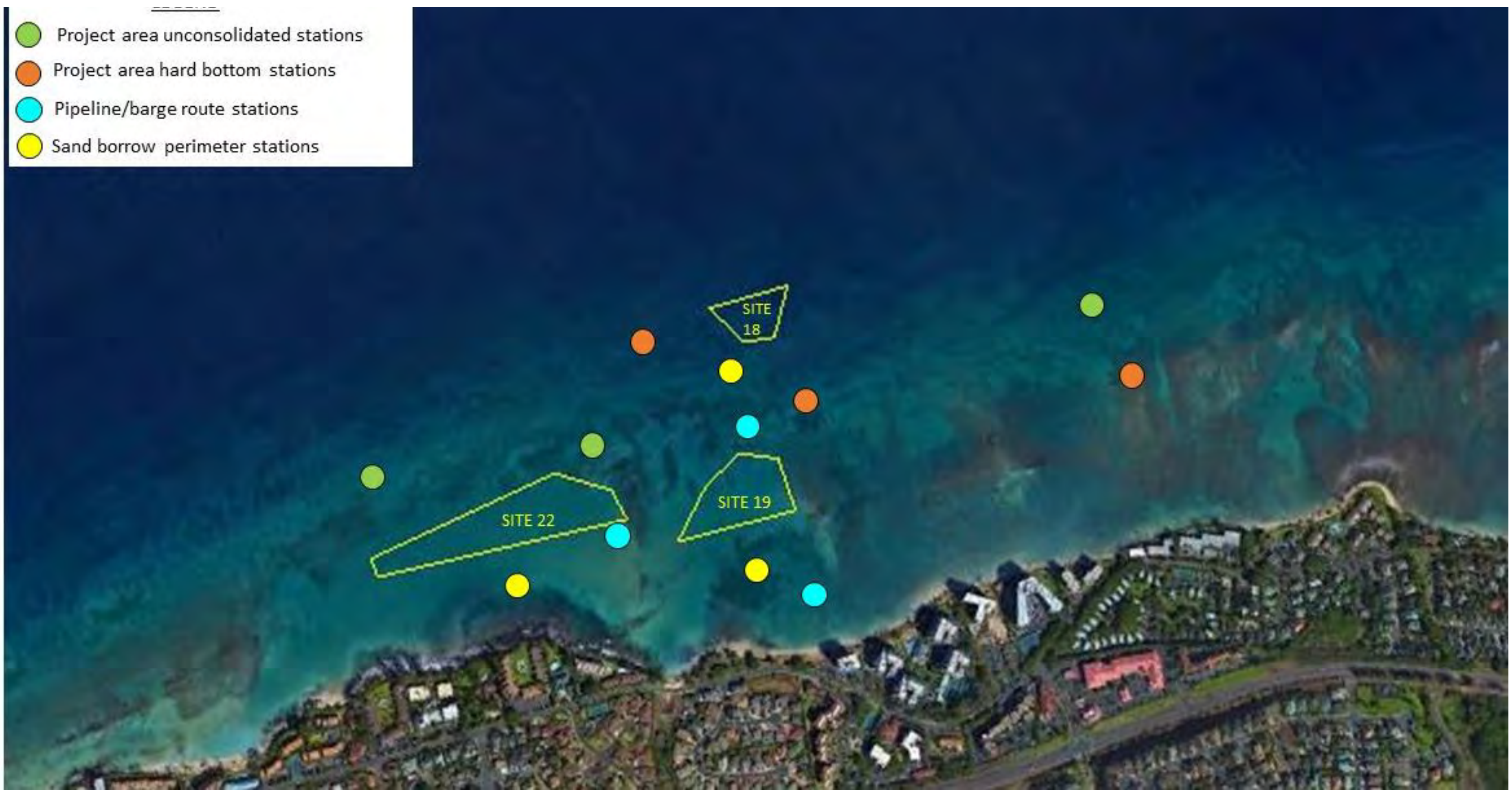

Figure 10. Location of offshore transects established for June 2019 surveys in the Project area. One 25-m transect was laid at each station.

Fish assemblage

At each survey location, the fish assemblage was assessed using visual belt transect survey methods (Friedlander et al., 2006). One biologist swam the transect and identified, to the lowest possible taxon, all fishes visible within 2.5 m to either side of the transect centerline (125 m^2 transect area for 25-m transects). For the 80-m groin transects, belt length was dependent upon beach width or shoreline stabilization structure (i.e., basalt boulders and temporary sand bags); thus, survey area varied from station to station. The transect meter mark was recorded where there was sufficient water depth (roughly 1 m or 2.8 ft) for the surveyor to submerge and start the survey. The diver estimated total length (TL) of each fish.

Species richness (S) was determined as the number of species observed for each transect. Species diversity was determined using the Shannon-Weiner diversity index (H') where p_i is the proportion of all individuals counted that were of species using the equation:

$$H' = -\sum_{i=1}^{S} p_i \ln p_i$$

Fish abundance was determined as the number of individuals observed for each transect normalized to number of individuals per 100 m^2. Fish biomass was calculated by converting estimated fish lengths to weights using the allometric length-weight conversion formula, where parameters a and b are species-specific constants, TL is total length in cm, and W is weight in grams:

$$\text{Weight (g)} = [\text{total length (cm) x constant a}]^{\text{constant b}}$$

The species-specific length to weight parameters (a and b) were obtained for each species from FishBase through the “Length to weight” link (www.fishbase.org; Froese and Pauly, 2019). For those species without available a and b constants, TL was converted to either fork length (FL) or standard length (SL), depending on which was available, by multiplying TL by a length-conversion factor obtained for each species through the FishBase “Morphometrics” link. Where parameters were not available for a species, parameters for a similar bodied congener were substituted.

Fish biomass as determined for each transect was sorted into trophic groups as defined by FishBase (www.fishbase.org; Froese and Pauly, 2019) and other published sources (Randall, 1996, 2007; Hoover, 2008). To maximize comparability with previous studies, biomass is expressed as g/m^2.

Macro-invertebrates

All non-coral macro-invertebrates greater than 3 cm along a 1-m belt on each 80-m and 25-m transect were inventoried.

Relative abundance of marine biota

Marine plants, fishes, corals, and other macro-invertebrates were identified in the field or from photographs and verified with various published texts. During the course of the surveys, biota observed at each station were identified to the most specific taxon possible and assigned to one of five abundance categories: dominant, abundant, common, occasional, or rare.

Protected and Listed Species

For each survey area, an inventory was made for invasive species, seagrass, and state- and federally-listed (endangered or threatened, or petitioned to be listed; NOAA-NMFS, 2018; HDLNR, 1998, 2014, 2015; USFWS, nd) marine species. Biologists also conducted a georeferenced land-based turtle survey along the beach in the Project area. At twelve stations, biologists performed ten-minute counts. Biologists also walked the shore in the Project area looking for turtle tracks from basking or nesting animals.

Results

Water Quality

Water quality results for the Project survey area are presented in Table 3 (physical data) and Table 4 (nutrient and chlorophyll α data). Water quality parameter means for individual nearshore transects are shown in Table 5.

All physical parameters, except DO saturation values, tended to increase in a northerly direction from south (S1) to north (S3). Nitrate+nitrite and total N means, on the other hand, tended to decrease from south to north.

Bottom complexity

Mean rugosity is presented for each future groin survey area in Table 7. A low rugosity value indicates low relief or low topographic complexity. With all mean rugosity values being less than 1.1, there is, overall and not unexpectedly, low bottom complexity on the reef flat in Kahana Bay. Occurrences of limestone

Table 3. Water quality results for physical parameters for samples collected between June 21 and June 23, 2019.

Date	Station Transect	Time	Temp. (°C)	Salinity (PSU)	pH	DO Sat. (%)	Turbidity (NTU)
06/21/19	T18	0825	27.0	35.09	8.22	102	0.48
	T19	1005	27.0	34.35	8.24	96	0.57
	T22	1210	26.7	35.20	8.24	99	0.25
06/21/19	S1 at 2m	1650	27.9	33.73	8.22	100	8.77
	S1at 10m	1650	28.1	33.69	8.24	109	6.09
	S2 at 2m	1624	28.3	33.67	8.27	104	7.61
	S2 at 10m	1624	28.5	33.83	8.29	116	4.12
	S3 at 2m	1601	28.8	33.83	8.26	103	9.53
	S3 at 10m	1601	29.3	33.88	8.27	104	10.40
06/22/19	S1 at 2m	0603	25.8	34.63	8.05	86	4.59
	S1at 10m	0605	26.1	35.00	8.06	75	1.87
	S2 at 2m	0633	26.1	34.60	8.06	86	5.46
	S2 at 10m	0635	26.3	35.12	8.07	77	5.07
	S3 at 2m	0620	26.3	34.83	8.05	78	2.85
	S3 at 10m	0622	26.3	34.82	8.05	77	8.25
06/23/19	S1 at 2m	0823	26.6	34.60	8.06	81	2.71
	S1at 10m	0824	26.5	34.48	8.10	87	2.56
	S2 at 2m	0746	26.5	34.72	8.01	89	2.82
	S2 at 10m	0747	26.5	34.72	8.04	80	2.12
	S3 at 2m	0807	27.0	34.85	8.02	79	4.09
	S3 at 10m	0808	26.9	35.09	8.04	75	2.40

Table 4. Water quality results for nutrients and chlorophyll α for samples collected between June 21 and June 23, 2019.

Date	Station	Time	NH_4. (μgN/L)	NO_3+NO_2 (μgN/L)	Total N (μgN/L)	Total P (μgP/L)	Chl. α (μg/L)
06/21/19	T18	0825	<5	12	143	5	0.08
	T19	1005	10	18	78	6	0.16
	T22	1210	<5	12	75	11	0.10
06/21/19	S1 at 2m	1650	15	114	209	12	0.46
	S1at 10m	1650	9	120	205	9	0.35
	S2 at 2m	1624	7	103	185	12	0.24
	S2 at 10m	1624	10	85	180	5	0.28
	S3 at 2m	1601	8	32	122	17	0.74
	S3 at 10m	1601	10	29	140	22	0.70

Table 4 (continued).

Date	Station	Time	NH_4. (μgN/L)	NO_3+NO_2 (μgN/L)	Total N (μgN/L)	Total P (μgP/L)	Chl. α (μg/L)
06/22/19	S1 at 2m	0603	15	61	147	5	0.25
	S1at 10m	0605	9	36	183	5	0.35
	S2 at 2m	0633	20	46	102	7	0.30
	S2 at 10m	0635	14	38	93	4	0.39
	S3 at 2m	0620	<5	29	122	14	0.40
	S3 at 10m	0622	15	18	106	14	0.67
06/23/19	S1 at 2m	0823	<5	71	152	5	0.54
	S1at 10m	0824	13	51	132	8	0.44
	S2 at 2m	0746	11	42	114	6	0.50
	S2 at 10m	0747	8	37	166	5	0.59
	S3 at 2m	0807	10	24	89	4	0.62
	S3 at 10m	0808	7	19	93	13	0.54

Table 5. Water quality means for nearshore transects.

Transect	Temp. (°C)	Salinity (PSU)	pH	DO Sat. (%)	Turbidity† (NTU)
S1	26.8	34.32	8.11	89	3.83
S2	27.0	34.44	8.12	92	4.16
S3	27.4	34.55	8.12	86	5.33

Transect	NH_4. † (μgN/L)	NO_3+NO_2† (μgN/L)	Total N† (μgN/L)	Total P† (μgP/L)	Chl. α† (μg/L)
S1	9	69	169	7	0.39
S2	11	54	135	6	0.36
S3	8	25	111	12	0.60

† Geometric mean

outcrops and hard bottom debris are sparse on this reef flat, and our transects did not capture this patchy distribution, although some limestone outcrops led to slightly elevated rugosity values at Stas. G2, G4, G5 and pipeline/barge route T22 to T19.

Table 7. Mean rugosity (±SD) for stations and areas: groin (*n* = 18), areas adjacent to sand borrow (*n* = 3), pipeline or barge routes (n=3), offshore unconsolidated areas (n=3) and offshore hard bottom areas (n=3).

Groin	Mean Rugosity	Station	Rugosity	Station	Rugosity
G1	1.07± 0.02	Route 18-19	1.01	Hard bottom 1	1.06
G2	1.15 ± 0.07	Route 22-19	1.22	Hard bottom 2	1.07
G3	1.05 ± 0.03	Route 19 -shore	1.03	Hard bottom 3	1.02
G4	1.12 ± 0.03	Routes x̄	1.09± 0.09	Hard bottom x̄	1.05± 0.02
G5	1.12 ± 0.03	**Station**	**Rugosity**	**Station**	**Rugosity**
G6	1.12 ± 0.01	Site 18	1.02	Unconsolidated 1	1.03
G7	†	Site 19	1.06	Unconsolidated 2	1.01
Groin x̄	1.10 ± 0.05	Site 22	1.01	Unconsolidated 3	1.06
		Sites x̄	1.03± 0.02	Unconsolidated x̄	1.03±0.02

† Conditions prevented rugosity measurement

Benthic Composition

<u>Groins</u> – Results of the 80-m benthic composition survey of the proposed groin sites are presented in Figure 11. Dominant bottom types along the 80-m transects are sand (50% mean cover) and bare limestone (30% mean cover). Turf algae, CCA and live coral were equally low along these transects (0.4% mean cover for each), with live coral cover observed on only three groin transects (G2, G5 and G 7). The category “Other” accounts for basalt rock (boulders) at G3.

Results of the 25-m benthic composition survey of the proposed groin sites are presented in Figure 12. The dominant bottom types along the 25-m groin transects are macroalgae (55% mean cover) and sand (30% mean cover). Bare limestone and turf algae make up a similar amount of cover, at 7% and 5%, respectively. Live coral cover is low across the 25-m transects, at 1% mean cover.

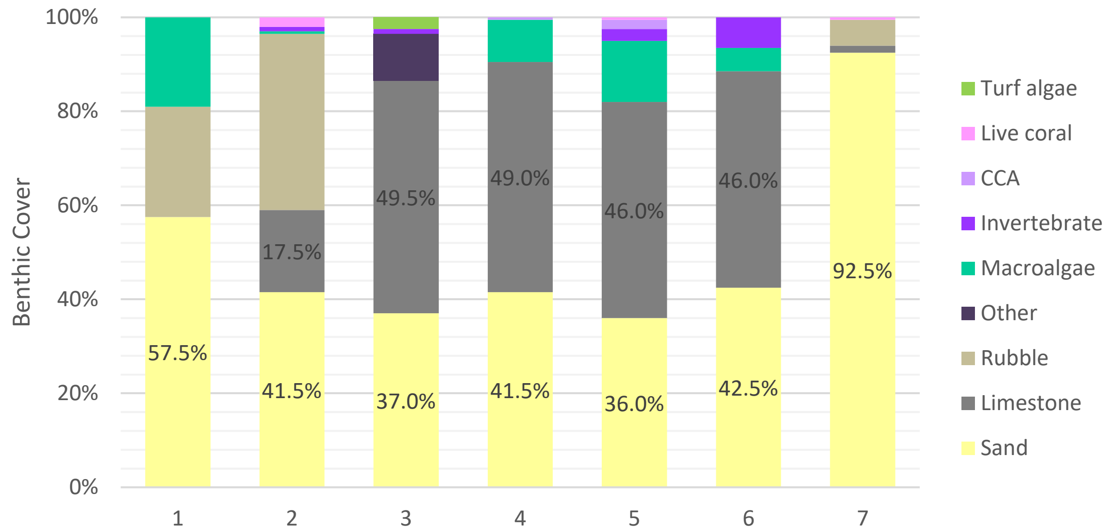

Figure 11. Benthic cover at 7 groin stations, as measured on 80-m transects (*n*=7).

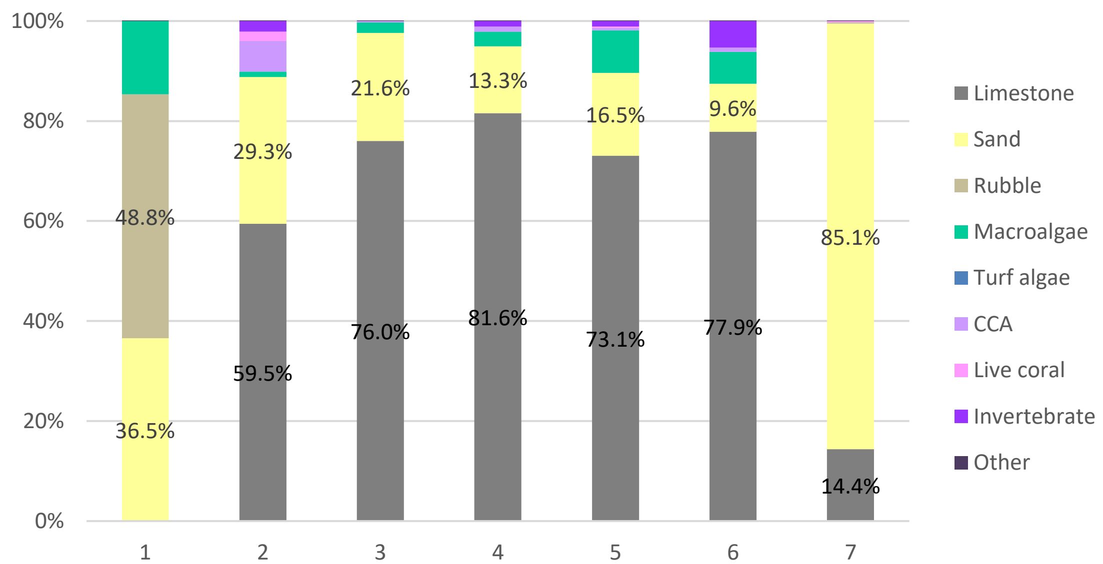

Figure 12. Benthic cover at seven groin stations measured on 25-m transects (*n*=21).

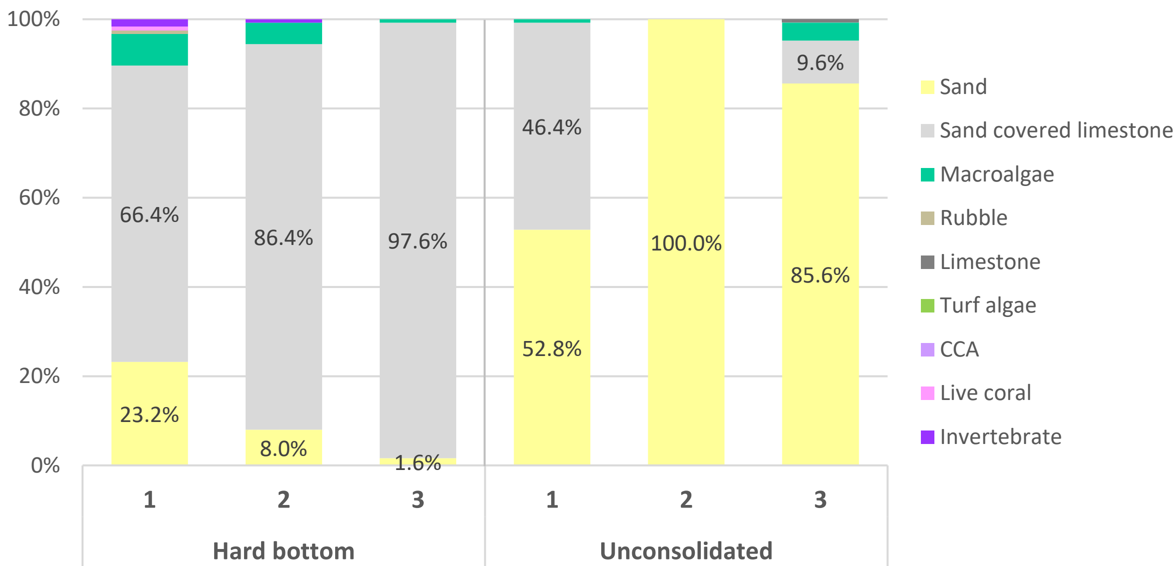

Figure 13. Benthic cover at the Project area unconsolidated and hard bottom stations (n=6), as measured on 25-m transects.

<u>Nearshore reef</u> – Benthic composition results from the 25-m transects in the nearshore Project area are presented in Figure 13. As expected, the most abundant cover type at the hard-bottom stations is sand veneer over limestone (84%). Macroalgae cover is low at 4% and composed entirely of *Halimeda kanaloana.* Invertebrate, rubble, and live coral cover are all very low across the hard bottom stations (0.8% and 0.3% for both rubble and live coral). The most abundant cover type across the unconsolidated bottom stations is sand at 79%, with sand-covered limestone making up 19% of the transect area. No rubble, CCA, live coral, or invertebrate bottom types occur in the unconsolidated stations.

<u>Offshore sand borrow sites</u> – Biologists confirmed the offshore sand borrow sites are sand bodies. Fields of macroalgae (*H. kanaloana*) occur over the sand borrow sites. Density of this macroalgae was estimated, but measured in areas at medium to high density. In some places, cover is estimated to approach 100%. The bottom around the perimeter of the sand borrow sites is sand (47%) and bare limestone (36%). Invertebrates and live coral are low (0.8% and 0.5%, respectively; Figure. 14). No rubble, macroalgae, turf algae, or CCA are recorded on transects placed around the perimeter of the three sand borrow sites.

Offshore pipeline/barge routes – The bottom type of the pipeline/barge routes is mostly sand, at 50% mean cover (Figure. 15). Bare limestone accounts for 26% of the bottom across the pipeline/barge routes and live coral is 4.5%. Live coral cover is highest on routes T19 to T22 and T19 to shore, at 7.2% and 6.4%, respectively.

Coral Abundance

Coral abundance was measured on 25-m transects in the Project area (hard bottom and unconsolidated), offshore sand borrow areas (perimeter), pipeline/barge routes, each one of three zones at the proposed groin locations, and along 80-m transects in the proposed groin locations. Total coral counts and abundance by area are summarized in Table 8.

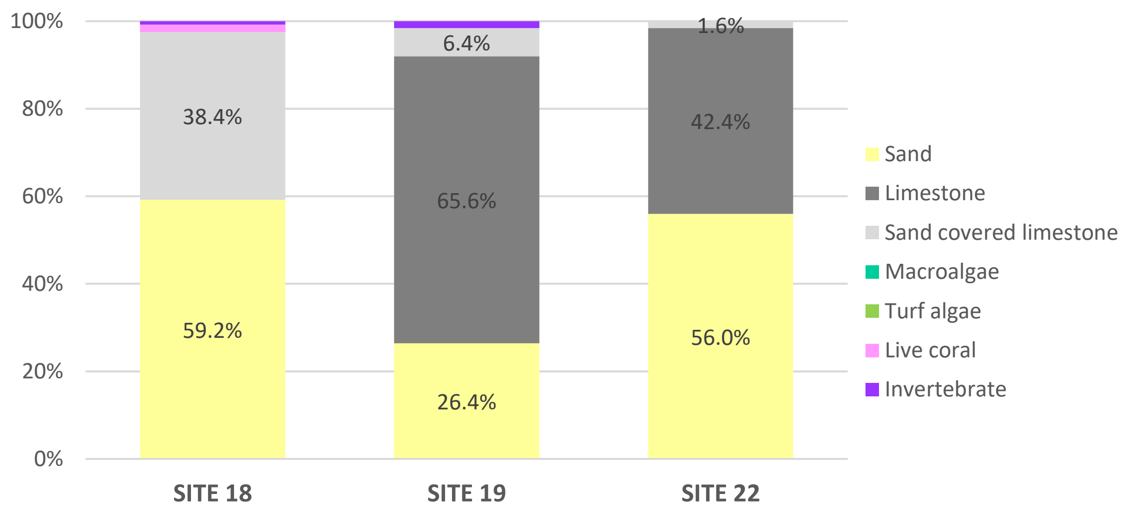

Figure 14. Benthic cover at perimeter of sand borrow areas (n=3), as measured on 25-m transects.

Groins - The total number of coral colonies counted on 25-m transects at the future groin sites is 86 colonies, ranging from 0 colonies (at Groin 7) to 51 colonies (at Groin 2; Table 9). As counted on 25-m transects, the groins have an average of 1.6 coral colonies per 10 m^2. Based on the 80-m transects, the groins have an average of 1.7 coral colonies per 10 m^2, with a total count of 90 colonies. Mean coral colony abundance ranges from 0 to 6.5 colonies per 10 m^2. Overall for the groins, a total of 176 colonies was counted, with a mean coral colony abundance for all transects combined of 1.7 colonies per 10 m^2. Across both the 25-m and 80-m transects, the proposed location of Groin 2 has the greatest coral abundance (Figure 16 and 17), with 91 total colonies and a mean of 5.9 colonies per 10 m^2. Groin 6 has the next greatest coral abundance, with 36 total colonies.

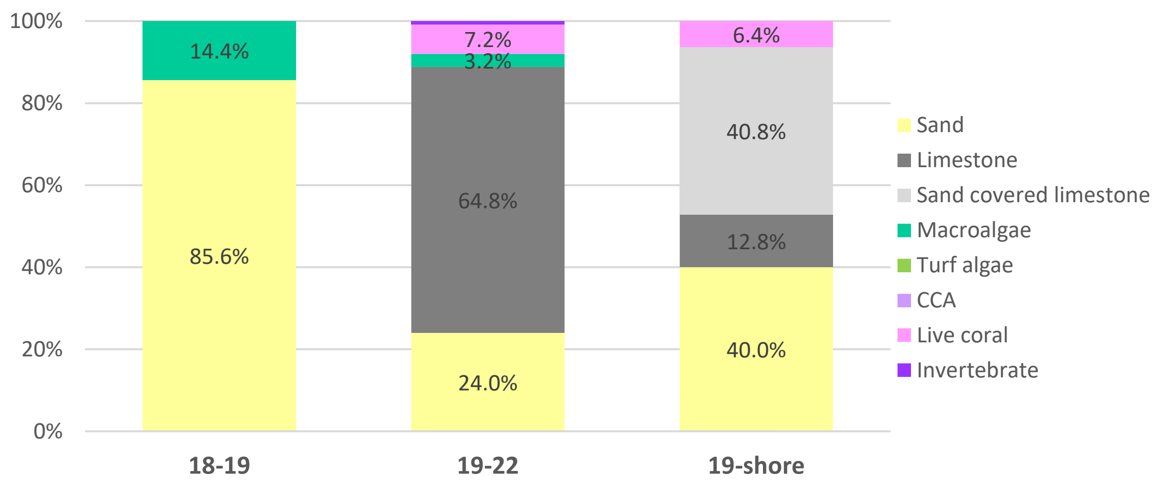

Figure 15. Benthic cover at pipeline/barge routes (n=3), as measured on 25-m transects.

Table 8. Total number of coral colonies and coral colony abundance (mean colonies per 10 m^2) by survey area.

Transect Area	Survey area (m^2)	Coral count (colonies)	Coral abundance (no./10 m^2)
Groin (25-m transects)	525	86	1.6
Groin (80-m transects)	520	90	1.7
Hard bottom	75	118	15.7
Unconsolidated	75	21	2.8
Pipeline/barge routes	75	95	12.7
Perimeter of sand borrow areas	75	101	13.5

Project area – The total number of coral colonies counted on 25-m transects at the hard bottom stations is 118 colonies, with an average of 15.7 coral colonies per 10 m^2. The total number of coral colonies counted on 25-m transects at the unconsolidated stations is 21 colonies, with an average of 2.8 coral colonies per 10 m^2 (Figure 18).

<u>Offshore sand borrow sites</u> – The total number of coral colonies counted on 25-m transects on hard bottom at the perimeter of the sand borrow sites is 101 colonies, all at Site 18. No corals were observed on the hard bottom on the perimeter of sand borrow Sites 19 or 22.

<u>Offshore pipeline/barge routes</u> – The total number of coral colonies counted on 25-m transects in the offshore pipeline/barge routes is 95 colonies, with an average of 12.7 coral colonies per 10 m^2. Along route 18-19, coral cover was low, with only 4 colonies counted on our transect.

Table 9. Total number of coral colonies and coral colony abundance (mean colonies per 10 m^2) counted on seven 80-m transects and twenty-one 25-m transect at 7 proposed groin locations.

Station	Survey area (m^2)	Coral count (colonies)	Mean coral abundance (no./10m^2)
		80-m transects	
Groin 1	71	5	<1
Groin 2	79	51	6.5
Groin 3	80	4	0.5
Groin 4	75	3	0.4
Groin 5	68	12	1.7
Groin 6	79	15	1.9
Groin 7	68	0	0
		25-m transects	
Station	Survey area (m^2)	Coral count (colonies)	Mean coral abundance (no./10m^2)
Groin 1	75	7	0.9
Groin 2	75	40	5.3
Groin 3	75	4	0.5
Groin 4	75	7	0.9
Groin 5	75	6	0.8
Groin 6	75	21	2.8
Groin 7	75	1	0.1
Overall Total	**1045**	**86**	**1.7**

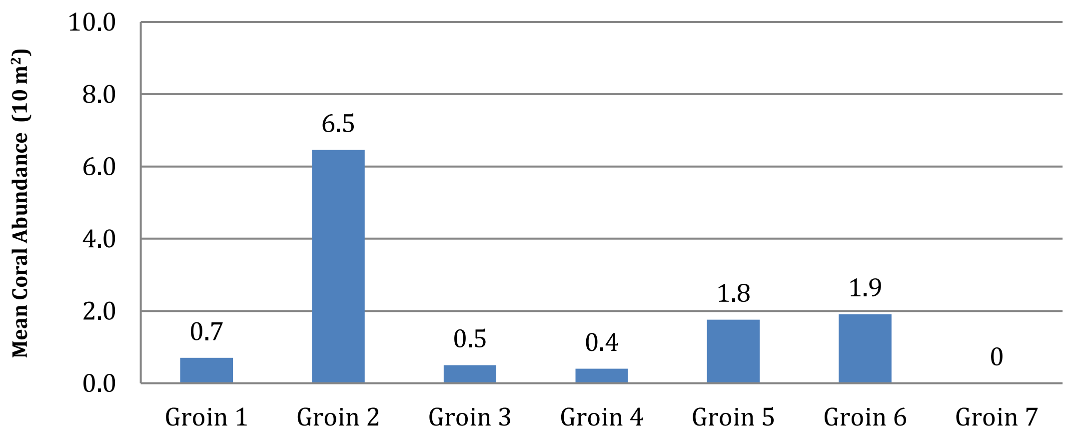

Figure 16. Mean coral colony abundance (colonies/10m²) for each groin station measured on 80-m transects.

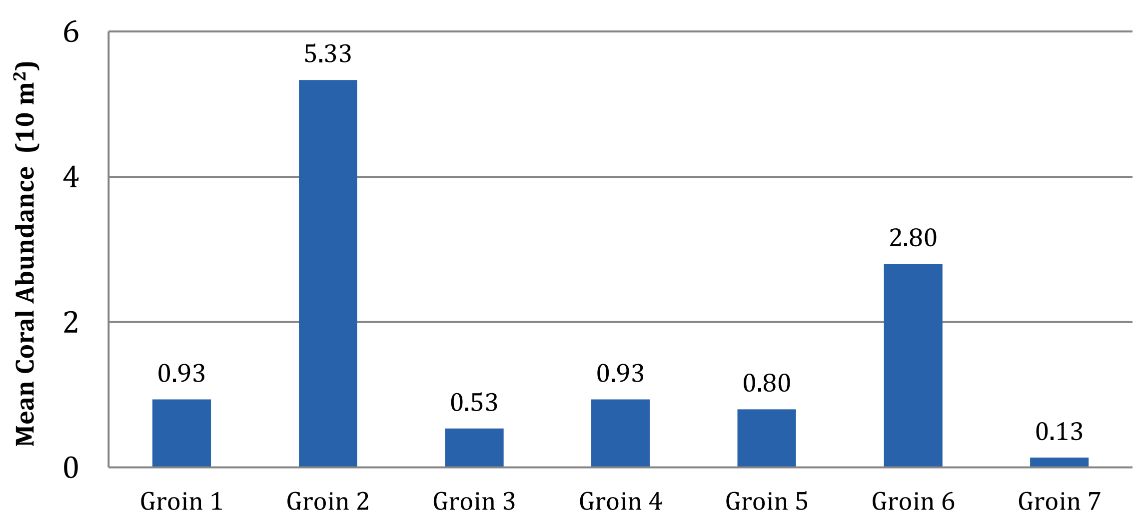

Figure 17 Mean coral colony abundance (colonies/10m²) for each groin station, as measured on 25-m transects.

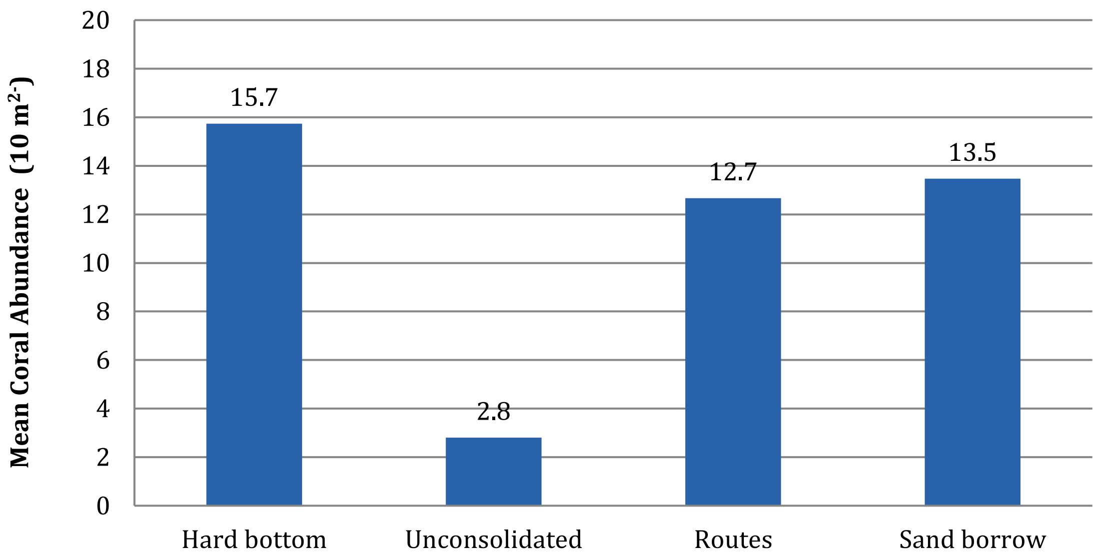

Figure 18. Mean coral colony abundance (colonies/10m^2) for offshore stations, as measured on twelve 25-m transects.

Coral size-class distribution

Coral size-class distribution was determined on 25-m transects in the Project area, offshore sand borrow areas (perimeter), pipeline/barge routes, at the proposed groin locations (as described above), and additionally on 80-m transects in the proposed groin location.

Groins – Coral size class distribution for 80-m transects at the 7 groin locations is presented in Table 10 and Figure 19. A total of at least 8 coral taxa (*Montipora capitata*, *M. patula*, *Pocillopora damicornis*, *Poc. meandrina*, *Porites lobata*, *Porites* sp., and *Psammocora stellata*), representing 90 colonies was recorded. The most common species were *Poc. damicornis* with 39 colonies (43% of the total), and *Poc. meandrina* with 28 colonies (31% of the total). The most common colony size was between 1 and 10 cm (82% of the total). The largest colony observed was in the 41- to 80-cm size class: a *M. patula* colony. No coral was observed on the 80-m transect in the proposed Groin 7 location.

Coral size class distribution for 25-m transects at the 7 groin locations is presented in Table 11 and Figure 20. A total of at least 9 coral taxa (*M. capitata*, *M. patula*, *Poc. damicornis*, *Poc. meandrina*, *P. compressa*, *P. lobata*, *Porites* sp., and *Psam. stellata*), representing 86 colonies was recorded. The most common species was *Poc. damicornis* with 44 colonies (51% of the total). The most common colony size was between 1 and 10 cm (38% for both 1- to 5 cm and 6- to 10 size class). The largest colony observed was in the 41- to 80-cm size class: one *M. patula* colony and one *Poc. meandrina* colony.

Table 10. Number of coral colonies in each size class for coral species recorded at groin stations. Data are the sum total of coral colonies from seven 80-m^2 transects.

	Size class (cm)						
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**Total**	***Percent of total***
M. capitata	1	2	1	1	--	4	*4*
M. patula	--	1	--	2	1	4	*4*
Poc. damicornis	15	16	8	--	--	39	*43*
Poc. meandrina	3	2	--	1	--	6	*7*
Porites lobata	25	2	--	1	--	28	*31*
Porites sp.	--	--	--	1	--	1	*1*
Psammocora stellata	--	1	7	--	--	8	*9*
Total count	45	29	9	6	1	90	*100*
Percent of total	*50*	*32*	*10*	*7*	*1*		

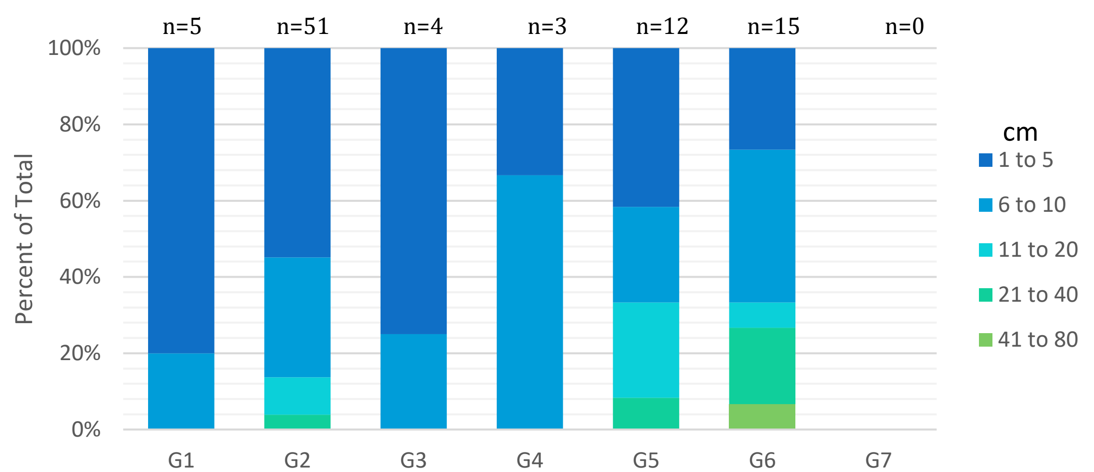

Figure 19. Percent distribution of coral colonies by size class at groin stations, from 80-m transect data (n = total number of colonies measured).

Table 11. Number of coral colonies in each size class for coral species recorded at groin stations. Data are the sum total of coral colonies from twenty-one 25-m^2 transects.

Taxa	**Size class (cm)** 1 to 5	6 to 10	11 to 20	21 to 40	41 to 80	**Total**	***Percent of total***
M. capitata	1	3	3	--	--	7	*8*
M. patula	--	2	--	--	1	3	*4*
Poc. damicornis	17	23	4	--	--	44	*51*
Poc. meandrina	1	1	--	3	1	6	*7*
Porites compressa	--	--	--	1	--	1	*1*
Porites lobata	12	3	1	--	3	19	*22*
Porites sp.	1	--	2	1	--	4	*5*
Psammocora stellata	1	1	--	--	--	2	*2*
Total count	33	33	10	8	2	86	*100*
Percent of total	*38*	*38*	*8*	*3*	*9*	2	

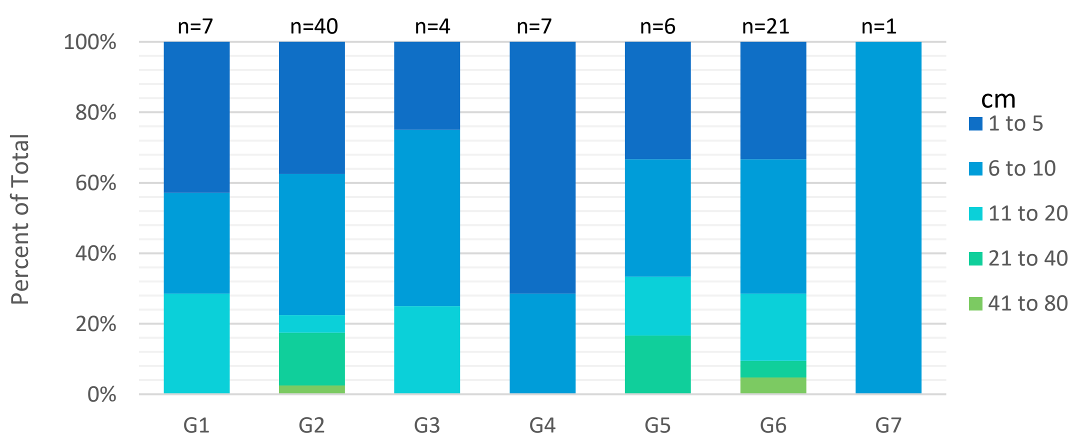

Figure 20. Percent distribution of coral colonies by size class at groin stations, from 25-m transect data (n = total number of colonies measured).

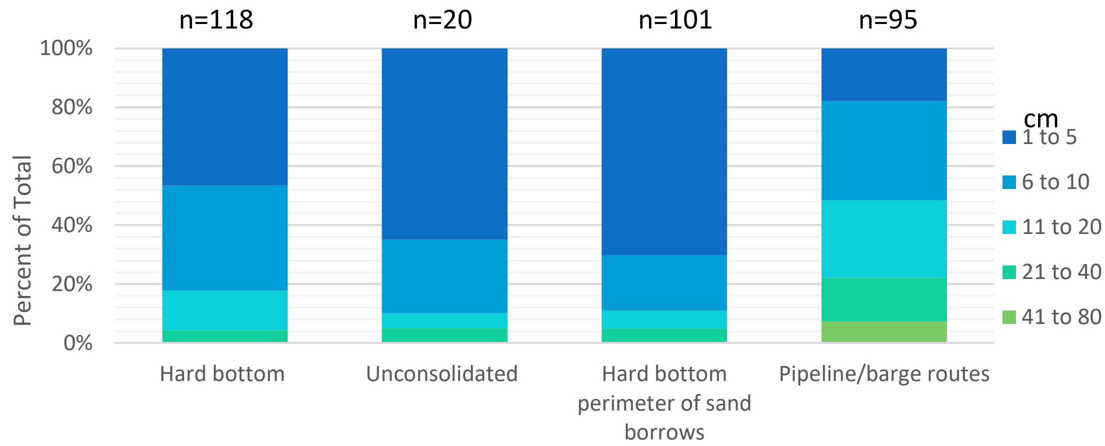

Figure 21. Percent distribution of coral colonies by size class for at the Project area, sand borrow perimeter and pipeline/barge route stations, from 25-m transect data (n = total number of colonies measured).

Project area – Coral size class distribution for 25-m transects at the hard bottom stations is presented in Table 12 and Figure 21 (above). A total of at least 9 coral taxa (*Cyphastrea agassizi*, *C. ocellina*, *Leptastrea* sp., *Leptastrea transversa*, *M. capitata*, *M. flabellata*, *Poc. meandrina*, *P. lobata*, and *Porites* sp.), representing 118 colonies was recorded. *Porites* was the most common genus (70% of the total), represented by at least two species (*P. lobata*, at 40% and *Porites* sp., at 30%). The most common colony size was between 1 and 10 cm (47% of the total in the 1- to 5 cm size class and 36% of the total in the 6- to 10 size class). The largest colony observed was in the 21- to 40-cm size class.

Offshore sand borrow sites – Coral size class distribution for 25-m transects at the perimeter of the offshore sand borrow site stations is presented in Table 14. A total of 5 coral taxa (*M. capitata*, *M. patula*, *Poc. meandrina*, *P. lobata*, and *Porites* sp.), representing 101 colonies was recorded. *Porites* was the most common genus (61% of the total), represented by at least two species (*P. lobata* and *Porites* sp., both at 31% of total). The most common colony size was the 1- to 5 cm size class, at 70% of the total. The largest colony observed was in the 21- to 40-cm size class.

Table 12. Number of coral colonies in each size class for coral species recorded at the hard bottom stations. Data are the sum total of coral colonies from three 25-m^2 transects.

	Size class (cm)						
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**Total**	***Percent of total***
Cyphastrea agassizi	1	--	--	--	--	1	*0.8*
C. ocellina	1	--	--	--	--	1	*0.8*
Leptastrea sp.	1	--	--	--	--	1	*0.8*
Leptastrea transversa	--	--	1	--	--	1	*0.8*
M. capitata	10	10	3	1	--	24	*20*
M. flabellata	1	--	--	--	--	1	*0.8*
Poc. meandrina	3	--	1	1	--	5	*4*
Porites lobata	22	20	5	2	--	49	*42*
Porites sp.	16	12	6	1	--	35	*30*
Total count	55	42	16	5		118	*100*
Percent of total	*47*	*36*	*14*	*4*	--		

Table 13. Number of coral colonies in each size class for coral species recorded at the unconsolidated stations. Data are the sum total of coral colonies from three 25-m^2 transects.

	Size class (cm)						
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**Total**	***Percent of total***
M. capitata	1	--	--	--	--	1	*5*
Poc. eydouxi	--	--	--	1	--	1	*5*
Psam. stellata.	13	4	1	--	--	18	*90*
Total count	13	5	1	1	--	20	*100*
Percent of total	*65*	*20*	*5*	*5*	--		

Pipeline/barge routes – Coral size class distribution for 25-m transects at the pipeline/barge route stations is presented in Table 15. A total of 8 coral taxa (*L. bewickensis*, *M. capitata*, *M. patula*, *Poc. meandrina*, *Pocillopora* sp., *P. lobata*, *Porites* sp. and *Psam. stellata*), representing 95 colonies was recorded. The two most common species were *M. capitata* (37% of the total) and *Poc. meandrina* (27% of the total). The most common colony sizes were in the 6- to 10 cm size class, at 34% of the total and the 21- to- 40 size class, at 26% of the total. The largest colony observed was in the 21- to 40-cm size class.

Table 14. Number of coral colonies in each size class for coral species recorded at the perimeter of the sand borrow site stations. Data are the sum total of coral colonies from three 25-m^2 transects.

	Size class (cm)						
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**Total**	***Percent of total***
M. capitata	24	2	2	1	--	29	*29*
M. patula	8	--	--	--	--	8	*8*
Poc. meandrina	1	--	--	1	--	2	*2*
Porites lobata	28	3	--	--	--	31	*31*
Porites sp.	--	--	--	1	--	31	*31*
Total count	72	19	6	5	--	101	*100*
Percent of total	*70*	*20*	*6*	*5*	--		

Table 15. Number of coral colonies in each size class for coral species recorded at the pipeline/barge route stations. Data are the sum total of coral colonies from three 25-m^2 transects.

	Size class (cm)						
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**Total**	***Percent of total***
Leptastrea bewickensis	--	--	1	--	--	1	*1*
M. capitata	11	17	7	--	--	35	*37*
M. patula	--	3	3	--	6	12	*12*
Poc. meandrina	--	7	11	8	--	26	*27*
Pocillopora sp.	1	--	--	--	--	1	*1*
Porites lobata	4	5	3	4	--	16	*17*
Porites sp.	--	--	--	2	1	3	*3*
Psam. stellata	1	--	--	--	--	1	*1*
Total count	17	34	25	14	7	95	*100*
Percent of total	*18*	*33*	*26*	*15*	*7*		

Macroinvertebrates

Over 33 macroinvertebrate taxa were identified throughout the survey. Sea urchin is the most abundant group (86%; Fig 22), with pale rock-boring sea urchin (*Echinometra mathaei*) occurring in large numbers on the limestone hard bottom survey areas. Black brittle star (*Ophicoma erinaceus*) is common throughout all hard bottom locations. The lined sea hare (*Stylocheilus striatus*) was found in large numbers in localized areas of the offshore stations[2]. Tables 16 through 17 show invertebrate densities for each survey area.

Fish abundance

The survey area and number of fishes counted for each transect are presented in Table 18. A total of 669 individual fishes, comprising 43 species were counted in our survey. Fish abundance, normalized to 100 m^2 for each station is presented in Table 19. Overall, fishes are most abundant at the hard bottom locations on the perimeter of the sand borrow sites where density averages 172 fishes per 100 m^2 and lowest at the proposed Groin 7 location at 3 fishes per 100 m^2.

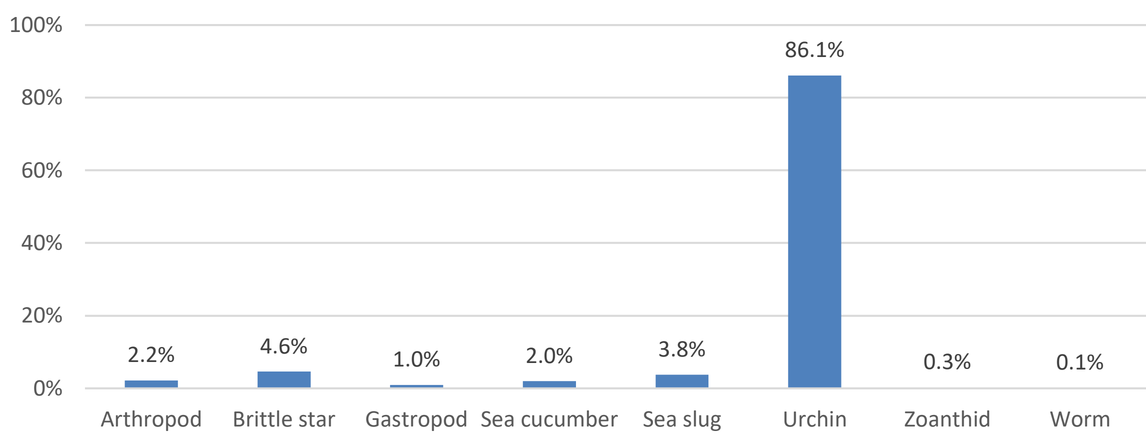

Figure 22. Percent of invertebrates in major groups, all survey areas combined.

[2] This slug feeds on cyanobacteria (blue-green algae), particularly of the genus *Lyngbya*, which was also observed in our survey stations. In the spring/summer, the populations are high and form vast "locust-like" swarms that migrate across the bottom stripping the substrate of cyanophytes.

Table 16. Invertebrate density (no/m²) measured using 25-m² transects (n=3) and 80-m² transect (n=1) at each proposed groin location.

Groin 1

Taxon	Density	St dev
Charybdis hawaiensis	0.02	0.01
Corallianassa borradailei	0.08	0.003
Echinometra mathaei	0.23	0.17
Holothuria atra	0.01	0.02
Ophicoma erinaceus	0.01	0.02
Tripneustes gratilla	<0.01	<0.01

Groin 2

Taxon	Density	St dev
Charybdis hawaiensis	0.01	0.02
Corallianassa borradailei	<0.01	<0.01
Echinometra mathaei	3.0	1.9
Echinometra oblonga	0.1	0.1
Echinothrix calamaris	0.02	0.03
Heterocentrotus mamillatus	<0.01	<0.01
Holothuria atra	0.01	0.02
Ophicoma erinaceus	0.4	0.2
Schizophroida hilensis	<0.01	<0.01
Tripneustes gratilla	0.01	0.02

Groin 3

Taxon	Density	St dev
Cellena sp.	<0.01	0.04
Charybdis hawaiensis	<0.01	0.04
Echinometra mathaei	0.12	0.04
Holothuria whitmaei	0.06	0.02
Holothuria cinerascens	<0.01	<0.01
Isognomon incisum	0.02	<0.01
Tripneustes gratilla	0.02	0.00

Groin 4

Taxon	Density	St dev
Actinopyga varians	0.01	0.02
Charybdis hawaiensis	0.10	0.07
Echinometra mathaei	0.13	0.10
Holothuria whitmaei	0.03	0.03
Holothuria cinerascens	0.01	0.02
Isognomon sp.	0.01	0.02
Ophicoma erinaceus	0.01	0.02
Palythoa caesia	0.03	0.05
Percnon planissium	0.03	0.05
Tripneustes gratilla	0.02	0.03

Groin 5

Taxon	Density	St dev
Charybdis hawaiensis	<0.01	<0.01
Conus imperialis	<0.01	<0.01
Echinometra mathaei	0.46	0.39
Echinometra oblonga	0.01	0.02
Holothuria whitmaei	0.13	0.22
Holothuria atra	0.01	0.02
Holothuria cinerascens	0.01	0.02
Isognomon incisum	0.02	0.03

Groin 6

Taxon	Density	St dev
Actinopyga varians	0.01	0.02
Conus imperialis	<0.01	<0.01
Conus sp.	0.01	0.02
Corallianassa borradailei	0.01	0.02
Echinometra mathaei	8.58	8.80
Echinometra oblonga	0.52	0.53
Heterocentrotus mamillatus	0.01	0.02
Holothuria whitmaei	0.02	0.03

Table 16 (continued).

Groin 5 (cont.)

Ophicoma erinaceus	0.13	0.23
Portunius sp.	0.01	0.02
Tripneustes gratilla	0.02	0.02

Groin 7

Taxon	Density	St dev
Echinometra mathaei	0.07	0.10
Holothruia atra	<0.01	<0.01
Tripneustes gratilla	0.01	0.02
Xanthidae (unidentified)	0.02	0.03

Groin 6 (cont.)

Holothuria cinerascens	0.01	0.01
Isognomon sp.	0.07	0.10
Ophicoma erinaceus	0.14	0.14
Palythoa caesia	0.02	0.02
Pseudosquilla cilata	0.01	0.02
Tripneustes gratilla	0.04	0.05

Table 17. Total invertebrates density (no/m^2) measured using 25-m^2 transects (n=3) at offshore stations.

Project area hard bottom

Taxon	Total	St dev
Conus planorbis	0.04	0.06
Echinometra mathaei	0.03	0.04
Echinometra oblonga	0.04	0.06
Echinothrix calamaris	0.01	0.02
Halgerda terramtuentis	0.01	0.02
Ophicoma erinaceus	0.01	0.02
Plakobranchus ocellatus	0.07	0.05
Pseudosquilla sp.	0.01	0.02

Perimeter of sand borrow sites

Taxon	Total	St dev
Charybdis hawaiensis	0.01	0.02
Echinothrix calamaris	0.07	0.07
Ophicoma erinaceus	0.01	0.02
Spirobranchus giganteus	0.03	0.04
Stenopus hispidus	0.03	0.04
Stylocheilus striatus	0.83	0.70
Trapezia intermedia	0.01	0.02
Tripneustes gratilla	0.03	0.02

Project area unconsolidated

Taxon	Total	St dev
Echinometra mathaei	0.08	0.11
Stylocheilus striatus	0.20	0.28

Pipeline/barge routes

Taxon	Total	St dev
Alpheus sp.	0.01	0.02
Charybdis hawaiensis	0.04	0.06
Echinometra mathaei	0.25	0.27
Echinothrix calamaris		
Stylocheilus striatus	0.03	0.04
Tripneustes gratilla	0.01	0.02
	0.01	0.02

<u>Groins</u> – At the groin locations, a total of 275 fishes was counted. Fish abundance ranged from 3 to 87 fishes per 100 m^2, although no fishes were observed on the 80-m transect in the proposed Groin 7 location. Abundance was greatest at the proposed Groin 2 location (87 fishes/100 m^2). Mean abundance for the groins, based on 80-m and 25-m transects combined, was 28.7 fishes per 100 m^2.

<u>Project area</u> – A total of 127 fishes was counted on the 25-m transects at the hard bottom stations (Table 18). Mean abundance was 169 fishes per 100 m^2. A total of 23 fishes was counted on the 25-m transects at the unconsolidated stations. Mean abundance was 31 fishes per 100 m^2 (Table 19).

<u>Offshore sand borrow sites</u> – On the 25-m transects on the perimeter of the sand borrow sites, a total of 129 fishes was counted (Table 18), with a mean of 43 per transect. Mean abundance was 172 fishes per 100 m^2 (Table 19).

<u>Pipeline/barge routes</u> – A total of 115 fishes was counted on the pipeline/barge route transects (Table 18), with a mean of 38 per transect. Mean abundance was 153 fishes per 100 m^2 (Table 19).

Table 18. Fish survey area and number of fishes counted for each station and mean (±SD) for each area.

Station	Survey area (m^2)	No. of Fishes Counted
Groin 1	146	10
Groin 2	154	134
Groin 3	155	15
Groin 4	150	40
Groin 5	143	26
Groin 6	154	77
Groin 7	143	4
Groin $\bar{x}$	149.3 ±4.9	*10.9* ± 13.7
Hard bottom	75	127
Hard bottom $\bar{x}$	--	*42* ± 31.7
Unconsolidated	75	23
Unconsolidated $\bar{x}$	--	*8* ± 6.2
Pipeline/barge routes	75	115
Pipeline/barge routes $\bar{x}$	--	*38* ±27.5
Perimeter of sand borrow areas	75	129
Perimeter of sand borrow areas $\bar{x}$	--	*43*±43.9
TOTAL	1345	669

Table 19. Fish abundance (fishes/100 m^2) for each station (mean ± SD).

Station	No. of fishes/100 m^2
Groin 1	6.8
Groin 2	87
Groin 3	9.7
Groin 4	26.7
Groin 5	18.
Groin 6	50
Groin 7	2.8
Groin $\bar{x}$	*28.7*±
Hard bottom 1	340
Hard bottom 2	36
Hard bottom 3	132
Hard bottom $\bar{x}$	*169.3*±
Unconsolidated 1	64
Unconsolidated 2	24
Unconsolidated 3	4
Unconsolidated $\bar{x}$	*30.7*± 24.9
Pipeline/barge route 18 to19	28
Pipeline/barge route 19 to shore	296
Pipeline/barge route 22 to 19	136
Pipeline/barge routes $\bar{x}$	*153.3*±110.1
Perimeter of site 18	*420*
Perimeter of site 19	*36*
Perimeter of site 22	*60*
Perimeter of sand borrow areas $\bar{x}$	*172*±175.6
Overall mean	103.9±123.5

Fish species richness and diversity

Fish species richness for each station and means for each area are presented in Table 20. Species richness was generally low, varying between 0 and 20 species per station. At the 80-m groin stations, species richness varied between 0 and 7 species, with a mean of 4.1 per transect. On the 25-m groin stations, species richness varied between 2 and 15, with a mean of 7 species per transect. The transect with the greatest species richness was at Groin 6 (Figure 23). The unconsolidated station has the lowest species richness of all stations, with a mean of 3.7 species per transect. Species richness was somewhat elevated at the hard bottom stations (Project area hard bottom and hard bottom on the perimeter of the sand borrow stations), with a mean of 10 and 10.3 species per transect, respectively. Mean species richness within the Project area (all stations combined) was 7.3 fish species per transect.

Table 20. Fish species richness and diversity (H') and mean (± SD) for each area.

Survey area	Species richness	Diversity (H')
G1 (80-m)	7	1.8
G2 (80-m)	4	1.3
G3 (80-m)	3	1.0
G4 (80-m)	5	1.6
G5 (80-m)	7	1.6
G6 (80-m)	3	1.0
G7 (80-m)	0	0.0
Groin mean (80-m)	4.1 ± 2.3	1.2 ± 0.6
G1 (25-m)	2	0.5
G2 (25-m)	10	1.6
G3 (25-m)	5	1.4
G4 (25-m)	8	1.4
G5 (25-m)	6	1.5
G6 (25-m)	15	2.2
G7 (25-m)	3	1.0
Groin mean (25-m)	7.0 ± 4.1	1.4 ± 0.5
Hard bottom 1	15	2.3
Hard bottom 2	5	1.6
Hard bottom 3	10	1.80
Hard bottom mean	10 ± 1.9	4.1 ± 0.3
Unconsolidated 1	5	1.4
Unconsolidated 2	3	0.9
Unconsolidated 3	3	0.9
Unconsolidated mean	3.7 ± 0.9	1.1 ± 0.2
Pipeline/barge route 18 to19	3	1.1
Pipeline/barge route 19 to shore	4	1.3
Pipeline/barge route 22 to 19	10	1.8
Pipeline/barge route mean	5.6 ± 3.1	1.4 ± 0.3
Perimeter of site 18	20	2.4
Perimeter of site 19	4	1.3
Perimeter of site 22	7	1.8
Perimeter of sand borrow area mean	10.3 ± 1.8	6.9 ± 0.4
Overall mean	7.3 ± 4.8	1.5 ± 0.5

Fish species diversity (H') for each station and means for each area are presented in Table 20, above. Fish diversity along individual transects ranged from 0 to 2.4 (Figures 25 and 26). Maximum fish diversity recorded among all 80-m groin transects was at Groin 1 (1.8). Among the 25-m groin stations, the greatest diversity occurred at Groin 6 (2.2). Among all stations, the greatest diversity was 2.4, recorded at the hard bottom on the perimeter of the sand borrow Site 18. Overall mean diversity for the entire survey area (groins and offshore stations) was 1.5 (Figure 24).

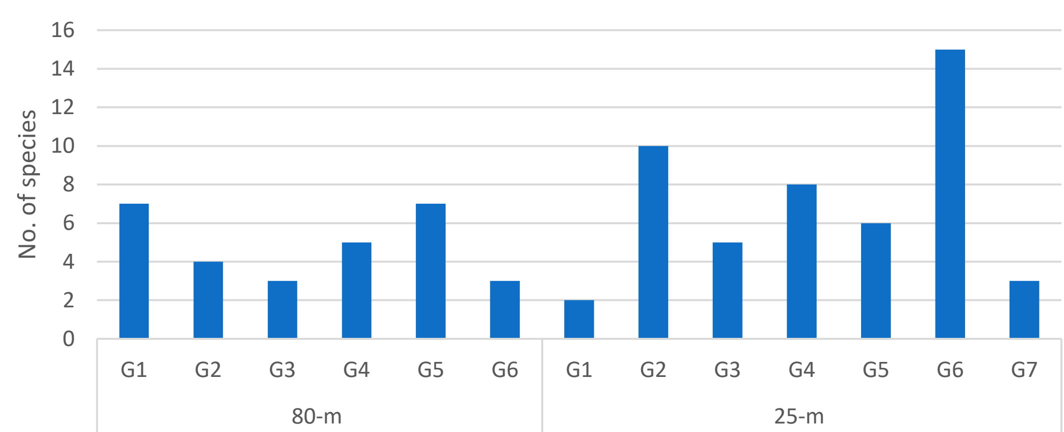

Figure 23. Fish species richness for groin stations. (One 80-m transect and three 25-m transects).

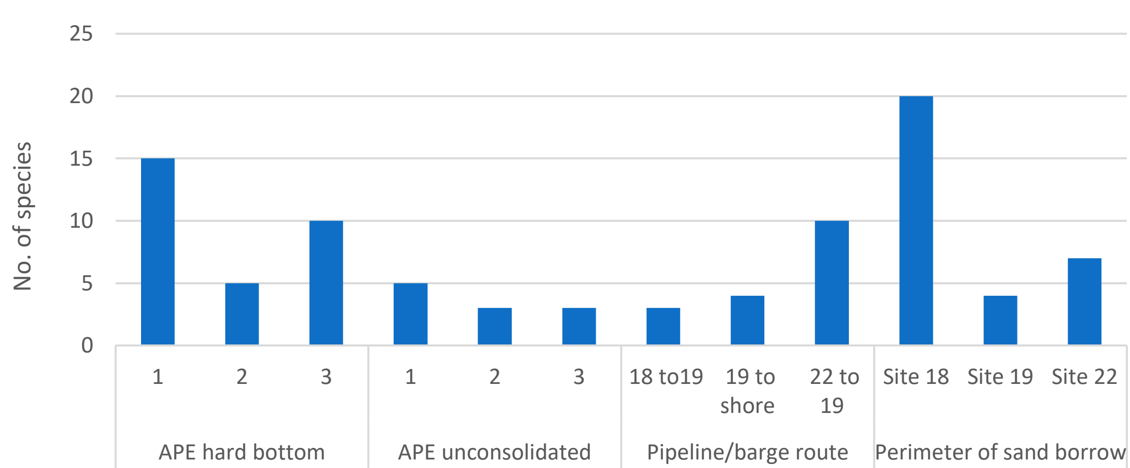

Figure 24. Fish species richness for each transect at the offshore stations.

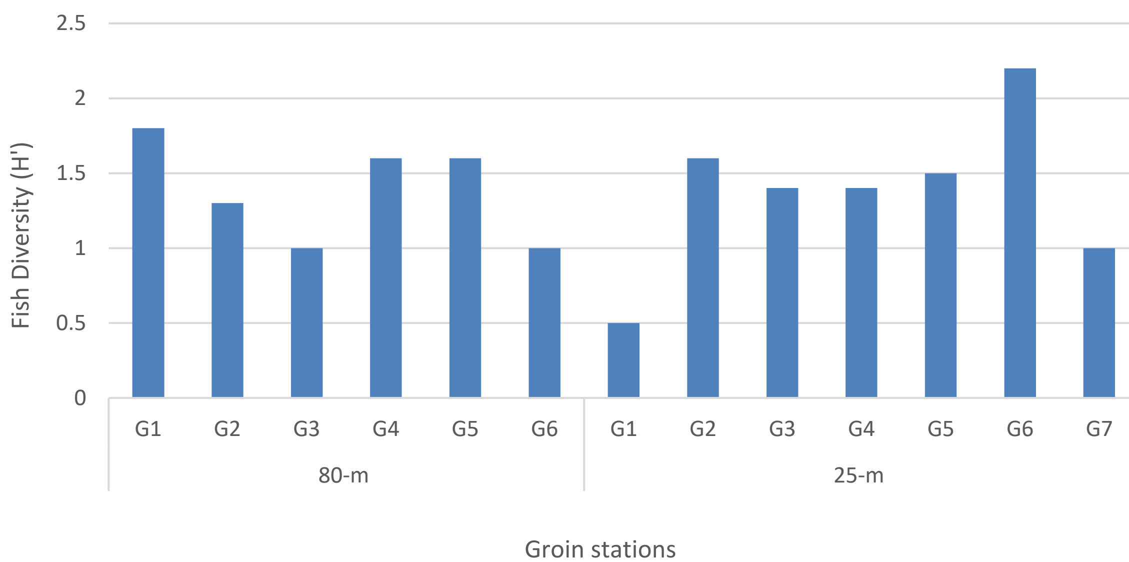

Figure 25. Fish diversity (H') for groin stations. (One 80-m transect and three 25-m transects).

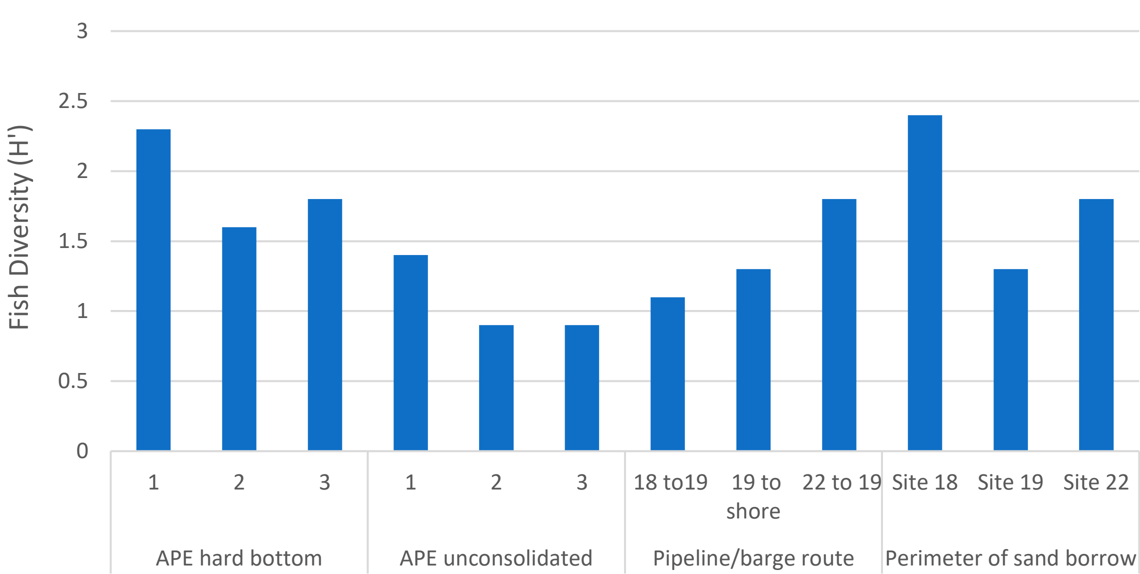

Figure 26. Fish diversity (H') for each transect at the offshore stations.

Fish biomass

Estimates for total length were made for all 669 fishes recorded on the fish transects and used to estimated fish biomass. Fish biomass was low across the groin stations, with an overall mean of 3.1 g/m^2 (Figure 27). Fish biomass for individual transects was highly variable, ranging from 0 to 14.7 g/m^2. The highest biomass occurred at Groin 2 (mean of 5.8 g/m^2) and Groin 6 (mean of 5.4 g/m^2).

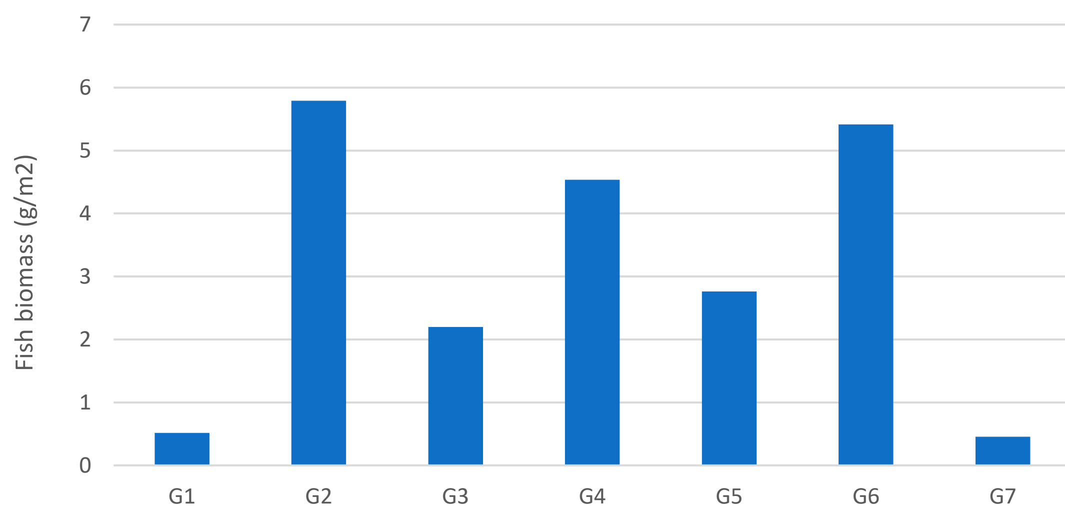

Figure 27. Mean fish biomass (g/m^2) for groin stations.

Fish biomass at the nearshore, reef stations was higher than at the groin stations located over mostly sand just off shore, with an overall mean of 13.3 g/m^2 (Figure 28). Fish biomass for individual transects was highly variable, ranging from 1 to 53.3 g/m^2. The highest biomass occurred at the hard bottom areas on the perimeter of the sand borrow sites (mean of 22.2 g/m^2) and the pipeline/barge routes (mean of 22. 5 g/m^2).

Five trophic guilds were observed in the survey area: herbivores, planktivores, mobile invertebrate feeders, sessile invertebrate feeders, and piscivores (Figures 29 and 30). At the offshore survey stations, herbivores (e.g., *Acanthurus blochii* and *A. triostegus*) account for the greatest overall fish biomass present (42% of the community), followed by planktivores (e.g., *Abudefduf abdominalis* and *Dascyllus albisella*: 23% of the community. At the groin stations, piscivores (e.g., *Caranx melampygus*) account for the greatest

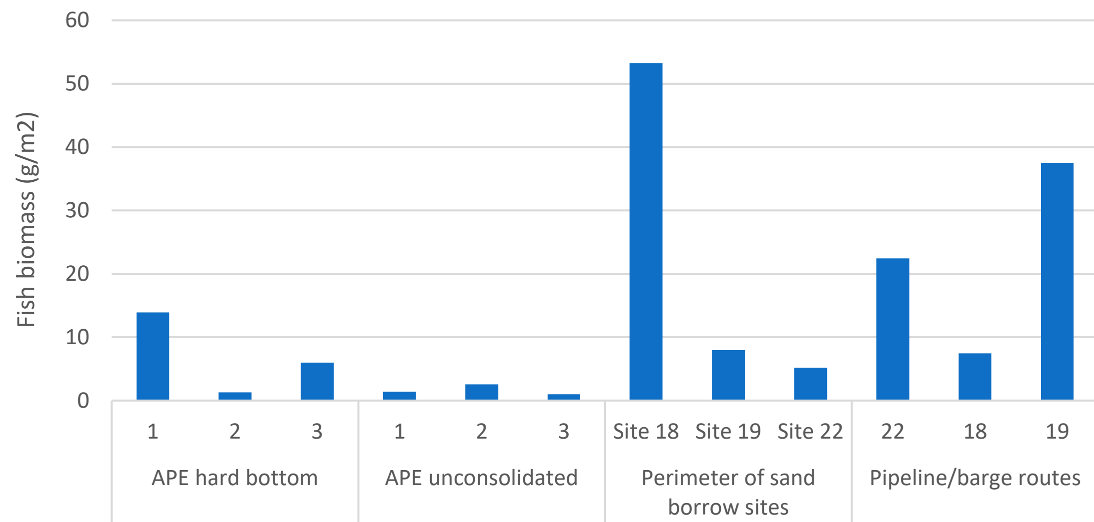

Figure 28. Fish biomass (g/m^2) for offshore stations

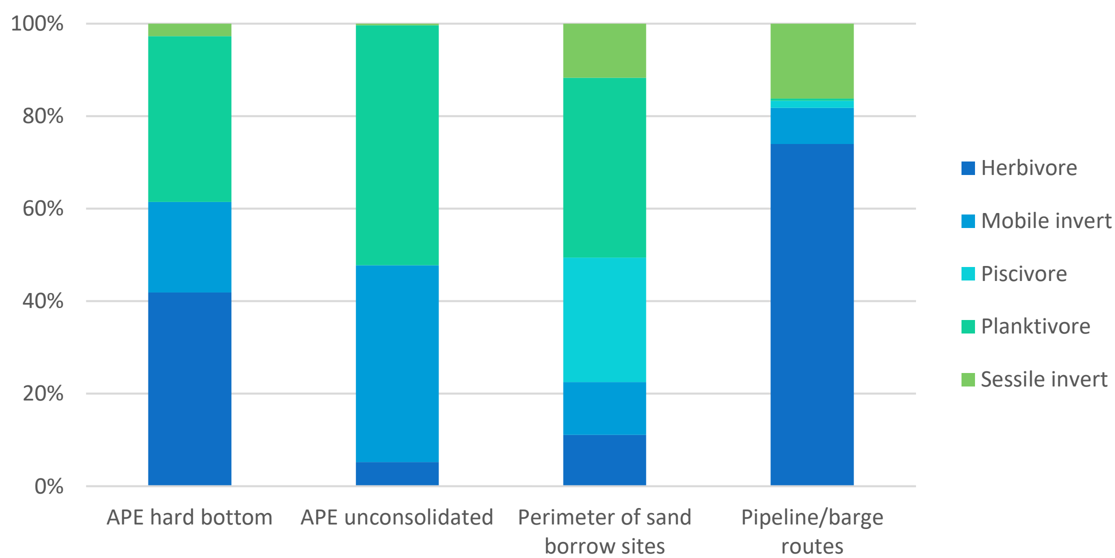

Figure 29. Percent of total fish biomass for each trophic category by offshore survey stations.

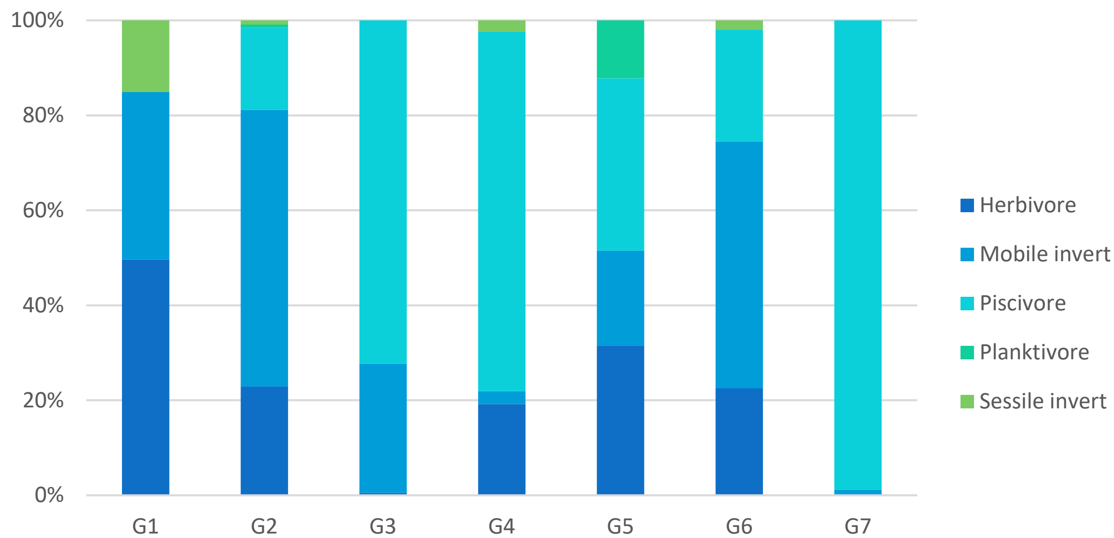

Figure 30. Percent of total fish biomass for each trophic category by groin survey stations.

overall biomass present (40% of the community). Mobile invertebrate feeders (e.g., *Stethojulis balteata*) make up 35% of the total community at the groin area (24% of the community). Planktivores, sessile invertebrate feeders (e.g., *Chaetodon lunula*), and piscivores (e.g., *Caranx melampygus* and *Scomberoides lysan*) each make up between 5% and 7% of the total community biomass and combined account for 18% of the total.

Turtle count

Biologists observed a total of 14 green sea turtles (*Chelonia mydas*) during the June 23, 2019 shore survey. Table 21 and Figure 31 display the 10-minute viewing stations and sightings.

Relative abundance of marine biota

Photos from across the survey area are provided in Appendix A. A listing with relative abundance values of algal, coral, macroinvertebrate, and fish taxa present in the Project area is provided as Appendix B.

Table 21. Ten-minute turtle-count stations at Kahana Bay Project vicinity, June 23, 2019.

Time	Station	Turtle count
643-653	N 20°58.633 W 156°40.687’	1
655-705	N 20°58.578 W 156°40.685	0
709-719	N 20°58.510 W 156°40.729	2
720-730	N 20°58.459 W 156°40.752	1
733-743	N 20°58.422 W 156°40.760	2
642-652	N 20°58.413 W 156°40.750	0
656-706	N 20°58.345 W 156°40.786	0
708-718	N 20°58.317 W 156°40.793	2
720-730	N 20°58.299 W 156°40.797	1
640-650	N 20°58.111 W 156°40.846	2
658-708	N 20°58.240 W 156°40.811	2
710-720	N 20°58.277 W 156°40.808	1
TOTAL		**14**

Figure 31. Green sea turtle survey stations and sightings at Kahana Project vicinity, Kahana, Maui on June 23, 2019.

Algae — A total of 33 algal taxa were identified across the survey areas. Macroalgae was common at most survey stations. Species observed include *Halimeda discoidea*, *Lyngbya majuscula*, *Padina sanctae-crucis*, *Acanthophora spicifera*, *A. pacifica*, *Neomeris* sp., *Galaxaura rugosa*, *Asparagopsis taxiformis*, *Halymenia* sp., and various coralline algae (*Hydrolithion* spp.). Meadows of *Halimeda kanaloana* were observed on the sand bottom areas.

Coral — A total of 19 coral taxa (*C. ocellina*, *C. agassizi*, *L. bewickensis*, *L. purpurea*, *L. transversa*, *M. patula*, *M. capitata*, *M. flabellata*, *Poc. damicornis*, *Poc. eydouxi*, *Poc. ligulata*, *Poc. meandrina*, *P. compressa*, *P. evermanni*, *P. lobata*, *P. lutea*, *Porites* sp., *Psam. stellata*, *Psam. profundacell*) were recorded across the survey stations. Thirteen of these were recorded at the hard bottom stations. Coral colonies were observed to be in generally good condition, and only *Porites* colonies showed signs of disease. Bleached (heat stressed) corals were uncommon.

Macroinvertebrates — A total of 40 macroinvertebrate taxa (not including hermatypic corals) was identified across the survey stations. Sea urchins (*Echinometra mathaei, E. oblonga*, *Heterocentrotus mammillatus*, *Diadema paucispinum*, *Echinothrix calamaris* and *Tripneustes gratilla*) are the most common macroinvertebrates across the survey areas. Hawaiian mussel (*Brachidontes crebristriatus*) and lined sea hare (*Stylocheilus striatus*) are abundant in localized areas. Other invertebrates, including vagabond boring sponges (*Spirastrella vagabunda*), Hawaiian swimming crab (*Charybdis hawaiensis*), zoanthids (*Palythoa caesia*, *P. tuberculosa*, *Zoanthus* sp.), cushion sea star (*Culcita novaeguineae*) sea cucumbers (*Holothuria atra*, *H. cinerascens, H. whitmaei,* and *Actinopyga varians*) occur occasionally across the survey stations. Other invertebrates, including cone shell (*Conus* spp.), gold lace nudibranch (*Halgerda terramtuentis*), and day octopus (*Octopus cyanea*) are rare across the survey stations.

Fishes — A total of 60 fish taxa was recorded across the survey stations. Roughly 25% of fish taxa recorded (15 of 60) are endemic to Hawaiʻi. Fishes occur in all locations with topographical complexity. Saddle wrasse (*Thalassoma duperrey*) was the most abundant species across all survey areas. The small planktivorous damselfish, *Dascyllus albisella,* and schools of Acanthurids, including brown tang (*Acanthurus nigrofuscus*), orangeband surgeonfish (*A. olivaceus*), and ringtail surgeonfish (*A. blochii*) were also prevalent. Other damselfishes (Pomacentridae), butterflyfishes (Chaetodontidae), and triggerfishes (Balistidae) constituted most of the other fishes. Moray eels (Muraenidae) were common in hard bottom areas. One smooth seahorse (*Hippocampus kuda*) was observed in the nearshore waters of the proposed Groin 1 location.

Discussion

Water Quality

The nearshore marine waters in the Project area are classified as open coastal in Hawaii's Water Quality Standards (HAR Chapter 11-54; HDOH, 2014). In this area off Maui, the nearshore waters are included on the HDOH 2018 list of impaired waters in Hawaiʻi, prepared under Clean Water Act §303(d; HDOH, 2018) and listed as impaired for ammonia, nitrate+nitrite, turbidity and chlorophyll α. The area is a "Category 2" water body, meaning that "some uses [are] attained" and a "Category 5" water body, meaning that "at least one use not attained" and a Total Maximum Daily Load Study (TMDL) is needed.

State water quality criteria for the parameters measured during this survey are given in Table 22. Criteria for temperature, salinity, DO and pH are based on deviations from ambient conditions, while criteria for turbidity, nutrients (nitrogen and phosphorus), and chlorophyll α are based on comparisons to geometric mean values.

Two sets of water quality criteria ("wet" and "dry") are specified for open coastal waters in Table 22. Whether "wet" or "dry" criteria is appropriate depends on the volume of freshwater discharge (stream and groundwater) at the shore as explained in the Table 22 footnote. For the purposes of this analysis, it is assumed that "dry" criteria apply as the average annual rainfall in the Kahana area is 768 mm (29.9 in) measured at Kahana Camp (Giambelluca et al., 2013) with little rainfall occurring during dry season months.

All of the measured physical water quality parameters, except turbidity, met state criteria during the present survey. Turbidity levels are typically elevated in shallow nearshore coastal waters, but the deterioration of the beach in the Project area may be contributing to local turbidity. Ammonia and nitrate+nitrite geometric mean exceeded state criteria on all three nearshore transects. Total nitrogen geometric mean exceeded the state criterion at Transect S1, but met the criterion on Transect S2 and S3. Total phosphorus geometric mean met the state criterion at all three transects. Chlorophyll α geometric mean exceeded the state criterion at all three transects.

Two nearby water quality stations (Sta. DOH/RPO and Sta. RKV; Fig. 5) with historic (Sta. DOH) and ongoing (Stas. RPO & RKV) monitoring programs also show elevated nitrate+nitrite and turbidity values. Water quality samples were collected at Sta. DOH once or twice monthly between February 2015 and October 2016. Hui O Ka Wai Ola (HUI, 2019) took over sampling at this site (now Sta. RPO) in October 2017 and has continued sampling at that station about every three weeks. Hui O Ka Wai Ola also started a sampling program at Sta. RKV (Fig. 5) in July 2017 and has continued sampling at that station approximately every three weeks. A comparison of the results from these three efforts, together with means calculated from the present water quality results are shown in Table 23.

Table 22. Selected state of Hawaii water quality criteria for open coastal waters for both dry (upper value) and wet (lower value in italics) criteria (HAR §11-54-05.2; HDOH, 2014).

Parameter	Geometric Mean value not to exceed this value	Value not to be exceeded more than 10% of the time	Value not to be exceeded more than 2% of the time
Ammonia Nitrogen	2.00	5.00	9.00
(µg N/l)	*3.50*	*8.50*	*15.00*
Nitrate+Nitrite	3.50	10.00	20.00
(µg N/l)	*5.00*	*14.00*	*25.00*
Total Nitrogen	110.00	180.00	250.00
(µg N/l)	*150.00*	*250.00*	*350.00*
Total Phosphorus	16.00	30.00	45.00
(µg P/l)	*20.00*	*40.00*	*60.00*
Chlorophyll α,	0.15	0.50	1.00
(µg/l)	*0.30*	*0.90*	*1.75*
Turbidity	0.20	0.50	1.00
(NTU)	*0.50*	*1.25*	*2.00*

Two values: upper, "dry" criteria apply when the open coastal waters receive less than three million gallons per day of freshwater discharge per shoreline mile; lower, "wet" (italicized) criteria apply when the open coastal waters receive more than three million gallons per day of freshwater discharge per shoreline mile.

Other "standards":

- pH units shall not deviate more than 0.5 units from a value of 8.1.
- Dissolved oxygen shall not decrease below 75% of saturation.
- Temperature shall not vary more than 1^{o}C from ambient conditions.
- Salinity shall not vary more than 10% from natural or seasonal changes.

Table 23. Mean water quality results from the present survey along with results for Stas. DOH, RPO, and RKV (see text).

Station	**Samples** (count)	**Temp.** (°C)	**Salinity** (PSU)	**pH**	**DO Sat.** (%)	**Turbidity** (NTU)
DOH	33	25.3	33.6	8.17	87	4.32
RPO	53	25.3	33.3	8.13	97	5.75
S1	6	26.8	34.3	8.11	89	3.83
S2	6	27.0	34.4	8.12	92	4.16
S3	6	27.4	34.6	8.12	86	5.33
RKV	30	26.1	34.0	8.16	101	9.30
Station	**Samples** (count)	**NH_4.** (µgN/L)	**NO_3+NO_2** (µgN/L)	**Total N** (µgN/L)	**Total P** (µgP/L)	**Chl. α** (µg/L)
DOH	33	11	160	251	21	0.53
RPO	53	4	106	182	18	---
S1	6	9	69	169	7	0.39
S2	6	11	54	135	6	0.36
S3	6	8	25	111	12	0.60
RKV	30	3	18	98	12	---

The results of these surveys demonstrate a gradient of nitrate+nitrite values, decreasing from south to north through the Project area. This trend is supported by comparative data between Sta. RPO and Sta. RKV. Fluctuations in nitrate+nitrite concentrations at Sta. RPO are greater than at Sta. RKV as shown in Figure 32.

Results of regression analysis (R^2) at Sta. RPO and Sta. RKV (Figure 33) demonstrate a significant inverse relation between salinity and nitrate+nitrite at both stations, with about 65% of the nitrate+nitrite variance accounted for by salinity at Sta. RPO and about 39% at Sta. RKV, suggesting terrestrial runoff or groundwater is the primary source of nitrate+nitrite in these nearshore waters. Since fallow agricultural fields upland of the proposed Project account for 32% of Kahana Watershed (Parham et al., 2008), residual fertilizer would be suspected as a nitrogen source transported to nearshore waters via groundwater influx. Other sources could include inputs via longshore currents as well as occasional inputs from Kahana Stream, which however only flows to the ocean during major storm events (Cheng, 2014).

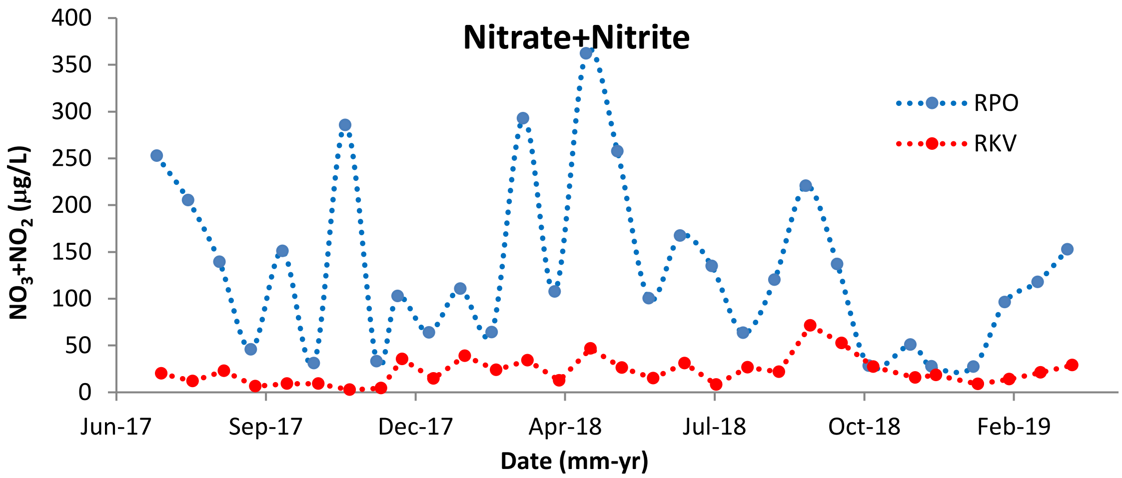

Figure. 32. Comparison of nitrate+nitrate concentrations at Sta. RPO (Pōhaku) and Sta. RKV (Kahana Village) between June 2017 and February 2019.

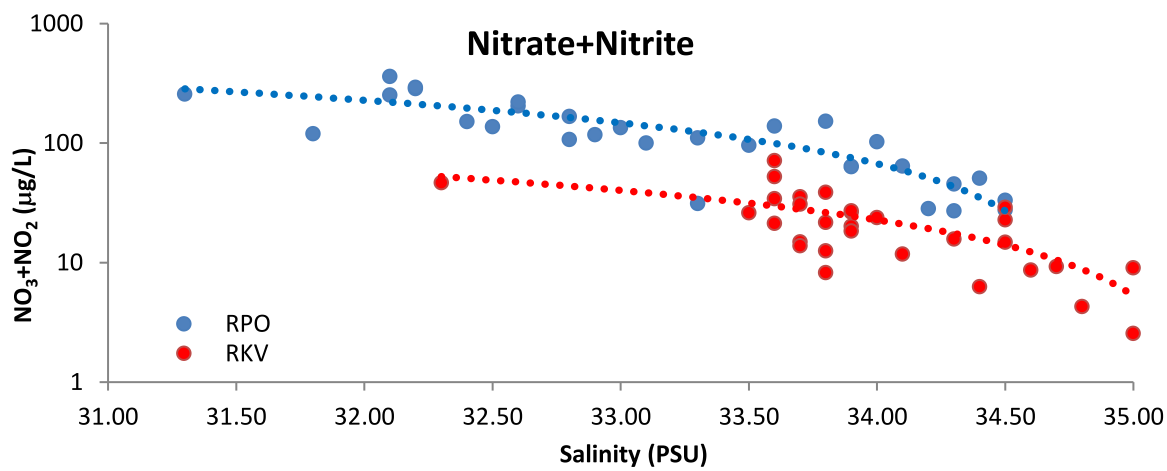

Figure 33. Regression analysis of salinity and nitrate+nitrite at Sta. RPO (Pōhaku) and Sta. RKV (Kahana Village) between June 2017 and February 2019.

Turbidities in the nearshore waters of the Project area are high. A ranked distribution curve of all historic and present survey turbidity data is shown in Figure 34. The geometric mean for these data is 5.77 NTU, which is an order of magnitude higher than the state wet criterion (0.50 NTU). Turbidity values are typically elevated in nearshore coastal waters in Hawaiʻi compared with state criteria due to wind and wave action stirring up shallow bottom sediments.

Listed and Protected Species

One federally protected species was observed in our survey—green sea turtle (*Chelonia mydas*). Other state- and federally-listed (endangered or threatened; HDLNR, 2015; USFWS, nd) marine species—hawksbill sea turtle (*Eretmochelys imbricata*) and monk seal (*Neomonachus schauinslandi*)—may occur in the general vicinity of the Project, considering the distribution of these species and their occurrences throughout the Islands.

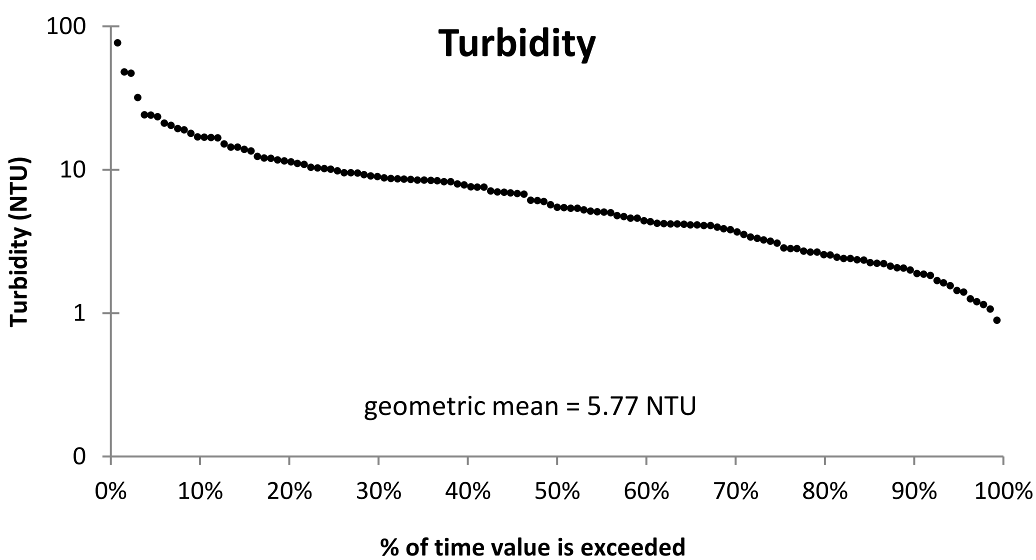

Figure 34. Distribution of turbidity in proposed Project nearshore waters (data from DOH, HUI, and *AECOS*)

<u>Invertebrates</u> — Coral species are protected by Hawaiʻi State regulations that prohibit damage to "any stony coral by any intentional or negligent activity causing the introduction of sediment, biological contaminants, or pollution into state waters" (HDLNR, 2014). On August 27, 2014, NOAA issued a final rule for listing 20 coral species as threatened under ESA (NOAA-NMFS, 2014), but none of these listed coral species occurs in Hawaiʻi. On September 20, 2018, NOAA

issued a proposed rule for listing the cauliflower coral (*Pocillopora meandrina*) as an endangered or threated species under ESA (NOAA-NMFS, 2018). A global status review has been initiated by NOAA to determine whether listing throughout the species range is warranted.

Hawaiʻi Department of Land and Natural Resources (HDLNR) regulates shellfishes such as pearl oysters (HDLNR, 1987) and ʻ*opihi* (HDLNR, 1989). An ʻ*opihi* species (*C. exarata*) and the pearl oyster (*Pinctada margaritifera*) were observed in our survey.

<u>Sea turtles</u> — The distinct population segment (DPS) of green sea turtle that occurs in Hawaiʻi is federally-listed as a threatened species (USFWS and NOAA-NMFS, 2016; UFWS, 2018) and as a threatened subspecies (*Chelonia mydas agassizi*) under Hawaiʻi regulations (DLNR, 2014).

Threats to the green sea turtle in Hawaiʻi include: disease and parasites, accidental fishing take, boat collisions, entanglement in marine debris, loss of foraging habitat to development, and ingestion of marine debris. Throughout the global range of green sea turtle, nesting and foraging habitats are being altered and destroyed by coastal development, beach armoring, beachfront lighting, vehicular/pedestrian traffic, invasive species, and pollution from discharges and runoff (NOAA & USFWS, 2007a, 2007b). Adult green sea turtles forage in shallow nearshore areas and coral reefs. Contamination from effluent discharges and runoff has degraded these environments, and invasive species may reduce native algae species preferred by green sea turtles or could exacerbate susceptibility to, or development of disease (NOAA-NMFS and USFWS, 2007a). Fibropapillomatosis, a disease characterized by the presence of internal and/or external tumors that may grow large enough to hamper swimming, vision, feeding, and potential escape from predators continues to be a major threat to green sea turtles. Extremely high incidence has been reported in Hawaiʻi, where affliction rates peaked at 47-69% in some turtle foraging areas (Murakawa et al., 2000).

Hawksbill sea turtle is distributed across the Pacific, Indian, and Atlantic oceans. Hawksbill sea turtle is much less common in the Hawaiian Islands than green sea turtle and is known to nest only in the southern reaches of the state (NOAA-PIFSC, 2010). Hawksbill sea turtle is federally-listed as endangered (USFWS, nd) and is also listed as an endangered subspecies (*Eretmochelys imbricata bissa*) under Hawaiʻi regulations (HDLNR, 2014). Hawksbill sea turtle faces many of the same threats affecting green sea turtle (see above section; NOAA & USFWS, 2007b).

Monk Seal — The endangered Hawaiian monk seal (*Monachus schauinslandi*) is known to occur in the Project vicinity. The Hawaiian monk seal was listed as an endangered species pursuant to the ESA on November 23, 1976 (41 FR 51612) and remains listed as endangered. In that same year, the Hawaiian monk seal was designated as "depleted" under the Marine Mammal Protection Act (MMPA). The majority of Hawaiian monk seal sighting information collected in the main Hawaiian Islands is reported by the general public and, therefore, highly biased by location and reporting effort. The only truly systematic monk seal count data available for the main Hawaiian Islands are from aerial surveys conducted by the Pacific Islands Fisheries Science Center (PIFSC) in 2000, 2001, and 2008 (Baker and Johanos 2004; PIFSC unpublished data). No Hawaiian monk seals were sighted in the Kahana Bay area during these three complete surveys around Maui.

Reports by the general public, which are non-systematic and not representative of overall seal use of main Hawaiian Island shorelines, have been collected in the main Hawaiian Islands since the early 1980s. For the purposes of this report, a sighting is defined as a calendar day during which an individual seal is documented as present at a specific location. There have been 51 reported sightings of monk seals in the Kahana Bay area from 2009 to 2018 (Table 24). Sightings were divided into two areas based on reported location and include Kahana Beach and Pohaku Park/S-Turns. Of the total sightings, 28 reports can be attributed to six uniquely identifiable seals (Table 25). No monk seal births have been documented in the Kahana Bay area of West Maui.

Table 24. Number of reported Hawaiian monk seal sightings at Kahana Bay, West Maui (2009 to 2018).

Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**Total**
Kahana Beach	4	2	5	6	8	6	0	0	1	**5**	**37**
Pokahu Park	1	0	1	1	0	2	0	0	2	**7**	**14**
Total	**5**	**2**	**6**	**7**	**8**	**8**	**0**	**0**	**3**	**12**	**51**

Table 25. Number of sightings of uniquely-identified Hawaiian monk seals reported at Kahana Bay, West Maui (2009-2018).

Seal ID	Sex	Sightings
R017	Female	11
R305	Female	4
R308	Female	9
R4DF	Female	1
RH44	Female	2
RL06	Female	1
TOTAL		**28**

Critical habitat for Hawaiian monk seals has been designated (NOAA-NMFS, 2015) and includes the seafloor and marine habitat to 10 m above the seafloor from the 200 m depth contour through the shoreline and extending into terrestrial habitat 5 m inland from the shoreline between identified boundary points. These terrestrial boundary points define preferred pupping areas and significant haul-out areas. (NOAA-NMFS, 2015). The shoreline off the Project site falls within assigned boundary points MA61 and MA62: Punalau Beach through to Mala Wharf, and therefore is designated monk seal terrestrial critical habitat. The waters offshore of the Project area are designated monk seal marine critical habitat.

Impact Assessment

Water Quality

Potential impacts during construction may include an increase in turbidity levels: (1) at sand source areas during sand extraction operations; (2) at groin construction sites; and (3) during sand replenishment operations.

The primary long-term Project impact will be a significant reduction in beach erosion and possibly turbidity levels in nearshore waters. Other minor impacts may include a slight increase in resident time for nearshore waters contained between groins and which may be expressed by slightly elevated water temperature, DO saturation levels, and pH during daylight hours, and slightly lower salinity and higher nitrate+nitrite concentrations due to groundwater seepage. Waves and tidal flushing will tend to minimize these potential impacts.

Water quality monitoring of both sand source and beach replenishment areas should be conducted before construction (preconstruction) to establish baseline conditions, during construction to monitor impacts, and post- construction to demonstrate that long-term negative impacts have not occurred. The primary best management practice (BMP) will be silt curtains surrounding both sand source areas and beach replenishment areas during construction, these anchored to the bottom and shore, where appropriate. Water quality measurements should include water temperature, salinity, pH, DO and turbidity as per HDOH guidelines (HDOH, 2000). Monitoring frequency will be determined by HDOH. Sand dewatering areas should be of sufficient size to ensure adequate percolation and to prevent overflow effluent from running off into nearshore waters.

Marine Resources

The Kahana Bay Erosion Mitigation Project is taking place on a narrow beach and shallow reef flat. Overall, the proposed groin project area is 46% limestone and 36% sand, offering limited topographical relief and structural complexity. The Project area supports a low abundance of fishes with low species richness and a marginal coral community. The daily use by large numbers of waders, fishers, paddlers, and swimmers influences negatively the biotic community. Areas with little or no vertical relief are affected by the continually shifting sand and tend to have little algal and macro-invertebrate diversity, with few or no coral colonies present. These hard bottom areas may be regularly covered and uncovered by shifting sand.

Coral assemblages at Kahana Bay are limited by availability of stable hard bottom, silt cover, competition with algae, and freshwater influence among other factors. Overall coral cover at the proposed groin locations is very low (mean of 0.4% cover); most common is *Poc. damicornis*, a fast growing, silt-tolerant hermatypic coral. In general, coral colonies here are small, with 90% being less than 10 cm in diameter. The lack of large coral heads is evidence that the Kahana Bay environment is not particularly favorable to coral growth. Coral settlement and growth are limited by impinging waves, scour by rubble and sand, reduced light conditions associated with turbid water events, and burial with fine sediment. Although *Pocillopora* is the most common genus, mound-forming *Porites* does occur.

<u>Direct Impacts</u> - Project-placed boulders and sand fill will bury a portion of the existing subtidal environment of primarily low relief sand, rubble, and

limestone. This limestone provides substrate for macroalgae and coralline algae growth, as well as habitat for macroinvertebrates, including octopus[3]. Placement of boulders and sand will result in loss of some benthic organisms, including corals. These corals provide ecological services to the coral reef ecosystem: shelter, reef consolidation, food for corallivores, or coral gametes. Impacts to corals could be avoided by relocating the few scattered corals that occur in the footprint of the placed sand and groins. Benthic invertebrates will repopulate from surrounding habitat after construction is completed and sessile organisms will colonize new hard surfaces (*AECOS*, 2014-2020). Additionally, the Project will provide stable, hard bottom for coral settlement and possibly calmer waters for coral development, but coral assemblage development may be moderated by competition for space, freshwater influences, and sediment transport.

Current Project plans of the groin placement and size allow us to estimate the loss of coral and other benthic organisms based on our quantitative survey results. The placement of groins would result in an estimated loss of 2086 coral colonies, the submerged sand fill would result in an estimated loss of 3707 coral colonies, and the non-submerged sand fill would result in an estimated loss of 325 coral colonies, for a total of 6118 coral colonies in the direct impact area (Table 26). For the Alternative Action of beach nourishment without groins, the submerged sand fill would result in an estimated loss of 3494 coral colonies, and the non-submerged sand fill would result in an estimated loss of 220 colonies for a total of 3714 estimated corals in the direct impact area. The majority of the corals within the direct footprint are small (<10 cm).

Our survey did not find any corals located within the offshore sand borrow sites. Average coral cover on the hard bottom surrounding the sand borrow sites is 0.5%. These corals present near the sand extraction sites should be indicated to the contractor, avoided, and monitored. Mean live coral cover along the pipeline/barge routes is 4.5%. If a pipeline is the selected method, it can be laid along sand channels to avoid most living coral heads.

Based on densities calculated from transect data, we estimated the loss of benthic macroinvertebrates (by major taxonomic group) in each of the Project footprints for both the Proposed and Alternative Actions (Table 27). Urchins and sea cucumbers are invertebrates found in the greatest densities across the Project area. An estimated 100,000 sea urchins and 26,814 sea cucumbers would be directly impacted from the Proposed Action. The Alternative Action would result in an estimated loss of 60,273 urchins and 20,263 sea cucumbers.

[3]Decline in octopus habitat is identified as a community concern (Michelson, J. pers. comm.).

Table 26. Predicted direct impacts to corals for Proposed and Alternative Actions.

Project area	**Project footprint (m^2)**	**Area coverage of coral colonies in direct impact area (colonies/m^2)**	**Estimated number of coral colonies in direct impact area (no. colonies) †**
Proposed Action			
Groin	12268	0.17	2086
Submerged sand fill	15444	0.24	3707
Non-submerged sand fill	28452	0.01	325
Total	--	--	**6118**
Alternative Action			
Submerged sand fill	14558	0.24	3494
Non-submerged sand fill	19213	0.01	220
Total	--	--	**3714**

† These values are likely underestimates, as the calculation does not account for direct impacts to corals outside of Project footprint

Table 27. Predicted direct impacts to macroinvertebrates (by major taxonomic group) for the Proposed Action and Alternative Action.

Proposed Action

Project areas	**Area (sq m)**	**Arthropod**	**Sea cucumber**	**Urchin**	**Brittle star**	**Gastropod**	**Zoanthid**
Groin footprint	12268	511	477	21721	3823	399	351
Submerged sand fill	15444	765	9266	27564	2306	618	618
Non-submerged sand fill	28452	1409	17071	50780	4249	1138	1138

Alternative Action

Project areas	**Area (sq m)**	**Arthropod**	**Sea cucumber**	**Urchin**	**Brittle star**	**Gastropod**	**Zoanthid**
Submerged sand fill	14558	721	8735	25983	2174	582	582
Non-submerged sand fill	19213	952	11528	34291	2869	769	769

Fish abundance and diversity are directly correlated with topographical structure and complexity (Friedlander and Parrish, 1998; Ménard et al., 2012). Fish species richness, biomass, and diversity tend to be highest in environments with great spatial relief such as along limestone outcrop/sand bottom interfaces; fish biomass is lowest on shallow reef flats (Friedlander and Brown, 2006) of the sort in the Project area. Table 28 presents numbers of fish species per transect and fish biomass data collected by DAR at survey locations in West Maui (Alaeloa) of comparable bottom type and depth to our surveys of Kahana Bay Project area, as well as other surveys at various locations across the state. Average number of fish species per transect and fish biomass at the proposed groin locations in Kahana Bay was far less than at other comparable locations in the area and across the state. Although the majority of the Project reef has low topographic relief, where vertical structure occurs, fishes are present and sometimes in high numbers. The distribution of topographical relief on this reef is highly patchy and weakly captured by our transect locations. Stations with visibly greater relief, in the form of limestone overhangs, boulders, or errant debris, had greater fish abundance and fish biomass than the survey area average. The substantial structural complexity and topographical relief offered by the groins will provide habitat for fishes and an increase in fish species richness, biomass, and abundance can be anticipated (*AECOS*, 2020).

Table 28. Mean number of species and fish biomass from various locations in Hawaiʻi, compared to the Kahana Bay survey area in 2019.

Location	Source	No. of Species/ Transect	Fish Biomass (g/m^2)
Shallow nearshore reef flats			
Kahana Bay, Maui	This report, 2019 data	7	3.1
Alaeloa West Maui[4]	Sparks, R., pers. comm.	10.1	38.9
Iroquois Point – Precon	*AECOS*,2012a, 2012a data	4	2.5
Iroquois Point – Postcon(0)	*AECOS*,2014a, 2013 data	7	19.2
Iroquois Point – Postcon(1)	*AECOS*,2014b, 2014 data	11	16.5
Iroquois Point – Postcon(2)	*AECOS*,2015, 2015 data	8	17.3
Iroquois Point – Postcon(3)	*AECOS*,2016, 2016 data	5	15.1
Iroquois Point – Postcon(5)	*AECOS*, 2018, 2018 data	5	8.8
Iroquois Point – Postcon(7)	*AECOS*, 2020	3	32
Gray's Beach, Waikiki, Oʻahu	*AECOS*, 2009	6	2.1

[4] For comparison purposes to the Project area, only data from transects with similar bottom type and depth are included.

Table 28 (continued).

Location	**Source**	**No. of Species/ Transect**	**Fish Biomass (g/m²)**
Natatorium area, Waikiki, Oʻahu	*AECOS*, 2011	8	7.1
Hanalei Bay, Kauaʻi	*AECOS*, 2012b	15	1.7
Marine Protected Areas			
Waikīkī MLCD, Oahu	Friedlander and Cesar, 2004	11	37.3
Hanauma Bay MLCD, Oʻahu	Friedlander and Cesar, 2004	28	125.4
Molokini Shoals MLCD, Maui	Friedlander and Cesar, 2004	20	89.1

One common algal species found at Kahana Bay is non-native and invasive: *A. spicifera*. This species is extremely wide-spread along the shores of the Islands and is a food favored by green sea turtle. The groin structures are not expected to affect species introductions to Hawaiʻi, but may serve as habitat for existing introduced species. Future monitoring events should note any changes in the distribution of *A. spicifera* and other invasive species at Kahana Bay.

To assess potential impacts to the coral community from how the proposed action may change the existing sediment deposition patterns in Kahana Bay, a numerical nearshore wave transformation model (the BOSZ [Bossinesq Ocean and Surf Zone]; Oceanit Laboratories, Inc. and Roeber, 2021) was used to evaluate the wave processes at the nearshore region of the Project site. The BOSZ results indicate that the proposed action is not expected to significantly increase seafloor sand movement. Moreover, the placement of the T-groin stabilization structures deflect longshore currents, as intended to help maintain the beach. The results from this model indicate that general sediment transport patterns are not expected to change as a result of the Project. Therefore, adverse impacts to the coral community further off the shore are not anticipated as a result of increased sand movement.

The proposed Project is not expected to result in any significant long-term degradation of the environment or loss of habitat. Rather, by the construction of the proposed T-head groins, the Project will improve the shoreline condition, restore a recreational beach at the site, improve water quality by eliminating erosion of terrigenous fill, and increase potential biological habitat in a relatively barren reef flat area. Ecological services of reef flat habitat will be lost under the project footprint (sand and groin), but will recover over time as the benthic community re-establishes. A biological and water quality monitoring program should be implemented to enhance control over Project construction impacts.

Afternoon winds and waves increase the suspended sediment load in the nearshore waters. A water quality monitoring plan should be developed and implemented to ensure Project activities do not further degrade water quality. We propose that monitoring programs be developed that focus on the specific components of particular interest to the resource and permitting agencies: water quality, changes in densities and distribution of macro-invertebrates including changes in condition of corals on hard bottom in (a) surroundings of the sand extraction pits, (b) adjacent to the dewatering site, and (c) offshore off the replenishment site, as well as the area surrounding the pipeline corridor.

Listed and Protected Species

Invertebrates — State protected biological resources (*ʻopihi*; HAR §13-92-02) occur in waters offshore of the Project area. State rules prohibit taking, possessing, selling, or offering for sale any *ʻopihi* shell (with meat attached) less than 1¼ inches in diameter. However, a permit may be issued by the Board of Land and Natural Resources under terms and conditions it deems necessary.

Sea turtles — A total of 20 green sea turtles were observed in our 2019 survey of the Project area: 6 during underwater surveys and 14 during the shoreline survey. Several macroalgal species (*Ulva* sp. and *Acanthophora spicifera*) consumed by green sea turtle are present off the shore of Kahana Bay. Some loss of foraging habitat for the green sea turtle may occur with beach replenishment. Additionally, the Project will improve beach access for humans, resulting in more vehicular and foot traffic, causing compaction of nests and reducing emergence success in the event nesting occurs here. Adult green turtle forage in shallow nearshore areas on the reef at Kahana Bay. Unmitigated contamination from effluent discharges or runoff from the Project site have the potential to degrade habitats utilized by turtles.

NOAA-PIRO Protected Resources Division (PRD) promotes responsible marine wildlife viewing and offers the following guidelines. These guidelines do not replace federal or state law. Pursuit and feeding of marine mammals is prohibited by federal law. The proposed Kahana Bay Erosion Mitigation Project should promote these guidelines:

- Remain at least 100 yards from humpback whales, and at least 50 yards from other marine mammals (dolphins, other whale species, and Hawaiian monk seals).
- Observe turtles from a distance, both in the water or on shore.
- Bring binoculars along on viewing excursions to assure a good view from the recommended viewing distances.
- Do not attempt to touch, ride, or feed turtles or marine mammals.

- Limit your time observing an animal to 1/2 hour.
- Marine mammals and sea turtles should not be encircled or trapped between boats or shore, or crowds of people.
- If approached by a marine mammal or turtle while on a boat, put the engine in neutral and allow the animal to pass. Boat movement should be from the rear of the animal.

NOAA-PIRO PRD also provides guidelines to help mitigate impacts to sea turtles. A stranded sea turtle is defined as any ocean turtle found dead, injured, sick, with tumors, or otherwise abnormal and sometimes even normal in appearance and out of the water, usually along the shore. The turtle may also be in very shallow water close to shore. Any stranded sea turtle should be reported to facilitate a response.

The Project may increase the number of users, resulting in more fishing activity. To help offset impacts to sea turtles from fishing interactions, NOAA-PIRO provides practical fishing tips[5]. To help prevent hooking and reduce the potential for interactions with sea turtles when fishing, the following guidelines are advised:

- Watch gear and check bait. Checking and recasting gear after a nibble helps to reduce interactions by relocating a baited hook away from a curious turtle.
- Use "turtle friendly" gear such as barbless circle hooks. Barbless circle hooks have been proven effective for catching fish while reducing the severity of injuries to non-target species (including turtles or seals). These hooks allow the animal a better chance of quickly ridding itself of the hook without human intervention.
- Use live bait. Live bait is expected to be less attractive to turtles and result in fewer interactions.
- Clean catch away from turtles. Turtles can become accustomed to being fed. Fishers are advised to clean catch away from turtles to avoid inadvertently "feeding" turtles.
- Report illegal gillnets by reporting to DLNR: (808) 643-3567.

Monk seal — From 2009 to 2018, there have been 28 monk seal sightings reported at Kahana Bay. Monk seals utilize terrestrial habitat to haul out for resting, molting, pupping, nursing and avoiding predators. Since monk seals may remain at sea for several days or more at a time, resting on land is essential to conserve energy. Resting commonly occurs on sandy beaches, but may also occur on rocky shores, rock ledges, emergent reefs, and even shipwrecks (50 CFR 226, June 2, 2011; NOAA-NMFS, 2011a; Antonelis et al., 2006). The shore

[5] http://www.fpir.noaa.gov/PRD/prd_fishing_around_sea_turtles.html#circlehooks.

along the Project area falls within boundary points defined as preferred pupping areas and significant haul-out areas, and is designated critical habitat. Therefore, consultation is recommended. Under section 7 of the ESA, federal agencies must ensure that activities that they fund, authorize (permit or license), or carry out do not jeopardize the continued existence of listed species or result in the destruction or adverse modification of identified critical habitat. Federal actions that may result in adverse impacts to a listed species or the species' identified critical habitat are required to consult with the appropriate regulatory agency, either NOAA Fisheries or the U.S. Fish & Wildlife Service.

Mitigation

Mitigating for impacts to marine resources is a sequential process of avoiding impacts, minimizing impacts, and then compensating for unavoidable adverse impacts. The first step is to avoid impacts through project design. The second step, after avoidance measures have been incorporated, is to minimize remaining impacts. If unavoidable impacts still exist after avoidance and minimization, then replacement of lost ecosystem functions and values is appropriate. This last step is called compensatory mitigation (Bentivoglio, 2003). Project design decisions should incorporate measures to avoid and minimize impacts to marine communities associated with beach stabilization to the extent possible. In particular, impacts to corals in the footprint of the proposed sand borrow margins should be avoided by excluding those areas from the dredging limits.

The United States Coral Reef Task Force (USCRTF) has identified a portfolio of compensatory mitigation and restoration options (USCRTF, 2016) and a list of Best Management Practices (BMPs) that could be implemented to offset adverse impacts on coral reef communities from development projects. The USCRTF list was reviewed and screened for appropriateness to anticipated Project impacts, ability to successfully implement, and impacts already minimized by project-specific BMPs. Possible avoidance and minimization measures that could be taken to offset adverse impacts are provided below.

Water quality improvements
- Storm water BMPs

Coral response and rescue team
- Movement of at-risk corals from a project area

Offsite placement of structures to enhance substrate
- Placement of material that mimics natural coral reef structure
- Deposition of boulders or other artificial material
- Placement of artificial reef modules
- Deposition of coarse dredge spoil

Nuisance species removal

- Removal of nuisance or invasive algae species
- Super sucker removal of invasive algae

Water Quality Improvements

Kahana Stream discharges on the subject nearshore reef at the north end of the Project area (at Kaʻea Point). Any adjunct project that reduces the amount of sediment carried to these marine waters would improve conditions for coral growth on the reef.

Coral and Macroinvertebrate Relocation

To avoid and minimize impacts to marine resources that occur in the Project area, any coral colonies and other macroinvertebrates (e.g., sea urchins, sea cucumbers) that occur within the direct footprint of the Project could be relocated, as practicable. Based on our surveys in the Project area, approximately 6117 corals occur within the footprint of the Proposed Action (3713 corals occur in the Project footprint of the Alternative Action). Removing corals from the Project area and transplanting them to another site could avoid and minimize impacts to the coral assemblage. Additionally, approximately 20 different macroinvertebrates are potential candidates for relocation, including primarily urchins and sea cucumbers.

Translocation of any invertebrates requires that, to be successful, a location must be found that is not only suitable for supporting the translocated individuals, but can actually benefit from the introduction of these organisms: that is, an environment suitable for introduction and one depauperate in the organisms being translocated. In other words, it would not be beneficial to collect large numbers of sea cucumbers at risk and move these to an area saturated with a population of the same species, even though obviously suitable with respect to environmental conditions.

Placement of Structures

The Proposed Action contains an inherent mitigation in that the proposed groins are hard substratum additions with substantial vertical relief that would be suitable for attraction of reef fishes and provide substratum for a wide variety of algae and invertebrates (including corals). The area of the direct impacts was formerly a beach. Shoreline retreat in Kahana Bay has averaged around 0.9 ft (0.27 m) per year since 1912 (County of Maui, 2016; see also SOEST, 2021). The Project proposes to recover, on average 50 ft 15 (m) of beach width. Viewed in this way, the Project is a recovery of beach habitat in an area of low quality, very near shore reef platform that has only been available for colonization by corals and other organisms over roughly the last 50 years. That is, approximately half of the reef exposed by erosion since 1912 would become beach, and the remaining fronting the expanded beach would be an environment very much like what that area fronting the reduced beach is presently. Although this assessment would apply to either alternative, the placement of sand without groins would not provide the addition of high quality habitats provided by the groin ends, nor the stability from continued erosion and sand movement that these structures are expected to provide.

<u>Nuisance Species Removal and urchin out-planting</u>

To offset loss of biological assemblages associated with the loss of hard substrate beneath the enhanced beach, invasive algae elsewhere could be removed as part of a reef restoration effort, thereby allowing an increase in diversity as native algae and invertebrates recolonize the reef. The key to maintaining low levels of invasive algae is the presence of native herbivores and native collector urchins (*Tripneustes gratilla*) are spawned and raised in captivity at the DLNR-DAR's Anuenue Fisheries Research Center (Oʻahu) for use as a biological tool to fight invasive alien seaweeds on reef areas throughout Hawaiʻi. Echinoderms rescued from the Project footprint could be used in such an effort, but only if a location can be identified where increasing the urchin population would provide the desired benefit.

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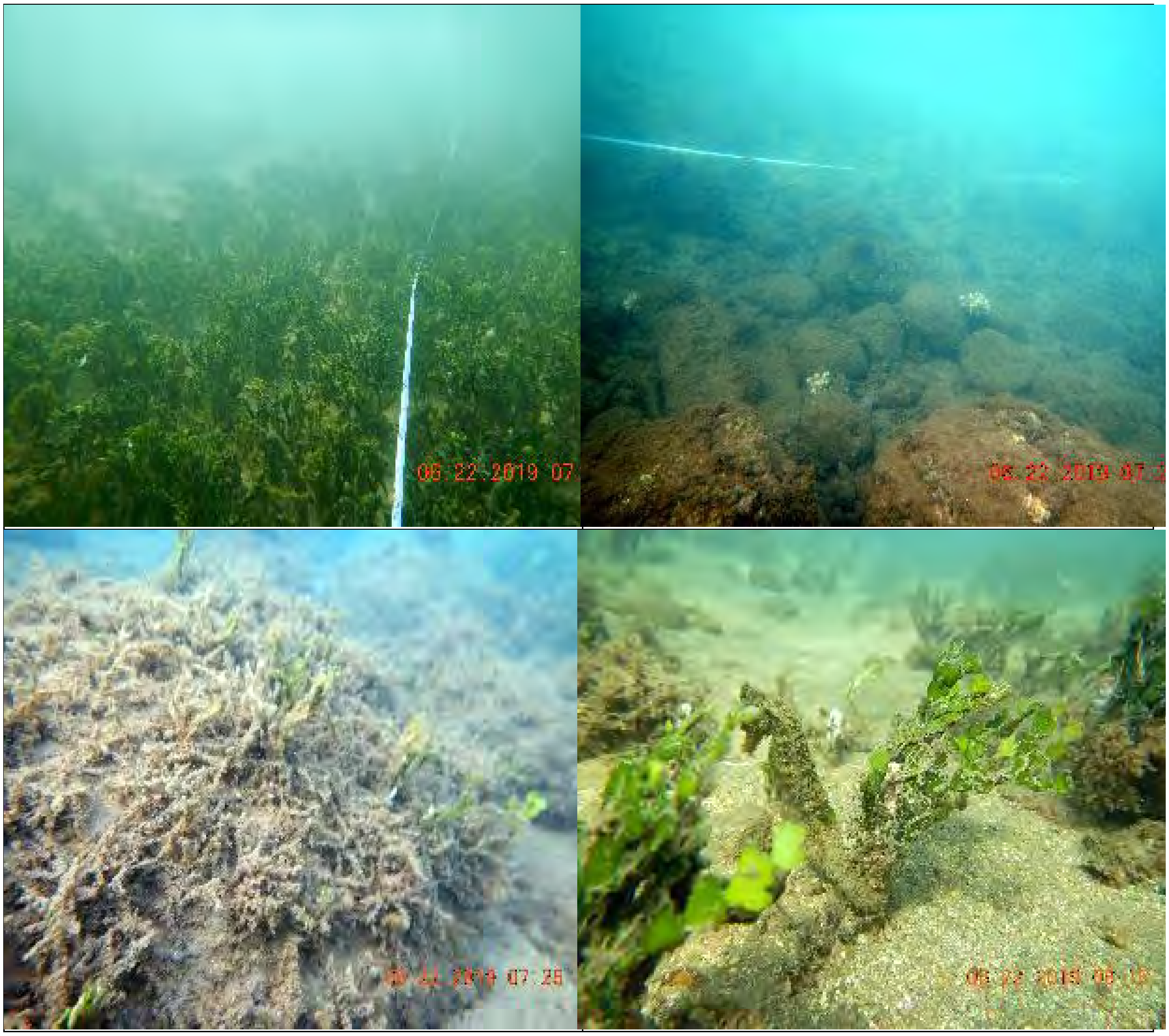
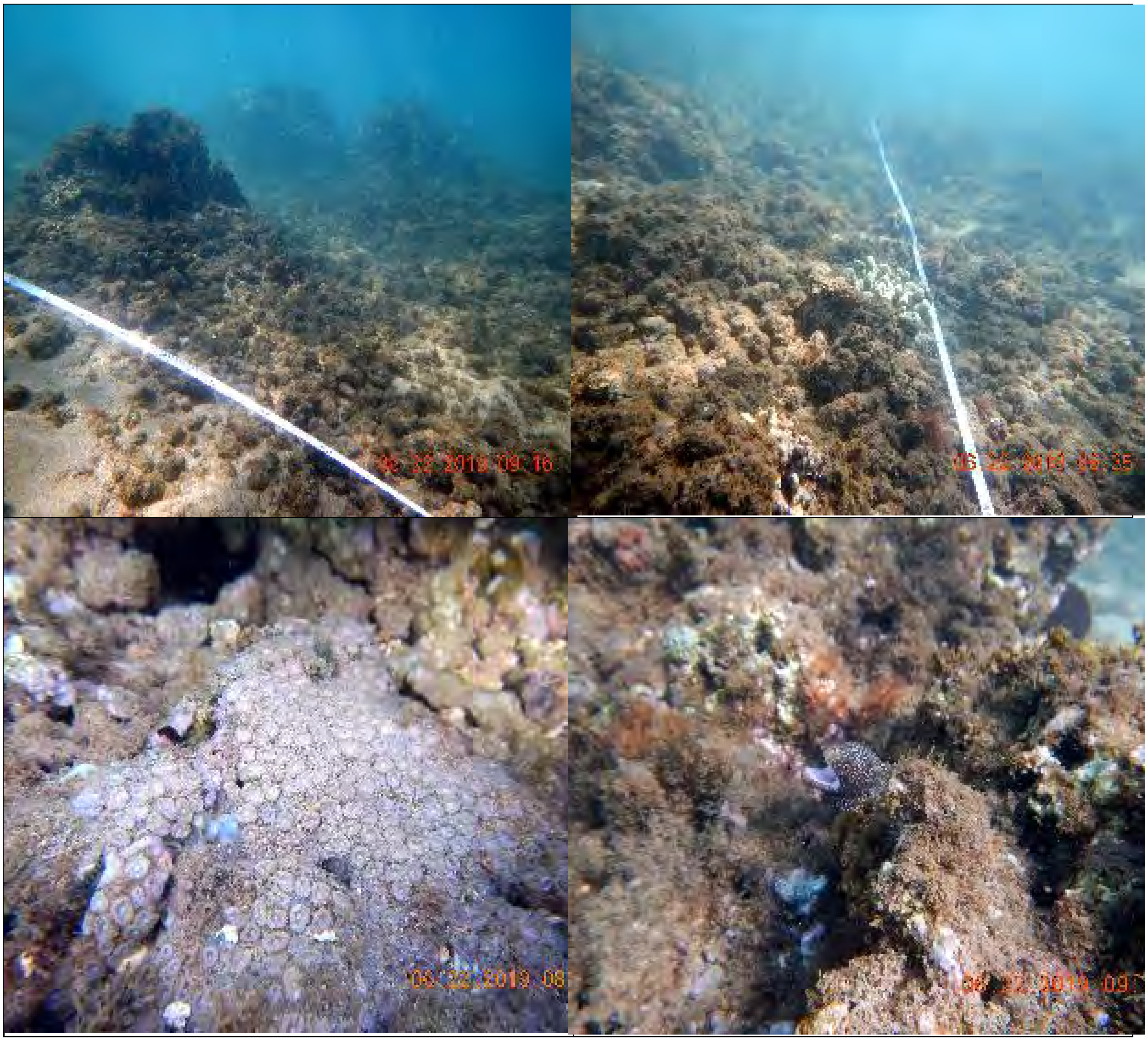
Appendix A

Photos taken from across 19 survey stations in the Project area in Kahana Bay and vicinity, Kahana, Maui, June 19-24, 2019.

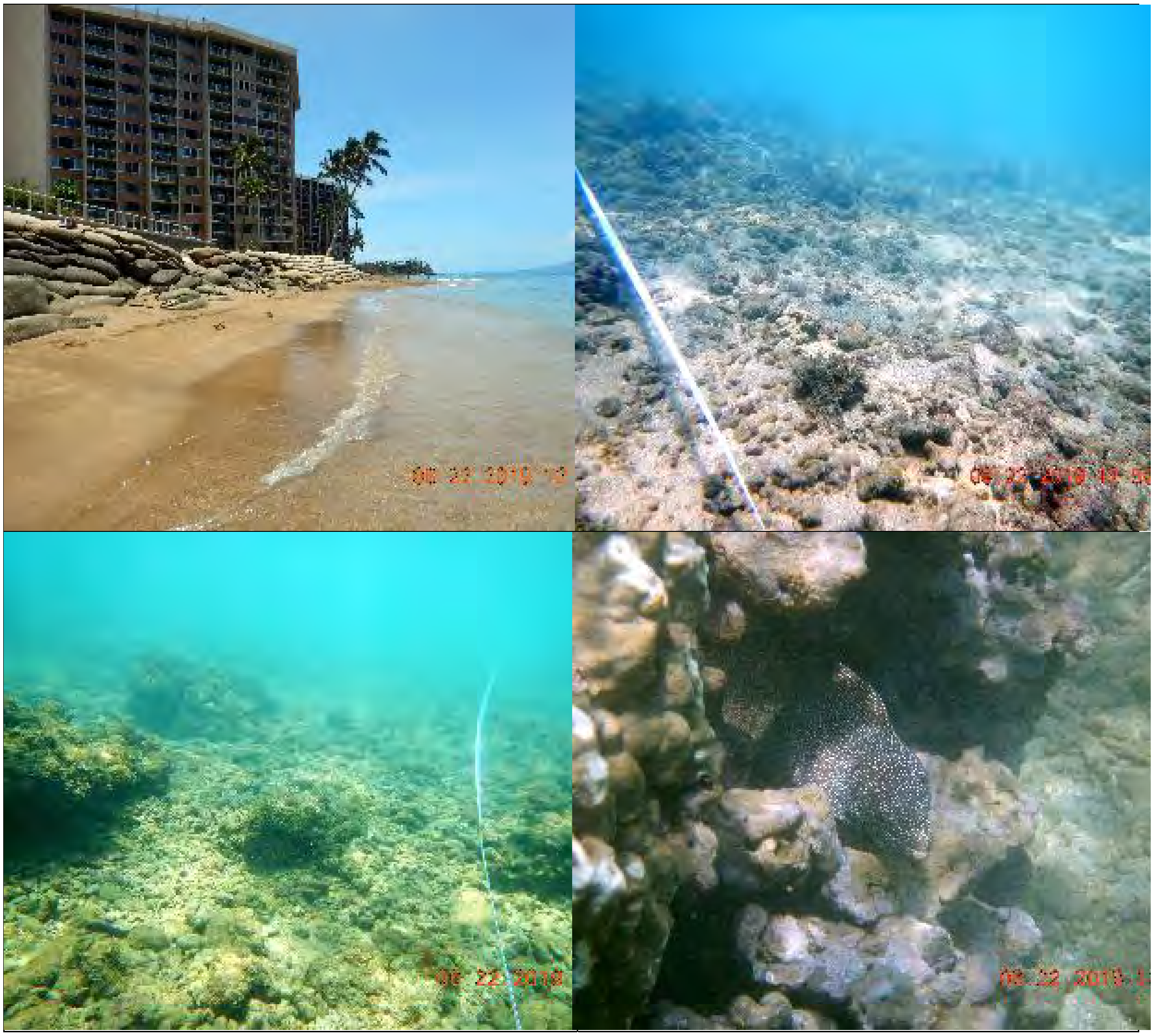


At the proposed location for Groin 1, sand and rubble make up the majority of the benthic composition, as based on three 25-m transects and one 80-m transect. Large meadows of *H. kanaloana* occur in the sand patches (top left photo). Small coral colonies (*Poc. damicornis*) are found on the rubble (top right photo). Red alga, *A. spicifiera*, is abundant in this area (bottom left photo). This Hawaiian seahorse (*H.* c.f. *kuda*) was observed in the shallow waters (bottom right photo).



At the proposed location for Groin 2, sand and limestone with some coral make up the majority of the benthic environment, as based on three 25-m transects and one 80-m transect (top photos). Zoanthids (*Zoanthus* sp.) are common here (bottom left photo). Eels (*Gymnothorax meleagris*) are found in crevices of the limestone (bottom right photo).

The proposed location for Groin 3 occurs off an existing seawall and basalt boulder shoreline (top left photo). A limestone bench with some coral extends offshore from the shore here (top right photo). Sand channels intersperse the limestone (bottom left photo). One green sea turtle (*C. mydas*) was encountered during our June 22, 2019 survey (bottom right photo).



The proposed location for Groin 4 occurs off a sand beach with temporary sand bags (top left photo). Limestone, with some sand, make up the majority of the benthic environment in this area (top right and bottom left photo). Eels (*Gymnothorax meleagris*) are found in crevices of the limestone (bottom right photo).

The proposed location for Groin 5 occurs off a sand beach with temporary sand bags (top left photo). Limestone, with some coral (*M. capitata*) and sand make up the majority of the benthic environment in this area (top right and bottom photos).

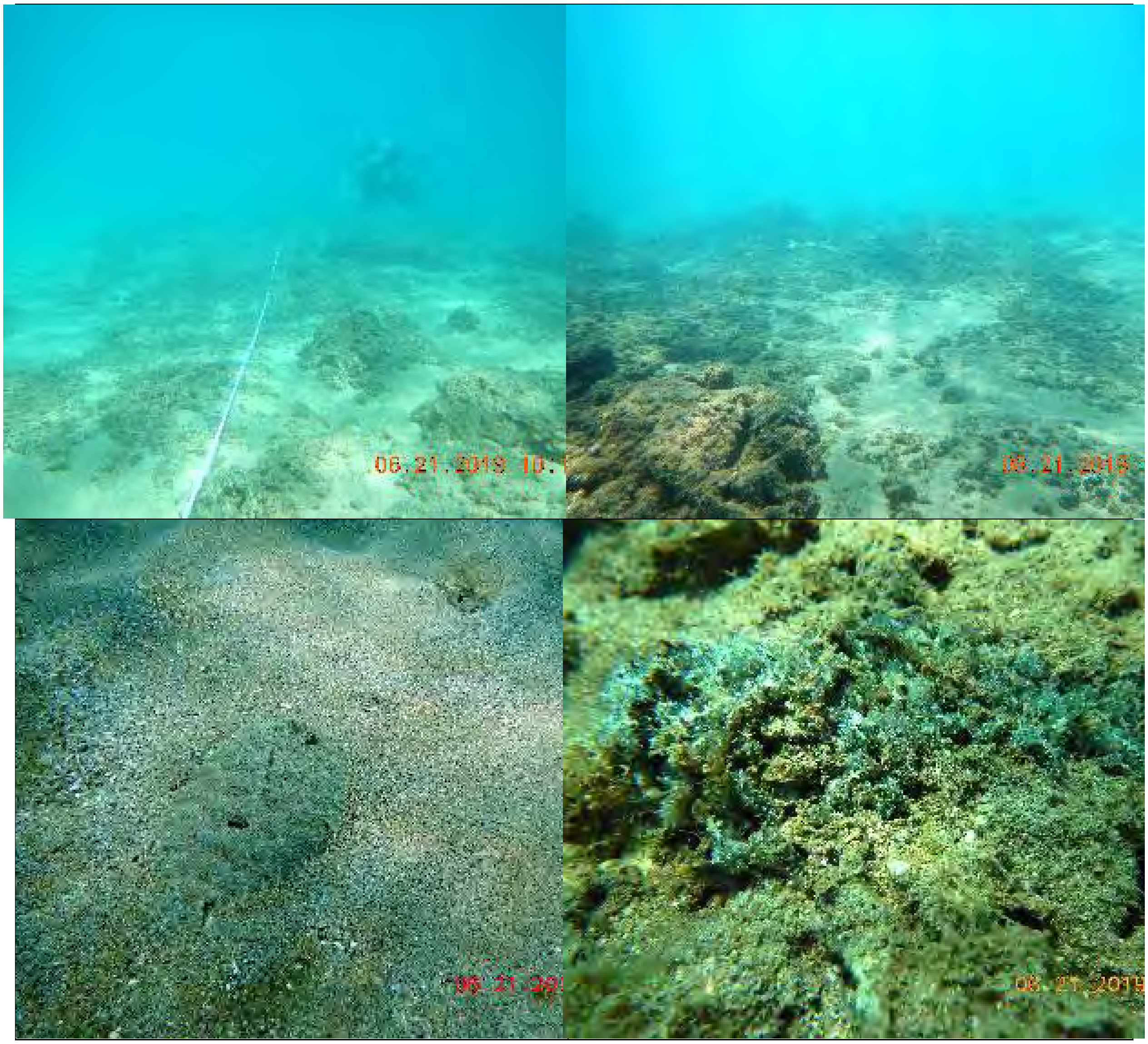
The proposed location for Groin 6 occurs off a sand beach with temporary sand bags (top left photo). Limestone, with some sand, make up the majority of the benthic environment in this area (top right and bottom right photo). A *Pocillopora meandrina* coral head (bottom left photo).

At the proposed location for Groin 7, sand makes up the majority of the benthic environment (top left photo). The calcareous algae, *H. kanalona*, is found in the sand (top right photo). Limestone and rubble with scattered coral colonies also occur in this location (bottom photos).

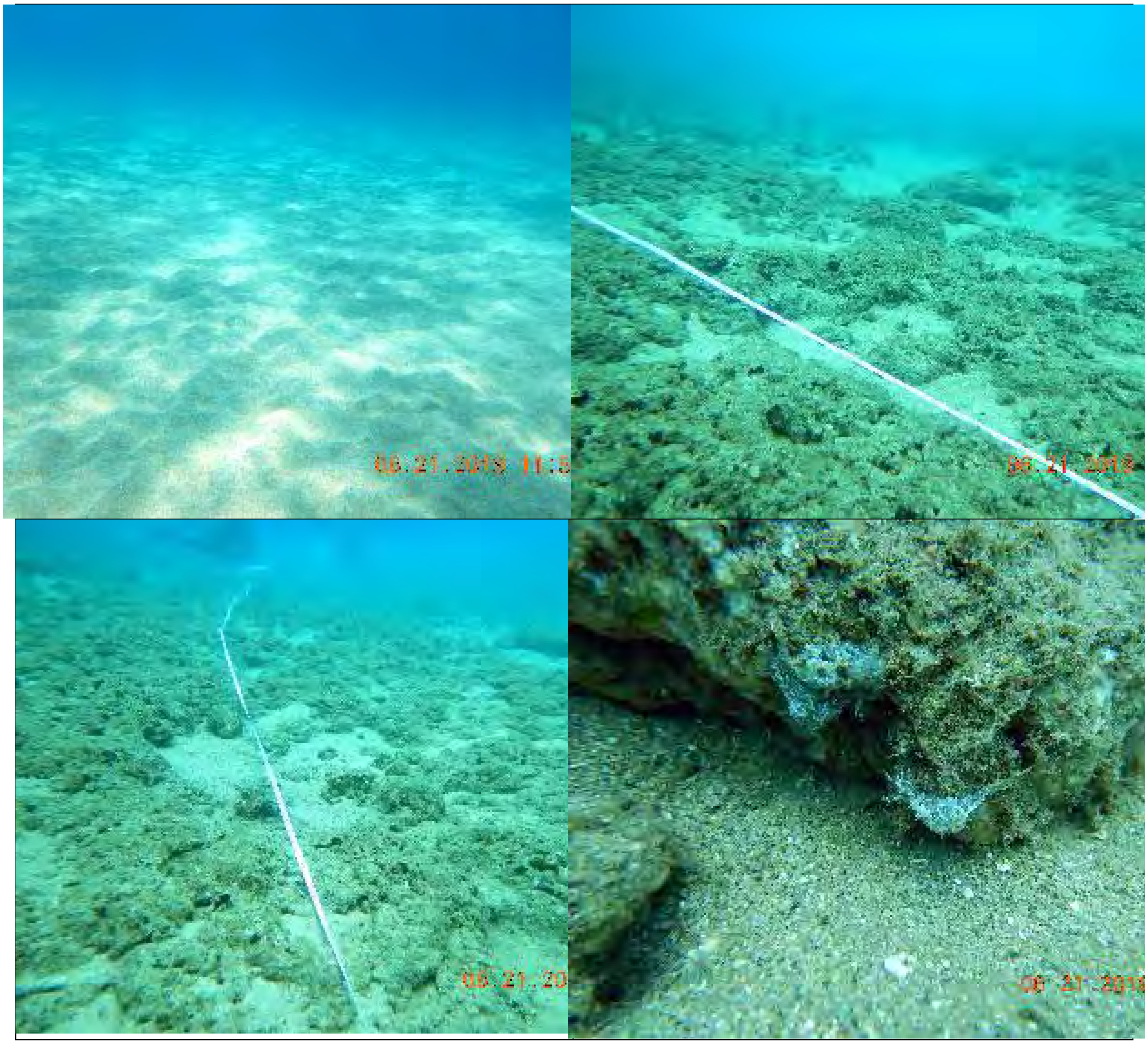
At the APE hard bottom survey stations, sand covered limestone and sand make up the majority of the benthic composition. The calcareous algae, *H. kanalona*, is abundant in the sand (top left photo). Scattered corals (*Pocillopora* spp.) occur on the hard bottom (top right). Aggregates of fish (*A. olivaceus*) school around the outcrops (bottom photos).

At the APE unconsolidated survey stations, sand makes up the majority of the benthic composition. Fields of the calcareous algae, *H. kanalona*, are abundant in the sand areas (top right photo). Hard bottom that is present in these locations is generally bare and/or sand coated (bottom photos).

Sand borrow Site 18 location is sand (top left). The hard bottom on the perimeter of the sand borrow Site 18 hosts encrusting *Montipora* spp. and mounding *Pocillopora* spp. coral colonies (top right and bottom photos).

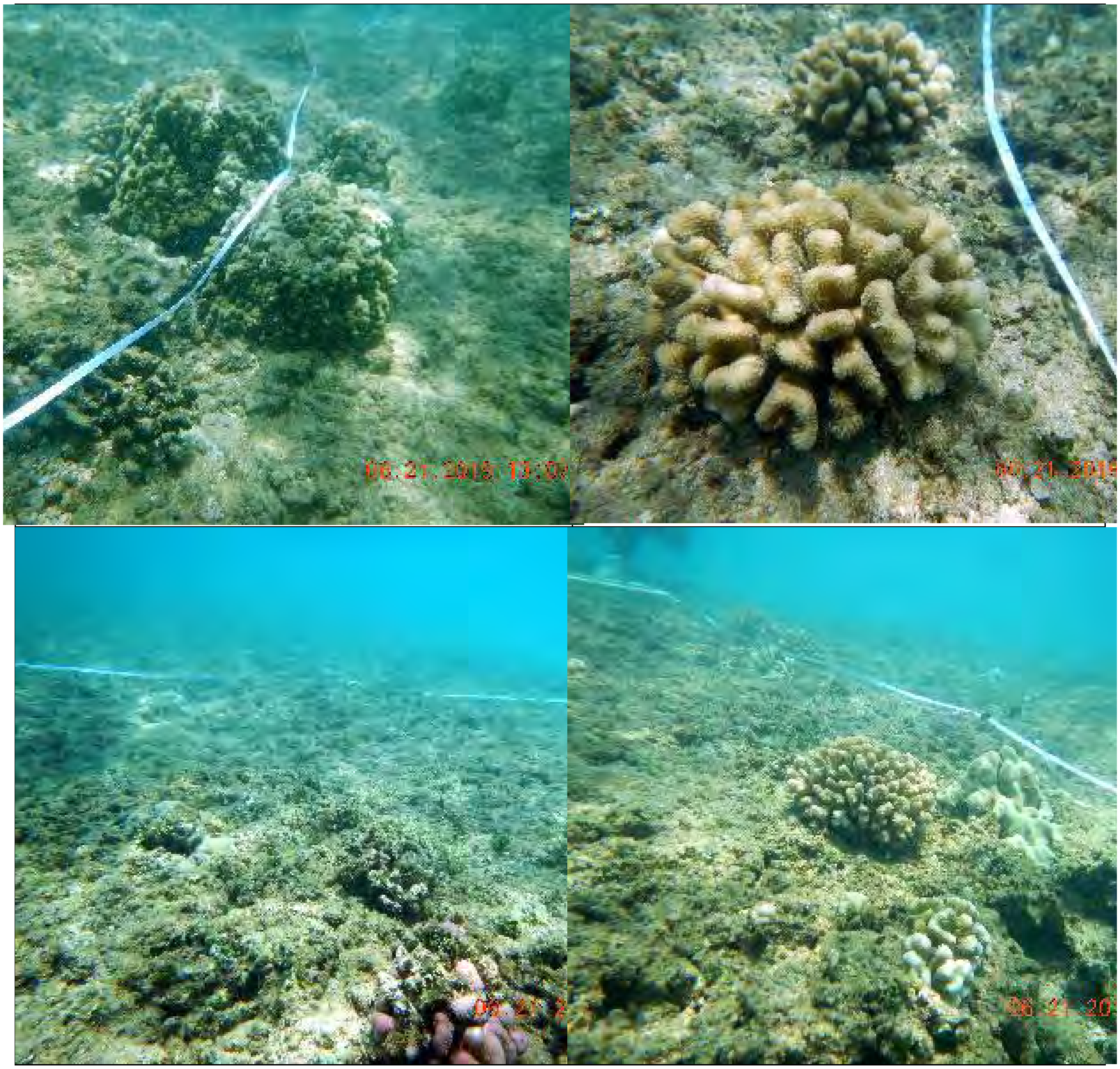


The hard bottom on the perimeter of the sand borrow Site 19 is interspersed with sand patches (top photos). A flounder (*Bothus pantherinus*) was observed in the sand patches (bottom left photo). Lined sea hares (*Stylocheilus striatus*) occur in large numbers in localized areas on the hard bottom (bottom right photo).

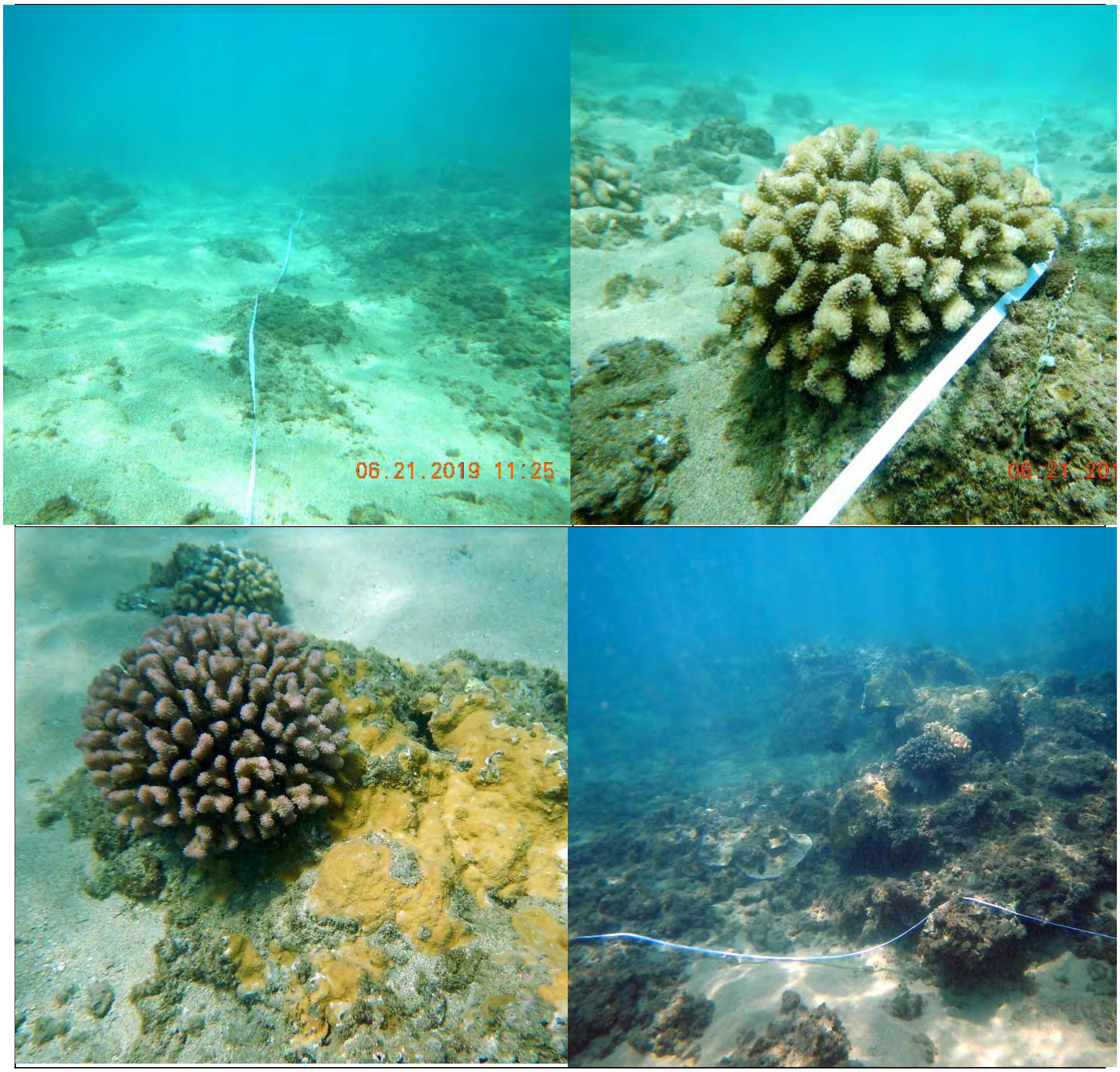


Sand borrow Site 22 is sand (top left photo). Bare limestone on the perimeter of Site 22 is interspersed with sand patches (top right and bottom left photos). Lined sea hares (*Stylocheilus striatus*) occur in large numbers in localized areas on the hard bottom (bottom right photo).

Sand is the dominant type along the pipeline/barge route 18-19. Meadows of *H. kanaloana* occur throughout the sand areas (top photos and bottom left photo). Few scattered outcrops host small coral colonies (*Porites* spp.; bottom right photo).



Limestone is the dominant type along the pipeline/barge route 19-22 Corals (*Porites* spp. and *Pocillopora* spp.) are common on the hard bottom.



Sand and sand covered limestone are the dominant bottom types along the pipeline/barge route 19-shore Corals (*Porites* spp., *Montipora* spp., and *Pocillopora* spp.) are common on the hard bottom.

Appendix B

Inventory of marine biota observed in Kahana Bay, Kahana, Maui, June 19-23, 2019.

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
	ALGAE		
CYANOPHYTA	CYANOBACTERIA		
Lyngbya majuscula	stinging algae	Ind.	O
Symploca hydnoides		Ind.	O
CHLOROPHYTA	GREEN ALGAE		
Bryopsis sp.		Ind.	R
Caulerpa serrulata	sawtooth caulerpa	Ind.	R
Halimeda discoidea		Ind.	O
Halimeda kanaloana		End.	C
Neomeris annulata		Ind.	O
Neomeris sp.		Ind.	C
Ulva reticulata		Ind.	R
Ventricaria ventricosa		Ind.	R
RHODOPHYTA	RED ALGAE		
Acanthophora spicifera	spiny seaweed	End.	C
Acanthophora pacifica			
Asparagopsis taxiformis		Ind.	C
Ahnfeltiopsis sp.			O-shore
Bangia atropurpurea	dark purple bangia	Ind.	O
Coelothrix irregularis	iridescent coelothirx	Ind.	R
Dasya iridescens	iridescent seaweed	End.	O
Dictotomaria sp.			O
Galaxaura rugosa		Ind.	O
Halymenia sp.	Cock's comb	Ind.	O
Hydrolithon gardineri		Ind.	O
Hydrolithon onkodes	encrusting coralline algae	Ind.	C
Hydrolithon reinboldii	indeteminate crusting coralline algae	Ind.	C
Lythophyllum kotschyanum	stubby coralline algae	Ind.	O
Mastophora pacifica	leafy coralline algae		R
Pterocladiella caerulescens	blue-green pterocladia	Ind.	R
Sporolithon erythraeum	patchy red coralline algae	Ind	R
Stenopeltis gracilis		Ind.	O
Tricleocarpa cylindrica		Ind.	R
OCHROPHYTA	BROWN ALGAE		
Dictyota bartayresiana	iridescent dictyota	Ind.	R
Dictyota sp.	dictyota		O
Lobophora variegata		Ind.	R
Padina sanctae-crucis	Japanese padina	Ind.	R

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
	INVERTEBRATES		
PORIFERA, POECILOSCLERIDA, ANCHINOIDAE			
Hamigera sp.	red boring sponge	Ind.	C
CHONDRILLIDAE			
Spirastrella vagabunda	vagabond boring	Nat.	C
Unidentified orange sponge		--	R
CNIDARIA, HYDROZOA, ANTHOATHECATA	HYDROIDS		
Pennaria disticha	Christmas tree hydroid	Nat.	O
CNIDARIA, ANTHOZOA, ZOANTHINARIA	ZOANTHIDS		
Zoanthus spp.	carpet zoanthid		R
Palythoa caesia	blue-grey zoanthid	Ind.	C
Palythoa tuberculosa	pillow zoanthid	Ind.	C
Palythoa sp.	green zoanthid, stalk	--	O
CNIDARIA, ANTHOZOA, SCELRACTINIA	HARD CORALS		
POCILLOPORIDAE			
Pocillopora damicornis	lace coral	Ind.	R
Pocillopora eydouxi	antler coral	Ind.	R
Pocillopora ligulata	Hawaiian cauliflower coral	End.	R
Pocillopora meandrina	cauliflower coral	Ind.	U
PORITIDAE			
Porites compressa	finger coral, *pōhaku puna*	Ind.	A
Porites lobata	lobe coral, *pōhaku puna*	Ind.	A
Porites lutea	mound coral; *pōhaku puna*	Ind.	R
Porites sp.		--	O
SIDERASTREIDAE			
Psammocora stellata	stellar coral	Ind.	R
Psammocora profundacella	hexagon psammocora	Ind.	R
FAVIIDAE			
Cyphastrea ocellina	ocillated coral	Ind.	R
Cyphastrea agassizi		Ind.	R
Leptastrea bewickensis	bewick coral	Ind.	U
Leptastrea transversa	transverse coral	Ind.	R
ACROPORIDAE			
Montipora capitata	rice coral	Ind.	C
Montipora flabellata	blue rice coral	Ind.	R
Montipora patula	sandpaper coral	End.	C

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
ANNELIDA, POLYCHAETA			
SERPULIDAE	WORMS		
Spirobranchus giganteus	Christmas-tree worm, *kio*	Ind.	O
SABELLIDAE			
unidentified	Unidentified sabellid worm	Ind.	R
TEREBELLIDAE			
Loimia medusa	medusa spaghetti worm	Ind.	O
MOLLUSCA, GASTROPODA,	SNAILS and SLUGS		
NERITIDAE			
Nerite picea	Black nerite; *pipipi*	End.	C-shore
PATELLIDAE			
Cellana exarata	black foot ʻopihi , *ʻopihi-ʻawa*	End.	O-shore
SIPHONARIIDAE			
Siphonaria normalis	false limpet; *ʻopihi-ʻawa*	Ind,	O-shore
VERMETIDAE			
Serpulorbis variabilis	variable worm snail, *kauna'oa*	Ind.	O
CONIDAE			
Conus flavidus	golden yellow cone	Ind.	R
Conus imperialis	imperial cone	Ind.	R
Conus sp.	unidentified cone	Ind.	R
CEPHALASPIDEA, AGLAJIDAE	SEA SLUGS		
Chelidonura alisonae	spotted swallowtail slug	Ind.	R
Chelidonura hirundinina	Blue swallowtail slug	Ind.	R
SACOGLOSSA, ELYSIIDAE			
Plakobranchus ocellatus	ringed sap-sucking slug	Ind.	O
ANASPIDEA, APLYSIIDAE	SEA HARES		
Stylocheilus striatus	lined sea hare	Ind.	C
NUDIBRANCHIA, ASTERONOTIDAE	DORIDS		
Halgerda terramtuentis	gold lace nudibranch	End.	R
MOLLUSCA, BIVALVIA, MYTILIDAE	BILVAVES		
Branchidontes crebristriatus	Hawaiian mussel; *nahawele*	**End.**	R
PTERIIDAE			
Pinctada margaritifera	Black-lipped pearl oyster, *pā*	**End.**	R
ISOGNOMONIDAE	PURSE SHELLS		
Isognomon californicum	black purse shell; *nahawele*	**End.**	O
Isognomon sp.	unidentified		O

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
CEPHALOPODA, OCTOPODA	OCTOPUS		
Octopus cyanea	day octopus; *he'e*	Ind.	O
ARTHROPODA, CRUSTACEA, STOMATOPODA	MANTIS SHRIMP		
PSEUDOSQUILLIDAE			
Pseudosquilla ciliata	ciliated mantis shrimp	Nat.	O
unidentified	mantis shrimp	--	R
CRUSTACEA, MALACOSTRACA, DECAPODA, STENOPODIDAE			
Stenopus hispidus	banded coral shrimp	Ind.	O
CRUSTACEA, MALACOSTRACA, DECAPODA, ALPHAEIDA			
Alpheus sp.	goby shrimp	--	R
CRUSTACEA, MALACOSTRACA, DECAPODA, CALLIANASSIDAE			
Corallianassa borradailei	Borradailes's ghost shrimp	Ind.	R
CRUSTACEA, MALACOSTRACA, DECAPODA, DIOGENIDAE			
Calcinus latens	hidden hermit crab	Ind.	R
Calcinus seurati	zebra hermit crab	Ind.	R
Dardanus sanguinocarpus	Bloody hermit crab	Ind.	R
CALAPPIDAE	BOX CRBS		
Calappa hepatica	Common box crab	Ind.	O
PORTUNIDAE	SWIMMING CRABS		
Charybdis hawaiensis	Hawaiian swimming crab	Ind.	C
GRAPSIDAE	ROCK CRABS		
Percnon planissimum	flat rock crab; *pāpā*	Ind.	O
TRAPEZIIDAE			
Trapezia intermedia	Common guard crab	**Ind.**	O
ECHINODERMATA, ECHNOIDEA, ECHINOMETRIDAE	SEA URCHINS		
Echinometra mathaei	rock boring urchin; *'ina kea*	Ind.	A
Echinometra oblonga	oblong boring urchin; *'ina*	Ind.	C
Heterocentrotus mammillatus	red pencil urchin; *hā'uke'uke'ula'ula*	Ind.	O

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
DIADEMATIDAE			
Diadema paucispinum	long-spined urchin; *wana hālula*	Ind.	O
Echinothrix calamaris	banded urchin	Ind.	C
Echinothrix diadema	blue-black urchin	Ind.	C
TOXOPNEUSTIDAE			
Tripneustes gratilla	collector urchin; *hāwaʻe maoli*	Ind.	C
ECHINODERMATA OPHIUROIDEA	BRITTLE STARS		
Ophiocoma erinaceus	spiny brittle star	Ind.	C
ECHINODERMATA, ASTEROIDEA	SEA STARS		
Culcita novaeguineae	cushion star	Ind.	O
HOLOTHUROIDEA, HOLOTHURIDAE	SEA CUCUMBERS		
Actinopyga mauritiana	white-spotted sea cucumber, *loli*	Ind.	C
Actinopyga obesa	plump sea cucmber; *loli*	Ind.	R
Holothuria atra	black sea cucumber; *loli okuhi kuhi*	Ind.	O
Holothuria whitmaei	teated sea cucumber; *loli*	Ind.	O
VERTEGRATA, ACTINOPTERYGII PERCIFORMES	BONY FISHES		
ACANTHURIDAE	SURGEONFISHES and UNICORNFISH		
Acanthurus blochii	ringtail surgeonfish	Ind.	C
Acanthurus nigrofuscus	brown tang, *māʻiʻiʻi*	Ind.	A
Acanthurus olivaceus	orangeband surgeonfish; *na'ena'e*	Ind.	C
Acanthurus triostegus	convict tang, *manini*	Ind.	O
Acanthurus xanthopterus	yellowfin surgeonfish, *pualu*	Ind.	U
Ctenochaetus strigosus	goldring surgeonfish	End.	O
Naso lituratus	orangespine surgeonfish, *umauma lei*	Ind.	O
Naso unicornis	bluespine unicornfish	Ind.	O
ZANCLIDAE			
Zanclus cornutus	moorish idol, *kihikihi*	Ind.	U
LUTJANIDAE	SNAPPER		
Lutjanus kasmira	bluestripe snapper; *taʻape*	Nat.	R

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
BOTHIDAE	FLATFISH		
Bothus pantherinus	flounder, *pākiʻi*	Ind.	R
POMACENTRIDAE	DAMSELFISH		
Abudefduf abdominalis	Hawaiian sergeant; *mamo*	End.	O
Chromis ovalis	oval chromis	End.	C
Chromis hanui	chocolate dip chromis	End.	O
Chromis vanderbilti	blackfin chromis	Ind.	O
Dascyllus albisella	Hawaiian dascyllus, *ʻāloʻiloʻi*	End.	O
Plectroglyphidodon imparipennis	bright-eye damselfish	Ind	C
Plectroglyphidodon johnstonianus	blue-eye damselfish	Ind	U
LABRIDAE			
Coris gaimard	yellowtain coris, *hīnālea ʻakilolo*	Ind.	O
Coris venusta	elegant coris;	End.	R
Thalassoma duperrey	saddle wrasse; *hinalea lauwili*	End.	A
Thalassoma purpureum	surge wrasse	Ind.	U
*Bodianus albotaeniatus (*juvenile)	Hawaiian hogfish, *'a'awa*	End.	U
Stethojulis balteata	belted wrasse, *ʻomaka*	End.	C
Halichoeres ornatissimus	ornate wrasse; *la'o*	Ind.	U
SYNODONTIDAE	LIZARDFISH		
Synodontidae sp.		Ind.	R
Synodus binotatus	twospot lizardfish	Ind.	R
Synodus dermatogenys	clearfin lizardfish	Ind.	R
BLENNIIDAE	BLENNIES		
Plagiotremus ewaensis	Ewa fangblenny	End.?	R
GOBIIDAE	GOBIES		
Bathygobius sp.	goby	--	R
CHAETODONTIDAE	BUTTERFLYFISH		
Chaetodon lunula	raccoon butterflyfish, *kīkākapu*	Ind.	O
Chaetodon multicinctus	multiband butterflyfish, *kīkākapu*	End.	O
Chaetodon miliaris	Milletseed butterflyfish; *lauwiliwili*	End.	O
Chaetodon ornatissimus	ornate butterflyfish, *kīkākapu*	Ind.	U
Chaetodon auriga	threadfin butterflyfish; *kīkākapu*	End.	O

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
TETRAODONTIDAE	PUFFERFISH		
Arothron hispidus	stripebelly puffer	Ind.	O
Canthigaster amboinensis	ambon toby	Ind.	O
Canthigaster jactator	Hawaiian whitespotted toby	End.	C
BALISTIDAE	TRIGGERFISH		
Rhinecanthus aculeatus	lagoon triggerfish; *humuhumu nukunuku apuaʻa*	Ind.	C
Rhinecanthus rectangulus	reef triggerfish; *humuhumu nukunuku apuaʻa*	Ind.	C
Melichthys niger	black triggerfish; *humuhumu ʻeleʻele*	Ind.	C
Melichthys vidua	pinktail triggerfish; *humuhumu hiʻukole*	**Ind.**	C
Sufflamen bursa	lei triggerfish; *humuhumu lei*	Ind.	C
Sufflamen fraenatus	bridled triggerfish; *humuhumu mimi*	Ind.	R
MONACANTHIDAE	FILEFISHES		
Cantherhines dumerilii	barred filefish; *ʻōʻili*	**Ind.**	R
CIRRHITIDAE			
Cirrhitus pinnulatus	stocky hawkfish	Ind.	R
Paracirrhites arcatus	arc-eye hawkfish; *pilikoʻa*	Ind.	U
OSTRACIIDAE			
Ostracion meleagris	spotted boxfish; *moa*	Ind.	O
MULLIDAE	GOATFISH		
Mulloidichthys flavolineatus	square-spot goatfish; *wekeʻā*	Ind.	C
Parupeneus pleurostigma	sidespot goatfish; *malu*	Ind.	U
Parupeneus multifasciatus	manybar goatfish; *moano*	Ind.	O
Upeneus arge	bandtail goatfish; *weke pueno*	Ind.	R
FISTULARIIDAE	CORNETFISH		
Fistularia commersonii	Bluespotted cornetfish; *nūnū*	Ind.	U
MURAENIDAE	MORAY EELS		
Echidna nebulosa	snowflake moray; *puhi kāpā*	Ind.	O
Gymnothorax meleagris	whitemouth moray; *puhi 'ōni'o*	Ind.	O
Gymnothorax flavimarginatus	yellowmargin moray	Ind.	O
Gymnothorax eurostus	stout eel	Ind.	R

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name; *Hawaiian name*	Status	Abundance
MURAENIDAE (cont.)			
Gymnomuraena zebra	Zebra moray; *puhi*	Ind.	O
Myrichthys mafnidicus	magnificant snake eel	End.	O
CARANGIDAE			
Caranx melampygus	bluefin trevally; *papio*	Ind.	O
Decapterus macarellus	mackeral scad; *ʻō pelu*	Ind.	R
SERRANIDAE			
Cephalopholis argus	peacock grouper; *roi*	Nat.	O
PTERELEOTRIDAE	DARTFISH		
Ptereleotris heteroptera	indigo dartfish	Ind.	U
SYNGNATHIDAE	SEAHORSE		
Hippocampus kuda	smooth seahorse	Ind.	R
	REPTILES		
CHORDATA, REPTILIA			
CHELONIIDAE			
Chelonia mydas	green sea turtle; *honu*	Ind.	O

KEY TO SYMBOLS USED:
Abundance categories:
R – Rare – only one or two individuals observed.
U – Uncommon – several to a dozen individuals observed.
O – Occasional – seen irregularly in small numbers
C – Common -observed everywhere, although generally not in large numbers.
A – Abundant – observed in large numbers and widely distributed.
Status categories:
End. – Endemic – species found only in Hawaii
Ind. – Indigenous – species found in Hawaii and elsewhere
Nat. – Naturalized – species were introduced to Hawaii intentionally or accidentally.

Appendix D:

Terrestrial Biological Resources Study

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Terrestrial Biological Resources Study
for the
Kahana Regional Erosion Mitigation Project
Lahaina, Maui, Hawaiʻi

Prepared for:

State of Hawaiʻi Department of Land and Natural Resources
Office of Conservation and Coastal Lands

P.O. Box 621
Honolulu, HI 96809

Prepared by:
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

June 2019

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Executive Summary

The terrestrial biological resources along the Kahana shoreline consist mainly of ornamental landscaped vegetation. The shoreline is a highly disturbed area lined with seawalls, emergency sandbags, and is heavily used for recreation. Vegetation is sparse and consists of introduced and landscaped plants. Birds observed in the area are common non-native birds to the Hawaiian Islands. No rare, threatened, or endangered flora or fauna species were encountered during the survey, and no sensitive habitat areas were observed. The proposed erosion mitigation action is not expected to have significant impacts on the terrestrial biological resources in the area.

On June 11, 2019, a terrestrial biological resources survey was conducted along Kahana Beach in Lahaina, on the west coast of Maui. The survey took place along the shoreline between Kahana Stream (northern end of the project site) and Pohaku Beach Park (i.e., "S-Turns" on the southern end of the project site). The survey spanned from the vegetation line fronting nine condominiums and one residential parcel along this section of beach, and seaward (i.e., *makai)* down to the Mean High Higher Water (MHHW) line.

The vegetation along the shoreline is sparse, and either landscaped or characterized by the ability to quickly establish on disturbed sandy soil from wave inundation and anthropogenic activity. The most abundant plant species were *naupaka kahakai* (*Scaevola taccada),* portia tree (or milo, *Thespesia populnea),* and false Kamani (*Terminalia catappa*). Only a few native plants were observed, including the *naupaka kahakai,* and the seaside morning glory (pohuehue, *Ipomoea pes-caprae subp. brasilensis*). Only introduced common bird species were observed such as mynas, spotted doves, house sparrows, and rock pigeons. Small ghost crabs (*Ocypode ceratophthalma*) and evidence of sand crab burrows were seen on the sandy beach area, and a few brown anoles (*Anolis sagrei)* were documented in the coastal vegetation. No mammals or other fauna were observed.

There were no protected flora or fauna species within the surveyed project area; however, green sea turtles (*Chelonia mydas*) are known to visit nearby beaches in Kaʻanapali and could potentially use the sandy area along Kahana Beach as a haul out area, along with Hawaiian monk seals (*Neomonachus schauinslandi*). If these protected species are present during construction, all construction work should halt until the animal leaves on its own accord. The best management practices (BMP) plan for the project should include notes to the contractor if any protected species are encountered.

1. Introduction

The project area is the Kahana shoreline located along the coastline of West Maui, north of Honokowai and south of Napili. Kahana Beach is approximately 3,500 feet (ft) and is bounded by Kahana Stream mouth to the north and Pohaku "S-Turns" Beach Park to the south (Figure 1-1). The project area includes a string of nine condominium complexes and one Kuleana parcel to the east along the shoreline and is bounded by a submerged fringing reef to the west. The condominium and residential buildings occupy the narrow strip of land between the shoreline and Lower Honoapiʻilani Road. The Kahana Bay Steering Committee (KBSC) represents the nine oceanfront condominiums and one Kuleana parcel along the Kahana Beach coastline.

Kahana Beach has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront resources, buildings, infrastructure, and amenities. Analysis of historical aerial images indicates that Kahana Bay shoreline recedes at an average rate of about one foot per year (Fletcher et al., 2003). The long-term coastal erosion trend is caused by a variety of factors including tropical storm and hurricane events, land subsidence, changes in sediment supply, prevalent wind and wave patterns, runoff drainage in the area, and rising sea levels. Episodes of rapid erosion caused by severe wave and current conditions have led to the installation of a variety of shore protection measures including emergency sandbag revetments, seawalls, sand dune restoration, and sheet-pile structures fronting the majority of the properties along Kahana Beach.

The KBSC is seeking a regional approach to mitigate coastal erosion along Kahana Bay, rather than implementing hardened shoreline structures on an individual parcel basis. The proposed action involves an approach to restore, rehabilitate and preserve the sandy beach along the bay using beach nourishment with stabilizing structures. Currently, a Draft Environmental Impact Statement (DEIS) is being prepared to address anticipated impacts from the proposed action.

The intent of this survey report is to identify terrestrial biological resources present along the project affected area of the Kahana shoreline from the vegetation line down to the mean higher high water line with the intent to identify and mitigate potential impacts to these resources from construction activities related to the proposed action. Data collected from this survey will be used to determine adequate Best Management Practices (BMPs) needed during construction.

1.1 Proposed Action

The proposed action is to restore, rehabilitate, and preserve the sandy beach along the bay by nourishing it with 50,000 to 100,000 cubic yards (cy) of sand transported from offshore borrow areas. The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The beach nourishment project would widen the beach to between 35–150 ft (approximately 50 ft average width). The nourished beach would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors. A conceptual sketch of the proposed action is depicted in Figure 1-2.

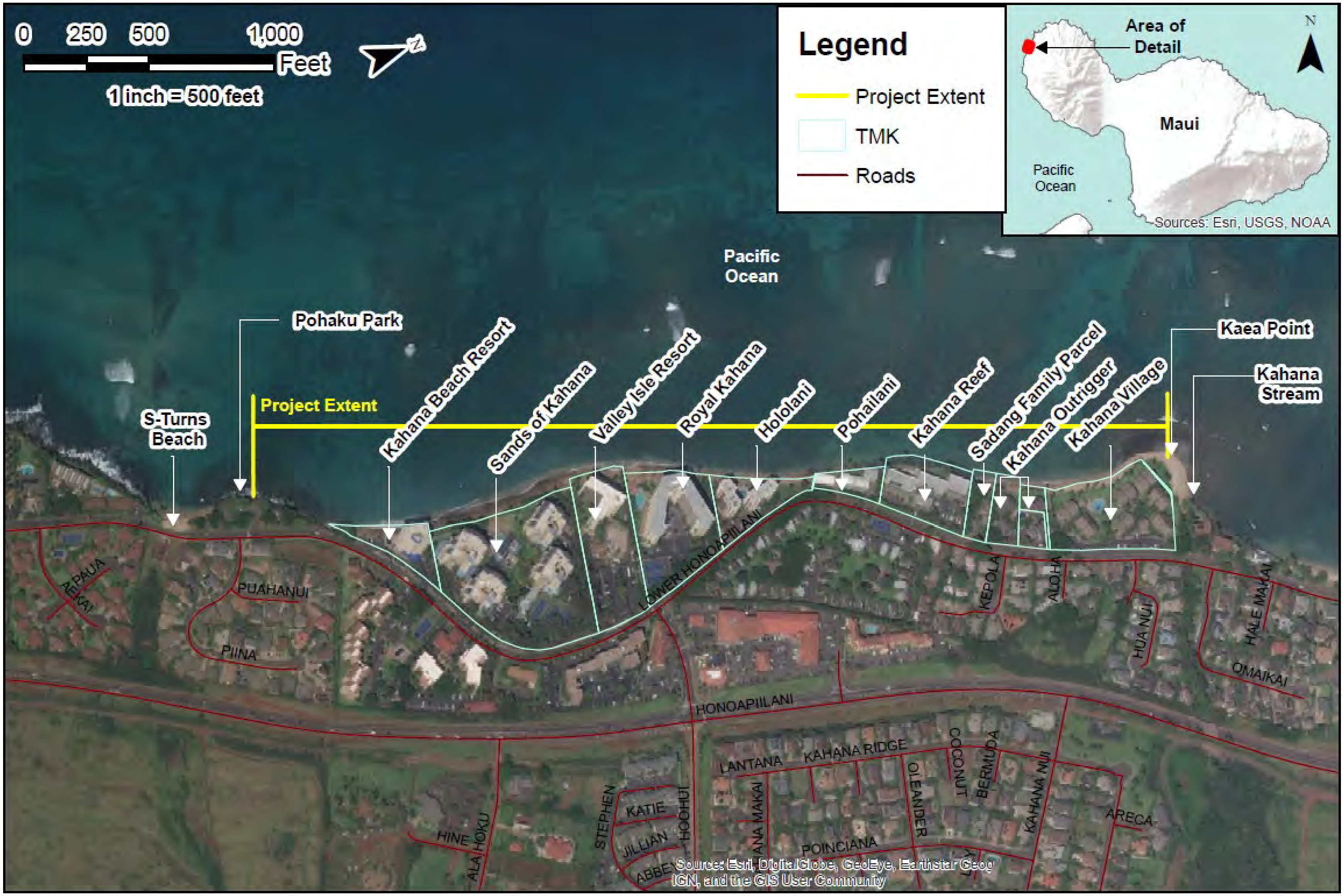


Figure 1-1: Project Site Map

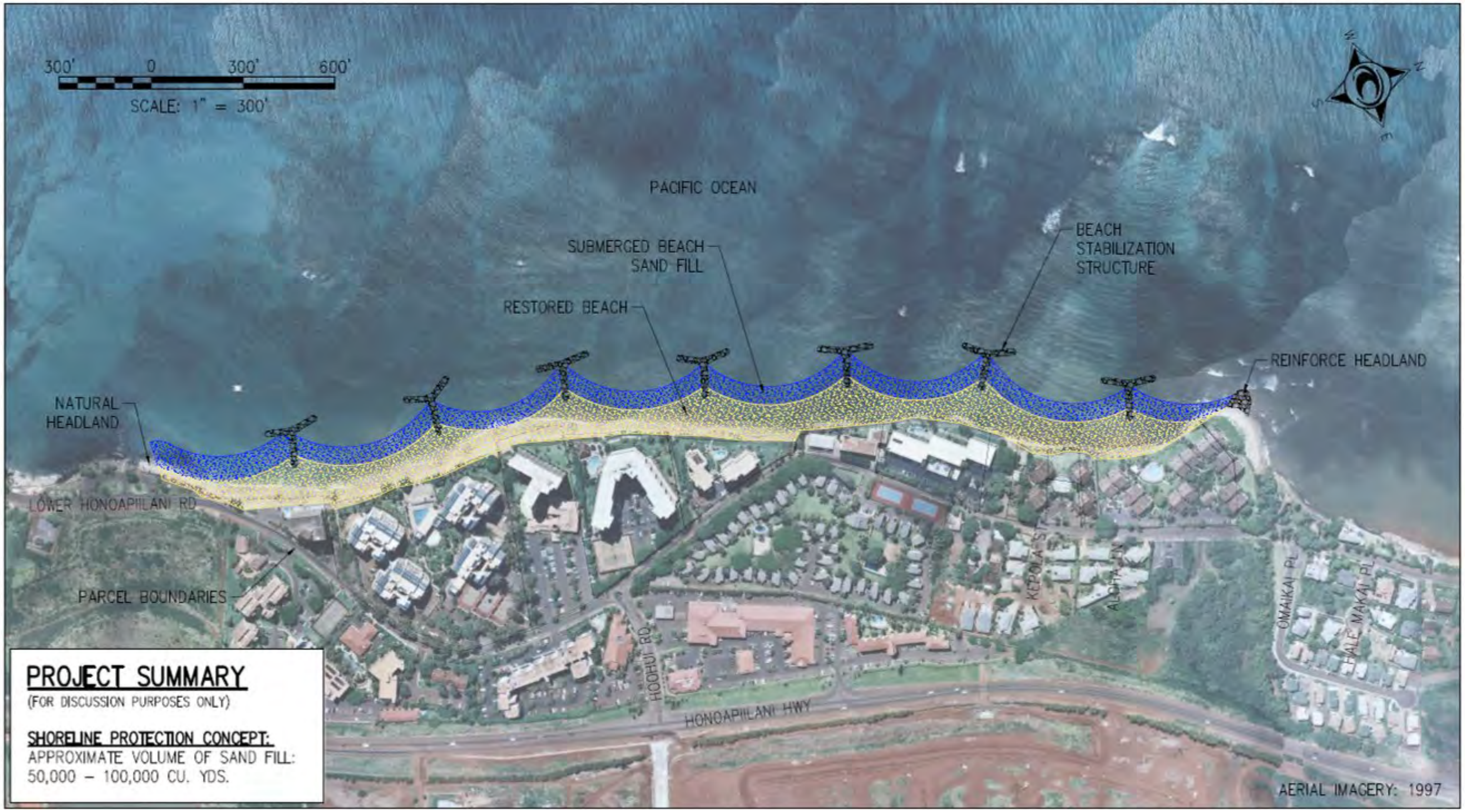
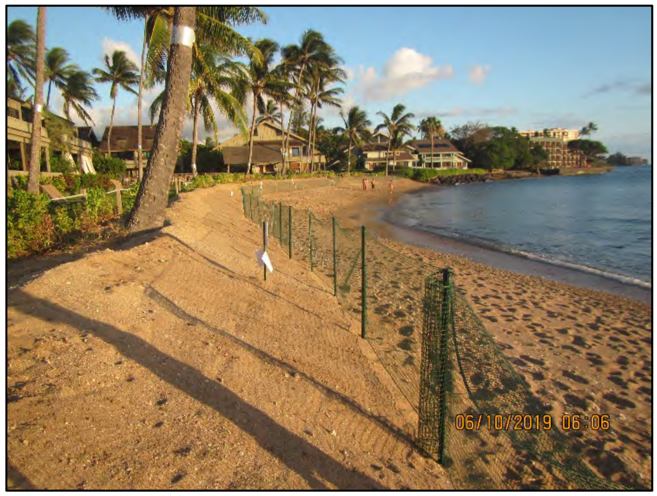


Figure 1-2: Conceptual Sketch of 50,000-100,000 cy Beach Nourishment with Beach Stabilization Structures

1.2 Site Description

Kahana Beach is a landscaped commercial vacation area with condominium rentals and properties, tourists, and recreational users. The nine condominiums and one residential parcel, from north to south, include Kahana Village, Kahana Outrigger, the Sadang Family Parcel, Kahana Reef, Pohailani, Hololani, Royal Kahana, Valley Isle, Sands of Kahana, and Kahana Beach Resort (Figure 1-1). Along the shoreline, dune protection, emergency sand bag structures, and hardened seawalls exist. The shorelines at each property are characterized in Table 1-1:

Table 1-1: Shoreline Characterizations of Kahana Beach Properties

Property	Shoreline Characterization	Photograph*
Kahana Village	Restored Dune	
Kahana Outrigger	Rock wall, large boulders and vegetated dune (Photos taken February 2019)	

Property	Shoreline Characterization	Photograph*
Kahana Outrigger		
Sadang Family Parcel	Partially hardened by large boulders and concrete boat ramp, small beach (Photo taken February 2019)	
Kahana Reef	Seawall	

Property	**Shoreline Characterization**	**Photograph***
Pohailani	Seawall	
Hololani	Seawall with emergency sand bag structure and Tensar Triton erosion control mattress makai of seawall	
Royal Kahana	Emergency fabric sand bag structures	

Property	Shoreline Characterization	Photograph*
Valley Isle	Emergency sand bag structure	
Sands of Kahana	Tensar Triton erosion control mattress, emergency sand bag structures, vegetated dune	

Property	Shoreline Characterization	Photograph*
Kahana Beach Resort	Concrete seawall with sandy beach *makai* of seawall	

*Photographs taken in June 2019 unless otherwise specified

Due to the erosive nature of wave forces, recent construction, and high foot traffic in the area, the land along the vegetation line is highly disturbed. The condominium areas *mauka* of the vegetation line consist of ornamental, landscaped plants that were planted and maintained by the condominium associations. Along areas with existing vegetated berm, landscaped and self-seeded plants established from the landscaped plants exist. Other instances of self-seeded plants occur by the mouth of the Kahana Stream and riparian outfall areas that likely were distributed by the water and originated upland. Only a few coastal plants that tolerate disturbance, sand, and salt water can naturally establish along the shoreline.

2. Survey Methods

A biologist conducted a walking survey for terrestrial flora (i.e., vegetation) and fauna along the Kahana Beach vegetation line *makai* down to the mean higher high water (MHHW) line. The terrestrial path along which the walking survey was performed is depicted in Figure 2-1. Each plant and bird species encountered along the length of the shoreline and was recorded.

The bird survey was conducted in the morning and included a series of four stationary point counts, each of which included a five minute viewing period where all birds observed during were recorded within a visible radius of the observer and by listening for vocalizations (Figure 2-1). Other incidental observations of birds during the walking survey along the shoreline were also recorded.

Figure 2-1: Terrestrial Biological Survey Walking Route Map

3. Survey Results

3.1 Terrestrial Flora

A total of 20 plant species were identified during the survey on June 11, 2019. Terrestrial plants comprise of mainly ornamental, landscaped plants or planted native plants (e.g., *naupaka kahakai* and *milo)*. The vegetation line along the coastline is either not existent due to the presence of seawalls and sand bag erosion control structures, landscaped by the condominiums, or highly disturbed by wave erosion events and anthropogenic use. The soil inland of the seawall and sandbags is mainly fill material vegetated with landscaped grass. There were no plants of concern that were identified as protected, threatened, or endangered (USFWS, 2015; DLNR, 2019).

The most abundant plant species along the shoreline are *naupaka kahakai* (*Scaevola taccada)*, portia tree (or milo, *Thespesia populnea)*, and false Kamani (*Terminalia catappa*). A few native plants were observed, including *naupaka kahakai*, *milo*, *Pritchardia spp.* palm, *aki'aki (Sporobolus virginicus),* and the seaside morning glory (pohuehue, *Ipomoea pes-caprae subp. brasilensis*). However, the *naupaka*, *Pritchardia spp.* palm, and *milo* appeared to be landscaped. A detailed plant list is included in Attachment A.

3.2 Terrestrial Fauna

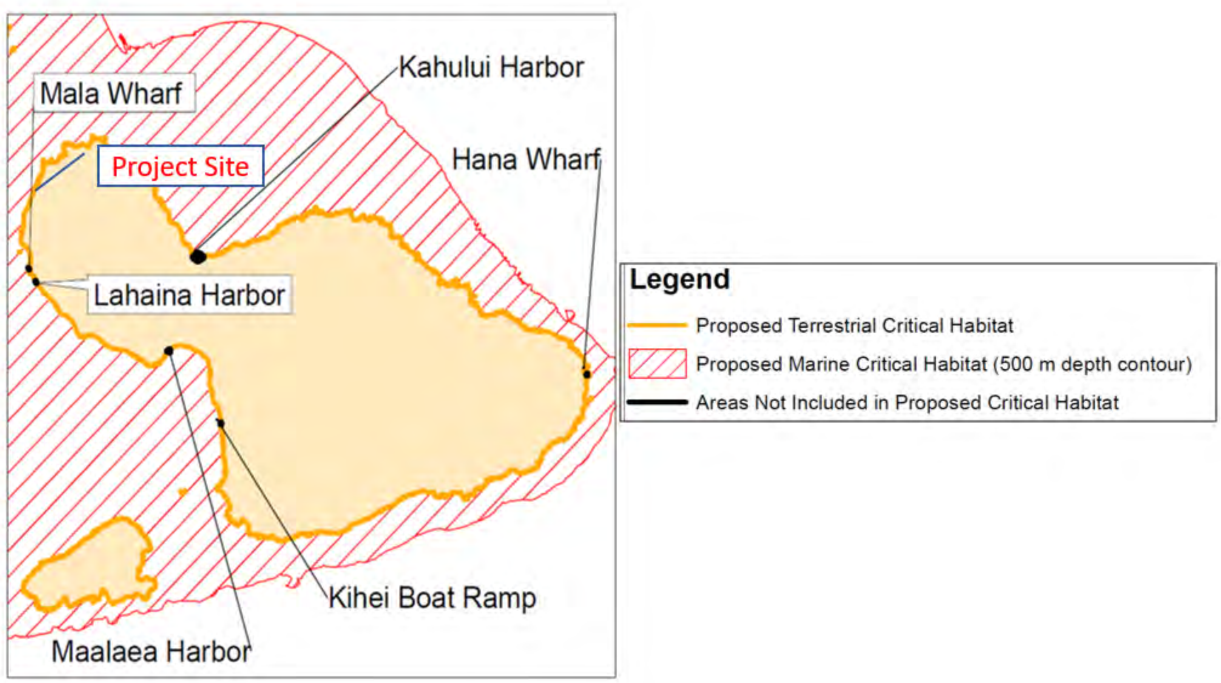
All bird species observed during the bird survey and the walking survey were introduced species commonly seen in populated areas across the Hawaiian Islands. No native birds were observed. A total of nine species of birds were recorded. None of the species are protected under the Migratory Bird Treaty Act (MBTA).

Table 3-1: Birds Observed in and Near the Survey Area

Common Name	Scientific Name	Status
Chicken	*Gallus gallus domesticus*	Non-native
Common myna	*Acridotheres tristis*	Non-native
House Sparrow	*Passer domesticus*	Non-native
Japanese White-Eye	*Zosterops japonicus*	Non-native
Red-crested Cardinal	*Paroaria coronata*	Non-native
Red-vented Bulbul	*Pycnonotus cafer*	Non-native
Rock Pigeon	*Columba livia*	Non-native
Spotted Dove	*Streptopelia chinensis*	Non-native
Zebra Dove	*Geopelia striata*	Non-native

There were only a few other faunal organisms within the project area. Ghost crabs *(Ocypode spp.)* and their burrows were observed in the sandy beach area between the vegetation line and the mean higher high water line. Non-native Brown Anoles *(Anolis sagrei)* were seen foraging in plants and bushes along the vegetation line. No large mammals were observed. There were no protected species of mammals, birds, reptiles, or insects observed. There are no terrestrial Maui Nui Critical Habitat Ecosystem areas within or near the project area, as defined by the United States Fish and Wildlife Service (Pacific Islands Fish and Wildlife Office, 2017). However, the sandy beach area is within the critical habitat for Hawaiian Monk Seals (i.e., terrestrial habitat that extends five meters inland from the shoreline) (National Oceanic and Atmospheric Administration, 2015) (Figure 3-1).

There is a possibility that green sea turtles (*Chelonia mydas*) or Hawaiian Monk Seals (*Neomonachus schauinslandi)* may use the sandy beach area to haul out. In addition, Hawaiian Hoary Bats *(Lasiurus cinereus semotus*) may roost in nearby trees and protected seabirds may fly over the project area.



Adapted from Pacific Islands Fish and Wildlife Office, 2017

Figure 3-1: Critical Habitat for Hawaiian Monk Seals

4. Conclusion

Potential impacts from the project operations on terrestrial flora or fauna will be minimal. No sensitive, protected, or rare, threatened, or endangered species were observed within the terrestrial areas in the footprint of the proposed beach nourishment and stabilization structures. However, green sea turtles are frequently observed in the nearby area and may occasionally use the sandy beach areas for hauling out. The plants within the project area are sparse and mainly consist of introduced, landscaped, ornamental species. The soil along the vegetation line is highly disturbed, and a substantive amount of the shoreline is armored by sea walls, geotextile fabric sandbag structures, and rock mattresses. Birds observed in the project are were non-native, common urban dwelling species.

Any impacts to extant terrestrial species will be localized and temporary, especially if proper BMPs and control plans are implemented. Construction routes and equipment areas should be staged along pre-existing roads beach accesses, and open lawn areas to minimize impacts to existing flora. Construction BMPs should also include notes that if protected species (e.g., green sea turtles or Hawaiian Monk Seals) are present, all construction work should halt until the animal leaves on its own accord.

A separate marine benthic study will analyze existing marine biological resources and the impacts of the proposed action seaward (i.e., *makai)* of the MHHW line.

5. References

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Appendix A: List of Plant Species Identified from June 11, 2019 Survey

Family	*Genus species*	Common Name	Status*	Abundance**
	Angiosperms - Dicotyledons			
Apocynaceae	*Nerium oleander*	Oleander	I	R
Apocynaceae	*Carissa macrocarpa*	Natal Plum	I	O
Asphodelaceae	*Aloe vera*	Aloe Vera	I	U
Asteraceae	*Sphagnetocola trilobata*	Wedelia / yellow daisy	I	U
Casuarinaceae	*Casuarina equisetifolia*	Ironwood	I	U
Combretaceae	*Terminalia catappa*	False Kamani / Indian-almond	I	A
Convulvulaceae	*Ipomoea pes-caprae subsp. brasiliensis*	Seaside Morning Glory / Pohuehue	N	O
Cyperaceae	*Cyperus involucratus*	Ahu'awa Haole, Umbrella plant	I	U
Euphobiaceae	*Codiaeum varigatum*	Croton Zanzibar	I	U
Fabaceae	*Leucaena leucocephala*	Koa Haole	I	C
Fabaceae	*Delonix regia*	Royal Poinciana	I	U
Fabaceae	*Prospis pallida*	Kiawe	I	U
Goodeniaceae	*Scaevola taccada*	Beach Naupaka, Naupaka Kahakai	N	A
Malvaceae	*Thespesia populnea*	Portia Tree / Pacific Rosewood / Milo	N	C
Musaceae	*Musa spp.*	Banana	I	U
	Angiosperms - Monocotyledons			
Arecaceae	*Cocos nucifera*	Coconut Palm	P	C
Arecaceae	Washingtonia spp.	Palm	I	R
Arecaceae	*Pritchardia spp.*	Palm	N	R
Poaceae	*Sporobolus virginicus*	Aki'aki / Seashore Rushgrass	N	U
Poaceae	*Cynodon dactylon*	Manicured Grass / Bermuda grass	I	C

* Status: N - Native to Hawaii, indigenous
I - Introduced, exotic
P - Polynesian introduction before 1778

** Abundance R - Rare (1-2 observations)
U - Uncommon (3-5 observations)
O - Occasional (5-10 observations)
C- Common (11-20 observations)
A - Abundant (>20 observations)

Appendix E:
Phase I Community Outreach –
Key Informant Interviews

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PLANNING CONSULTANTS HAWAII, LLC
URBAN & REGIONAL PLANNING

TO: Michael Foley, OCEANIT
Jeremy Michelson, OCEANIT
Thorne Abbott, Coastal Planners

FROM: Michael Summers, Planning Consultants Hawaii

SUBJECT: Kahana Bay EIS, Key Informant Interview Summary

DATE: April 1, 2019

The first phase of the public outreach program for Kahana Bay was to conduct interviews with key informants. PCH conducted interviews with eleven key informants between February 6 and February 26, 2019.

The purpose of the interviews was to gather strategic community intelligence early in the environmental review process to inform the preparation of the EIS. Interviewees were expected to be familiar with the project area and the shoreline erosion that is occurring there. Moreover, key informants were also expected to have one or more of the following characteristics:

- Possess a strong historical connection to the project area by having lived within the area for an extended period of time and/or having a family history in the area;
- Be an owner of property within the project area;
- Be an active traditional Hawaiian practitioner with a history of resource gathering within the project area;
- Be an active ocean recreation enthusiast with a history of conducting ocean recreation within or near the project area;
- Have recognized professional and/or personal expertise in one or more of the following areas: Hawaiian traditional practices and cultural resources; ahupua'a traditional land use and resource management; marine biology; ocean ecology; coastal water quality; land-based erosion, and drainage control mitigation; and
- Have experience in West Maui community engagement, community representation, or community activism in matters related to Hawaiian cultural resources, land use issues, environmental issues, and community issues.

As part of the outreach scope, the following key informants were interviewed:

- ***Glenn Kamaka;*** Hawaiian Kūpuna and Traditional Practitioner

  Glenn is a Kūpuna and traditional Hawaiian practitioner. Glenn has spent most of his life living near the project area, and his family ties to Kahana and Nāpili go back many generations. Glenn was raised in a fishing family. His family regularly fished the waters off of Kahana Bay and he and his family also gathered limu and other traditional Hawaiian foods for sustenance. Glenn is still an avid surfer, snorkeler, and fisherman.

- ***Elle Cochran;*** Former Maui County Council Member for West Maui.

  Elle was born and raised in Lahaina, and has family that has worked within the project area. Elle is also a surfer, and surfs the nearshore waters within Kahana Bay. Elle has a long history of community advocacy and was a four term (8 year) Maui County council member for West Maui. As a council member, Elle worked closely with the Maui County Planning Department on matters related to shoreline erosion, and is intimately familiar with the issues surrounding Kahana Bay.

- ***Mark Deakos; PhD.;*** Executive Director, Founder, and Chief Scientist; Hawaii Association for Marine Education and Research

  Mark Deakos, PhD. is a resident of Nāpili and is a wildlife and marine biologist researcher. He is the Executive Director and Chief Scientist of the Hawaii Association for Marine Education and Research, whose mission it is to conduct sound research to better understand the health and status of Maui's marine resources and how to better to preserve them. Mr. Deakos is also an active water man who snorkels the reefs offshore of Kahana Bay.

- ***Andrew O'Ridoran;*** Chair, Surfrider Foundation Maui Chapter

  Andrew has lived in the immediate area with his family for about five years. Andrew is an almost daily user of the beach area for swimming and the offshore waters for surfing.

- ***Ekolu Lindsey;*** Polanui Hiu; Maui Cultural Lands

  Ekolu was born and raised in the Lahaina area and has a familial attachment to the area that goes back generations. He is also a surfer and surfs Kahana Bay's nearshore coastal waters. Ekolu is a recognized expert in Hawaiian cultural practices. He is also a recognized expert of Hawaiian ahupua'a traditional land use and resource management. Ekolu is a founding member of Polanui Hiu, a local community group that is working to restore the coastal waters and marine resources of Polanui. Ekolu is also the president of Maui Cultural Lands, a Maui-based grassroots land trust organization whose mission is to stabilize, protect, and restore Hawaiian cultural resources.

- ***Kelly Robinson;*** Long-term Resident of Ka'opala Bay

  Kelly is a multi-generational resident of Ka'opala Bay. Her Great Grandmother acquired her family's shoreline property nearly a century ago, and the property has been in the family's possession ever since. Kelly's family residence is located on the shoreline, and she is very familiar with the shoreline activities that occur in the area and the impact that shoreline erosion is having upon Kahana Bay.

- ***Felimon Sadang;*** Property Owner, Hawaiian Kūpuna, and Traditional Practitioner

  Felimon is a Kūpuna and traditional Hawaiian practitioner. He has spent most of his life living and working from his shoreline property, which is part of the Kahana Bay project area. Felimon's familial ties go back generations to his property. Felimon was raised in a fishing family, and he has continued the family's fishing business. He is also a regular fisher, and remembers Kahana Bay as it was before resort development in the 1960s. Felimon recalls when the beaches fronting his property were wide, from 50- to 100-feet, and one could walk from Pokaku Beach Park to the Kahana Stream. He also recalls when the limu and other traditional Hawaiian foods were readily available for gathering at Kahana Bay.

- ***John Seebart;*** Area Resident and Active Community Member

  John Seebart was born on Maui and resided in Lahaina, but grew-up on the mainland. John has been a resident of the immediate area for several years. John is also an active community member, and has been working on addressing issues related to traffic and the erosion issues impacting the community.

- ***Sandy Szymanski;*** Property Owner and Chairperson of the Kahana Bay Steering Committee

  Sandy Szymanski is a Maui resident and has been an owner of a unit at the Kahana Reef since about 2010. She uses her Kahana Reef unit as a vacation rental, but she and her family also use it as a second home when it is available. Sandy is intimately knowledgeable of the ongoing erosion impacts to property owners along the bay and she is the current Chair of the Kahana Bay Steering Committee.

- ***Tova Callender;*** Coordinator of the West Maui Ridge to Reef Initiative

Tova is the watershed and coastal management coordinator for the West Maui Ridge to Reef Initiative, whose purpose it is to restore and enhance the health and resiliency of West Maui coral reefs and near-shore waters through the reduction of land-based pollution threats from the summit of Puʻu Kukui to the outer reef. Tova has considerable expertise in watershed management and soil and erosion control, and she is intimately familiar with the impact that upland sedimentation has on nearshore water quality. Tova is very familiar with the erosion issues impacting Kahana Bay.

- ***Kai Nishiki;*** Na Papa'i Wawae 'Ula'Ula

  Kai was born and raised in West Maui and is a Honokōwai business owner. She and her family are frequent users of the Kahana Bay beaches and surfing spots. Kai has a history of community and environmental advocacy and was a co-founder of Na Papa'i Wawae 'Ula'Ula, whose purpose is to facilitate the public's access to the shoreline. Kai is intimately familiar with the existing shoreline erosion conditions and improvements that have occurred within the project areas.

Methodology

PCH administered a common set of questions to each informant (See Attachment A). Informants with specialized knowledge were asked follow-up questions related to their areas of expertise. Additional questions were also administered to facilitate back and forth discussion and information sharing around the central question. The questions were intended to capture a common set of information related to the following:

1. Key informant's expertise and knowledge of the area;
2. Ocean related activities that occur along the Kahana Bay shoreline and within its nearshore coastal waters;
3. Historical change that has occurred within the Kahana Bay shoreline area;
4. Impression of the significance of the shoreline erosion that is occurring;
5. Concerns about the existing shoreline and nearshore water conditions and associated impacts to the environment, Hawaiian traditional practices , ocean recreation, and property owners;
6. Perceptions of positive and negative impacts associated with T-groins and beach nourishment, and how these impacts may be distributed across interest groups;
7. Receptiveness towards T-groins and beach nourishment and other alternatives to mitigate shoreline erosion;
8. Recommendations related to the preparation of the EIS; and
9. Recommendations related to future actions.

The interviews with key informants were digitally recorded with the permission of those being interviewed. Attachment B is a compilation of key informant concerns and recommendations.

Summary Findings

1. ***Ocean related activities occurring within Kahana Bay***. Key informants identified the following ocean related activities that are ongoing within Kahana Bay:

    - Surfing;
    - Stand-Up Paddle Boarding;
    - Windsurfing;
    - Body surfing;
    - Tako fishing;
    - Spear fishing;
    - Pole fishing;
    - Snorkeling;
    - Swimming;
    - Occasional jet skiing, parasailing, kite surfing;
    - Kayaking; and
    - Siting on beach.

2. ***Change within the Kahana Bay shoreline area***. Key informants identified the following significant changes that have occurred within the project area:

    - Transition from agriculture, open space, low density residential to resort development between the 1960's through the 1970's;
    - Loss of shoreline access;
    - Near total loss of a 35 to 100-foot wide beach that stretched from Pōhaku Beach Park to the Kahana Stream;
    - Degradation of the reef and nearshore coastal waters;
    - Disappearance and/or decline of limu, wawae'iole, wana, ohiki crab, lobster, fish and other traditional gathering foods;
    - Erection of concrete and sandbag seawalls fronting the condominiums to mitigate erosion;
    - Sea level rise;
    - Catastrophic shoreline erosion;
    - Failure of the existing seawalls; and
    - Undermining of existing infrastructure and structures from shoreline erosion.

3. ***Significance of the shoreline erosion***. Key informants generally agreed that the shoreline erosion is significant, and that some form of action is warranted to address the ongoing problem.

4. ***Concern over existing erosion impacts***. Key informants identified many common concerns and impacts associated with the shoreline erosion. Commonly identified concerns and impacts across key informants included the following:

    - Impact to property owners, including negative impacts related to property values and livability;
    - Loss of infrastructure and utilities;
    - Degradation of nearshore water quality;
    - Degradation of reefs and marine ecology;
    - Beach loss and associated impacts to shoreline access, including access for traditional Hawaiian practices; and
    - Degradation of aesthetic quality, including visual impacts caused by sand bags and seawalls.

5. ***Perceptions of positive and negative impacts associated with T-groins with beach nourishment***. Key informants identified positive and negative impacts associated with installing T-groins with beach nourishment to mitigate erosion at Kahana Bay.

    Potential Positive Impacts Identified:

    - Protects private property and structures;
    - Possible creation of marine habitat; and
    - Creation of a beach.

      These potential positive impacts were identified by Kai Nishiki, Sandy Szymanski, Ekolu Lindsey, and John Seebart.

    Other potential positive impacts identified by one or more key informants included: the protection of tax revenue; creation of new locations for fishing; and reduction in local traffic.

    Tova Callender noted that a positive impact of T-groins with beach nourishment might be the reduction of sedimentation caused by the shoreline erosion.

    Potential Negative Impacts Identified:

    There were significant concerns for potential negative impacts, which center on the following areas of concern:

    - Degradation / impacts to reefs and marine habitat;
      Glenn Kamaka, Elle Cochran, Mark Deakos, Andrew O'Ridoran, Ekolu Lindsey, Kelly Robinson, Felimon Sadang, John Seebart, Kai Nishiki
    - Loss of tako gathering and fishing grounds;

Glenn Kamaka, Elle Cockran, Felimon Sadang, Kai Nishiki

- Changes to natural ocean currents;
  Glenn Kamaka, Elle Cochran, Mark Deakos, Ekolu Lindsey, Felimon Sadang

- Impacts to the nearshore ecosystem from pollutants and organisms brought to shore by the mining of off-shore sand
  Glenn Kamaka, Mark Deakos, Ekolu Lindsey, Felimon Sadang, Tova Callender

Other potential concerns and negative impacts identified by one or more key informants included: impacts to surf spots; visual and aesthetic impacts caused by the groins; impacts to the existing fish and benthic organisms living within the sand that is proposed to be mined; impacts to the seabed from sand minding; development and long-term maintenance costs and the parties responsible for paying those costs, the project's interaction with existing seawalls, and the removal of the groins following their useful life.

6. ***Receptiveness towards T-groins with beach nourishment and other alternatives***

The following key informants indicated that they do not currently support T-groins with beach nourishment:

- Glenn Kamaka;
- Mark Deakos;
- Ekolu Lindsey;
- Felimon Sadang; and
- Kai Nishiki.

These key informants are primarily concerned about the impact of the project on: nearshore marine habitat and benthic organisms, natural flowing water currents, and traditional Hawaiian practices such as tako fishing. There is a concern that the project (sand mining, construction, operations) might degrade the nearshore marine environment and result in a loss of existing resources, and that once lost these resources cannot be replaced. These key informants indicated a preference for a more permanent long-term solution that would require managed retreat. Kai Nishiki indicated a preference for beach nourishment without the T-groins. Kai Nishiki and Mark Deakos indicated support for a long-term commitment to restore the natural shoreline ecology within the project area.

The following key informants indicated that they would be willing to support the project if their concerns could be addressed:

- Elle Cockran. Elle noted that her primary concerns are related to potential project impacts to the reefs and marine habitat, tako and fishing grounds, surf spots, and water currents. She also expressed concerns related to the project's development and maintenance costs, and was concerned about who would be required to pay these costs. If these issues could be addressed, Elle indicated that she could support the project. However, Elle also requests that managed retreat be studied.

- Andrew O'Ridoran. Andrew acknowledged that the project has the potential to produce positive impacts. However, he would like to review all of the information that comes from the EIS before indicating a preference for or against the project. Andrew requested that a thorough analysis of the managed retreat option be conducted.

- Tova Callender. Tova acknowledged that the project might improve nearshore water quality if the existing erosion is mitigated. However, she also had concerns about the potential for the proposed sand source to degrade nearshore water quality if the mined sand is not compatible with the existing beach sand, or if it contains contaminants. She would like to see these issues addressed, and requests that post water quality monitoring be conducted.

  The following key informants indicated strong support for T-groins with beach nourishment.

  - Kelly Robinson. Kelly noted that the coastline fronting her family's property has a natural groin like feature which she believes has helped to mitigate shoreline erosion. She acknowledges that the project might have some impacts to surf spots or habitats, but that saving the beaches is also important. She feels that the positive impacts of the project would likely be greater than the negative impacts.

  - John Seebart. John noted that the benefits of the project would likely be very significant and that the project would likely result in a beach fronting the project area that could be used by the community for activities like fishing, canoeing, and walking along the beach. He also noted that the project might produce new habitat for fish. John does have concerns that the project could have impacts upon the seabed and the benthic community and that this concern needs to be considered and accounted for. John also expressed concern about the managed retreat option, because of the burden it would impose upon property owners. He also noted that managed retreat could have a significant impact upon tax revenues, and that buildings falling into the ocean would be a disaster. John feels that society needs to try to adapt and that the T-groins with beach nourishment is a good attempt at adaptation.

- Sandy Szymanski. Sandy believes that the project provides an ideal situation for all parties. The project would create new habitat for sea life, replenish the beach, protect buildings, and protect the investments of the owners, residents, and state. She also noted that the project may reduce local traffic and increase spending in the existing commercial areas. However, she did note that there needs to be a commitment for adequate maintenance of the facility over time.

Summary Key Informant Recommendations

1. Recommendations applicable to the EIS

Key informants provided the following recommendations that are applicable to the preparation of the EIS.

- Sample off-shore sand sources for pollutants and compatibility
- Conduct further study of beach nourishment
- Conduct further study of off-shore artificial reefs
- Conduct a thorough study of the managed retreat option
- Get more input from fisherman
- Determine acceptable timeframe, i.e. 20, 50, 100 year timescales for the project
- Conduct broader community outreach
- Consult with the Kūpuna
- Determine the up-shore and down-shore impacts (beaches, surfing, etc.)
- Conduct a broader / regional plan up-shore and down-shore (Kahana/Nāpili)
- “Tell the story in a clean, understandable, and broad way”. “The presentation can impact how well the solution is received.”
- Consider doing shoreline planting as a mitigation alternative; living shorelines
- Document the existing baseline shoreline and offshore dredging conditions – reef, sand, benthic resources, critical species, seaweeds, etc.
- Document baseline cultural resource uses such as fishing, gathering
- Document existing baseline water quality
- Demonstrate that the mauka areas have quality sand resources and not silt or mud
- Conduct soil testing of the project area to determine the sedimentation threat if managed retreat is pursued
- Ensure sand compatibility to avoid beach nourishment impact to water quality

2. Recommendations applicable to future actions

Key informants provided the following recommendations that are applicable to future actions related to Kahana Bay.

- Implement beach nourishment without T-groins, and put managed retreat policies in place, restore a more natural shoreline
- Plan to move key infrastructure away from the shoreline
- Study a subsidy / buy-back program / government funding assistance to help property owners conduct managed retreat
- Better control existing drainage runoff from the project area into the ocean; older resorts may not have catchment systems
- Allow properties to protect themselves (maintain walls)
- Establish future shoreline setbacks that account for rising sea levels
- Develop a long-term planning approach to address sea level rise and mitigation in the West Maui Community Plan Update
- Conduct follow-up managed retreat workshops in West Maui to bring experts together

3. Recommendations applicable to EIS and future actions

Key informants provided the following recommendations that are applicable to the preparation of the EIS as well as future actions related to Kahana Bay.

- Study the opportunity to create a special improvement district for funding
- Incorporate more opportunities for shoreline access
- Give S-turns shower and park area a “facelift”
- Increase capacity of parking at S-turns
- Increase parking capacity in the area for beach users
- Get community vision and involvement; not in favor of a “band aid” approach; want a more “generational” approach
- Consider doing a “trial” first; conduct a study to see the impacts
- Consider using short-term erosion mitigation, such as sand bags, to mitigate erosion that causes decline in water quality
- Work collaboratively with Ridge-to-Reef to establish monitoring protocols
- Conduct water quality monitoring and identify the sources of water threat and address them

Conclusions

The key informant interviews were conducted to gather strategic community intelligence to support the preparation of the EIS for Kahana Bay. There is a general consensus amongst informants that the existing shoreline erosion along Kahana Bay has produced significant negative impacts, and that some form of action is warranted to improve the existing conditions.

However, several key informants expressed significant concern that the project will produce unacceptable impacts to nearshore water quality, marine habitat, and Hawaiian traditional practices. Based upon these findings, PCH recommends that the following be addressed in the EIS:

1. Short- and long-term impact to nearshore water quality from beach nourishment with T-groins relative to other project alternatives;
2. Short- and long-term impact to existing marine habitat from sand mining, construction of groins, and initial and on-going placement of sand along the subject shoreline;
3. Impact to existing tako grounds from sand mining, construction of groins, and initial and on-going placement of sand along the subject shoreline;
4. Impact of sand mining upon benthic organisms living within the sand proposed to be mined;
5. Impact upon the seabed from the mining of the proposed sand;
6. Assessment of the impact to natural ocean currents from the project, and any secondary impacts to the marine environment;
7. Assessment of sand for pollutants and compatibility with existing beach sand;
8. Assessment of project impact upon existing surf sites;
9. Testing of mauka on-site soils to determine the sedimentation threat from on-going shoreline erosion of the project area;
10. Assessment of the project for cultural impacts and impacts to Hawaiian traditional practices;
11. Long-term monitoring of the project's impact to nearshore water quality;
12. Thorough analysis of the feasibility, costs, and benefits associated with managed retreat, including partial and phased retreat schemes;
13. Assessment of long-term funding sources for project maintenance; and
14. Discussion of the project's lifespan and any monetary costs or subsequent actions required once the project's lifespan has been reached.

PCH recommends that the next phase of the community outreach program center around the sharing of information from technical studies to address concerns related to the project's environmental and cultural impacts. PCH also recommends that effort be placed into developing a community benefits program to address community concerns related to the following: public access to and along the proposed beach; shortage of existing public beach parking stalls; mitigation of existing runoff from parking lots that lack on-site retention; commitments to work to improve long-term nearshore water quality and restoration of marine habitat.

ATTACHMENT A

KEY INFORMANT INTERVIEW QUESTIONS

KAHANA BAY EIS
KEY INFORMANT INTERVIEWS
INTERVIEW QUESTIONS

Interviewee: ____________________ Date:____________

Interviewee affiliation:__________________ Interview Location:______________

Type of stakeholder: ______________________ Interviewer:______________

1. What is your history and relationship to the Kahana Beach project area?

2. How do you use Kahana Beach?

   A. What types of activities do you do?
   B. Where do you conduct these activities?
   C. How often do you conduct these activities?

3. Based on your knowledge of the area, what are the primary activities that occur at Kahana Beach?

   A. How many people?
   B. What time of day?
   C. Where do the activities occur?

4. What is your role at Hawaii Association for Marine Education and Research?

5. What is the purpose of Hawaii Association for Marine Education and Research?

   A. What activities does it conduct?
   B. Does it have any plans or activities planned for Kahana Beach?

6. How has Kahana Beach changed over the years?

7. How would you describe the significance of the shoreline erosion that has occurred along Kahana Beach?

8. Has the shoreline erosion had a significant impact upon the natural environment?

   A. What are the impacts?
   B. Where have the impacts occurred?
   C. How significant have the impacts been?

9. Has the shoreline erosion had a significant impact upon Kahana Beach property owners?

   A. What are the impacts?
   B. Where have they occurred?
   C. Has this impact changed significantly over time?

10. Has the shoreline erosion significantly impacted recreational and/or Hawaiian traditional uses of the area?

    A. What are the impacts?
    B. Where have they occurred?
    C. How significant are the impacts?

11. Are you aware of the The Kahana Beach Regional Mitigation Project?

    A. How did you become aware of it?

12. An Environmental Impact Statement is being prepared to evaluate various alternatives to mitigate the erosion fronting Kahana Beach. These alternatives include No Action; Managed Retreat; seawalls and/or revetments; beach nourishment; and combining beach nourishment with the use of T-groins.

    I would like to ask you some questions about conducting beach nourishment with T-groins at Kahana Beach. According to preliminary engineering drawings, this alternative would require the placement of off-shore groins within the beach cell, and the placement of sand between the groins. This would be done to provide protection from erosion, while also creating a new beach of between 50- and 150-feet within the beach cell. With ongoing beach nourishment and maintenance, it is estimated that this alternative would mitigate erosion for between 20 and 30 years or more. In addition, it is possible that the groins could provide habitat for some species of fish, and that the groins could be designed to accommodate recreational uses such as fishing.

A. In your opinion, are there positive effects associated with this alternative?
   a. What are they?
   b. Who would benefit?
   c. How significant are these benefits?

B. In your opinion, are there negative effects associated with this alternative?
   a. What are they?
   b. Who would bear the costs?
   c. How significant are these benefits?

C. If your concerns about …. could be mitigated, could you support such an alternative?

13. Are there other alternatives that you feel should be analyzed in the FEIS?

14. What is the best way to capture the impacts upon the marine environment from a project like this?

15. What is your vision for the future of the Kahana Beach coastal zone?

16. Are there any specific actions (improvements and/or management activities) that you would like to see for Kahana Beach to improve the existing conditions?

17. What do you not want to see happen at Kahana Beach?

18. Are there other people/organizations that you think we should reach out to?

19. Do you have other comments or suggestions you'd like to share?

ATTACHMENT B
KEY INFORMANT KEY CONCERNS AND RECOMMENDATIONS

Kahana Bay Key Informant Interviews

Summary Matrix of

Key Concerns & Recommendations

KEY CONCERNS & RECOMMENDATIONS	KEY INFORMANTS										
	GLENN K.	ELLE C.	MARK D.	ANDREW O.	EKOLU L.	KELLY R.	FELIMON S.	JOHN S.	SANDY S.	TOVA C.	KAI N.
Existing Conditions											
Climate change and sea level rise		●					●				
Water quality from upland run-off	●				●		●			●	
Significant erosion's impact upon Kahana Bay's natural environment	●	●		●	●		●	●		●	●
Shoreline erosion's impact on native coastal vegetation					●						
Erosions negative impact on water quality and ecosystem health within the bay		●			●		●	●	●	●	●
Beach loss and its impact upon the public right of way		●	●			●	●				●
Erosion / beach loss impact on traditional Hawaiian practitioners; can't harvest resources that have been harvested for generations	●				●						●
Loss of beach access for Hawaiian traditional practices		●	●				●	●			●
Concern about the cumulative effect of upland runoff, water quality, warming waters, sea level rise, erosion impacts to natural environment			●								
Man made changes to shoreline that have disrupted the natural systems leading to degradation of the environment			●								
Lack of existing shoreline access		●						●			●
Concern about erosion impact on roads and utilities	●	●				●	●		●		
Loss of limu, wawae'iole, wana, ohiki crab, fish and other traditional gathering foods	●	●			●		●				

Kahana Bay Key Informant Interviews

Summary Matrix of
Key Concerns & Recommendations

	KEY INFORMANTS										
KEY CONCERNS & RECOMMENDATIONS	GLENN K.	ELLE C.	MARK D.	ANDREW O.	EKOLU L.	KELLY R.	FELIMON S.	JOHN S.	SANDY S.	TOVA C.	KAI N.
Erosions impact upon private property owners (buildings, property values, property usage, livability)		●	●	●	●	●	●	●	●	●	●
Loss of beach and associated recreation								●	●	●	●
Failure of existing seawalls due to ocean waves									●		
The formation of sink holes behind existing walls									●		
Impact of sandbags on the shoreline for access, aesthetics, and environmental impact						●					●
Loss of coastal trees that provided shade						●					●
Project Impacts (T-Groin with Beach Nourishment)											
Impact to reefs and marine habitat	●	●	●	●	●	●	●	●			●
Impact to tako and fishing grounds	●	●					●				●
Impact to natural water currents	●	●	●		●		●				
Impact to surf spots	●	●									●
Visual / aesthetic impacts caused by the groins											●
Impact to nearshore ecosystem from pollutants and organisms brought to shore by the off-shore sand	●		●		●		●			●	
Impact to Betta (sand fish) from mining of off-shore sand	●				●		●				
Impact to seabed from mining of sand, i.e. creation of a hole, and associated impacts on currents and waves					●		●				
Project cost and long-term maintenance cost		●							●		
Who is going to pay for the development and maintenance costs?		●									
Interaction with existing seawalls		●									

Kahana Bay Key Informant Interviews

Summary Matrix of

Key Concerns & Recommendations

	KEY INFORMANTS										
KEY CONCERNS & RECOMMENDATIONS	GLENN K.	ELLE C.	MARK D.	ANDREW O.	EKOLU L.	KELLY R.	FELIMON S.	JOHN S.	SANDY S.	TOVA C.	KAI N.
What happens to the groins after the useful life of the project?		●									
What State and County agencies will have jurisdiction over the project?		●									
Project could create a wedge between locals and mainlanders / condo owners				●							
Impact of buildings falling into the ocean						●		●			
Protects private property and structures				●	●	●		●	●		●
May provides new habitat for fish				●	●	●		●	●	●	
Creates new spots for fishermen to fish									●		●
Creates a new beach				●	●			●			●
Increases / protects property tax revenues								●	●		
May mitigate sedimentation by preventing erosion										●	
Mitigates traffic by creating beach near the condos									●		
Attitude Towards Project & Alternatives											
Does not support seawalls		●	●			●	●				●
Does not <u>currently</u> support groins with beach nourishment	●		●		●		●				●
If impacts can be addressed, may support groins with beach nourishment		●		●						●	
Strong support for beach nourishment with groins						●	●	●	●		
Plan for managed retreat away from the shoreline		●	●		●		●				●
Conduct managed retreat and restore natural systems			●								●
Prefer to see no change / action							●				
Concern about the fairness of mandating managed retreat on property owners; impact upon State and County tax revenues from managed retreat								●			

Kahana Bay Key Informant Interviews

Summary Matrix of

Key Concerns & Recommendations

	KEY INFORMANTS										
KEY CONCERNS & RECOMMENDATIONS	GLENN K.	ELLE C.	MARK D.	ANDREW O.	EKOLU L.	KELLY R.	FELIMON S.	JOHN S.	SANDY S.	TOVA C.	KAI N.
Prefers beach nourishment as a short-term solution											●
Beach nourishment is a short term solution. Any short term solution should come with the condition that managed retreat policies should be put in place at implementable dates.											●
Beach nourishment could mitigate against erosion that causes sedimentation by creating buffer											●
Conduct “restorative engineering”, i.e. bringing it back to its natural state			●								●
Key Informant Recommendations											
Sample off-shore sand sources for pollutants and compatibility							●			●	
Conduct further study of beach nourishment							●				
Conduct further study of off-shore artificial reefs		●					●	●			
Study the managed retreat option		●	●	●	●		●				●
Implement beach nourishment done without T-groins, put managed retreat policies in place, restore a more natural shoreline											●
Get more input from fisherman					●		●				
Determine acceptable timeframe, i.e. 20, 50, 100 year timescales?				●							
Plan to move key infrastructure away from shoreline							●				
Study a subsidy / buy-back program / government funding assistance to help property owners conduct managed retreat		●	●								
Study the opportunity to create a special improvement district for funding		●									
Need to conduct broader community outreach		●									
Need to consult with the Kupuna		●									

Kahana Bay Key Informant Interviews

Summary Matrix of

Key Concerns & Recommendations

	KEY INFORMANTS										
KEY CONCERNS & RECOMMENDATIONS	GLENN K.	ELLE C.	MARK D.	ANDREW O.	EKOLU L.	KELLY R.	FELIMON S.	JOHN S.	SANDY S.	TOVA C.	KAI N.
Need to determine the effects up-shore and down-shore impacts (beaches, surfing, etc.)				●							
Incorporate more opportunities for shoreline access				●				●			
Give S-turns shower and park area a “facelift”				●							
Increase capacity of parking at S-turns				●							
Increase parking capacity in the area for beach users								●			
Conduct a broader / regional plan up shore and down shore (Kahana/Napili)				●							
“Tell the story in a clean, understandable, and broad way”. “The presentation can impact how well the solution is received.”				●							
Get community vision and involvement; not in favor of a “band aid” approach; want a more “generational” approach					●						
Consider doing a “trial” first; conduct a study to see the impacts	●										
Consider doing shoreline planting as a mitigation alternative; living shorelines	●							●			
Document the existing baseline shoreline and offshore dredging conditions – reef, sand, benthic resources, critical species, seaweeds, etc.	●		●							●	
Document baseline cultural resource uses such as fishing, gathering			●								
Document existing baseline water quality			●							●	
Better control existing drainage runoff from the project area into the ocean; older resorts may not have catchment systems	●										
Allow properties to protect themselves (maintain walls)									●		
Establish future shoreline setbacks that account for rising sea levels									●		
If you argue for managed retreat should demonstrate that the mauka areas have quality									●		

Kahana Bay Key Informant Interviews

Summary Matrix of

Key Concerns & Recommendations

	KEY INFORMANTS										
KEY CONCERNS & RECOMMENDATIONS	GLENN K.	ELLE C.	MARK D.	ANDREW O.	EKOLU L.	KELLY R.	FELIMON S.	JOHN S.	SANDY S.	TOVA C.	KAI N.
sand resources and not silt or mud											
Conduct soil testing of project area to determine sedimentation threat if managed retreat is pursued			●								
Ensure sand compatibility to avoid beach nourishment impact to water quality										●	
Conduct monitoring of post project conditions so if negative impacts to water quality and marine habitat is occurring they can be mitigated			●							●	
Develop a long-term planning approach to address sea level rise and mitigation in the West Maui Community Plan Update										●	
Consider using short-term erosion mitigation, such as sand bags, to mitigate erosion that causes decline in water quality										●	
Work collaboratively with Ridge-to-Reef to establish monitoring protocols										●	
Conduct water quality monitoring and sources of water threat and addressing them			●								
Conduct follow-up West Maui managed retreat workshops to bring together experts			●								

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Appendix F:

Phase II Community Outreach –

Focus Groups

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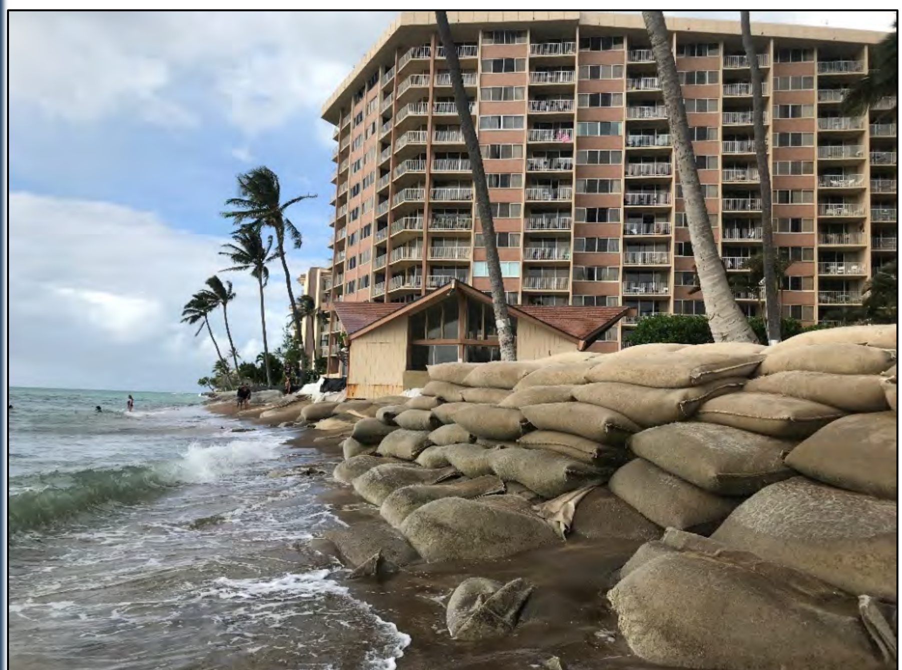
Kahana Bay Erosion Mitigation Project
Community Outreach Phase II
Report on Focus Groups



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December 2020

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LIST OF TABLES

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1. BACKGROUND AND PURPOSE

Community outreach for the Kahana Bay Erosion Project comprised two phases. Phase I was conducted in February 2019 by Planning Consultants Hawaii and included eleven interviews with key community informants. The report on that effort is appended to and summarized in the Draft Environmental Impact Statement, or DEIS.

Phase II was initially intended to convene community stakeholder group meetings during the preparation of the DEIS. The stakeholder group meetings were not possible, however, given restrictions on group gatherings brought about by the COVID-19 pandemic. The project team sought to find alternative ways to engage the community in a dialogue on the Kahana Bay Erosion Mitigation Project in a timely and transparent manner. This report summarizes Phase II efforts to continue and expand community outreach.

2. PHASE II PROCESS AND FORMAT FOR VIRTUAL FOCUS GROUPS

The target outcomes for Phase II included:

- Broaden the conversation of community issues and concerns by working with those already interviewed to reach people in their networks;
- Increase the project team's understanding of community perspectives of potential project impacts; and
- Implement a transparent process in a timely manner.

In Phase I, those interviewed represented four areas of interests relevant to the Kahana Bay Erosion Mitigation Project, including:

- Cultural;
- Ocean users;
- Environment / sustainability; and
- Residents – adjacent and surrounding.

Phase II was designed to reach out to these interest groups in virtual focus group sessions. Individuals included in each group shared common interests and / or background. This approach allowed participants to build upon each other's input in a constructive, rather than oppositional, manner.

Prospective participants included those previously interviewed, their networks, and community leaders in the interest areas. Invitations were extended mostly by phone; some were invited by other participants. A project summary packet based on information contained in the July 2019 Environmental Impact Statement Preparation Notice was emailed to those who agreed to participate.

The focus group sessions were facilitated by Berna Cabacungan Senelly. Dr. Michael Foley, principal investigator and project designer, was available to respond to technical questions. It was noted that, because the DEIS was still in preparation, information may be preliminary or limited, as some questions were still being studied and would be addressed in the DEIS.

The sessions were informal and recorded with permission from each group over Zoom, an online meeting platform. It was explained that the recordings were for internal purposes only and will not be available to the public. The facilitator explained that comments would be analyzed as an aggregate and would not be attributed to specific individuals.

Each participant discussed their connection to the project and indicated how they wanted to be identified in this report and in the DEIS. After the introductions, the project was summarized based on the information packet.

The meetings were then open for questions and comments. All sessions were scheduled for 1.5 hours, and groups were asked to extend meeting times if needed. A total of twenty-two people participated. Three of these individuals participated in all four sessions, although they wore the "hat" appropriate to each of the group interests.

3. OVERVIEW OF EACH FOCUS GROUP

While there were topics common to all groups, each session had its own "personality" and emphasis. Although some individuals participated in multiple groups, those individuals shared different perspectives depending on the interest group of which they were participants. The following sections describe each group and characterizes each respective discussion.

3.1 Cultural Focus Group

The cultural focus group was convened on October 12, 2020. Table 3-1 lists the eight participants and their self-identification.

Table 3-1: Cultural Focus Group Participants

Name	Self-Identification
Foster Ampong	Concerned community leader
Jay Carpio	Caring community member
Paul Hanada	Retired commercial fisherman
Archie Kalepa	Community advocate
Vernon Kalanikau	Local community member
Ekolu Lindsey	West Maui resident
Junya Leonard Nakoa	Concerned community member
Felimon Sadang	Kahana Bay resident Member of Kahana Bay Steering Committee

This group stressed a fundamental cultural belief that "nature will have its way." As such, it was generally felt that property owners need to plan for immediate or long-term managed retreat. Participants pointed out that other regions, such as Kīhei, are also faced with beach erosion and that beach nourishment may just be a temporary measure. They believed that, in time, the community will need to move further from the shoreline. Participants also warned that fixing the erosion problem in one area may have long-term negative effects on other beaches.

Participants were especially concerned about the effects that project implementation or non-implementation would have on a fellow participant who is a generational owner of a single-family residential property on Kahana Bay, an avid fisherman, and a community leader in cultural organizations. They were very respectful and protective of his situation.

Sand extraction was a concern because sand is a public resource, and some believed it should not be used for private benefit. The potential biological impacts on native ocean food gathering practices, and the potential for archaeological findings in the source sands were also of concern.

Community-based monitoring of construction activities and long-term effects was suggested by many. Participants felt that during construction, cultural and archaeological monitors should be present to detect possible issues. Recommended monitoring also included a marine archaeologist, who should monitor extracted sand, and local ocean users to observe construction effects on ocean habitats, fish, *tako* (octopus), and corals. There was an emphasis on the need to engage monitors who have generational ties to Kahana Bay.

3.2 Ocean Users Focus Group

The ocean users focus group convened on October 13, 2020. Table 3-2 lists eleven participants and their self-identification.

Table 3-2: Ocean Users Focus Group Participants

Name	Self-Identification
Foster Ampong	Westside Maui resident
Lauren Blickley	Hawaiʻi Regional Manager of Surfrider Foundation
Paul Hanada	Loves the ocean and everything connected to it
Vernon Kalanikau	Kula Kai / Kīhei resident
Ekolu Lindsey	West Maui resident
Dane Maxwell	Maui Ocean Center Cultural Advisor
Junya Leonard Nakoa	Napili resident
Kai Nishiki	Maui resident
Christine Roberson	Maui resident Vice Chair of Maui Surfrider Foundation
Felimon Sadang	Kahana Bay resident Fisherman
Darrell Tanaka	Fisherman's advocate

Comments and questions regarding T-head groins and sand source and extraction were common in this group. Questions were asked about the source and size of the *pōhaku* (essential building materials of traditional Hawaiian culture) to be used in the T-head groins. It was reported that there were problems in Keawekapu with how the concrete blocks were set in and that eventually there were major cracks and exposed rebars. Questions about public access to the groins were raised, and there was strong encouragement to allow fishing and other food gathering from the groins.

It was felt by some that sand nourishment is a band-aid solution. There were questions regarding the difference in lifespan with and without the T-head groins and general acknowledgement that the stabilizing structures would extend the time span for a wider beach. It was also pointed out, however, that sand is not a renewable resource and needs to be used efficiently. It was recommended that any surplus sand be stockpiled to reduce the frequency of extraction and related impacts.

Managed retreat was discussed, and there were inquiries about whether sand cores were done on properties adjacent to the beach. Participants felt these may indicate the quality and quantity of sand that would be exposed as the buildings are reduced, relocated, or removed. A few felt that managed retreat should be the only option.

3.3 Environmental Focus Group

The environmental focus group was convened on October 14, 2020. Table 3-3 lists the twelve participants and their self-identification.

Table 3-3: Environmental Focus Group Participants

Name	Self-Identification
Foster Ampong	Maui resident
Tova Callender	Watershed Coordinator of West Maui Ridge to Reef Initiative
Mark Deakos	Executive Director of the Hawaii Association for Marine Education and Research
Lucienne deNaie	Co-Vice Chair Sierra Club of Hawaii
Liz Foote	Coordinator of the West Maui Ridge to Reef Initiative Marine conservation professional
John Gorman	Acting Curator and Coral Specialist at the Maui Ocean Center
Paul Hanada	Born and raised on Maui
Kai Nishiki	Member of West Maui Preservation Association Member of West Maui Community Association Nā Papaʻi Waewae ʻUlaʻula Chair of West Maui Community Plan Advisory Committee
Tamara Paltin	Part of Aha Moku o Kaʻanapali Former Kahana Bay resident
Dustin Paradis	Conservation Research Coordinator at the Maui Ocean Center Marine Institute
Christine Roberson	Vice Chair of Maui Surfrider Foundation
Felimon Sadang	Kahana Bay resident and fisherman

This group had a strong emphasis on biological and environmental impacts. There were questions about project impacts on sea turtles nesting nearby and monk seals at S-Turns Beach. Participants were concerned about project impacts on sand crabs and invertebrates not just from a biological perspective, but from a cultural perspective as well, because these are food for *tako* and nearshore fish gathered by local gatherers.

Hope was expressed that the groins be considered a public resource and that there would be an increase in public access to the shoreline, including public parking, as well as public access to the groins.

Participants discussed the quality and compatibility of sand to be used in nourishment and wanted to make sure this sand was appropriate to this project. While there was a call to study why the coral is dying or dead in this area, it was also pointed out that there is a possibility to grow coral from this area off-site, harvest that coral, and replant them on T-head groin surfaces.

Managed retreat was raised as a viable alternative, and participants wanted to see provisions and conditions attached to the Proposed Action as possible long-term solutions.

One participant strongly disagreed with the characterization of the Proposed Action as beach nourishment and possible long-term habitat improvements. He articulated his perspective that the proposed action was "dredging ecosystems, bulldozing benthic communities and creating artificial beaches."

3.4 Resident Focus Group

The resident focus group was convened on October 15, 2020. Table 3-4 lists the eight participants and their self-identification.

Table 3-4: Resident Focus Group Participants

Name	Self-Identification
Foster Ampong	Maui resident
Paul Hanada	Resident of Kula Fisherman and diver who investigated Sugar Cove and Stable Road Beach
Sterling Honea	President of Valley Isle Resort Chair of Kahana Bay Steering Committee
Kai Nishiki	Maui resident Formerly lived across street from Kahana Bay
Tamara Paltin	Maui County Council Representative for West Maui
Kelly Robinson	5th Generation on family property north of project area
Felimon Sadang	Private property owner on Kahana Bay Steering Committee Steering Committee of Aha Moku o Kaʻanapali
John Seebart	Member of Kahana Bay Steering Committee representing private property owner Resident near Kahana Bay

The two common topics in this group were public access and project effects on adjacent properties. In terms of public access, there were questions and comments about maintaining existing public accesses and the possibility of adding more accesses. Kahana Bay residents stressed that beaches are public, and that they welcome whoever uses the beach. They noted that existing public easements would be open 24/7.

There was discussion on how reconfiguration or redesign of a portion of Lower Honoapiʻilani Road near the project site might lead to an increase in public access and parking. This reconfiguration or redesign would be intended to address ongoing shoreline erosion and possible obstruction of roadway circulation. Participants discussed how possible change of vehicular circulation from two-way to one-way traffic may open up spaces for parallel public parking to support nearby shoreline activities.

There was much interest in how the project actions would affect adjacent properties, both north and south of the project area. Participants hoped that the project would help stabilize sand movement and keep beaches in place. This sentiment particularly applied to properties north of Kahana Bay. It was reported that extreme shoreline erosion resulting from the 2011 tsunami in Japan has appeared to scour nearshore reef that previously served as a natural barrier to coastal erosion.

There was general acceptance for the Proposed Action, including beach restoration and T-head groins. Participants felt that this is a reasonable alternative for the foreseeable future and were supportive of residents living on adjacent properties. The lack of definitive public policies on implementation and compensation for adjacent landowners made it difficult to envision how regional managed retreat would be implemented.

One person strongly felt that managed retreat should be the preferred option, regardless of current policy, and that landowners do not need to be compensated since they chose to develop and live along coastal areas.

4. ISSUES ANALYSIS

This section organizes and analyzes participant comments and issues included in the focus group sessions. The input offered by focus group participants is integral in the preparation of the DEIS and will be addressed and incorporated throughout this environmental process.

4.1 Overall Proposed Action

4.1.1 Beach Nourishment

There was consensus that coastal and beach erosion is a serious island-wide problem and that beaches are narrowing. Beach nourishment was generally accepted as a solution, although there was doubt that nourishment in itself will be a long-term viable solution. It was seen by some as a temporary, or a band-aid, measure.

Mining and transporting sand were of major concern. Participants were not confident that dredging sand for this project could be accomplished without significant negative impacts on the environment and water quality. They questioned the possibility of mechanical failures, such as oil leaking from equipment.

There were questions and concerns about the compatibility of the sand source with Kahana Bay beach conditions. It was noted that the project should use ocean, not inland, sand. One person reported that inland sand from Oʻahu was used in beach nourishment at Sugar Cove, and that it caused problems with surrounding areas because that sand was too fine. It was suggested that the sand come from nearby areas in the same *ahupuaʻa*, and that excess dredged sand, if there is any, be stockpiled to ensure access to future supply without having to dredge more sand.

Participants wanted to make sure that the vegetated sand berms are protected, as well as the native vegetation forming the dunes. It was reported that in some areas, people walk and park canoes on sand dunes, thereby damaging a natural shoreline barrier.

4.1.2 T-Head Groins

Participants were interested in T-head groins and asked questions about how the structures would be constructed, what they would look like, the source of rocks, and their long-term effectiveness. There was acknowledgement that T-head groins would help to keep the sand and beach in place and thus require less upkeep. Participants also hoped that the T-head groins would replace existing seawalls and sandbags, which they believed contributed to beach and coastal erosion. It was also often hoped that the groins would be open to the public for fishing access.

Of concern was the visual impact of human constructed structures in a natural ocean setting. Participants felt that the groins' length and height were "excessive" and "visually painful to see." Such visual impacts were counter to the beauty of current prevailing views of the ocean.

While participants acknowledged that groins could be effective at maintaining the beach, they also warned that previous experience with Maʻalaeia Harbor suggests that problems may still occur in the long run. They believed that the construction of the Maʻalaeia Harbor jetty eventually led to the "disappearance" of sand at Kaʻanapali, which now requires major beach nourishment.

As with the sand sources, it was suggested that the *pōhaku* rock for groins be taken from the same *ahupuaʻa*.

4.1.3 Managed Retreat Alternative

Participants in all groups discussed managed retreat as an alternative that should be seriously considered. It was felt that sea level rise will continue to erode the coast and its beaches, and eventually the community will need to figure out how to move people and structures further *mauka*. One person cited his experience in Samoa, where an entire island was evacuated due to sea level rise. Much of that island is now submerged.

Participants had different ideas about timing. For a couple of people, managed retreat should be the preferred alternative in the DEIS. For most participants, managed retreat should be considered as a viable alternative in the long-term future. There were suggestions that permits allowing the Proposed Action to proceed should include some type of condition for long-term managed retreat.

Participants strongly urged the DEIS preparers to thoroughly discuss managed retreat. Several were critical of a DEIS regarding a Lahaina regional beach maintenance project. They believed that the DEIS did not adequately address managed retreat as an alternative.

There were questions as to whether there have been cores taken from under existing structures to ascertain if there are natural sand dunes, and if the underlying sand would support a healthy beach, if and when, structures are reduced or relocated.

4.2 Surrounding Properties

A common topic in all focus groups was the effect of the Proposed Action on properties adjacent to Kahana Bay. Participants expressed their concerns from the following perspectives:

- Project impact on the project on sand movement and quantities north and south of the project site, and whether there would be a hardening effect on neighboring properties;
- Whether the beach at S-Turns would be used as a staging zone for sand dredging and T-head groin construction;
- The possibility of sand coming back on its own with wave swells from the right direction, and whether the Proposed Action would prevent sand coming in from S-Turns to fill in Kaolapa Bay;
- If sand captured by project T-head groins would keep sand from migrating to properties and beaches down current; and
- Who is liable if significant negative impact(s) would occur due to any of these factors.

One participant observed that there was a problem at Sugar Cove with using inland sand for beach nourishment. Because of the fine grain size profile of the inland sand, the beach keeps disappearing because it moves and blows sand inland. It was further believed that around Stable Road, sand is captured by Stable Road groins which results in down current properties having less sand and eroding beaches.

Participants urged that the DEIS include the study of wave effects and sand movement on adjacent properties. Participants hoped that the Proposed Action will help to indirectly restore this northern area. A common mitigation measure suggested by participants was monitoring sand movement, wave currents, and beach changes south and north of the project area in a long-term time frame, which was characterized by some as a ten-year monitoring program.

4.3 Cultural and Socioeconomic

In the big picture context, for many participants, the concept that "nature will have its way" is both cultural and "local." While they did not want to see people lose their homes and properties, there was an underlying belief that, over time, dealing with sea level rise will be more about changing attitudes than the actual location and relocation of buildings. In various ways, they expressed their belief that public policies, community values and cultural beliefs will ultimately determine how Maui and Hawai'i will adapt to sea level rise.

Sand extraction and installation of T-head groins were of cultural concern because during dredging, sand would be manipulated in possible burial sites. It was noted that remains were once buried in land that has since eroded into to the ocean. With erosion and sea level rise, there was concern that burials that may have slipped into the ocean will be unearthed.

Participants urged the project team to study marine archaeology and have marine archaeologist monitors present during all phases of construction. They also wanted assurance that the project archaeology and cultural consultants remain objective even though their fees are paid by the project advocate.

Another culture-related concern is the project's impact on shoreline invertebrates during sand dredging, beach nourishment, and T-head groin construction. Participants pointed out that shoreline invertebrates are food for *tako* and shoreline fish, both of which are important for local food gatherers who frequent the area. As with marine-related archaeology, participants urged monitoring by local fisherman and ocean users during construction. They suggested that such monitoring be conducted by multi-generational observers and advisors.

There was concern about a perceived conflict between private benefit and public interest. For some, there was an underlying sentiment with that the Proposed Action would benefit "condo owners," who some perceived as outsiders more affluent than local residents, and visitors from outside Hawai'i. These concerns were reflected in the following sentiments:

- Participants pointed out that sand is a public resource that would be dredged for private benefit, although there was also an understanding that the resulting widened beach would be a public, as are all beaches in Hawai'i.
- Participants felt that private "condo owners" chose to purchase these units, and that the public should not "bail them out" because their properties are vulnerable.
- Participants were critical of the State of Hawai'i contributing funds for the Ka'anapali beach restoration project. The potential to use Community Facilities District (CFD) funds for Kahana Bay was discussed, and it was understood that discussions are continuing.
- There was concern that KBSC would use the vegetated berm to expand private property and encroach on public beaches. It was later understood that public beaches are clearly delineated and cannot be included in private properties.
- Public shoreline access was a common topic. Participants asked if the T-head groins would be accessible to the public, if there would be additional *mauka* to *makai* shoreline access, as well as additional public parking. They wanted assurances that the public would not be kept off beaches, the shoreline, and the T-head groins. The project team noted that lateral shoreline access is guaranteed by law and that the intention was not to limit public access to the T-head groins, although these structures are not designed for pedestrian access at this time. Further, a KBSC participant stressed that he was fully supportive of public use and access "24/7."

- There were questions about liability related to public access to T-head groins, should someone get injured on these structures.

4.4 Biological Concerns

Participants were concerned that construction activities would negatively impact fish, monk seals, turtles, corals, reefs, and overall habitat due to dredging, sedimentation, and water quality degradation. It was reported that monk seals are sighted near S-Turns and that sea turtle nesting grounds are nearby. Ocean invertebrates that are food for *tako* and nearshore fish thrive along this shoreline. Corals and reefs are essential habitats of the affected shoreline.

Participants warned that sedimentation resulting from construction activities might settle on reefs and rocks and destroy habitat. They were also concerned that sedimentation would obstruct coral spawning if construction activities occurred during spawning season. There was also an inquiry about the presence of *pūnāwai*, or fresh springs, along the Kahana Bay shoreline.

Oceanit noted that the proposed T-head groins would present an opportunity to grow coral collected from the project area in an off-site location, harvest the newly grown coral, and plant them along the T-head groins to propagate new coral growth. Participants also felt that the T-head groins may serve as new habitat for ocean life and support more fish and other aquatic species. This would be positive for fishers and food gatherers.

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Appendix G:

Archaeological Literature Review and Field Inspection

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SCS Project Number 2302 Fld Insp and Lit Rev-5

AN ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION FOR THE KAHANA BAY EROSION MITGATION PROJECT KĀ'ANAPALI AHUPUA'A, LAHAINA (KĀ'ANAPALI) DISTRICT ISLAND OF MAUI, HAWAI'I

TMK: (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; AND (2) 4-3-010:001

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MARCH 2021

FINAL

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INTRODUCTION

At the request of Oceanit, Scientific Consultant Services, Inc. (SCS) conducted an archaeological field inspection of the project area and prepared an archaeological literature review for the Kahana Bay Erosion Mitigation Project Environmental Impact Statement.

The project area is located along the shoreline between Kahana Stream and Pohaku Park, extending along Lower Honoapi‘ilani Road, Kā‘anapali Ahupua‘a, Lahaina (Kā‘anapali) District, Island of Maui and is located within the following Tax Map Keys: (TMKs) (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001] (Figures 1 through 3). The project involves the seaward portions of Kahana Village, Kahana Outrigger, a private residence, the Kahana Reef, Pohailani, Hololani Resort Condominium, Royal Kahana, Valley Island Resort, Sands of Kahana, and the Kahana Beach Resort. All property owners and acreages are listed in Table 1.

The proposed project includes 1) beach nourishment, 2) a vegetated berm, and 3) 7 T-groins that will serve as stabilization structures. The project purpose is to develop a sustainable and resilient solution to mitigate the regional erosion along the Kahana Bay shoreline on Maui. The project will require federal, state, and county permits.

The archaeological field inspection was conducted by SCS archaeologist Derek Butler, B.A., under the supervision of Michael F. Dega, Ph.D., Principal Investigator. This report presents information on the natural and built environments that comprise the Kahana Bay coastline, an overview of previous archaeological reports and documented archaeological sites in the vicinity, archaeological field inspection methods, results of the archaeological field inspection, and recommendations for the project area.

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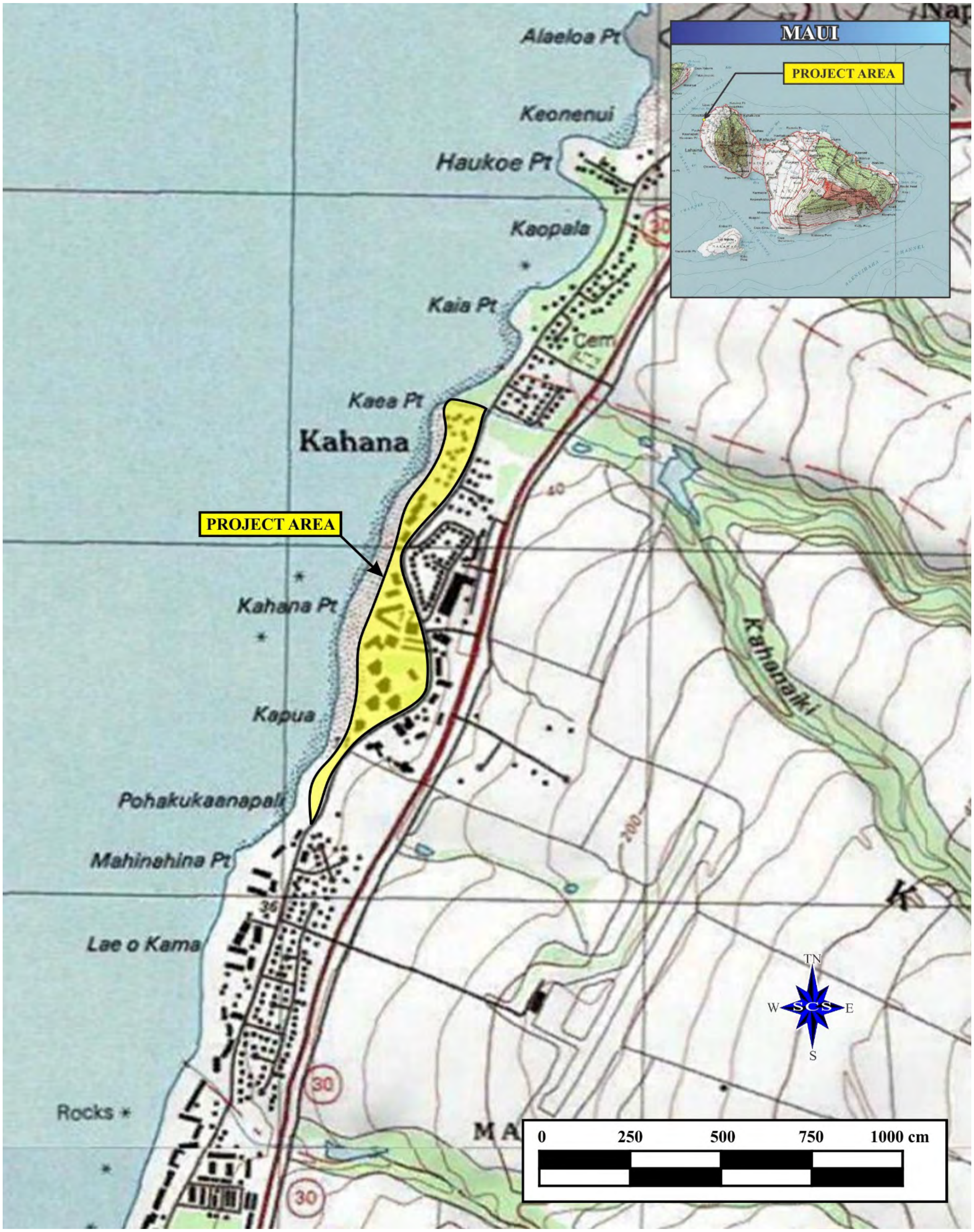

Figure 1: USGS Quadrangle (Kaanapali, HI 1992: 1:24,000) Project Area Location.

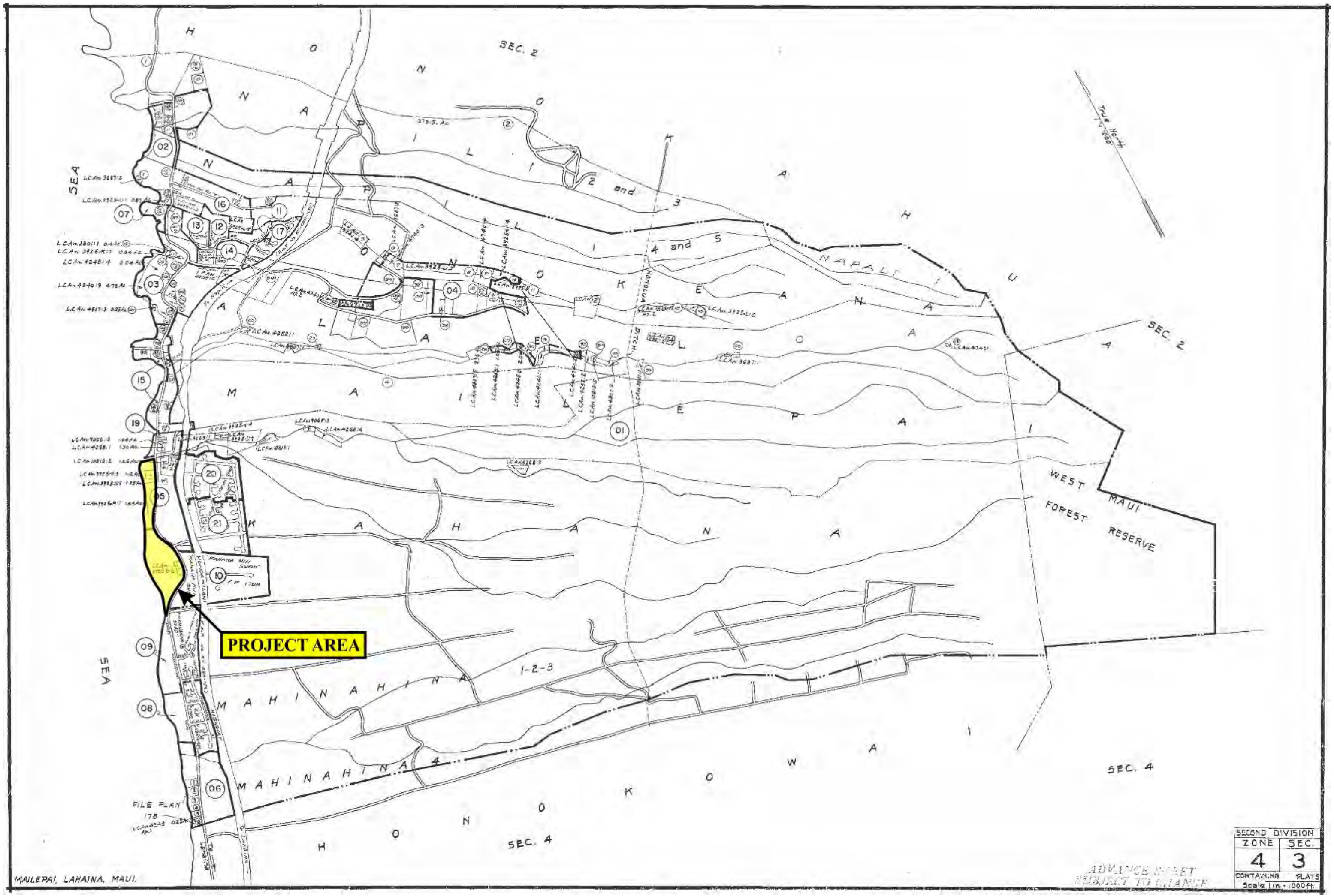

Figure 2: Tax Map Key [TMK: (2) 4-3] Showing the Project Area Location.

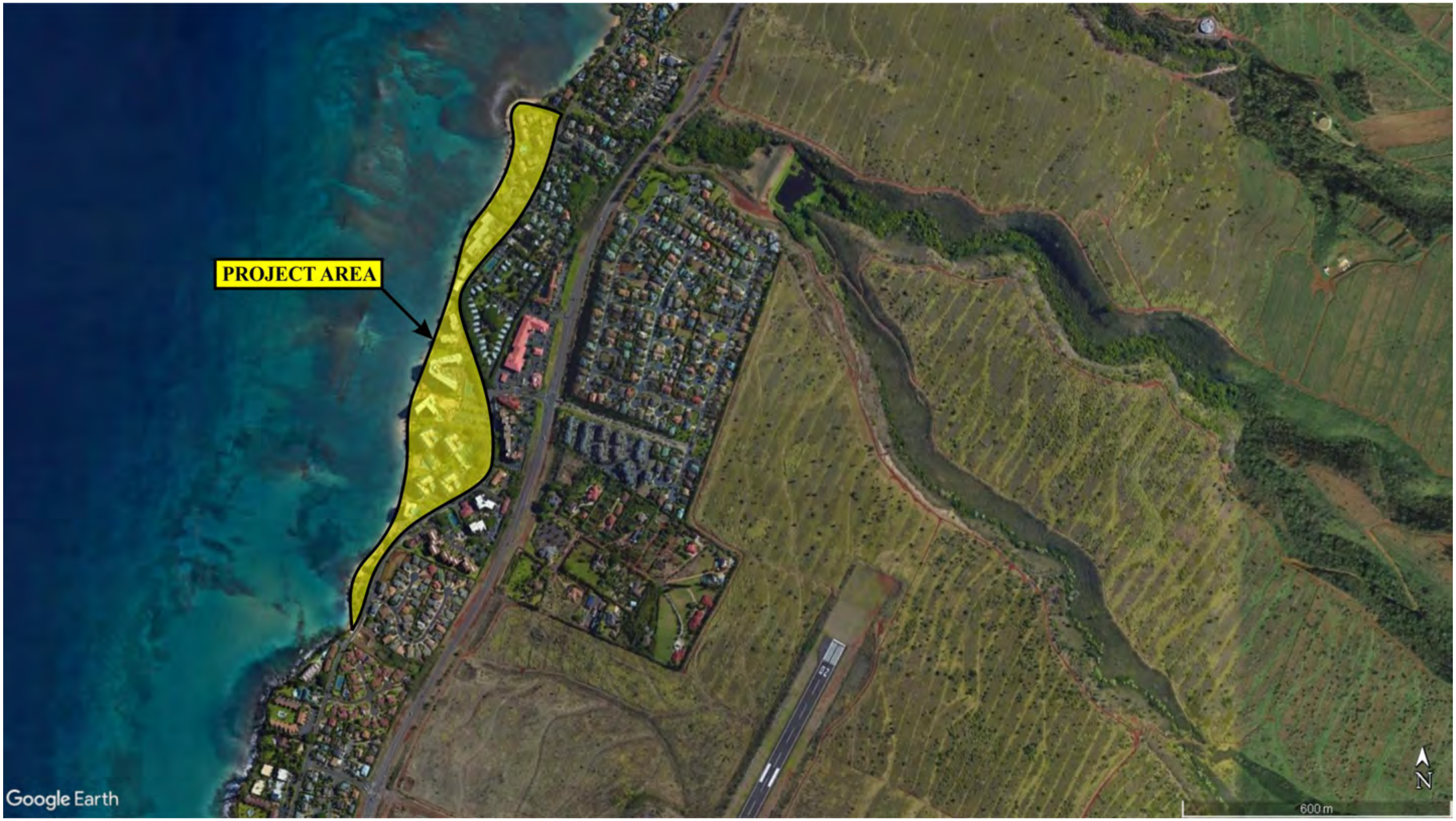

Figure 3: Satellite Image (Google 2018; Imagery Date 1/30/20) Showing Project Area Location.

Table 1: Property Information.

TMK: (2)	Land Owner	Acreage
4-3-005:029	Kahana Village	3.199 acres
4-3-005:020	Kahana Outrigger	0.71 acres
4-3-005:021	Kahana Outrigger	Unlisted
4-3-005:031	Kahana Outrigger	1.2 acres
4-3-005:019	Sadang, Joseph	0.61 acres
4-3-005:009	Kahana Reef	1.96 acres
4-3-005:008	Pohailani Maui	8.058 acres
4-3-010:009	Hololani	1.4309 acres
4-3-010:007	Royal Kahana	3.3142 acres
4-3-010:004	Valley Isle	3.054 acres
4-3-010:002	Sands of Kahana	6.788 acres
4-3-010:001	Kahana Beach	1.02 acres

PROJECT DESCRIPTION

Coastal erosion in Hawaiʻi is an ongoing and worsening problem throughout the state. Eighty-five percent of Maui shorelines are experiencing long-term erosion due to rising sea-levels. According to the University of Hawaii research, Maui's shorelines are changing faster than both Oʻahu and Kauaʻi (Romine et al. 2013). The chronic erosion has led to shoreline retreat and the narrowing of beaches, which impacts the built environment close to the shoreline.

Built shoreline protection structures constructed to protect shoreline properties can result in edge effects that can increase erosion rates at the ends of the seawalls. In the adjacent properties, temporary structures have been installed. Nine of the oceanfront condominium complexes have existing non-contiguous seawalls that vary in design, construction materials, top elevation, condition, and effectiveness. Existing shoreline protection measures are listed on Table 2.

Table 2: Existing Erosion Mitigation Measures.

Property	Shoreline Mitigation Type
Kahana Village	Vegetated Sand Berm
Kahana Outrigger	Rock Revetment and Rock
Kuleana Parcel	Rock and Concrete
Kahana Reef	Seawall
Pohailani Maui	Seawall
Hololani	Sand Bag. Revetment with Seawall Backstop
Royal Kahana	Sand Bag Revetment
Valley Isle Resort	Sand Bag Revetment
Sands of Kahana	Not Armored
Kahana Beach	Seawall

The proposed project consists of a comprehensive coastal erosion program that includes 1) beach nourishment, 2) a vegetated berm, and 3) T-groins that will serve as stabilization structures. The project purpose is to develop a sustainable and resilient solution to mitigate the regional erosion along the Kahana Bay shoreline on Maui. The project will require federal, state, and county permits.

ENVIRONMENTAL SETTING

The Island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Maui Island was formed by two volcanoes; Puʻu Kukui to the west and Haleakalā to the east. Puʻu Kukui, forming the west end of the island (1,215 meters above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast.

PROJECT AREA

The project area is located along the northwest coast of West Maui and includes an approximately 3,700-foot-long beach cell between Kahana Stream and Pohaku Park, extending along lower Honoapiʻilani Road, Kāʻanapali Ahupuaʻa, Lahaina (Kāʻanapali) District, Island of Maui [TMK: (2) 4-3-005: various and (2) 4-3-010: various]. The project involves the seaward portions of Kahana Village, Kahana Outrigger, a private residence, the Kahana Reef, Pohailani, Hololani, Royal Kahana, Valley Isle Resort, Sands of Kahana, and the Kahana Beach Resort. The project area extends from approximately 10 to 30 feet above sea level (amsl) and is situated along the coastline.

SOILS

According to Foote et al. (1972:116, Figure 4), the northern portion of the project [TMK: (2) 4-3-005] is comprised of Pulehu clay loam (PsA). This soil is on alluvial fans, stream terraces, and in basins. Historically, this soil has been used for sugarcane and pasture.

The land just south of the PsA soil sector where TMK: (2) 4-3-010 begins, is comprised of Jaucas Sand (Jac). This soil series is found in narrow beach strips and in areas of Pulehu, Mokuleia and Keaau soils. The soil is neutral to moderately alkaline throughout the profile. Juacas sand has been used for pasture, sugarcane, truck crops, and urban development (Foote et al. 1972: 48). The entire coastal portion of the project area is comprised of the Jaucas sand series (JaC), making the area highly susceptible to erosion due to rising sea levels.

South of the JaC soils, the land is comprised of Lahaina silty clay loam (LaB) and (LaC) series. This soil is commonly found on smooth uplands and has historically been used for sugarcane and pineapple, as well as crops, pastures homesites and wildlife habitat (Foote et al. 1972: 78,79) (Figure 4).

DRAINAGE

Drainage infrastructure is present in and along the project site. The majority of the drainage infrastructure is underground, but open at its discharge point to the backshore area of the beach, where the water infiltrates through the sand prior to being discharged into the ocean. Between the Hololani and Pohailani condominiums, an approximately 15 ft-wide County stormwater easement leads a short distance from Lower Honoapiʻilani Road to the ocean. A grated storm drain on mauka side of the road collects stormwater, which is piped under the roadway and discharges to the ocean. A concrete lined culvert exists along the southern makai boundary of the Valley Isle condominium. Along the more urbanized segment of the project area south of Hoʻohui Road, curbs and gutters are used to direct stormwater from parking lots, sidewalks, and roadways into storm gutters that ultimately discharge to the ocean. Open lined concrete culverts, such as the one between along the southern makai boundary of the Sands of Kahana condominium, convey stormwater from the street to the ocean. The outlet is adjacent to and extends underneath of a public shoreline access path. A very large concrete-lined drainage swale at the southern end of the project area and Pohaku Park extends under Lower Honoapiʻilani Road through a box culvert, and there is a large settling basin and stormwater flood control weir on the mauka/upland side of the road.

Figure 4: USDA Soil Survey Showing Soil Types Within the Project Area.

CLIMATE

Rainfall in this lowland-coastal, leeward environment is modest, with the area receiving 21 to 25 inches per year. Most rainfall occurs during the winter months, from November to April (Giambelluca 2013). Seasonal variation in rainfall amounts follows normal patterns for leeward areas. At higher elevations within the ahupuaʻa, the amount of rainfall received is sometimes double and triple that on the coast. Water flows from upland watersheds to coastal reaches and thus, the project area receives some secondary water sources from upland rains. This run-off water is not channeled through a drainage or swale. LITERATURE REVIEW

TRADITONAL AND HISTORICAL CULTURAL CONTEXT

Archaeological settlement pattern data suggest that initial colonization and occupation of the Hawaiian Islands first occurred on the windward shoreline areas of the main islands between A. D. 850 and 1100, with populations eventually settling in drier leeward areas during later periods (Kirch 2011). Although coastal settlement was dominant, native Hawaiians began cultivating and living in the upland Kula (plains) zones. Greater population expansion to inland areas began around the 14th century and continued through the 16th century (Kirch 2011). Large scale or intensive agriculture was implemented in association with habitation, religious, and ceremonial activities.

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various ahupuaʿa. Traditionally, there were two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland kalo (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultigens, such as kō (sugar cane, *Saccharum officinaruma*) and maiʿa (banana, *Musa sp.*), were also grown and, where appropriate, such crops as ʿuala (sweet potato, *Ipomoea batatas*) were produced. Traditionally, this was the typical agricultural pattern seen during the pre-Contact Period on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). Agricultural development on Maui was likely to have begun early in what is known as the Expansion Period (AD 1200-1400) (Kirch 1985).

PAST POLITICAL BOUNDARIES

In general, several terms, such as moku, ahupuaʻa, ʻili or ʻiliʻāina were used to delineate various land sections. A district (moku) contained smaller land divisions (ahupuaʻa), which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the ahupuaʻa were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each ahupuaʻa to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The ʻili ʻāina or ʻili were smaller land divisions next to importance to the ahupuaʻa and were administered by the chief who controlled the ahupuaʻa in which it was located (Lyons 1875: 33; Lucas 1995:40). The moʻoʻāina were narrow strips of land within an ʻili. The land holding of a tenant or hoa ʻāina residing in an ahupuaʻa was called a kuleana (Lucas 1995:61). The project area is located in Pau-nau Ahupuaʻa, which literally means "completely chewed up" (Pukui et al. 1974:182).

TRADITIONAL SETTING OF KĀʻANAPALI

The project area is locate in the traditional Moku (district of Kāʻanapali, which is known through Hawaiian legends as a location of population centers and battle sites, as well as for cultivation areas (taro, sweet potato) and salt gathering sites (Sterling 1998). Within the Kahana area of the district, the former presence of several heiau (Walker Sites #13 and #14; Walker 1931) attests to the ceremonial significance of the area. If one asserts that heiau in an area equates to population sizes, then a sizeable pre-Contact population occupied Kahana lands. There are other lines of evidence to infer that the Kahana area was largely populated during traditional times. Near the project area, Sterling (1998) notes the presence of the heiau, salt gathering areas along the Kahana coastline, and the presence of taro cultivation within Kahananui stream valley. Archaeological work in the Kahana area has mostly supported these traditional uses of the land.

PRE-CONTACT PERIOD (PRE-1778)

A general settlement model based on archaeological evidence has been suggested for the Kāʻanapali District (Chapman and Kirch 1979; Kirch 1985). This model includes coastal marine foraging and fishing with more upland agricultural pursuits. In typical native Hawaiian fashion, dating at least from the later pre-Contact period (if not earlier), people in this area would have moved between the coast and the upland agricultural fields, exploiting the full range of resources available within the ahupuaʻa. Based on these observations, it is probable that the region in and around the project area was inhabited and farmed, at least in later pre-Contact Period through the early Historic Period (post-1778).

The current project is located in the traditional District of Kāʻanapali, which is situated north of the traditional District of Lāhainā on the west side of the Island of Maui. The District extended north and west from Kekaʻa Point to ʻIli O Kukuipuka, encompassing five major stream valleys draining the leeward slopes of West Maui (i.e., Honokōwai, Kahana, Honokahua, Honolua, and Honōkohau) (Sterling 1998:46; Handy and Handy 2004:494). These valleys are "watered by the streams draining western slopes of the West Maui Watershed" (Handy and Handy 1972:494). "The valleys of Honokōhau, Honolua, and Honokōwai merge together at around 4,000 [amsl], below Lake Manowai where the headwaters begin (Anderson 2016:113). During the pre-Contact Period, these valleys were all productive wet taro (loʻi) lands, with extensive systems of terracing which were reportedly used from the early Historic Period into the early 20th century.

It has been documented (Arago 1823:119-120, cited in Handy and Handy 1972:493) that the area surrounding the village of Lahaina was "dry and barren" at the time of contact with Westerners. In contrast, Fornander (1919, Vol. 5: 540-541, cited in Handy and Handy 1972: 494) stated that Kekaʻa was "once an area of intensive cultivation." Thus, it can be inferred that, traditionally, the entire northwest coast of Maui was under "continuous [loʻi] cultivation."

> Kekaa was the capital of Maui when Kakaalaneo was reigning over West Maui. ... Many houses were constructed and people cultivated a great deal of potatoes, bananas, sugar cane, and things of a like nature. I have been told that the country from Kekaa to Hahakea and Wahikuli - that country now covered by cactus, in a northwesterly direction from Lahaina-was all cultivated. This chief (Kakaalaneo) also planted bread fruit and kukui trees down at Lahaina. Some of these trees southwest of the Lahaina fort, were called the bread fruit trees of Kauheana. (Fornander 1918-1919, Vol. 5: 540-541, cited in Handy and Handy 1972: 494)

D.T. Fleming (cited in Handy 1940:106) substantiated Fornander's (1918-19191, Vol. 5: 540-541) inference when he visited the valleys of Honokōwai, Kahana, Honokahau, and Honolua. Of his observations, Fleming (cited in Handy 1942:106) states:

> …Honokōwai, Honokohua and Honolua, as well as Kahana, there was considerable taro raised in olden times; as a matter of fact, a great deal was raised in Honokōwai, where there must have been 30 or 40 acres under cultivation at one time.

According to Handy and Handy (1972:494)," by 1934 commercial planting and the exhaustion of the soil had brought in root rot, and some of the large lo‘i were abandoned, and were replaced in rice" fields in Kā‘anapali District, and quite possibly within the ahupua‘a in which the current project is located.

In addition to watering the valleys, the above-mentioned streams provide water for the six bays located on the western shores of Maui. These bays and coves, whose names begin with *Hono*-, include Honokahua, Honokeana, Honokōhau, Honokōwai, Honolua, and Hononana, which are collectively known as "Hono a Pi‘ilani"; literally meaning bays (hono) acquired or ruled by Pi‘ilani (Pukui and Elbert 1986, Pukui et al. 1974, and Clark 1980).

The coastal and marine environments adjacent to the project area would have provided rich resources for traditional subsistence foragers and fishermen in the pre-Contact and early Historic Periods. A large number of fish species are found in the near-coastal waters: weke, surmullet (*Mulloidichthys auriflamma*); kūmū (goatfish, Paru*peneus prophyreus*); *mamo* (sergeant fish, *Abudefduf abdominalis*); manini (surgeonfish, *Acanthurus triostegus*); *palani* (surgeonfish, *Acanthurus bariene*); nenue (rudder or pilot fish, *Kyphosus fuscus*); kōkala (porcupine fish, *Diodon hystrix*); hinalea (wrasse, Family, Labridae); uhu (parrot fish, *Scarus perspicillatus*); ‘ala‘ihi (squirrel fish, *Holocentrus* sp.); kala (surgeonfish or unicorn fish, *Acanthurus* sp.); and nehu (anchovy, *Anchoviella purpurea*). In addition to a relatively high density of gastropods and pelecypods, including pipipi, black nerita (*Nerita picea*) and *Littorina pintado*), at least five species of sea urchin have been noted: Centrechinus paucispinus, Tripneustes gratilla, Podophora atrata, Heterocentrotus mammillatus, and Echinometra mathaei (Kirch 1973).

Kahana played another important role in traditional life, in addition to providing a substantial amount of taro. According to Rebecca Nuuhiwa, an informant for Elizabeth Sterling (cited in Sterling (1998:50):

> The people of Lahaina gathered their salt at Kahana. It was said they carried the sea water to the depressions and then let it settle and dry out. They gathered their salt on dry days.

Valleys originating high in West Maui and bordering Māhinahina Ahupua‘a to the north and south all had extensive taro lands located in the valley bottoms, where terraces rose tier upon tier in symmetrical stone-faced lo‘i (Handy and Handy 1972). Honokōwai, itself, had been a canoe landing and was the last sandy inlet before the rocky shoreline of Māhinahina. Fresh water springs could be found at the water's edge of Honokōwai Bay (Clark 1980).

Most of the ahupuaʻa on the coast have been overshadowed by the famous roadstead and village that served as the capitol of the Hawaiian Kingdom after the conquest of Kamehameha I until 1855. The ethnographic and historic literature, often our only link to the past, reveal that the lands around Lāhainā were rich agricultural areas irrigated by aqueducts originating in well-watered valleys with permanent occupation predominately on the coast. Crops cultivated included coconut, breadfruit, paper mulberry, banana, taro, sweet potato, sugar cane, and gourds.

HISTORIC BACKGROUND

The pre-Contact Period in the Hawaiian Islands came to an end with the arrival of Captain Cook to the island of Kauaʻi in 1778. The years to follow would drastically alter the political, agricultural, and social foundation of the Hawaiian Kingdom. The destabilization of Hawaiian society was further intensified by the profound reformation of the traditional land system (Beaglehole, 1967).

THE MĀHELE

During the mid-1800s, extreme modification to traditional land tenure occurred throughout all of the Hawaiian Islands. The transition from traditional Hawaiian communal land use to private ownership and division was commonly referred to as the Māhele (Division). The Māhele of 1848 set the stage for vast changes to land holdings within the islands as it introduced the foreign (western) concept of land ownership to the Islands. Although it remains a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) established laws changing the traditional Hawaiian system of land tenure, which were intended to keep lands in the hands of the Hawaiians, but resulted in providing an opportunity for foreigners to obtain land (Kuykendall Vol. I, 1938:145 footnote 47, 152, 165–166, 170; Daws 1968:111; Kelly 1983:45; Kameʻeleihiwa 1992:169–170, 176). Once Article IV of the Board of Commissioners to Quiet Land Titles was passed in December 1845, the legal process of private land ownership was begun.

The Māhele divided the lands of the kingdom of Hawaiʻi among the king (crown lands), the aliʻi and konohiki, and the government. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were made available, and private ownership was instituted, native Hawaiians, including the makaʻainana (commoners), were able to claim land plots upon which they had been cultivating and living, through the Kuleana Act of 1850..

For the commoners, these claims did not include any previously cultivated land that was left to fallow, stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kameʻeleihiwa 1992:295; Kirch and Sahlins 1992). If the commoners were able to establish occupation through the testimony of two witnesses, they were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

The process for foreigners to acquire land was through the Alien Landownership Act of 1850. Oftentimes, foreigners were simply just given lands by the aliʻi. However, in the case of commoners, they would make claims only if they had first been made aware of the foreign procedures (kuleana lands, land commission awards). Commoners claiming house lots in Honolulu, Hilo, and Lāhainā were required to pay commutation to the government before obtaining a Royal Patent for their awards (Chinen 1961:16).

According to the Office of Hawaiian Affairs Kipuka Database (2019) and the Waihona ʻAina (2019 Database), one land grant and four LCA were claimed within the vicinity of the current project area [TMK: (2) 4-3-005 and TMK: (2) 4-3-010].

Land Grant 1166

Land Grant 1166 containing 2675 acres was claimed by Baldwin, D., J.H. Pogue & S.E. Bishop, and their heirs on August 30th, 1853. This 2,675-acre piece of land was used for mineral and metallic mining. This land grant includes TMKs: (2) 4-3-010: 009, 007, 004, 002, 001 and (2) 4-3-005: 029, 020, 021, 031, 019, 009, 008.

LCA 3925I

LCA 3925I (Patent Grant #6231), was claimed by Pala in 1869. Land Commission Award 3925I consisted of six pieces of land in Kahanaiole and Kahanaiki. Land Section 1 was used as a salt patch in Kahanaiole. Land Sections 2 through 6 were used as kalo land in Kahananui. The land sections include TMKs: (2) 4-3-010:004 and 4-3-010:002.

LCA 3925D

LCA 3925D (Patent Grant 4177) was claimed by Hualii in 1839. The claimant received five pieces of land in Honokōwai and Honokōhau. Land Sections 1 and 2 are kalo lands in Wainalo which Hualii received from David Malo in 1839. Land Section 3, a kalo land in Honokōwai and Land Section 4, a salt land in the ahupua'a of Kahanaiole, were given to the claimant by his parents in ancient times. Land Section 5 is taro land in Hana of Honokōhau, which Hualii received from his wife in the days of Kaahanui. The claimants title has never been disputed. This LCA include TMKs: (2) 4-3-010:004, 002.

LCA 3925H

LCA 3925H, patent grant #7945, was awarded to Kaaha and his heir Kehinalua in 1848. The LCA consisted of six lands in Honokowai, Kahana, and Mailepai. Land section 1 was used as Kalo land in Naunaunahawele. Land section 2 was used as a Kula land in Maile, Honokowai. Land section 3 was a house lot in Kahananui. Land sections 4 and 5 were used as kula land in Kahananui. Land section 6 was used as kula land in Mailepai. The claimant received land sections 1-5 from his parents in ancient times, and the 6th from Kaala in 1848. The LCA includes TMK: (2) 4-3-005:029.

LCA 3925M

LCA 3925M, patent grant #4919, was awarded to Lili in 1848. The LCA consisted of six pieces of land. Land section 1 was used as a house lot, while Land Sections 2-6 were used as kula uala. The claimant received the lands from his parents who possessed them from the days of Kamehameha I. Lili's title has never been disputed. The LCA includes TMK: (2) 4-3-005:029.

PREVIOUS ARCHAEOLOGY

Although no archaeological projects have been conducted within the project area, at least seven archaeological projects have been conducted near the area (Figure 5). The first archaeological study of the Kahana area was conducted by W. Walker on an island-wide survey that took place in 1931. Focused on monumental coastal sites, Walker noted a destroyed heiau at Kahana Point (Walker Site No. 12), one heiau that was washed away at Mailepai Point (Walker Site No. 13), and another destroyed heiau, named Hihiho which was located along a country road near Kalaeokaea Point (Walker Site 14). There has been no on-ground confirmation of these structures since Walker's initial survey (Walker 1931).

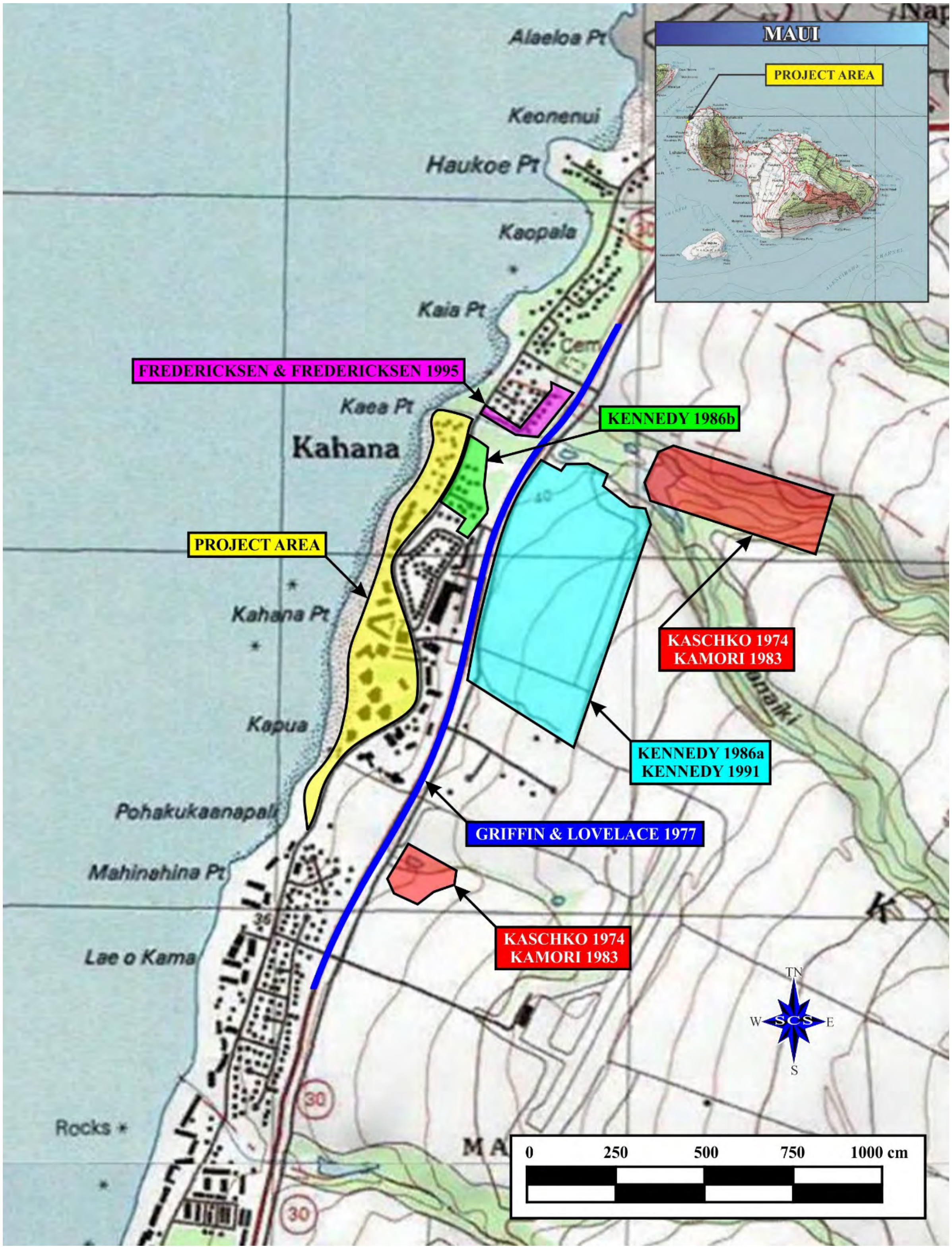

Figure 5: USGS Quadrangle (Kaanapali, HI 1992: 1:24,000) Showing Previous Archaeology in the Vicinity of the Project Area.

Much archaeological work has been located in the gulches of the Kahana area, and provides overlapping lines of evidence for land use and habitation in the area. In 1974, Michael Kaschko of the Bishop Museum conducted a walk-through of select gulches for the U.S. Soil Conservation Service in conjunction with the Wailuku Flood Prevention Project and the Honolua Watershed. Kaschko's survey "noted numerous stone walls, terraces, alignments and a historic midden," (Kaschko 1974:4,5; cited in Pestana and Dega 2009:10).

In 1977, Archaeological Research Center Hawai'i, Inc. (Griffin and Lovelace 1977) conducted survey and salvage excavations on select areas of Māhinahina Gulch for the Hawai'i Department of Transportation. Five gulches were surveyed and a total of five archaeological sites were located (Griffin and Lovelace 1977:11), and given State Site numbers. Griffin and Lovelace (l 977) were interpreted as pre-Contact walls, one of which was previously identified by Kaschko (1974).

In 1983, the Bishop Museum (Komori 1983) conducted archaeological investigations that included surface surveys and inspections of backhoe-disturbed soil in Kahana gulch [TMK: (2) 4-3-01:por 31]. The work was done under contract to the U.S. Soil Conservation Service and was a follow-up to Kaschko's 1974 project. Seven sites were recorded by Komori's during these investigations: These included an overhang shelter coupled with a 10 meter long segment of terraced earth, a platform bordered by terraces, a wall segment and two stone alignments, wall segments and terraces, a floodplain partitioned off from the rest of the landscape by stone walls and terraces, walls of stacked stone and a rock shelter containing a hammer stone or unfinished 'ulu maika (traditional Hawaiian game stone) (Komori 1983:8).

Four projects conducted by Archaeological Consultants Hawaii (Kennedy 1986a, b, 1990, 1992) were located in mauka side of Lower Honoapiʻilani Rd.; [TMK: (2) 4-3-005:013]. Kennedy's first visit to the area in September of 1986 investigated and confirmed the ruins of a stone church dating to the mid-nineteenth century. Although Kennedy could find no record of a graveyard attached to the church, nor marked graves at the site, he could not discount the possibility of unmarked graves near the church (Kennedy 1986a:1-5). In November 1986, Kennedy made a return visit to the area to take photographs, map the site, and search for burials. No burials were found on the property (Kennedy 1986b:1-5). In 1990, Kennedy returned to the area for the third time to conduct an archaeological inventory survey of 50 acres of land near Kahana Ridge Subdivision; [TMK: (2) 4-3-001:031]. The survey found two new sites: a two-tiered basalt rock platform placed over a human burial and a petroglyph on a large boulder were identified (Kennedy 1992:4).

In 1995, Fredericksen and Fredericksen conducted extensive investigations of a 4-acre parcel located to the north/northeast of the current SCS project area in [TMK: (2) 4-3-005:071]. A total of twenty-two stratigraphic trenches were mechanically (backhoe) excavated and two test units were manually excavated by researchers, all of which produced negative results. One historic site (State Site 50-50-01-4069) consisting of a stone bridge footing and retaining wall, a section of the old Pioneer Mill railway (Site -6478), and an historic grave site (State Site 50-50-01-4072) were identified during the investigations. Fredericksen and Fredericksen (1995:20) state that there was no evidence of *in situ* historic or indigenous cultural deposits across the investigated parcel, as a majority of the parcel was grubbed and filled in recent times.

SCS (Pestana and Dega (2008) conducted an Archaeological Inventory Survey of a 5.18-acre property in Mailepai Ahupuaʻa, Lahaina (Kāʻanapali) District, Island of Maui [TMK: (2) 4-3-001:069]. The Inventory Survey resulted in the identification of a segment of the Historic Pioneer Mill Railroad (State Site 50-50-03-6478) which extends along the western flank of the parcel. The survey also re-located and documented the previously identified Mailepai Cemetery (State Site 50-50-03-6482). The small historic family cemetery is located at a southeast portion of the parcel, adjacent a chain link fence that borders the parcel along Honoapiʻilani Highway.

ARCHAEOLOGICAL FIELD INSPECTION

METHODS

The purpose of the archaeological field inspection was to identify any potential historic properties within the proposed project area that may be affected by the ground-disturbing activities associated with sand dredging and construction of the T-head groins and beach nourishment. The archaeological field inspection was conducted by SCS archaeologist Derek Butler, B.A., under the supervision of Michael Dega, Ph.D., Principal Investigator, on December 18, 2019.

Field methodology included a review of previously conducted archaeological studies. One archaeologist conducted the pedestrian survey of the project area during high tide, beginning at the south end and finishing in the north end. Photographs were taken to record the state of the shoreline and the built environment that would be impacted by this project (working south to north). No subsurface testing was performed during the field inspection.

RESULTS

In recent years, Maui’s shoreline has experienced chronic erosion due to rising sea levels (Romine et al. 2013). This chronic erosion has led to narrowing beaches, which has impacted the infrastructure and buildings along the coast (Figures 6 through 15) . Historically, the response to erosion has been the construction of seawalls or revetments to protect at-risk developments. However, this type of shoreline armoring has contributed to a cumulative loss of sandy beaches and shoreline access. At Kahana Bay, the condominium complexes built close to the shorelines are threatened by erosion. No historic properties were identified during the archaeological field inspection

RECOMMENDATIONS

The current planned modifications will impact the shoreline, as well as the built environment within the project area. No pre-Contact or Historic Period archaeological sites or cultural materials were identified during the field investigation. Due to the negative findings, an archaeological inventory survey is not recommended for the project area in advance of the project. Based on the findings of the previous archaeological work conducted in the vicinity of the current project area, and the findings of archaeological work conducted in similar environments throughout the Hawaiian Islands, there is a high potential that historic properties, including artifacts associated with marine resource procurement, temporary habitation, tool manufacture, and traditional native Hawaiian human burials, may be encountered in subsurface contexts. Thus, a program of archaeological monitoring is recommended during all ground disturbing activities associated with the Kahana Bay Erosion Mitigation project.

Figure 6: Coastal Photographic View of S-Turns Beach and the Side Angle of a Resident Property at the Noelani Resort. View to the Southwest.

Figure 7: Photographic Overview of the West Maui Coastline. View to the South Towards S-Turns Beach.

Figure 8: Photographic Overview of Kahana Beach is in the Foreground, Sands of Kahana and Valley Isle are also Visible. View to the North.

Figure 9: Photographic Overview of a Portion of the West Maui Coastline. Valley Isle Resort and the Sands of Kahana are in the Foreground. View to the North.

Figure 10: Photographic View of the Seaward Side of Part of the Royal Kahana and Sandbags Along the Shoreline. View to the North.

Figure 11: Coastal Photographic View of a Seaward Facing Portion of the Hololani Resort and Sandbags Along the Shoreline. View to the North.

Figure 12: Coastal Photographic View of a Path in Front of the Seaward Facing Portion of the Hololani Resort and the Pohailani. Note the Sandbags Along the Shoreline. View to the North.

Figure 13: Coastal Photographic View of a Portion of the Kahana Village. View to the South.

Figure 14: Coastal Photographic View of a Portion of the Kahana Outrigger and Boulders Lining the Shore. View to the South.

Figure 15: Coastal Photographic View of a Portion of the Kahana Village from the Beach. View to the North.

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Appendix H:

Cultural Impact Assessment

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FINAL
Cultural Impact Assessment for the Kahana Bay Erosion Mitigation Project Kahana Ahupuaʻa, Lāhainā District, Maui TMKs: [2] 4-3-005:008, 009, 019, 020, 021, 029, 031; 4-3-010:001, 002, 004, 007, 009

Prepared for
Oceanit Coastal Corporation

Prepared by
Chantellee Konohia Spencer, B.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.
Kailua, Hawaiʻi
(Job Code: KAHANA 7)

November 2020

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Management Summary

Reference	Cultural Impact Assessment for the Kahana Bay Erosion Mitigation Project, Kahana Ahupuaʻa, Lāhainā District, Maui Island, TMKs: [2] 4-3-005:008, 009, 019, 020, 021, 029, 031; 4-3-010:001, 002, 004, 007, 009 (Spencer and Hammatt 2019)
Date	November 2020
Project Number(s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: KAHANA 7
Agencies	Office of Environmental Quality Control (OEQC)
Land Jurisdiction	County/State/Private
Project Proponent	State of Hawaiʻi
Project Location	The project area encompasses portions of Kahana Bay and Kahana Beach. Kahana Beach is located along the coastline of West Maui, north of Honokōwai and south of Nāpili. Kahana Beach is approximately 3,500 feet (ft) in length and is bounded by Kahana Stream mouth to the north and Pōhaku “S-Turns” Beach Park to the south. To the west, a submerged fringing reef separates the beach from the Pacific Ocean. The condominium and residential buildings occupy the narrow strip of land between the shoreline and Lower Honoapiʻilani Road.
Project Description	**<u>Purpose of the Project</u>** The purpose of the project is to devise a regional approach to mitigate coastal erosion at Kahana Bay. Kahana Bay has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront land, buildings, infrastructure, and amenities. Analysis of historical aerial images indicates the Kahana Bay shoreline recedes at an average rate of about 1 ft per year (Fletcher et al. 2003). **<u>Proposed Action</u>** The plan includes nourishing the beach with 50,000 to 100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas. The beach nourishment project would widen the beach to between 35-150 ft (approximately 50 ft average width) to provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors. The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The layout of the proposed beach stabilization structures remains in the design phase and will depend on benthic, archaeological, cultural, and other

	studies conducted as part of the Environmental Impact Statement (EIS) process. **Construction Methods** The following description outlines potential construction methods for the proposed beach restoration. Construction methods may significantly change if an alternative erosion mitigation scheme is ultimately selected. The sand source for the beach nourishment will come from nearby offshore sand deposits identified as compatible sand in the 2016 Feasibility Study (County of Maui 2016). A barge or pipeline will be used to transport the sand to shore depending upon whether hydraulic or mechanical dredging is conducted at the sand source. If a hydraulic method is used, a sand/water slurry may need to be dewatered in a temporary settling basin on or near the beach prior to sand being graded to its final configuration. To initiate the construction activities, equipment (e.g., dump trucks, backhoes, excavators or similar machines) will access the beach from the roadway through the public access way located between the Kahana Beach Resort and Sands of Kahana properties. The beach will be restored in phases along the length of the bay; as the beach is nourished and stabilized, the construction equipment will have sufficient width to traverse further along the coastline. Each section would be constructed in a step-wise progression, from south to north, until the entire shoreline project area is nourished with sand held by retaining structures. Construction equipment will primarily be limited to the nourished portions of the beach and the staging access and routes will be clearly indicated during construction activity. In-water floating sediment containment barriers will be placed around dredge and construction areas to minimize turbidity and protect water quality. In addition, a water quality monitoring plan will be implemented. **Expected Community Impacts** The proposed action may benefit the Maui community by mitigating the beach and shoreline erosion that currently poses a risk to public safety and property (County of Maui 2016). The restored public beach area would expand the potential recreational use for residents and visitors. Sea turtles and monk seals may also utilize the restored beach as a haul out area. The project engineers may design the beach stabilization structures to incorporate artificial reef elements that promote coral establishment and create microhabitats for fish and invertebrates (Foley et al. 2014). The structures could also provide new resources to fishers and gatherers. The costs of the project include the loss of community resources in the footprint of the

	proposed beach fill and stabilization structures. The EIS will further identify the expected community costs and benefits of the proposed project.
Project Acreage	The project area consists of approximately 110.8 acres (44.8 hectares).
Document Purpose	The purpose of this cultural impact assessment (CIA) is to comply with the State of Hawaiʻi's environmental review process under Hawaiʻi Revised Statutes (HRS) §343, which requires consideration of the project's potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts on cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts*), which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawaiʻi significance Criterion e, pursuant to Hawaiʻi Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and§13-284-6). The document will likely also support the project's historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project's environmental review and may also serve to support the project's historic preservation review under HRS §6E-8 and HAR §13-284.
Results of Community Consultation	CSH attempted to contact 67 Native Hawaiian Organizations (NHOs), agencies, and community members. Of the 14 people who responded, two submitted written testimony, and two participated in formal interviews for more in-depth contributions to the CIA. 1. Foster Ampong, Lineal Descendant of Kekaʻa 2. Felimon Sadang, *Kamaʻāina* of Kahana, Fisherman 3. Etan Krupnick, *Kamaʻāina* of Kahana 4. Jacinth Lum Lung, *Kamaʻāina* of Kahana
Results of Background Research	Background for this project yielded the following results (presented in approximately chronological order): 1. The project area is located on the shores of Mauna Kahalawai, (West Maui Mountains) in the Kahana Ahupuaʻa and Lāhainā District. The project area is north of

	historic Lāhainā Town. Kahana is bordered by Mailepai Ahupua‘a to the north and Mahinahina 4 Ahupua‘a to the south. The *mauka* (inland) portion is bordered by the *ahupua‘a* (traditional land division usually stretching from the mountains to the sea) of Honokahua at the northeast and Honokōwai at the southeast 2. The most imposing geological features surrounding the project area are the West Maui Mountains. Macdonald, Abbot, and Peterson (1983:50) indicate that there are three volcanic series that comprise the shield volcano making up the West Maui Mountains. The Wailuku Volcanic Series is the oldest. Next in age is the Honolua Volcanic Series and the youngest rocks are associated with the Lāhainā Volcanic Series. 3. The *kalana* (division of land smaller than a district) of Lāhainā has been known by three other names in the past: “Nā-hono-a-Pi‘ilani”, “Lele”, and “Keka‘a”. 4. Pu‘u Keka‘a, also referred to as Black Rock, is a popular feature in Lāhainā. This rock formation that juts out to sea is considered a sacred *leina*, a place where spirits could “leap” into the nether world (Pukui and Elbert 1986). 5. Though numerous *heiau* (pre-Christian place of worship) were recorded in Lāhainā, only two have been noted in Kahana. These *heiau* are Hihiho and Kahana and have both been destroyed. 6. In the *mo‘olelo* of Māui, he wrangles the rays of the sun (Moemoe) and forces it to travel slowly through the sky. The purpose was to allow his mother and others enough time to complete their daily tasks. Māui breaks one of Moemoe’s rays, which immediately turned to stone once it hit the ground. This stone can be seen *makai* (towards the ocean) of the current Sheraton Maui Resort and Spa. 7. Kaka‘alaneo was an early ruler of Maui who directed his attention to agriculture and the domestic industry (Nakuina 1904:53). Kaka‘alaneo was famous for planting the highly valued breadfruit grove of Lāhainā known throughout the Hawaiian Islands as Malu Ulu o Lele (“the shady breadfruit grove of Lele [Lāhainā]”). 8. Pi‘ilani was the famous *ali‘i nui* (high chief) of Maui known for his peaceful rule of Maui, Moloka‘i, and Lana‘i. 9. During the wars of unification, Lāhainā continued to serve as a political center as the place in which Kamehameha I established his seat of government. A two-story brick house was constructed at the Lāhainā landing (*makai* of the present-day public library, further south of the project area)

for the use of the king, when his travels brought him to Lāhainā. Kamehameha I sailed his fleet of war canoes to Lāhainā in 1802, consecrated several *heiau*, and collected taxes.

10. With the unification of the Hawaiian Islands in 1791, the town of Lāhainā and the surrounding landings played a prominent role in the early economy of the Kingdom. The lands surrounding Lāhainā town were cultivated in commercial sugar (Gilmore 1931:198-203), while the whale trade, Irish potato trade (Gilman 1906), and establishment of the Lāhainā Mission Station and Lāhaināluna Seminary, drew people to the water front areas which ultimately resulted in a population rise (Haun and Henry 2001).
11. Land Commission Award documentation LCA 3925M:1 was awarded to Lili and includes a house lot. The detail of the Māhele Record states that the claimaint inherited these lands from his parents who were caretakers from the days of Kamehameha I. LCA 3925D:2 was awarded to Hualiʻi and included *loʻi* in the *ʻili* of Wainalo. The details state that he received this particular parcel from his parents in "ancient times". LCA 3925H:3 was awarded to Kaʻaha and his son, Kehunalua. This parcel was a house lot in Kahananui which the claimant received from his parents. The last LCA claim within the project area is LCA 3925I:1 which belonged to Pala. This parcel was a salt patch in Kahanaiole.The claimant received these lands from his parents.
12. By 1855, land use in the areas surrounding the major port towns of Lāhainā, Wailuku, and Hāna was changing. The whaling industry had seen its best days and by 1860, the progressive scarcity of whales led to the industry's fall.
13. With the decline of the whaling industry in the Pacific, the Hawaiian Islands attracted a new generation of managers, professionals, and entrepreneurs who would reshape the landscape for Western pursuits. Samuel T. Alexander and Henry Perrine Baldwin were prominent in this movement. In 1876, the duo started a project that brought water from East Maui to the dry leeward isthmus of Central Maui. It was the first major irrigation project throughout the Hawaiian Islands, which was later repeated by other entrepreneurs.
14. By 1936, the Pioneer Mill Company was either employing or housing 65% of the total population of Lāhainā. A sugar analyst noted that "not only were good living quarters

	supplied [to] employees of all classes, but attention is given social welfare and recreational facilities" (A.B. Gilmore 1936:202). In addition, a well-equipped hospital with regular medical staff and free medical was available to employees and their families. 15. In the years immediately following statehood in 1959, the Kāʻanapali area north of Lāhainā was master planned as a resort destination. The parent company of the Pioneer Mill Company, American Factors [AmFac], developed the cane lands located in Kāʻanapali into the Royal Kāʻanapali Golf Course and the first hotel along the coastline, the Sheraton Maui Hotel, opened on Kāʻanapali Beach in 1963. Some 325 prime acres, including the promontory of Puʻu Kekaʻa, was dedicated to the project.
Identification of Cultural Practices	Community consultation conducted as part of this CIA have identified the following cultural, historical, and natural resources where cultural practices (including traditional and customary native Hawaiian rights) are being exercised within the project area: 1. Mr. Foster Ampong mentioned that though fewer people gather (dive/fish) from within the project area, *kuleana* families who live just outside of the project area still dive and fish along the coast 2. Mr Etan Krupnick gathers from the coast and surfs out in Kahana Bay. He has gathered *ulua*, *pāpio*, *ʻōmilu*, *moano*, schools of *ʻōʻio*, *moi*, *kala*, octopus, *opihi*, *wana*, *limu*, *ʻōpelu*, and *ahi* from Kahana Bay. 3. Mr. Jacinth Lum Lung has lived in Kahana for most of his life and aside from gathering at the shore, he and his family also surf from "S-Turns" to Napili Point. He shared that there are alot of beautiful and undisturbed breaks on the outer reef. Based on the results of community consultation and background research conducted as part of this CIA, CSH has identified the following on-going cultural practices within the project area: 1. Gathering of ocean resources 2. Fishing for ocean resources 3. Diving for ocean resources 4. Surfing
Identification of Impacts to Cultural Practices	Community members that participated in this CIA have noted the potential for cultural impacts as follows: 1. Mr. Felimon Sadang is against the movement of sand from outer regions for replenishment as it will be destructive to the

	in-shore species and may have rippling effects along the coast. 2. Mr. Felimon Sadang believes the placement of any beach stabilization structure will affect the natural movement of the sand washing in and out with the tides. 3. Mr. Etan Krupnick is against the building of sea walls as he says it will destroy the coastline which is still thriving with sea life. Based on the results of community consultation, CSH has identified the following potential cultural impacts related to the proposed project: 1. The project has the potential to impact gathering of near-shore ocean resources including from fishing and diving 2. The project has the potential to impact the ocean environment and the natural processes of beach erosion and accretion.
Mitigation Recommendations	Community members that participated in this CIA have provided the following recommendations: 1. Mr. Ampong strongly recommends a marine environmental impact study be conducted before any movement of sand takes place. If a marine environmental impact study is not conducted, he does not support this project. 2. Mr. Sadang believes that some kind of beach nourishment is necessary, however, he has witnessed the beach come and go seasonally and ultimately believes the placement of any beach stabilization structure will affect the natural movement of the sand washing in and out with the tides. Based on the results of community consultation and CSH's expertise in conducting cultural impact assessments, the following actions are recommended to promote and preserve cultural beliefs, practices, and resources of Native Hawaiian and other ethnic groups: 1. A marine environmental study including evaluation of the effected adjacent marine habitat to be undertaken and followed up with periodic monitoring and reporting to allow evaluation of the effects of the project on the adjacent marine biota. The results of this study would be useful in evaluation and planning for the potential effects of future projects of this kind which will become more frequent throughout the shorelines of the Hawaiian Islands as the effects of rising sea levels become more prominent. 2. Further consultation with community members which could take the form of a community advisory group which is

	informed of and involved in all aspects of planning and implementation of the project. A specific community member could be appointed in consultation with the involved community and project representatives to serve as a cultural monitor and liaison between the project proponent and the community and monitor daily activities. 3. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* (Native Hawaiian skeletal remains) are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended. 4. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance. These recommendations have the potential to mitigate impacts of the proposed project.

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Section 1 Introduction

1.1 Project Background

At the request of Oceanit, Cultural Surveys Hawaiʻi, Inc. (CSH) is conducting a cultural impact assessment (CIA) for the Kahana Bay Erosion Mitigation Project, Kahana Ahupuaʻa, Lāhainā District, Maui, Tax Map Keys (TMKs): [2] 4-3-005:008, 009, 019, 020, 021, 029, 031; 4-3-010:001, 002, 004, 007, 009. The project area consists of approximately 110.8 acres encompassing portions of Kahana Bay and Kahana Beach. Kahana Beach is located along the coastline of West Maui, north of Honokowai and south of Nāpili. Kahana Beach is approximately 3,500 feet (ft) in length and is bounded by Kahana Stream mouth to the north and Pōhaku "S-Turns" Beach Park to the south. To the west, a submerged fringing reef separates the beach from the Pacific Ocean. The condominium and residential buildings occupy the narrow strip of land between the shoreline and Lower Honoapiʻilani Road. The project area is depicted on a portion of the 1997 Napili and 1992 Lahaina U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Figure 1), a tax map plat (Figure 2), and a 2015 aerial photograph (Figure 3).

Purpose of the Project

The purpose of the project is to devise a regional approach to mitigate coastal erosion at Kahana Bay. Kahana Bay has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront land, buildings, infrastructure, and amenities. Analysis of historical aerial images indicates the Kahana Bay shoreline recedes at an average rate of about 1 ft per year (Fletcher et al. 2003).

The long-term coastal erosion trend is attributed to factors including tropical storm and hurricane events, land subsidence, changes in sediment supply, prevalent wind and wave patterns, runoff drainage in the area, and rising sea levels. Episodes of rapid erosion caused by severe wave and current conditions have led to the installation of a variety of shore protection measures including sandbag revetments, seawalls, sand dune restoration, and sheet-pile structures on properties along Kahana Bay.

Ongoing studies are evaluating several alternatives for erosion mitigation such as shoreline armoring, beach restoration, and managed retreat. Currently, the preferred alternative and proposed action is beach restoration, which includes beach nourishment with stabilization structures.

Proposed Action

The Kahana Bay Steering Committee (KBSC) represents the nine oceanfront condominiums and one *kuleana* parcel along the Kahana Bay coastline. In consultation with the Maui County Planning Department, the KBSC has developed an approach to restore, rehabilitate, and preserve the sandy beach along the bay. The plan includes nourishing the beach with 50,000 to 100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas (Figure 4). The beach nourishment project would widen the beach to between 35-150 ft (approximately 50 ft average width) to provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors.

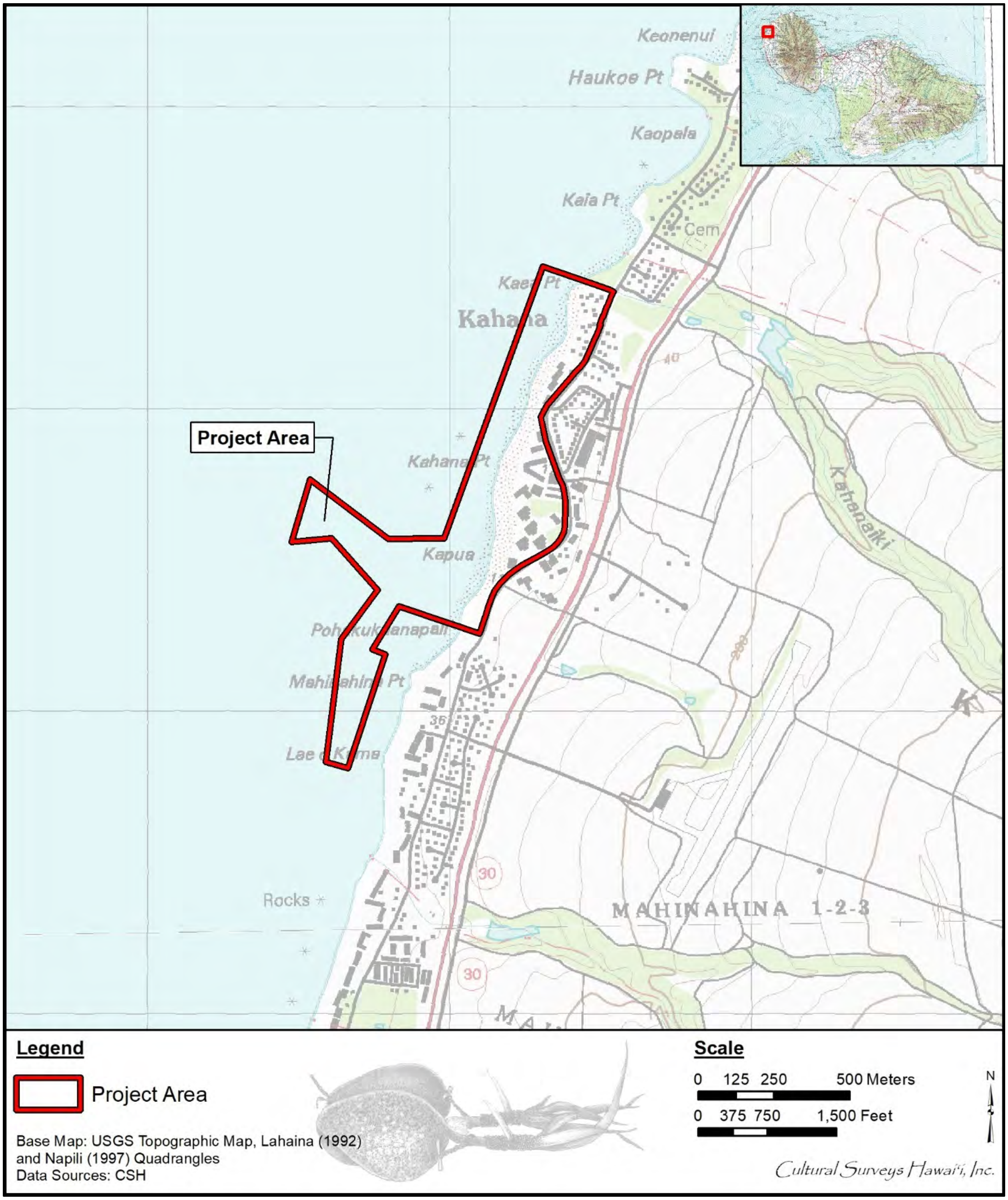

Figure 1. Portion of the 1992 Lahaina and 1997 Napili USGS 7.5-minute topographic quadrangles showing the location of the project area

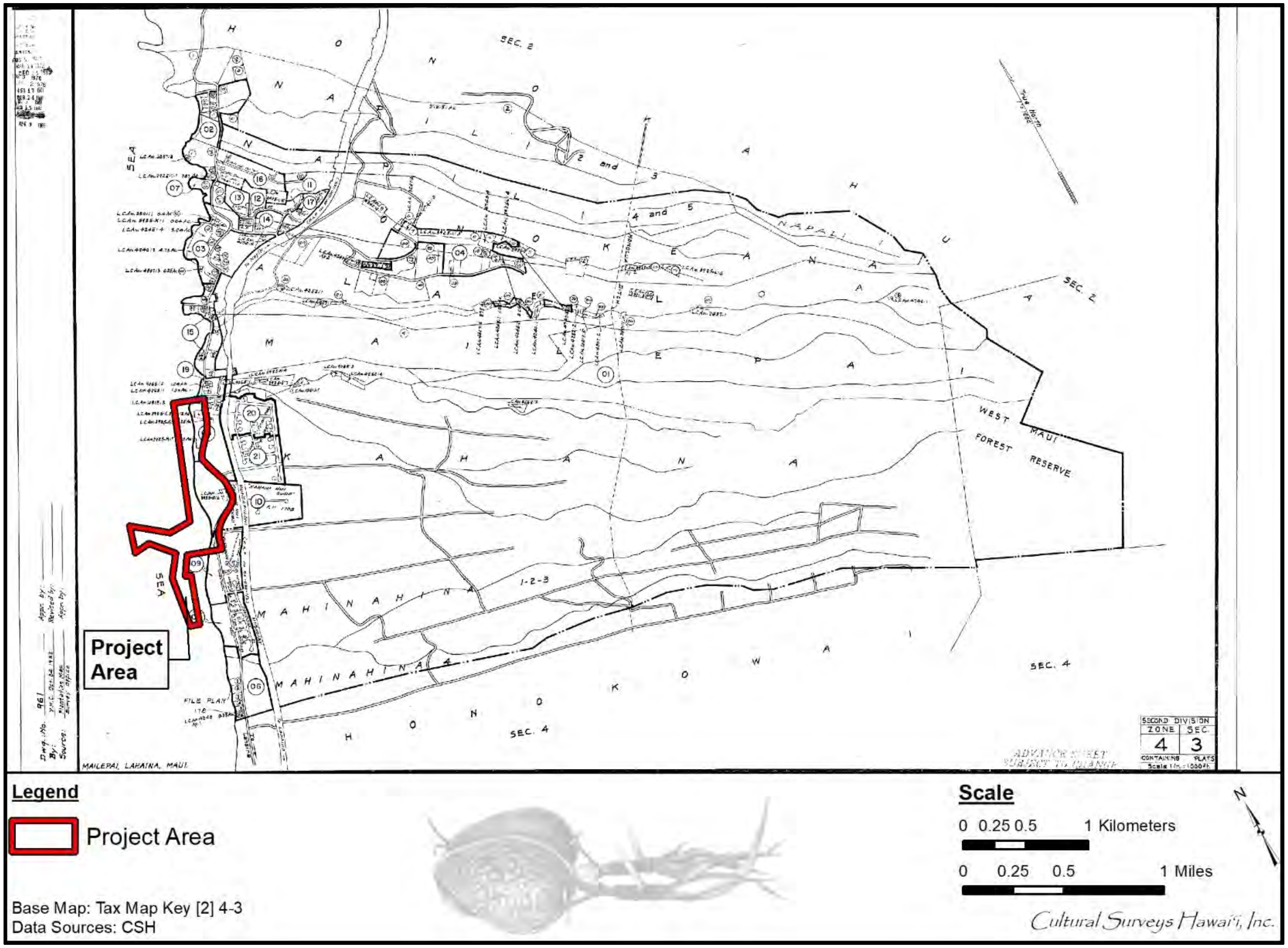

Figure 2. TMK: [2] 4-3 showing the project area (Hawai‘i TMK Service 2014)

Figure 3. Aerial photograph showing the location of the project area (ESRI Web Server 2015)

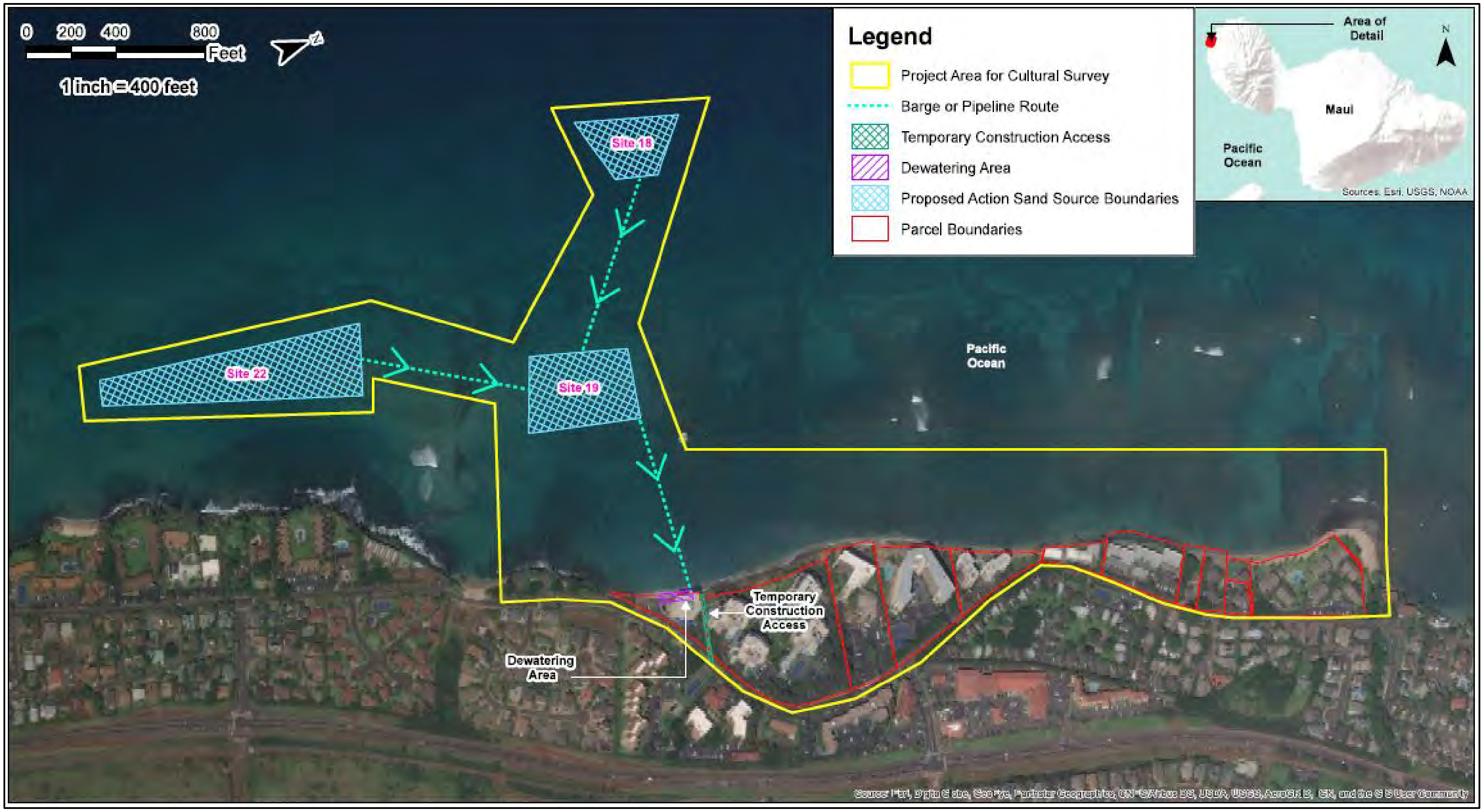

Figure 4. Aerial photograph depicting proposed sand borrowing areas, construction access and egress route, and proposed dewatering area (courtesy of client)

The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The layout of the proposed beach stabilization structures remains in the design phase and will depend on benthic, archaeological, cultural, and other studies conducted as part of the Environmental Impact Statement (EIS) process.

Construction Methods

The following description outlines potential construction methods for the proposed beach restoration. Construction methods may significantly change if an alternative erosion mitigation scheme is ultimately selected.

The sand source for the beach nourishment will come from nearby offshore sand deposits identified as compatible sand in the 2016 Feasibility Study (County of Maui 2016). A barge or pipeline will be used to transport the sand to shore depending upon whether hydraulic or mechanical dredging is conducted at the sand source. If a hydraulic method is used, a sand/water slurry may need to be dewatered in a temporary settling basin on or near the beach prior to sand being graded to its final configuration.

To initiate the construction activities, equipment (e.g., dump trucks, backhoes, excavators or similar machines) will access the beach from the roadway through the public access way located between the Kahana Beach Resort and Sands of Kahana properties. The beach will be restored in phases along the length of the bay; as the beach is nourished and stabilized, the construction equipment will have sufficient width to traverse further along the coastline. Each section would be constructed in a step-wise progression, from south to north, until the entire shoreline project area is nourished with sand held by retaining structures. Construction equipment will primarily be limited to the nourished portions of the beach and the staging access and routes will be clearly indicated during construction activity. In-water floating sediment containment barriers will be placed around dredge and construction areas to minimize turbidity and protect water quality. In addition, a water quality monitoring plan will be implemented.

Expected Community Impacts

The proposed action may benefit the Maui community by mitigating the beach and shoreline erosion that currently poses a risk to public safety and property (County of Maui 2016). The restored public beach area would expand the potential recreational use for residents and visitors. Sea turtles and monk seals may also utilize the restored beach as a haul out area. The project engineers may design the beach stabilization structures to incorporate artificial reef elements that promote coral establishment and create microhabitats for fish and invertebrates (Foley et al. 2014). The structures could also provide new resources to fishers and gatherers. The costs of the project include the loss of community resources in the footprint of the proposed beach fill and stabilization structures. The EIS will further identify the expected community costs and benefits of the proposed project.

1.2 Document Purpose

The purpose of this CIA is to comply with the State of Hawaiʻi's environmental review process under Hawaiʻi Revised Statutes (HRS) §343, which requires consideration of the project's potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts on cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts*), which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawaiʻi significance Criterion e, pursuant to Hawaiʻi Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation review under HRS §6E and HAR §13-275 and §13-284. The document is intended to support the project's environmental review and may also serve to support the project's historic preservation review under HRS §6E-8 and HAR §13-284.

1.3 Scope of Work

The scope of work for this CIA includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices in or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 Natural Environment

The project area is located on the shores of Mauna Kahalawai, (West Maui Mountains) in the Kahana Ahupuaʻa and Lāhainā District. The project area is north of historic Lāhainā Town and the *kalana* of Lāhainā. Kahana is bordered by Mailepai Ahupuaʻa to the north and Mahinahina Four Ahupuaʻa to the south. The *mauka* portion is bordered by the *ahupuaʻa* of Honokahua at the northeast and Honokōwai at the southeast.

The most imposing geological features surrounding the project area are the West Maui Mountains. Macdonald et al. (1983:50) indicate there are three volcanic series that comprise the shield volcano making up the West Maui Mountains. The Wailuku Volcanic Series is oldest, dating between ca. 1.27 and 1.30 million years ago (mya). Next in age is the Honolua Volcanic Series dated between ca. 1.15 and 1.17 mya. The youngest rocks are associated with the Lāhainā Volcanic Series dated to ca. 1.03 mya. The current geological appearance of the West Maui Mountains is the result of a complex series of erosional periods and volcanic eruptions followed by cessation of volcanic activity and continued erosion and cutting of deep valleys. The summit of West Maui represents the remnant of a highly eroded and scoured caldera. Stream erosion of the West Maui volcano has reached the late youthful to sub-mature stage according to MacDonald and others (1983). Alluvial fans fringe the eastern and southwestern sides of the mountain. Alluvial fans along the eastern side are due in part to “loss of water from the streams to the permeable lavas of Haleakala that have built the [central] Maui isthmus. . . ” while those along the southwestern side “have built out the shoreline with debris transported and deposited by steams in greater volume than is removed by waves and ocean currents. . .” (MacDonald et al. 1983:387).

1.4.2 *Lepo* (Soils)

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), the project area’s soils consist of Lahaina silty clay, 7 to 15% slopes (LaC), Lahaina silty clay, 3 to 7% slopes (LaB), Jaucas sand, 0 to 15% slopes (JaC), Ewa silty clay loam, 0 to 3% slopes (EaA), and Pulehu clay loam, 0 to 3% slopes (PsA). Figure 5 illustrates the various soil sediments within the project area.

Soils of the Lahaina Series are described as follows:

> This series consists of well-drained soils on uplands on the islands of Lanai, Maui, Molokai, and Oahu. These soils developed in material weathered from basic igneous rock. They are nearly level to steep. Elevations range from 10 to 1,500 feet. […] These soils are used for sugarcane and pineapple. Small acreages are used for truck crops, pasture, homesites, and wildlife habitat. The natural vegetation consists of bermudagrass, feather fingergrass, ilima, kiawe, lantana, oi, and uhaloa. [Foote et al. 1972:78]

Soils of the Jaucas Series are described as follows:

> This series consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean. These soils occur on all the islands of this survey area. They developed in wind- and water- deposited sand from coral and seashells. They are nearly level to strongly sloping. Elevations range from sea level to 100 feet, […] These soils are used for pasture, sugarcane, truck crops, alfalfa, recreational areas, wildlife habitat, and urban development. The natural vegetation consists of kiawe, koa haole, bristly foxtail, bermudagrass, fingergrass, and Australian saltbush. [Foote et al. 1972:48]

Soils of the Ewa Series are described as follows:

> This series consists of well-drained soils in basins and on alluvial fans on the islands of Maui and Oahu. These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from near sea level to 150 feet. […] These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass, kiawe, koa haole, klu, and uhaloa. [Foote et al. 1972:29]

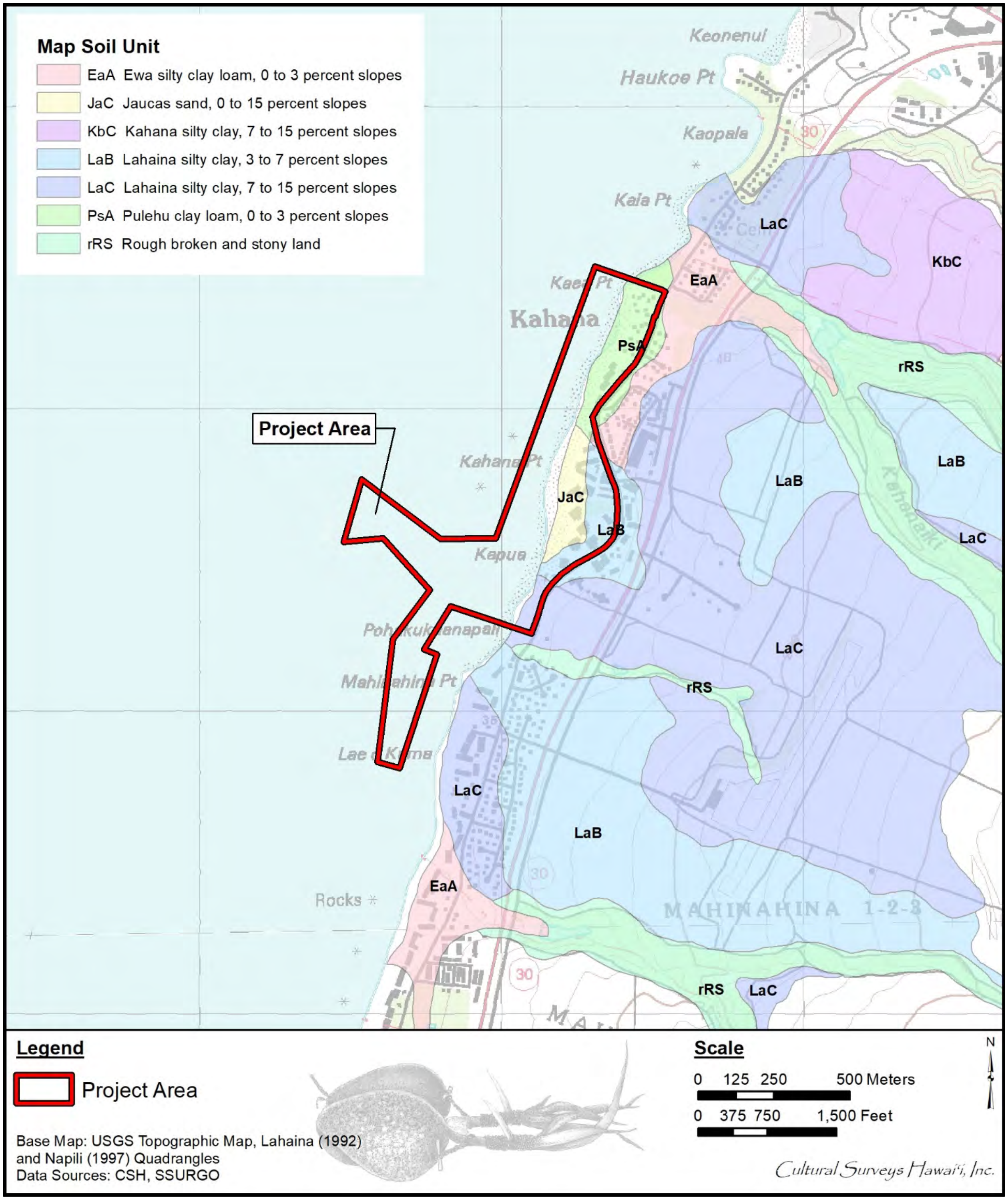

Figure 5. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the project area (USDA SSURGO 2001)

Soils of the Pulehu Series are described as follows:

> This series consists of well-drained soils on alluvial fans and stream terraces and in basins. These soils occur on the islands of Lanai, Maui, Molokai, and Oahu. They developed in alluvium washed from basic igneous rock. The soils are nearly level to moderately sloping. Elevations range from nearly sea level to 300 feet. […] These soils are used for sugarcane, truck crops, pasture, homesites, and wildlife habitat. The natural vegetation consists of bermudagrass, bristly foxtail, fingergrass, kiawe, klu, lantana, koa haole, and sandbur. [Foote et al. 1972:115]

1.4.3 *Makani* (Wind)

The Hawaiian word for wind is *makani*. The Wind Gourd of Laʻamaomao tells the story of Pākaʻa and his son Kuāpākaʻa. They were descendants of the wind goddess Laʻamaomao and with the possession of this special gourd, had the ability to control and call forth the winds of Hawaiʻi *pae ʻāina* (archipelago). Pākaʻa's chant traces the winds of Maui in the *moku* (district) of Lāhainā. The chant lists the winds near the project area from north to south:

I na pali aku o Kahakuloa,	The cliffs of Kahakuloa,
O Waiuli aku i Honolua,	Of Waiuli at Honolua,
Pohakea i Mahinahina,	Pohakea is at Mahinahina,
Lililehua i na pali,	Līlīlehua is at the cliffs,
He imihau ko Kekaa,	ʻImihau is of Kekaʻa,
Nahua i Kaanapali,	Nahua is at Kaʻanapali,
He unuloa i kela pea,	Unuloa fills the sail,
He maaa ko Lahaina,	Maʻaʻa is of Lahaina
Ke kau mai la i Kamaiki	Settling at Kamaiki

[Nakuina 1902:68; 1992:63–64]

1.4.4 *Ua* (Rain)

Precipitation is a major component of the water cycle accountable for depositing fresh water on local flora. Pre-Contact *kānaka ʻōiwi* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer), lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *hoʻoilo* (winter, rainy season), continues through the end of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more prevalent (Giambelluca et al. 1986:17). Typically, the maximum rainfall occurs in January and the minimum in June (Giambelluca et al. 1986:17).

Similar with naming their winds, Hawaiians also gave names to their rain, too. These names showed their action towards plants or the supposed effects on people or their possessions (Akana and Gonzalez 2015:xvi). There were many recognized rains in Lāhainā. These rains include Nahua, associated exclusively with Kahana, Paʻūpili, Hāliʻipili; and Kanikanilehua, all of which are described below and often mention the ancient name of Lāhainā, Lele. Though the rains mentioned are just a few, the actual number in Lāhainā are *nui ‘ino* (very many).

1.4.4.1 Nahua

Nahua is also the name of a wind associated with Kā‘anapali; a nearby *ahupua‘a* (traditional land division) also on the Western coast of Maui. The following *mele* (song) was composed for Lunalilo and was sung when presenting *lei* (flower garland) (Akana and Gonzalez 2015:181).

Lei Hoeuli i ka ua o ka Nahua

Ua nanahu pō‘aha ‘ula i ke pili

Ka ua a ka ua ‘Ula nū i ka nahele

‘O ka wai ke kahe ala i kai o Lele ē, i laila

Translation:

Hoeuli wears a lei of rain from the Nahua

That struck and encircled the pili grass with red

The ‘Ula rain roars in the forest

The water is flowing seaward of Lele, there

[Akana and Gonzalez 2015:180]

1.4.4.2 Pa‘ūpili

A well-known rain of Lāhainā is Pa‘ūpili. The following *mele* is taken from the legend, *Ka Mo‘olelo o Hema* and mentions the Pa‘ūpili rain.

Lohia lau ‘ohe ia ka la‘i o Lele

E unuhia a oki me he wa‘a kioloa lā

Ka ‘ō‘ili o ka pua i ka mālie

‘Umea e ka lā i kāwalawala hiolo

Kākua iho ka ua Pa‘ūpili ē

‘Ae

Pili iho i ke kula o Keka‘a

Pili nānā i ka ua Leikoko‘ula

Translation:

The calm of Lele shines like ‘ohe leaves

Long and tapered like a kioloa canoe

Billowy clouds appear in the calm

Attracted by the sunligh that falls and scatters

The Pa‘ūpili rain envelops

Yes

Clinging to the plains of Kekaʻa

Clinging, resting in the Leikokoʻula rain

[Akana and Gonzalez 2015:223]

This wind is also mentioned in a farewell song for the Princess Nāhiʻenaʻena:

Kuʻu hoa mai ka malu ʻulu o Lele

Kuʻu hoa mai ka laʻe a ke Kiowea

Kuʻu hoa mai ka ua Paʻūpili o Lāhainā

Translation:

My companion from the shade of the ʻulu trees of Lele

My companion from the calm of the Kiowea wind

My companion from the Paʻūpili rain of Lāhainā

[Akana and Gonzalez 2015:223]

It is mentioned again in a different *mele*:

Nani Lāhainā i ka ua Paʻūpili

I pili aloha ʻia me ka makani he Maʻaʻa

Keikei Lāhainā i ka ua Paʻūpili

I pili aloha ʻia

E Maunahoʻomaha me Kekaʻa

Translation:

Beautiful is Lāhainā in the Paʻūpili rain

Joined lovingly by the Maʻaʻa wind

Lāhainā is glorious in the Paʻūpili rain

Held in the bonds of love

By Maunahoʻomaha and Kekaʻa

[Akana and Gonzalez 2015:224]

1.4.4.3 Hāliʻipili

This rain has been mentioned in association with an older name of Lāhainā, Lele.

To spread over a region, as a shower, like the spreading of a mat. Hāliʻipili i ke kula o Lele.

(*The shower exteneds over the plain of Lāhainā.)*

[Akana and Gonzalez 2015:34]

It was also briefly mentioned in a *mele kanikau* or lament. Laments often mention places, activities, winds or rains in memory of the deceased.

Kuʻu kaikamahine mai nā kai ʻewalu

Mai ka ua heʻe koko ʻula i ka moana

Mai ka ua Hāliʻipili o Lele

Translation:

My beloved daughter from the eight seas

From the fleeting rainbow rain over the ocean

From the Hāliʻipili rain of Lele

[Akana and Gonzalez 2015:34]

1.4.4.4 Kanikanilehua

Same as the Kanilehua rain most popular on Hawaiʻi island, this rain is also found in Kuʻia and Mākila, Maui (Akana and Gonzalez 2015:48). Kuʻia Ahupuaʻa is in Lāhainā and Mākila (beach) is also called Puamana Beach Park.

The following *mele aloha* (song of love) was written for Lāhaināluna Seminary:

Ka holo o Kuʻia a me Mākila

Kuʻu makua o ka ua Kanikanilehua

Mākila ka makua o ka ʻohu noenoe o Kuʻia

Translation:

And the trail of Kuʻia and Mākila

My mother of the pattering [Kanikanilehua] rain

Mākila was the mother of the [ʻohu] fog of Kuʻia

[Akana and Gonzalez 2015:48-49]

1.4.5 Built Environment

The built environment surrounding the project area consists primarily of resort hotels, condominiums, and vacation rentals along the coastline. The project area spans the coast of Kahana. The beachfront condos from Kahana Beach Resort to the south, to Kahana Village Vacation Rentals to the north are the boundaries of the project area. Large sand bags are present and stacked on the beach fronting some condominiums as a buffer of protection.

Section 2 Methods

2.1 Archival Research

Research centers on Hawaiian *kaʻao* (legends), *wahi pana* (storied places), *ʻōlelo noʻeau* (Hawaiian proverbs), *oli* (chants), *mele* (songs), traditional *moʻolelo* (stories), traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, previous archaeological reports, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawaiʻi State Archives, the Bishop Museum Archives, the University of Hawaiʻi at Mānoa's Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau.org 2014), the State Historic Preservation Division (SHPD) library, the State of Hawaiʻi Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona ʻAina Corporation's Māhele database (Waihona ʻAina 2000), the Office of Hawaiian Affairs (OHA) Papakilo Database (Office of Hawaiian Affairs 2015), and the Ava Konohiki Ancestral Visions of ʻĀina website (Ava Konohiki 2015).

2.2 Community Consultation

2.2.1 Scoping for Participants

We begin our consultation efforts by utilizing our previous contact list to facilitate the interview process. We then review an in-house database of *kūpuna* (elders), *kamaʻāina* (native born), cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior's NHO list), and community groups. We also contact agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response on the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts.

2.2.2 "Talk Story" Sessions

Prior to the interview, CSH cultural researchers explain the role of a CIA, how the consent process works, the project purpose, the intent of the study, and how their *ʻike* (knowledge) and *manaʻo* (thought, opinion) will be used in the report. The interviewee is given an Authorization and Release Form to read and sign.

"Talk Story" sessions range from the formal (e.g., sit down and *kūkā* [consultation, discussion] in the participant's place of choice over set interview questions) to the informal (e.g., hiking to cultural sites near the study area and asking questions based on findings during the field outing). In some cases, interviews are recorded and transcribed later.

CSH also conducts group interviews, which range in size. Group interviews usually begin with set, formal questions. As the group interview progresses, questions are based on interviewees' answers. Group interviews are always transcribed and notes are taken. Recorded interviews assist the cultural researcher in 1) conveying accurate information for interview summaries, 2) reducing misinterpretation, and 3) adding missing details to *mo‘olelo*.

CSH seeks *kōkua* (assistance) and guidance in identifying past and current traditional cultural practices of the study area. Those aspects include general history of the *ahupua‘a*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana*, archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*ka‘ao* and *mo‘olelo*); referrals; and any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area.

2.2.3 Interview Completion

After an interview, CSH cultural researchers transcribe and create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the transcription and interview summary to the interviewee for review and ask that they make any necessary edits. Once the interviewee has made those edits, we incorporate their *‘ike* and *mana‘o* into the report. When the draft report is submitted to the client, cultural researchers then prepare a finalized packet of the participant's transcription, interview summary, and any photos that were taken during the interview. We also include a thank you card and honoraria. This is for the interviewee's records.

It is important that CSH cultural researchers cultivate and maintain community relationships. The CIA report may be completed, but CSH researchers continuously keep in touch with the community and interviewees throughout the year—such as checking in to say hello via email or by phone, volunteering with past interviewees on community service projects, and sending holiday cards to them and their *‘ohana* (family). CSH researchers feel this is an important component to building relationships and being part of an *‘ohana* and community.

"*I ulu no ka lālā i ke kumu*—the branches grow because of the trunk," is an *‘ōlelo no‘eau* (#1261) shared by Mary Kawena Pukui with the simple explanation: "Without our ancestors we would not be here" (Pukui 1983:137). As cultural researchers, we often lose our *kūpuna* but we do not lose their wisdom and words. We routinely check obituaries and gather information from other informants if we have lost our *kūpuna*. CSH makes it a point to reach out to the *‘ohana* of our fallen *kūpuna* and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference.

Section 3 *Kaʻao* and *Moʻolelo*

Hawaiian storytellers of old were greatly honored; they were a major source of entertainment and their stories contained teachings while interweaving elements of Hawaiian lifestyles, genealogy, history, relationships, arts, and the natural environment (Pukui and Green 1995:IX). According to Pukui and Green (1995), storytelling is better heard rather than read for much becomes lost in the transfer from the spoken to the written word and *kaʻao* are often full of *kaona* or double meanings.

Kaʻao are defined by Pukui and Elbert as a "legend, tale [. . .], romance, [and/or], fiction" (Pukui and Elbert 1986:108). *Kaʻao* may be thought of as oral literature or legends, often fictional or mythic in origin, and have been "consciously composed to tickle the fancy rather than to inform the mind as to supposed events" (Beckwith 1970:1). Conversely, Pukui and Elbert define *moʻolelo* as a "story, tale, myth, history, [and/or] tradition" (Pukui and Elbert 1986:254). The *moʻolelo* are generally traditional stories about the gods, historic figures or stories that cover historic events and locate the events with known places. *Moʻolelo* are often intimately connected to a tangible place or space.

In differentiating *kaʻao* and *moʻolelo* it may be useful to think of *kaʻao* as expressly delving into the *wao akua* (realm of the gods), discussing the exploits of *akua* (gods) in a primordial time. However, it is also necessary to note there are exceptions, and not all *kaʻao* discuss gods of an ancient past. *Moʻolelo* on the other hand, reference a host of characters from *aliʻi* (chief), to *akua* and *kupua* (supernatural beings), to finally *makaʻāinana* (commoners), and discuss their varied and complex interactions within the *wao kānaka* (realm of man). Beckwith elaborates, "In reality, the distinction between kaʻao as fiction and moʻolelo as fact cannot be pressed too closely. It is rather in the intention than in the fact" (Beckwith 1970:1). Thus, a so-called *moʻolelo*, which may be enlivened by fantastic adventures of *kupua*, "nevertheless corresponds with the Hawaiian view of the relation between nature and man" (Beckwith 1970:1).

Both *kaʻao* and *moʻolelo* provide important insight into a specific geographical area, adding to a rich fabric of traditional knowledge. The preservation and passing on of these stories through oration remains a highly valued tradition. Additionally, oral traditions associated with the study area communicate the intrinsic value and meaning of a place, specifically its meaning to both *kamaʻāina* as well as others who also value that place.

The following section presents traditional accounts of ancient Hawaiians living in the vicinity of the Kahana Bay Erosion Mitigation project area. Many relate an age of mythical characters whose epic adventures inadvertently lead to the Hawaiian race of *aliʻi* and *makaʻāinana*. The *kaʻao* in and around the project area shared below are some of the oldest Hawaiian stories that have survived; they still speak to the characteristics and environment of the area and its people.

3.1 *Kaʻao*

3.1.1 The Legend of Eleio

The legend of Eleio is told in the collections of Abraham Fornander's *Collections of Hawaiian Antiquities and Folklore* (1916-1919). In this legend, Eleio, the chief's runner, while on an errand for his *aliʻi nui* (high chief), Kakaalaneo of Maui, comes across the spirit of a woman, who he brings back to life. This woman, who lived a humbled life on Maui was, in fact, a high chiefess from Hawaiʻi. As repayment for Eleio's life giving powers, she offers herself as his wife but instead he insist she marry his *aliʻi nui,* Kakaalaneo. The story mentions ʻAʻalaloa, a cliff just *makai* of the project area and references an old term for Lāhainā not often used today, Lele.

> O Lele, oia o Lahaina, i Maui ka aina, o Kakaalaneo, ke ʻlii nui o Maui a puni ia wa. He kanaka mama loa o Eleio, he haalele ia ke kikiao makani e ia he, kukini; ekolu puni o Maui ia ia i ka la hookahi ke hele. No kona mama, hoolilo ke ʻlii o Kakaalaneo ia ia, i kii awa i Hana i kona wa e ai ai. A makaukau ka ai aua a ke ʻlii, holo kela a hiki i Hana, a loaa ka awa hoi mai; ia ia e hoi mai ai ma ke alanui, loaa ia ia o Kaahualii, he ʻkua ia, nonoi mai ia Eleio i awa. I aku o Eleio: "eia iho no ka awa o ko huluhulu-lemu, o ka wai no, ko hanawai hohono." Lohe o Kaahualii, hahai a pau ke aho o Eleio; ike ke kaikuahine o Eleio ua pau ke aho, e noho ana i Kamaalaea, wehe i ke kapa a kuu i ka mai, hilahila ke akua a haalele ia Eleio. O ka inoa o ke kaikuahine o Eleio, o Pohakuloa. Ekolu hele ana a Eleio ma keia alanui, o ka hahai pinepine a ke akua, haalele ia alanui, a hele ma ka aoao huli komohana o Hana, e hoi mai ana a hiki i Kaupo.
>
> Ia ia i hiki ai i Kaupo, e noho ana keia wahine i ke alanui, o Kanikaniaula ka inoa; kaha loa mai o Eleio hele ma ke alanui, kahea mai o Kanikaniaula: "Ea! Hele loa no ka, aole ka e aloha mai." A lohe o Eleio i keia leo, huli aku la ia a aloha aku la. I mai o Kanikaniaula, e hoi ma ka hale, ae aku o Eleio. Maanei, e hoolohe iki kakou i ka moolelo pokole o Kanikaniaula. Ua make o Kanikaniaula i keia wa a laua e kamailio ana me Eleio, he kino wailua uhane keia, aohe kino maoli. He wahine maikai loa o Kanikaniaula, a he ʻlii nui hoi no Hawaii mai a noho i Kaupo, Maui, a nolaila kana kane i hoao ai, he kanaka kuaaina, maainana loa. O ka laua hana o ka mahiai a me ka hoa umu, o ka hanau holoholona, o ka lawaia, pela ko laua noho ana a hiki i ka make ana o Kanikaniula. Hana iho la kana kane i hale puoa no kana wahine, i wahi no ke kino kupapau e waiho ai, eia nae, i ko Kanikaniula wa e ola ana he hoailona alii kona mai Hawaii mai, he ahuula. Ua huna loa ia me ka ike ole o kana kane a hiki i kona la make, aole no hoi oia i olelo i kona alii ana.
>
> A hiki o Eleio i ka hale, nana aku la, he kane ke noho ana, aole ua wahine nei, olelo aku o Eleio i ke kane: ʻAuhea la hoi koʻu hoa hele?' I mai ke kane: ʻOwai kou hoa hele?' ʻHe wahine koʻu hoa hele,' pela aku o Eleio. ʻUa make; o kaʻu wahine ponoi, aia i kela hale e puoa mai la,' pela mai ke kane. I aku o Eleio i ke kane: ʻAhia la o ka waiho ana i ka lepo?' I mai ke kane: ʻAlua la, o ke kolu keia o ka la a kaua e kamailio nei.' ʻAe, akahi ka au a hana i ko wahine;' pela aku o Eleio. Hana iho la o Eleio a hala eha la, ola o Kanikaniaula, hoi a like me kona kino mamua.
>
> Olelo mao o Kanikaniaula ia Eleio: ʻI aha la uanei kaʻu uku ia oe?' O kuu kino no paha?' I mai o Eleio: ʻAole oe e uku mai iaʻu, aia kau kane i hope a kuu haku oia o Kakaalaneo. Ae mai o Kanikaniaula: ʻAe, o koʻu haku ia; eia nae kahi makana au e lawe aku ai ia ia, he ahuula.' Ia wa ike ke kane, he ʻlii o Kanikaniaula. ʻE hoi oe, a na po o Kane kii mai oe iaʻu; e holo ay i Hawaii i koʻu wahi, i keia mau la a hoi mai.' Hoi mai o Eleio, me ka ahuula i kona a-i, e aahu ana. O ka ahuula, aole i loaa ia Kakaalaneo ko Maui alii.

Ma keia hele loihi ana o Eleio, ua huhu ke ʻlii o Kakaalaneo, a kena ae la ia i kona mau ilamuku, e hoa ka umu a enaena, i umu e kalua ai ia Eleio ke hoi mai. Ua hoonoho aku o Kakaalaneo i na kiu e kiai i ka hoi mai o Eleio i ka pali o Aalaloa, a ike i ka hoi mai, alaila, e hoa mai ko laila ahi i ike ko Lele nei poe, alaila, hoa ka umu i enaena mamua o ka hiki ana o Eleio. A hiki o Elelio ma ka pali o Aalaloa, hoa he ahi, ike ko Lele poe hoa i ka umu.

Ma keia holo ikaika ana o Eleio me ka aahu i ka ahuula ma kona kua, a hiki i Lele, kahi o ka umu e hoa ia ana, e noho ana o Kakaalaneo ke ʻlii. Oia holo no ko Eleio a lele iloko o ka enaena o ka umu e waiho ana, ike o Kakaalaneo ke ʻlii i keia mea ulaula maika i luna o Eleio, kahea mai i na kanaka, ʻLalau ia Eleio, lalau ia Eleio.ʼ Ma keia lalau ana ia Eleio i loko o ka imu, ua lele o Eleio ma kapa a pakele i ka make i ke ahi. O ka ahuula hoi, ua weluwelu a kau liilii i na lima o na kanaka, koe nae kekahi apana i kona lima.

Kahea mai o Kakalaneo: ʻE Eleio, hele mai oe maanei.ʼ A hiki o Eleio, ninau aku ke ʻlii: ʻNohea keia mea maikai i loaa ai ia oeʼ" Olelo aku o Eleio: ʻOia kuu mea i noho ai a hala keia mau la; he wahine maikai loa o Kanikaniaula, ka inoa, ua make, a naʻu i hana aku nei a ola, a ua olelo aku nei au o oe ke kane.ʼ I mai la o Kakaalaneo ia Eleio: ʻHeaha la hoi kou mea i lawe ole mai ai ianei?ʼ I aku o Eleio: ʻAia a na po o Kane kii aku au.ʼ

A hiki o Eleio i Kaupo, i na po o Kane, ua hoi mai o Kanikaniaula mai Hawaii mai, me na ʻlii, me na kanaka, me na aahu ahuula. Ia wa lakou i hoi mai ai a hiki i Lele, a hiki imua o Kakaalaneo, ia wa laua i hoao ai a noho pu iho la, he kane a he wahine, aole i loihi na la i hala, hookauhua o Kanikaniaula. [Fornander 1916-1917:482–486]

Translation:

Lele, otherwise known as Lahaina, in Maui, is the country in which the events of this legend took place and the time was during the reign of Kakaalaneo who was king of the whole island of Maui. Eleio was a very fast runner, faster than the wind, and could make three complete circuits of the island of Maui in one day. Because of his great speed, he was made runner to King Kakaalaneo. It was his duty as runner to bring (awa) fish from Hana for the king. When a meal was about ready, Eleio would set out for Hana to bring fish and he would always return before the king sat down to eat. Once while he was on his way back, he met on the road Kaahualii, a spirit who asked him for some fish. Eleio answered: "Take the hairs on your behind for the fish and your urine for water." When Kaahualii heard this, he chased Eleio. Upon coming by Kamaalaea, Eleio's sister who was residing at this place saw that her brother was out of breath, so she took down her pau and exposed herself to the spirit. This action so shamed the spirit that it abandoned Eleio. The name of this sister of Eleio was Pohakuloa. Being chased by this spirit on three different occasions along this same road, Eleio upon his next return trip went around the west side of Hana by way of Kaupo. Upon his arrival at Kaupo one day he found a woman by the name of Kanikaniaula sitting by the roadside, but he passed right along without noticing her. Kanikaniaula at this want of respect on the part of Eleio called out after him: ‘Say, are you going to pass right along without greetings?’ When Eleio heard this call he turned back and greeted her. Kanikaniaula then invited him to the house which invitation was accepted by Eleio.

Let us here take a short sketch of Kanikaniaula.

Kanikaniaula at the time when this conversation was taking place was dead. Although she appeared in the form of a live person it was really in spirit. Kanikaniaula was a very fine woman and came from a line of high chiefs from Hawaii. She, however, upon coming to live in Kaupo, Maui, married a person of low rank who lived in the back country. Their time was spent chiefly in the tilling of the soil and the preparation of food, stock raising and fishing. This was kept up until the death of Kanikaniaula. Upon her death the husband built a tomb, a small house of poles in the form of a pyramid, in which he placed the dead body of his wife. When she came to Maui to live she brought with her from Hawaii a feather cape which was the insignia of a very high chief, but which article she had hidden up to the time of her death, nor had she ever once alluded to her rank as a high chiefess.

When Eleio arrived at the house he saw a man occupying it but the woman was not to be seen. Eleio then asked the man: ‘Where is my companion?’ The man asked in turn: ‘Who is your companion?’ Eleio answered: ‘My companion was a woman.’ ‘She is dead, my own wife, she is laid in that small house yonder,’ said the man. Eleio then asked the man: ‘How many days has she been lying there?’ The husband answered: ‘Two days already, this is the third day in which we are speaking.’ ‘Yes, I will undertake to bring your wife to life again,’ said Eleio. Eleio then proceeded, and at the end of the fourth day Kanikaniaula was brought back to life and in all respects became as was before her death. Kanikaniaula then asked Eleio: ‘What indeed shall I give you as a recompense? Shall it be myself?’ Eleio answered: ‘I will not take anything in payment from you, but I wish you to become the wife of my lord, Kakaalaneo.’ Kanikaniaula consented to this saying: ‘Yes, he shall be my lord; but here is a present which I wish you to take to him; a feather cape.’ At this the husband for the first time was made aware that Kanikaniaula was a chiefess. ‘You may now return and in the nights of Kane you may come for me. I am going to my place on Hawaii, and shall return in a few days.’ Eleio then returned [home] wearing the feather cape tied around his neck. Feather capes at this time were so rare that even Kakaalaneo the king of Maui did not have one in his possession.

As Eleio had been absent a number of days, Kakaalaneo became very angry and ordered his chief officers to start an umu and make it very hot, in which to bake Eleio upon his return. In the meantime, Kakaalaneo had posted spies along the Aalaloa cliffs to watch for the return of Eleio, and when seen to start a fire as a signal to the people at Lele of his approach when the umu was to be started and made hot before the arrival of Eleio; so when Eleio arrived at the Aalaloa cliffs, the fire signal was started and the people at lele started the umu.

As Eleio came running at full speed with the feather cape over his shoulders, on arrival at Lele and seeing the umu burning and the king sitting near it, he jumped

> right in to the hot umu. When the king saw something red and pretty on Eleio's shoulders, he called out to the men: 'Seize Eleio! Seize Eleio!' At this the people got ahold of Eleio and he was pulled out of the umu and was saved; but the feather cape was torn to pieces: a small piece, however, was saved in the hands of Eleio. Kakalaneo then called Eleio to come to him and when he got in the presence of the king, the king asked him: 'Where did you get this beautiful thing?' Eleio replied: 'This is the cause of my delay. Kanikaniaula, a very handsome woman was dead and I brought her to life again. I have told her that you are to be her husband.' Kakaalaneo then asked Eleio: 'Why didn't you bring her along with you then?' Eleio replied: 'I am to go and bring her in the nights of Kane.'
>
> When Eleio arrived at Kaupo in the nights of Kane he found that Kanikaniaula had returned from Hawaii with some of the chiefs, their servants, and with feather capes. When they reached Lele and stood before the king Kakaalaneo then took Kanikaniaula and they dwelt together, husband and wife. Not very long after this Kanikaniaula conceived a child. [Fornander 1916-1917:482–486]

3.1.2 Kaʻululāʻau, Son of Kakaalaneo

In an extension of the Legend of Eleio, the story continues to include the life of Kaʻululāʻau, son of Kakaalaneo and Kanikaniaula. On the day Kanikaniaula gave birth, Kakaalaneo ordered all the chiefly children born on the same day to be brought forth and raised alongside his son, so that he may have companions. Each day Kaʻululāʻau would lead his companions into mischief from their time as children until they became young adults. On any given day, Kaʻululāʻau's companions would pick the fruits of the breadfruit tree and when the fruits were too high to reach, Kaʻululāʻau would uproot the entire tree. They did this so often that breadfruit trees became scarce in Lāhainā a place where they were known to grow abundant. To teach his son a lesson, Kakaalaneo eventually had all the companions sent back to their homes but this caused Kaʻululāʻau to become even more mischievous. In desperation to fix his son's wrong-doing, Kaʻululāʻau was exiled to Lānaʻi island, an island inhabited by spirits. While exiled on Lānaʻi, Kaʻululāʻau eventually killed all the spirits and reestablished a bond with his father, who saw his son's strength and courage. A canoe was sent to fetch Kaʻululāʻau and bring him home to Maui (Fornander 1916-1917:486).

3.1.3 *He Moʻolelo No Māui* (A Legend of Māui)

The demi-god Māui is famed throughout Hawaiʻi for his heroic bouts with *kupua* of all sorts. In the following *moʻolelo*, Māui wrangles the rays of the sun, Moemoe, and forces it to travel slowly through the sky. This allowed his mother and others enough time to complete their daily tasks that required much sunlight. Māui broke one of Moemoe's rays and as it hit land it turned to stone. This stone can be found *makai* of the current Sheraton Maui Resort and Spa (Figure 6)

> I ka wa o ua Maui nei e noho ana, a, i kekahi manawa, nui loa kona aloha i kona makuahine no kana mea kaulai; aole e liuliu iho ke kau ana a ka la, puka aela no a napoo koke aku la no, kupu ka manao e kii i ka la e alehe, i hele malie. Hele keia a hiki i ka lae o Hamakua, ike keia ia Moemoe e moe ana i ka lua pao o Kapepeenui o Wailohi; ike keia i ka puka o ka la ma Hana, hele keia a ma Haleakala nana keia a he kupono; hoi keia a hiki i kahi o na makua, nana hou keia i ka la o kana hana a

Figure 6. Photo of cliff diver at Pu‘u Keka‘a, also known as Black Rock, where Māui kills Moemoe (courtesy of Stacey Alonzo for *Hawai‘i Magazine* 2016)

mau no. Hele keia a hiki ma Peeloko i Waihee, luku aku ana keia i ka niu apau i lalo, kii keia i ka pulu, hana a nui, hele keia e alehe i ka la.

Pane kikoi mai o Moemoe: ‘Aohe e loaa ka la, he lopakuakea;’ pane aku o Maui: ‘Make kuu enemi, a ko kuu iini, make oe ia‘u.’ Hele keia a hiki i Haleakala, a kau pono maluna oia nei, e alehe ae ana keia i ka pulu niu, haki kahi kukuna, alehe hou keia pau na kukuna ikaika o ka la. I aku keia: ‘Make oe i a‘u no ko holo wikiwiki loa.’ I mai ka la: ‘E ola au, e nana mai oe i kuu hele aku;’ nana keia ua lohi ka hele ana, pau ko ianei manao kii hou. Oia ka mea i hele loho ai o ka la. A o Haleakala e kapa ia nei, aole oia ka pololei, o Alehe la; no ke alehe ana a Maui i ke kukuna o ka la.

Ma ia huli hoi ana mai ana, a hiki i ko Moemoe wahi, aole kela, huli loa maila no a loaa i Kawaiaopilopilo. Aia ia wahi mawaena o Kekaa ame ka ulu ko a Kimo ma; ike nae ua Moemoe nei, holo i uka, i kai pela kona hele kekee ana. Nui loa ihola ka huhu o Maui, e lele mai ana keia maluna a loaa mauka iho o Kekaa pepehi keia a make; ua lilo nae i kpohaku. Aia no ia pohaku makai iho o ke alanui hou e moe loihi ala; o kona loa ua aneane ehiku kapuai. Aia i keia wa a Maui e hele nei, aia no kona makuahine ua hapai hou, a hanau he pueo, ke keiki. [Fornander 1918-1919a: 538–539]

Translation:

While Maui was living with this parents, he felt sorry for his mother because of what she had to dry. The sun did not tarry long on its journey; it arose and set very quickly. The idea sprung up in him to go and snare the sun so that it would go slower. He went and at the cape of Hamakua he saw Moemoe sleeping in the cave of Kapepeenui at Wailohi; he saw the sun rising at Hana; he climbed Haleakala and inspected it and found it satisfactory. He went back to his parents’ place; he noticed that the sun still kept on its old ways. So he came along to Peeloko at Waihee and threw down a lot of coconuts; he secured a plenty of husk and with it he went off to snare the sun.

Moemoe called out sarcastically, ‘You can not catch the sun for you are a low down farmer.’ Maui answered, ‘When I conquer my enemy and satisfy my desire I shall kill you.’ He came to Haleakala, and when the sun passed directly over him he snared it with the coco-husk, and broke some of its rays; he repeated this and broke all the strong rays of the sun. He said: ‘I am killing you because you travel so fast’” The sun requested, ‘Let me live; you watch how I travel.’ He looked and beheld that it traveled slower, so he desisted from going after it again. That is why the sun goes slowly. And the name ‘Haleakala’ given to it now is not correct; it should be Alehela, on account of Maui‘s snaring the rays of the sun.

On his return he called Moemoe’s place. It was absent. Maui traced it to Kawaiaopilopilo. This place between Kekaa and James‘ canefield Moemoe saw him, and it went on in an irregular manner, now towards the moutain and now towards the sea. Maui became greatly angered, so he flew right on and caught the other above Kekaha; he killed it; it turned, however, into a rock. Thatrock is still lying along there makai of the new road. Its length is nearly seven feet. While Maui

> was off on this journey his mother became pregnant with and bore another child, an owl. [Fornander 1918-1919a:538–539]

3.2 *Moʻolelo*

3.2.1 *Moʻolelo No Puʻulaina* (Story of Puʻulaina)

Another story taken from the collections of Abraham Fornander describes the creation of mountains in the area and the original name of Haleakalā (Figure 7).

> Na kumu kahi i puka mai ai keia puu. Wahi a kekahi poe i hanau maoli ia mai no e kekahi mau kuahiwi, oia ke kuahiwi o Eeke ame Lihau. O Eeke ke kane, a o Lihau ka wahine, he mau kanaka maoli no keia, aka, mahope aku e ike no kakou i ke kumu o ka lilo ana i mau kuahiwi. I ko laua noho a kane a wahine ana, hanau mai la ka laua keiki, he keiki kane, oia ka mea nona ka moolelo a kakou e kamailio nei. Aka, i kekahi manawa, loaa iho la ka hihia ia Eeke, no ka mea, ua ike aku la o Eeke i ka wahine maikai o Puuwaiohina, no Kauaula ia, a ua hana laua i ka hewa. No ia mea, manao iho la o Lihau e umi i ke keiki, a hele pu aku no hoi i ke kalohe; a noia mea, hoopaapaa ae la laua. Lawe aela o Eeke i ke keiki na kona makuahine e hanai, oia hoi o Maunahoomaha. Ma ia hope iho hookapu mai la ko lakou akua, o Hinaikauluau, aole e noho pu laua, aole hoi e launa aku me kekahi mea e; aka he anahulu mahope iho o keia olelo, haule hou iho la o Eeke i ka hewa, me Puuwaiohina, oia kela mea mua i hai ia ae nei, a o ko Lihau muli iho nohoi ia. No ia mea, hoopai mai la ua akua nei o lakou, a hoolilo ia o Eeke i mauna, a o Puuwaiohina hoi i kualapa, oia no kela kualapa i Kauaula e ku mai la. A aia ka ma ka welau o ua pali la malalo iho, he puka; ina e kani ana ua puka nei, oia iho la ka wa e pa ai ke kauaula, aole o kana mai.
>
> Mahope iho oia manawa, kupu mai ke aloha ia Lihau no ka laua kamalei; nonoi mai la ia ia Maunahoomaha, e ike mai i kana keiki. He mea oluolu ia i kona makuahonowai, a ike ia i kana keiki, a laila oluolu kona manao. A ike hoi i ke kanaka maikai o kaua kamalei, alila, hoomoe aku la ia me Molokini, kekahi kaikamahine puukani oia kau, no ka mea, oia no ka wahine i upu ia mana.
>
> Aka, i kekahi manawa, holo aku la kekahi kanaka mai Hawaii i Kahikinuilaniakea, o Kanilolou ka inoa; a he kino puhi hoi kekahi ona, a nolaila no ka e kapaia nei ka puki la, he Puhikanilolou. A hiki aku la ia ilaila, aole i maikai ia wahi elike me Hawaii nei (aole nae o Hawaii ka inoa ia manawa). Alila, kaena iho la ia, me ka olelo ana: ʻAole aku no ka e like me koʻu aina ka maikaʻi, aohe pohaku e kuia ai ka wawae.ʼ
>
> A lohe o Pele i keia olelo kaena alaila pane mai la ia ia: ʻHoi aku oe, aohe maikai o ko aina, ua paa i ke a-a mai uka a kai.ʼ I hoi mai ka hana, a pae mua ma Kauai, he ino wale no; Holo mai hoi a hiki i Maui nei, he ino wale no; a pela aku a hiki i Hawaii.

Figure 7. Photo of sunrise atop Haleakalā summit (CSH 2012)

> Eia nae i ka hiki ana mai i Maui nei, eia keia hana ino a ka Pele; ike ae la kekahi o kona mau pokii i ke kanaka maika o Puulaina, nonoi ak la ia Molokini nana ke kane a laua. Hoole mai kela, no ka mea, ua kupouli loko ia Kanehoa i ke aloha o ke kane; nolaila, hoolilo ia aku la ia i wahi mokupuni a hiki i keia manawa.
>
> A lohe o Lihau i keia mea, he mea kaumaha ia i kona manao no kana hunona wahine, alaila, hele aku la ia, a kamailio pu me Pele no keia mea. Aka, olelo huhu mai o Pele: ʻIna pela, alaila ke hai aku nei au e make ana oe; make pu hoi me ko keiki.ʼ Ia manawa, lilo koke o Lihau i puu, a noho ka Pele malaila i kekahi manawa, a make pu iho la no hoi ke keiki; aka nae, o ka mea nona ka makemake, uwalo aku la ia me ke noi ana i ola ke kane, aka, aole pela ka manao o ua wahi makole-ulaula nei. A pela i lilo ai ua keiki nei i puu a hiki i keia manawa. A mahope iho, hele aku la o Pele a hiki ma Aheleakala, ke kuahiwi nui o Maui, i ke kukuna o ka la. Ua hewa ke kapaia ana i keia manawa o Haleakala; o Aheleakala ka pololei. [Fornander 1918-1919b:533–536]

<u>Translation</u>:

> Concerning the origin of this hill, some say that it was begotten by two mountians, Eeke and Lihau. Eeke was the husband and Lihau was the wife. They were real persons, but it will be shown later the reason for their being changed to mountains.
>
> After they had lived as man and wife, a child was born to them, a son, the subject of this story which we are considering. But after some time Eeke became entangled, for he saw a beautiful woman, Puuwaiohina from Kauaula, and they committed adultery. Because of this, Lihau thought to choke the child to death, so that the two of them could go and do mischief; this caused them to quarrel. Eeke took the child to his mother, Maunahoomaha, and left him with her. After that their god, Hinaikauluau, placed a restriction over them; they were not to live together, nor were they to have any intercourse with others; but ten days after this order, Eeke again committed adultery with Puuwaiohina above referred to, who was a younger sister to Lihau. Because of this their god punished them by making Eeke a mountain and Puuwaiohina a mountain ridge; that is the ridge prominent at Kauaula. There is, it seems, a hole below the highest point of this ridge. When sound issues from this hole, that is the time the kauaula wind blows a fierce gale.
>
> After that, Lihau was possessed with love for their child, so she asked Maunahoomaha for permission to meet her son. That was agreeable to her mother-in-law, and when she met her child she was glad. When she realized what a handsome man her favorite son had grown to be, she gave him for husband to Molokini, one of the noted beauties of that time, because she was the wife intended for him.
>
> But at some time, a man sailed from Hawaii to Kahikinuilaniakea; his name was Kanilolou. He possessed also an eel body. That is why an eel is named Puhikanilolou. Arriving there, he saw that it was a land not as fair as Hawaii (but Hawaii was not the name at that time). Therefore he bragged, saying: ʻThis can not compare in beauty with my country; there are no stones for the fee to strike against.ʼ

> When Pele heard his boast, she replied: ‘When you return, your country is no longer beautiful; it is covered with rocks from the mountain to the sea.’ When he returned and landed first at Kauai, he found the land destroyed; he sailed on to Maui, it was as bad; and so it was when he arrived at Hawaii.
>
> However, arriving on Maui, this was one of Pele’s cruel deeds: one of her younger sisters saw how handsome Puulaina was, so she asked Molokini to let her have him for husband. The other refused, for she was greatly in love with her own husband; so she was changed into a little island, and she has remained so to this day.
>
> When Lihau heard of this, she grieved for her daughter-in-law, so she went to consult Pele on the matter. But Pele replied gruffly: ‘If that is the case, then I say to you that you will die; also your son.’ Lihau was there and then changed into a hill where Pele resided for some time; the son also died. But the one whose was the desire, earnestly entreated and begged her husband be spared. But the red-bleary-eyed did not wish it that way. That was how the son became a hill and has remained such until this day.
>
> After this Pele traveled until she came to Aheleakala the large mountain of Maui at the rising of the sun. That is a misnomer, Haleakala; Aheleakala is the correct name. [Fornander 1918-1919b:533–536]

3.3 ***Wahi Pana*** **(Legendary Places)**

Wahi pana are legendary or storied places of an area. These legendary or storied places may include a variety of natural or human-made structures. Oftentimes dating to the pre-Contact period, most *wahi pana* are in some way connected to a particular *moʻolelo*, however, a *wahi pana* may exist without a connection to any particular story. Davianna McGregor outlines the types of natural and human-made structures that may constitute *wahi pana*:

> Natural places have mana, and are sacred because of the presence of the gods, the akua, and the ancestral guardian spirits, the ʻaumakua. Human-made structures for the Hawaiian religion and family religious practices are also sacred. These structures and places include temples, and shrines, or heiau, for war, peace, agriculture, fishing, healing, and the like; puʻuhonua, places of refuge and sanctuaries for healing and rebirth; agricultural sites and sites of food production such as the loʻi pond fields and terraces slopes, ʻauwai irrigation ditches, and the fishponds; and special function sites such as trails, salt pans, holua slides, quarries, petroglyphs, gaming sites, and canoe landings. [McGregor 1996:22]

As McGregor makes clear, *wahi pana* can refer to natural geographic locations such as streams, peaks, rock formations, ridges, offshore islands and reefs, or they can refer to Hawaiian land divisions such as *ahupuaʻa* or *ʻili* (land section or subdivision of an *ahupuaʻa*), and man-made structures such as fishponds. It is common for places and landscape features to have multiple names, some of which may only be known to certain *ʻohana* or even certain individuals within an *ʻohana*, and many have been lost, forgotten, or kept secret through time. Place names also convey *kaona* (hidden meanings) and *huna* (secret) information that may even have political or subversive undertones. Before the introduction of writing to the Hawaiian Islands, cultural information was exclusively preserved and perpetuated orally. Hawaiians gave names to literally everything in their environment, including points of interest that may have gone unnoticed by persons of other cultural backgrounds. Hawaiians have named taro patches, rocks and trees that represented deities and ancestors, sites of houses and *heiau* (pre-Christian place of worship), canoe landings, fishing stations in the sea, resting places in the forests, and the tiniest spots where miraculous or interesting events are believed to have taken place (Pukui et al. 1974:x).

3.3.1 Place Names of Kahana

The primary compilation source for place names in this section is the online database of Lloyd Soehren's (2010) Hawaiian Place Names. Soehren has compiled all names from the mid-nineteenth century land documents, such as Land Commission Awards (LCA) and Boundary Commission Testimony (BCT) reports (Figure 8). The Boundary Commission testimony lists boundary points for many (but not all) of the *ahupuaʻa.* The names of *ʻili ʻāina* (land units within an *ahupuaʻa*) and *ʻili kū* (land units rewarded separately from a specific *ahupuaʻa*) are compiled from the testimony in Māhele Land Commission Awards, from both awards successfully claimed and from those rejected.

The Soehren database includes place name meanings from the definitive book on Hawaiian place names, *Place Names of Hawaii* (Pukui et al. 1974). In cases where Pukui et al. (1974) do not provide a translation, Soehren often suggests a meaning for simple names from the *Hawaiian Dictionary* (Pukui and Elbert 1986). Thomas Thrum (1922) also compiled a list of place names in the 1922 edition of Lorrin Andrews', *A Dictionary of the Hawaiian Language*, although these meanings are considered to be less reliable than those in *Place Names of Hawaii*. Oftentimes these place names can be found on historic maps.

The following table lists and defines the meaning of place names located within Kahana and also a brief description when provided by the sources; additional place name meanings are given as appropriate.

Limited sources provide a meaning to the name Kahana. These sources also provide no further explanation of the meaning or its relevance to the area. One meaning from Soehren's (2010) collection translates Kahana to "cutting". Another meaning says, "turning point" (Clark 2002:135).

Table 1. Place names of the Kahana Ahupuaʻa

Name	Type	Description
Hihiho	*Heiau*	Along County Road near Kalaeloa Point but destroyed to build a road
Hinapīkaʻo	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Hoaka	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kaʻape	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kaʻea	Point	
Kahakapuaʻa	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kahana	*Heiau*	Along shore at Kahana Point; completely destroyed

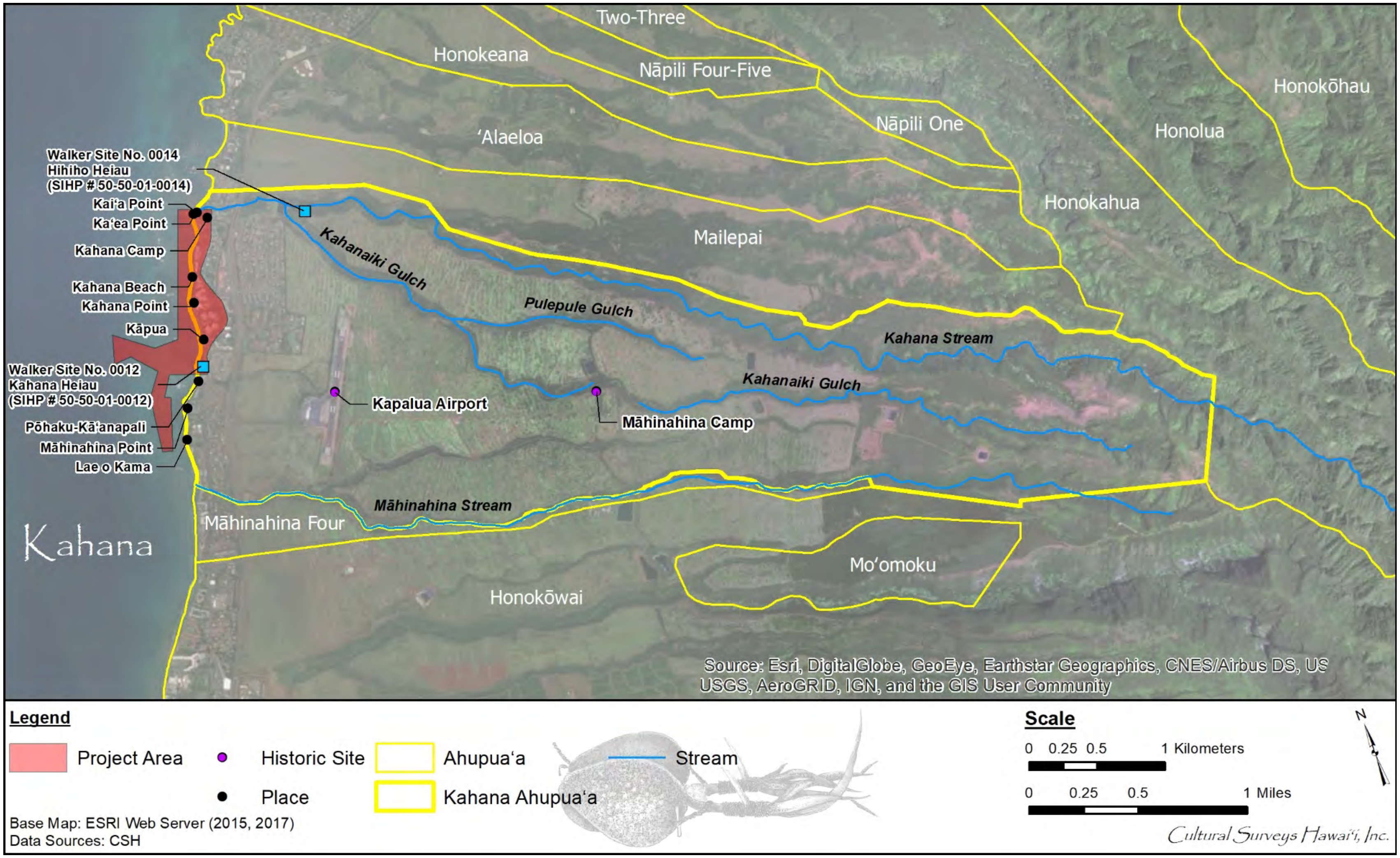

Figure 8. Place Names map of Kahana with special attention to the project area

Name	Type	Description
Kahana	Point	
Kahana	Stream	Stream that rises at 3,800 ft elevation and flows to the sea
Kahanaiki Gulch	Stream	Stream that rises at 2,200 ft elevation and joins Kahana Stream at 50 ft
Kaluaʻīlio	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kapua	Place	An *ʻili* near shore though not confirmed
Kapuna	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Keakukui	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kolekole	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kukuikanu	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kukuiolono	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kumukahi	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Kupoupou	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Likipu	*ʻIli ʻāina*	LCA 9065, 0.07 acre, awarded to Kuoioi
ʻŌhiʻa 1 and 2	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
ʻOpihi	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Pakei	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Pulepule	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded
Pulepule Gulch	Stream	Stream that rises above 900 ft elevation and joins Kahanaiki Stream at 380 ft
Uhali	*ʻIli ʻāina*	One of 18 *ʻili ʻāina* named in Land Commission testimonies; none awarded

3.3.2 The Many Names of Lāhainā

The *kalana* of Lāhainā has been known by three other names in the past. The oldest name was said to be Nā-hono-a-Piʻilani, the lands of Piʻilani, as it was surrounded by the islands of Molokaʻi, Lānaʻi, Kahoʻolawe, and Molokini (Sterling 1998:37). Following this time, Lāhainā became known as Lele, a name acknowledged as the ancient name of Lāhainā (Sterling 1998:34–37) in the story of Kamalālāwalu and Halemano in their flight from the Oʻahu Chief ʻAikanaka in the *Legend of Halemano* (Fornander 1919a:238), and in the *Legend of Pupukea* as home to Maui Chief

Kamalālāwalu (referred to frequently as Kama), a contemporary of Kākuhihewa on Oʻahu (Fornander 1919b:436). A third name for Lāhainā is mentioned in the story *Relating to Kekaa* (S. Kaha in Fornander 1919c:540–544), where Kekaʻa is noted as the capital of Maui when Kaʻalaneo was reigning over West Maui. Fornander (1919c:540) speculates that the name of Kekaʻa predates that of Lele as the story predates the introduction of breadfruit, the primary food source referred to when speaking of the area as Lele (H.L. Sheldon in Sterling 1998:35).

3.3.3 Puʻu Kekaʻa

Puʻu Kekaʻa, also referred to as Black Rock, is a popular feature in Lāhainā. This rock formation that juts out into the sea was considered a sacred *leina* (place where spirits leaped into the nether world) to Native Hawaiians. Kekaʻa was also the birthplace of Kaululāʻau (as mentioned in Section 3.1.2) (James 2002:41). Though this area of Lāhainā is heavily developed, there was once a *heiau* situated on the *puʻu* (hill) where the Sheraton-Maui Resort stands (James 2002:41). Puʻu Kekaʻa was also the place where the *aliʻi,* Kahekili, was known for his great athleticism in *lele kawa* or cliff jumping (James 2002:42). It was said that only a person with tremendous *mana* (spiritual power) could leap from a *leina* and return unharmed (James 2002:42).

3.3.4 Pōhaku o Kāʻanapali

Espeth P. Sterling (1998:50-51) in *Sites of Maui* discussed Pōhaku o Kāʻanapali, a large boulder located between Kapua and Lae O Kama at Kāʻanapali in Kahana. According to the *moʻolelo*, a young *aliʻi* from the island of Molokaʻi sailed across the narrow channel between Molokaʻi and Kāʻanapali. When he arrived in Kāʻanapali, he met a young *aliʻi* from Maui and remarked that "I see nothing here to compare with the cliffs of Molokai." This angered the Maui man who dared the Molokaʻi man to "try to climb one of our cliffs" wagering "a bone" (Sterling 1998:50-51).

The Molokaʻi man knew that "this meant death for him if he should fail, and death for the other if he succeeded," however, he accepted the challenge as he was "agile and strong, and well skilled in climbing cliffs on Molokai that almost defied being scaled" and "it would be cowardly to refuse such a challenge." The Maui man led him to a large boulder with a depression in it near the shore at Kāʻanapali and said to the Molokaʻi man, "You must stand with your heels together, and moving both feet at the same time, see if you can ascend this rock." After a number of failed attempts to ascend the rock, the Molokaʻi man turned to the Maui man and stated, "You have won, . . . Our wager was a bone. My life is yours" (Sterling 1998:50-51).

Impressed by the efforts of the Molokaʻi man, as well as, his sportsmanship which did allow him to complain when seeing the "cliff," the Maui man said, "I call our wager off, . . . Just remember that it is not a good thing to boast. And now we will be friends" (Sterling 1998:50-51).

> A very long time ago, an interesting meeting took place between young chiefs of Molokai and Maui. The Molokai chief had sailed in his canoe across the narrow channel that separated his island from Kaanapali. On meeting a young alii of that vicinity, he remarked that he had heard that there were on Maui some high cliffs. "But I see nothing here to compare with the cliffs of Molokai" he went on. "The steepness, great height and spectacular beauty of our pali can hardly be imagined by one who has not seen them . . . They rise above the sea like towering battlements, or like the way to Heaven, depending on one's mood. If you have anything like

them on Maui, I should certainly like to see it" He smiled in a confident manner, secure in his belief that Maui's cliffs were inferior to those of his island.

Although at first meeting the Maui alii had been strangely attracted to this young man, he was angered and his pride in his island was hurt to hear the cliffs of Maui slighted. It might be true that the pali of Molokai were higher and steeper- but he had no proof that they were not – but he resented the superior way in which it had been said. And surely Maui's cliffs were as beautiful as those of any island in the sea!

I won't allow this fellow to think he can come to Maui and speak in such a way, he thought. "I dare you then to try to climb one of our cliffs," he said heatedly. "And our wager will- be a bone."

Now, as the Molokai man knew very well, this meant death for him if he should fail, and death for the other if he succeeded. But he was agile and strong, and well skilled in climbing cliffs on Molokai that almost defied being scaled. Besides, it would be cowardly to refuse such a challenge.

The Maui chief led him to a boulder that stood near the shore at Kaanapali.

"Is this your cliff?" The Molokai man was unable to believe his eyes.

"Come to this side," said the other.

A depression in the great rock was revealed. "You must stand with your heels together, and moving both feet at the same time, see if you can ascend this rock."

It looked hopeless, as the unlucky man saw at once. But for the honor of his island, as well as for the sake of his own life, he made a desperate attempt. The rock slanted outward above the depression in such a way, however, that it was impossible.

Again and again he tried to gain a foothold from which he could leap. At last he turned to the Maui man. "You have won," he said simply. "Our wager was a bone. My life is yours."

The Maui chief had been deeply impressed by the efforts of his rival, and couldn't help admiring him for the sportsmanship which had not let him complain when he saw the "cliff."

After all, it had been a trick. "I call our wager off," he said. "Just remember that it is not a good thing to boast. And now, we will be friends."

From that time, the boulder was called the Pohaku o Kaanapali. [Sterling 1998:50-51]

3.3.5 Pōhaku Moemoe and Pōhaku Wahine Peʻe

A different version of the story of Māui and Moemoe says that Moemoe was a companion of Māui though opposite in character. Moemoe, as his name would suggest, was always tired and lazy. One day Māui went off to try to slow the course of the sun so that his mother, Hina, would have enough time and sunlight to dry her *kapa* (tapa). Moemoe insisted Māui rest before his battle because he would not be successful anyway. Māui was able to slow the sun and when he returned to Kekaʻa he turned Moemoe into stone, where he now rests was his most favorable spot (James 2002:43).

Beside Pōhaku Moemoe is another stone called Pōhaku Wahine Peʻe (James 2002:43). One story relating to this *pōhaku* (stone) is presented below:

> Once, a young boy named Kāʻili was kidnapped from the beach near Kekaʻa by warriors in need of a human sacrifice. The boy was to be offered to the war god at Halulukoʻakoʻa Heiau, a large *luakini* (human sacrifice) temple near Lahaina. Nāʻilima, the boy's sister, saw Kāʻili taken by the men and fled to the mouth of Ke Ana Pueo ["the Owl Cave"], where she began to cry. Responding to the situation, the owl-spirit, Wahine Peʻe, flew to the temple's sacrificial stones, where Kāʻili had been tied-up to wait until the next morning's ritual offering. Wahine Peʻe freed the boy and instructed him to walk backwards out of the sacred precinct and along the beach to where he had been captured by the warriors. Kāʻili carefully made his backward footprints in the sand, leaving no impression of anyone having left the *heiau*. Wahine Peʻe took both the children to a cave atop Puʻu Kekaʻa, where they waited while the confused warriors searched for their missing sacrifice. When the search was abandoned, Kāʻili and Nāʻilima returned safely to their village. [James 2002:44]

In another story, Pōhaku Wahine Peʻe is also known as Pōhaku o Wahine o Manua (James 2002:44). In this story, a woman flees her abusive husband and hides at Halulukoʻakoʻa Heiau, which was *kapu* (forbidden) to women. An *ʻaumakua* (family god) in the form of an owl led the woman to a rock near Kekaʻa where she was able to find rest and departed Lāhainā when she woke the next morning.

3.3.6 Heiau

Though a number of sources mention *heiau* within the *moku* of Lāhainā, only a few sources give details to *heiau* in Kahana. The following table lists *heiau* recorded in Kahana and some in the wider district of Lāhainā.

Table 2. *Heiau* in the district of Lāhainā

Name	**Location**	**Description**
Walker Site 15	Alaeloa	On bluff at south side of rocky cove between Alaeloa and Papaua Points;mall rectangular enclosure measuring 50 x 66 ft. Has rough stone walls about 3 ft. high with an opening at the west end. In the S.W. corner is what appears to be a platform of small stones and pebbles. Use unknown. Several people though it was a cattle pen. [Walker cited in Sterling 1998:52]
Apahua	Waineʻe	Credited to Hua-nui, about 50 years later than the above; fragments of foundation only remain. [Thrum 1908:38]

Name	Location	Description
Halekumukalani	Lāhainā	In *ahupuaʻa* of Halekaʻa. A small *heiau* only. [Thrum 1908:38]
Halulukoʻakoʻa	Lāhainā	Corner of coconut grove and *ahupuaʻa* of Wahikuli, of coral construction. [Thrum 1908:38]
Hihiho	Kahana	Along County Road near Kalaeokaea Point. Destroyed to build road. [Walker cited in Sterling 1998:52]
Kahana	Kahana	Along shore at Kahana Point. Totally destroyed. [Walker cited in Sterling 1998:50]
Kahauiki	Kahauiki	*Mauka* to Kahauiki Camp a short distance up the west side of a gulch of the same name. A small irregular platform of stones whose walls have been taken for stock pens. [Walker cited in Sterling 1998:52]
Luakona	Near Kapaulu, Lāhainā	Built by Hua-a-Pohaku-kaina. Site now lost. [Thrum 1908:38]
Mailepai	Near Mailepai	Near point of the same name. Washed away. [Walker cited in Sterling 1998:52]
Waiʻie	Near Kapaulu, Lāhainā	Built by Hua-a-Pohaku-kaina. Fragments of foundation now only to be seen. [Thrum 1908:38]
Wailehua	Lāhainā	In *ahupuaʻa* of Makila, at shore, about 130 x 80 ft; built in time of Kauhi-ai-moku-a-kama, son of Kekaulike, about 1738. [Thrum 1908:38]

Thrum goes on to explain the construction of *heiau* on Maui that are credited to Hua, *aliʻi* of Maui who reigned prior to the tenth century (Thrum 1908:44). Hua is also known by Hua-a-Pohukaina and Hua-a-Kapuaimanaku, names by which his father was known. Thrum also noted that of the *heiau* listed above in Lāhainā, Hua was responsible for constructing two, Luakona and Waiʻie (Thrum 1908:44). The following details are also given in regards to the *heiau* listed in the table:

> Two of these [*heiau*], Halulukoakoa and Wailehua, are distinguished as receiving Liholiho's first public duty, at his consecration of them in 1802, after he had been sanctified to that service as the heir of Kamehameha I., at the early age of five years.
>
> The erection of Wailehua was responsible for a rebellion on Maui caused by the carrying of stones for its building, incited by Pinaau, a counsellor [*sic*] and priest in the time of Kauhiaimokuakama, eldest son of Kekaulike, against the authority of Kamehameha-nui, about 1740 […]
>
> The remises adjoining the heiau of Wailehua was where the victims for the sacrifices upon its altars were slain, and on the nights of Kane, and Lono, the beating of drums within its precincts are constantly heard, and on day of Lono the

> ancient chiefs are wont to gather therein to look about, go out surf bathing, and collect the fragrant lipoa [type of seaweed] of Wailehua to this day.
>
> Halekumulani also gives forth the sound of drum beating on the nights of Kane and Lono, and within its walls are some canoes and other ancient articles.
>
> Halulukoakoa, a coral structure, is famed traditionally as having given shelter to Wahine-o-Manu [Section 0], a very beautiful young woman who fled from her husband in consequence of constant ill treatment. Regardless of the rigid kapu of the heiaus against women being allowed within its sacred walls, she hid herself therein and watched those searching for her. On their departure she ventured forth and on reaching the road an owl god appeared to her as guardian and guide, and by the clapping of its wings led the pursued girl through the brush till she reached the large stone mauka of Kekaa, Kaanapali, where it left her and she lay down and slept till morn, when she arose and departed. The stone is known as Pohaku o Wahine o Manua. [Thrum 1908:44–45]

3.4 ***‘Ōlelo No‘eau*** **(Proverbs)**

Hawaiian knowledge was shared by way of oral histories. Indeed, one’s *leo* (voice) is oftentimes presented as *ho‘okupu* (“to cause growth,” a gift given to convey appreciation, to strengthen bonds); the high valuation of the spoken word underscores the importance of the oral tradition (in this case, Hawaiian sayings or expressions), and its ability to impart traditional Hawaiian “aesthetic, historic, and educational values” (Pukui 1983:vii). Thus, in many ways these expressions may be understood as inspiring growth within the reader or between speaker and listener:

> They reveal with each new reading ever deeper layers of meaning, giving understanding not only of Hawai‘i and its people but of all humanity. Since the sayings carry the immediacy of the spoken word, considered to be the highest form of cultural expression in old Hawai‘i, they bring us closer to the everyday thoughts and lives of the Hawaiians who created them. Taken together, the sayings offer a basis for an understanding of the essence and origins of traditional Hawaiian values. The sayings may be categorized, in Western terms, as proverbs, aphorisms, didactic adages, jokes, riddles, epithets, lines from chants, etc., and they present a variety of literary techniques such as metaphor, analogy, allegory, personification, irony, pun, and repetition. It is worth noting, however, that the sayings were spoken, and that their meanings and purposes should not be assessed by the Western concepts of literary types and techniques. [Pukui 1983:vii]

Simply, *‘ōlelo no‘eau* may be understood as proverbs. The Webster dictionary notes it as “a phrase which is often repeated; especially, a sentence which briefly and forcibly expresses some practical truth, or the result of experience and observation.” It is a pithy or short form of folk wisdom. Pukui equates proverbs as a treasury of Hawaiian expressions (Pukui 1995:xii). Oftentimes within these Hawaiian expressions or proverbs are references to places. This section draws from the collection of author and historian Mary Kawena Pukui and her knowledge of Hawaiian proverbs describing *‘āina* (land), chiefs, plants, and places. Though there are no *‘ōlelo* *noʻeau* specific to Kahana, the following proverbs below describe the larger area of the Lāhainā district and are taken from Mary Kawena Pukui's *ʻŌlelo Noʻeau* (Pukui 1983).

3.4.1 *ʻŌlelo Noʻeau* #430

The following proverb mentions the breadfruit trees of Lāhainā, noted in the Legend of Eleio.

> *Hālau Lahaina, malu i ka ʻulu.*
>
> Lahaina is like a large house shaded by breadfruit trees.
>
> [Pukui 1983:53]

3.4.2 *ʻŌlelo Noʻeau* #1425

The following proverb references Pōhaku-o-Hauola, a stone *makai* at Lāhainā that was popular amongst pregnant women.

> *Ka laʻi o Hauola.*
>
> The calm of Hauola.
>
> Peace and comfort. There is a stone in the sea at Lahaina, Maui, called Pōhaku-o-Hauola, where pregnant women went to sit to ensure an easy birth. The umbilical cords of babies were hidden in the crevices in the stone. [Pukui 1983:154]

3.4.3 *ʻŌlelo Noʻeau* #1451

The following proverb again mentions the old name for Lāhainā and its associated wind.

> *Ka Maʻaʻa wehe lau niu o Lele.*
>
> The Maʻaʻa wind that lifts the coco leaves of Lele.
>
> [Pukui 1983:157]

3.4.4 *ʻŌlelo Noʻeau* #1811

The following proverb warns others to not talk too much of one's kin and is a reminder that trouble will follow those who destroy the innocent.

> *Koʻele na iwi o Hua i ka lā.*
>
> The bones of Hua rattled in the sun.
>
> A warning not to talk too much of oneʻs kin. Also, a reminder that trouble is sure to befall those who destroy the innocent. Hua was a chief of Maui who heeded the lies of jealous men and ordered the death of his faithful priest, Luahoʻomoe. Before he died, he sent his sons to the mountains for safety, because it was foretold by gods what was to come over the land. After his death, drought and famine came. Many died, including the chief Hua. There was no one to hide his remains, so his bones were left exposed to sun and wind. Also expressed *Nakeke na iwi*. . . . [Pukui 1983:194]

3.4.5 *ʻŌlelo Noʻeau* #1936

The following proverb mentions the old name for Lāhainā.

Lahaina, i ka malu ʻulu o Lele.

Lahaina, in the shade of the breadfruit trees of Lele.

The old name for Lahaina was Lele. [Pukui 1983:209]

3.4.6 *ʻŌlelo Noʻeau* #1594

The following proverb mentions the rain found in Lāhainā.

Ka ua Paʻūpili o Lele.

The Pili-soaking rain of Lele.

The plains of Lahaina, Maui, were covered with pili grass in ancient days. When the rain poured the grass was well soaked. [Pukui 1983:172]

3.5 *Mele* (Songs)

3.5.1 "Song for Kaumualiʻi"

Fornander notes the following verses describing the violent weather of Lāhainā. Although the first ten verses refer to locales on the island of Oʻahu, as examples of places where people travel in the rain, and the precautions they must take—so the same measures occur at Lāhainā. The winds and rains that move seaward from the back of the valleys and mountain ridges behind Lāhainā are described. The remainder of this song pertains only to the island of Hawaiʻi and, specifically, the Hilo region so only the verses that mention Lāhainā are presented below:

A Malailua i Nahuina ka ua,	From Malailua to Nahuina it is raining;
Iolo, iolo ku ole ka makani i Kahua.	Soughing and whiffling about, the wind reaches not Kahua,
I Kahuawai, i Kahuawai nunu i ka opeope.	At Kahuawai, at Kahuawai, the bundle is large,
Hume ka malo o ka huakai hele ua,	Gird on the loin cloth for rain traveling;
Palepale ke kapa o ka wahine hele ua o Koolau,	Tuck up the skirts of the rain-traveling women of Koolau
Puolo huna i ka lauki ka malo o ke kanaka	Cover with ti-leaves the loin cloth of the men
Hele Kona a Kawalanakoa lu ka lauki,	In going to Kona, at Kawalanakoa drop the ti-leaves,
Wehewehe kai opeope o ka huakai,	Open up the bundles of the travelers,
Kakua ke kapa o ka wahine pa-u,	Gird on the skirts of the women
Hele Kona o Ewa.	Going from Kona to Ewa.
Ke Kona o Waikiki ke kanaka,	Of Waikiki in Kona is the man.
Me he kanaka la ko aloha e noho nei	Like a man is your love which possesses me.
Kaalo ae no e noho mai ana.	When you look around it is sitting there.

Kauaula ka ua noho i uka	Kauaula is a rain in the mountain
Noho i uka o Kanaha.	Inhabiting the uplands of Kanaha,
Ka makani nu me he hakikili la a noho i uka,	The fierce wind as the rumbling of thunder in the mountain.
Ai la i uka o Hahakea.	There it is the uplands of Hahakea,
Hooneenee ana ka ua i ke pili,	The rain approaches the pili.
O ka ua o ka makani haele i kai,	The rain and the wind move seaward;
Ke kii e kalohe eu ka makani.	Moving to cause damage, the mischievous wind
Pau ka maia, ka lau o ka laau,	Tearing up bananas and leaves of trees,
Ka ulu, ka niu, ka wauke,	The breadfruit, the coconut, the wauke.
Aohe koe i ka hoonaikola ia e ka makani,	Nothing remains through the destructive march of the wind
He ai niho ole ana ka makani i ka ai,	[For] without teeth it is destroying food
Mai Puako a Moalii,	From Puako to Moalii
He ʻlii ka lai, he haku,	A chief is the calm, a lord,
No Lahaina, e no Helelua no kekahi malino,	At Lahaina and at Helelua is another calm
Malino Hauola ia Wailehua	Glossy is the surface of the water at Hauola and on Wailehua
O kekahi lulu Kekaa e noho nei,	Another calm place now is Kekaa
He pohu ko Makila he lai o Kuhua,	Makila is without wind, Kuhua is calm
Ua hee pumaia ka nalu o Uo	The banana stalks [are used] for surfboards at Uo
Kihehe i ka lau maia pala.	Using the split ripe banana leaves
Alalai no ke poo o ke kanaka,	For head covering, for the heads of the people,
No ke kini heenalu o Kelawea,	For the multitude of people surf-riding at Kelawea.
Hoonuinui ana i ka nani o Lahaina,	Lauding the glory of Lahaina
He nui ka puu o Lahaina o ka ea,	But Lahaina is faulty, it is full of dust,
Mai waho mai ka ea a loko o ka hale,	There is dust outside as well as inside the house
He ilina na ka ea o Mokuhinia,	Mokuhinia is the resting place of the dust
Kuhinia i ka olelo palolo eia la	Satisfied with the other's lying statements,

Hoonuinui i manawa ino au.	Lauding [Lahaina] to cause me to anger

[Fornander 1920:476–477]

3.5.2 "Kananaka"

This *mele* mentions the Maʻaʻa wind of Lāhainā and also speaks of a mermaid that lived in the waters just off shore.

> This hula often performed as a hula noho, or sitting dance, is about the mermaid Kananaka who lived in the surf outside Lahaina. Mermaids did not exist in traditional Hawaiian lore, and Kananaka may be an innovation inspired by the whalers' tales in Lahaina. Maui elders credit this song to Kauhailikua, a court dancer for Kalākaua and grandmother of Eddie Kamae.

ʻO ka pā mai a ka Maʻaʻa	The blowing of the Maʻaʻa wind
Halihali mai ana lā i ke ʻala	Bears with it a fragrance
Ke ʻala onaona o ka līpoa	A sweet scent of the līpoa seaweed
Hana ʻoe a kani pono	Get it until you are satisfied
Nani wale ia puʻe one	Beautiful is that stretch of sand
I ka nalu heʻe mai aʻo Kananaka	With the surf break of Kananaka
Kahi a mākou i heʻe ai	Where we have ridden the waves
I ke ʻehuʻehu o ke kai	There amid the spray of the sea
ʻO ka mahina hiki aloalo	The moon rises to its zenith in the sky
Hoʻolaʻilaʻi ana lā i nā pali	Poised aloft here above the cliffs
Pōhina wehiwehi i ke onaona	A silvery gleam, lush with fragrance
Koni maʻeʻele i ke kino	Bringing a throb and a tingle to the body

[Wilcox et al. 2003:107]

3.5.3 "Puamana"

The following *mele* highlights the beautiful property once belonging to Ane Keohokālole, mother of David Kalākaua. After her death and the death of her successors, Charles Farden purchased the half-acre lot and still kept the name, Puamana. The *mele* was composed by Irmgard Farden Aluli, one of Charles and Annie Farden's 12 children (Clark 1989:56).The property was eventually sold and the house dismantled. The only reminder left of the Farden residence is a row of coconut trees (Clark 1989:56), mentioned below.

Puamana, kuʻu home i Lahaina	Puamana, my home in Lahaina
Me nā pua ʻala onaona	With the fragrant flowers

Ku‘u home i aloha ‘ia	My home that I love
Home nani, home i ka ‘ae kai	Beautiful home, home at the waters edge
Ke kū nani a ka mahina	Standing beautifully in the moonlight
I ke kai hāwanawana	By the whispering waves
Ku‘u home, i ka ulu o ka niu	My home, in the grove of coconut trees
‘O ka niu, kū kilakila	The coconut trees standing so majestically
E napenape mālie	Their leaves gently fluttering
Ha‘ina ‘ia mai ka puana	Tell the refrain
Ku‘u home i Lahaina	About my home in Lahaina
Ua piha me ka hau‘oli	That filled us completely with happiness
[Clark 1989:56]	

3.5.4 "No Nahi‘ena‘ena"

This *mele inoa,* name song or eulogy, was composed for princess Nahi‘ena‘ena following her tragic death due to complications from childbirth (Kamakau 1992:340). She was the younger sister of Kauikeaouli (Kamehameha III) and daughter of Keopuolani (Emerson 1909:209) and died at just 21 years old (Figure 9; Kamakau 1992:341)

In residence at Lāhainā with her mother, Keopuolani, the princess Nahi‘ena‘ena lived there from May 1823 until her death in 1836. In Lāhainā, a royal roadway was constructed from the shore to the protestant church at Waine‘e, to accommodate her funeral procession and the many mourners of her passing (Kamakau 1992:341).

He inoa no ka Lani	A eulogy for the Princess
No Nahi‘ena‘ena;	For Nahi‘ena‘ena a name!
A ka luna o wahine.	Chief among women
Ho‘i a ka ena a ka makalani	She soothes the cold wind with her flame
Noho ka la‘i i ka malino--	A piece that is mirrored in calm--
Makani ua Ha-aō;	A wind that sheddeth;
Ko ke au i hala ea.	A tide that flowed long ago.
Punawai o Manā,	The water-spring of Manā,
Wai ola na ke kupa	Life-spring for the people,
A ka ilio nanā	A fount where the lapping dog
Hae nanahu i ke kai;	Barks at the incoming wave,
Hae nanahu i ke kai;	Barks at the incoming wave,

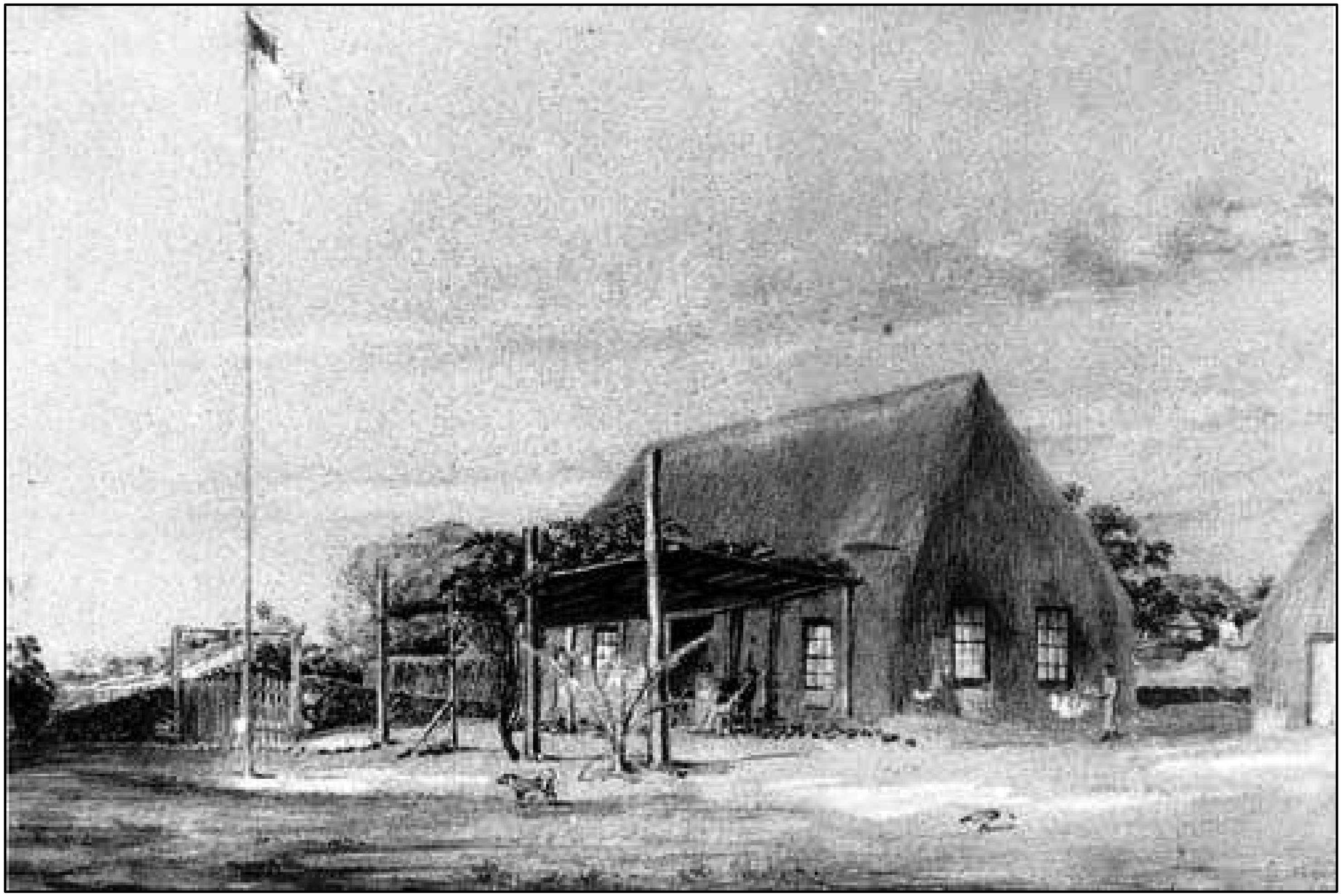

Figure 9. Photo of Halekamani which was built for Princess Nahiʻenaʻena (Kamakau 1992:341)

Ehu kai nāna ka pua,	Drifting spray on the bloom
Ka pua o ka iliau.	Of the sand-crawling iliau.
Ka ohai o Mapēpe.	And the scarlet flower of ohai
Ka moena weʻuweʻu i ulana ia e ke Aʻe	On the wind-woven mat of wild grass,
Ka naku loloa.	Long naku, a springy mattress.
Hea mai o kawelo-hea,	The sprout-horn, Kawelo-hea,
Nawai la, e, ke kapu?	Asks, who of right has the tabu?
No Nahiʻenaʻena.	The Princess Nahiʻenaʻena.
Ena na pua i ka wai,	The flowers glow in the pool,
Wai au o Holei.	The bathing pool of Holei!
[Emerson 1909:209]	

3.6 *Oli* (Chant)

3.6.1 Kaala-miki-hau

A large ocean-going shark by the name of Kaala-miki-hau, respected as an *ʻaumakua,* is known along the shoreline of this area. According to the writings of Moke Manu, the following chant is recited by fishermen of the region:

Eia ka ʻai	Here is food
Eia ka iʻa	Here is fish
Eia ke kapa	Here is bark-cloth
Nou e Kaala-miki-hau	For you, O Kaala-miki-hau
Nānā iaʻu kāu pulapula	Look after me, your offspring.
I mahiʻai	Let me plant
I lawaiʻa	Let me fish
Kuku kapa	And beat the bark-cloth
A e ola iaʻu, Kanui.	Grant me life, Mighty one.
	[Informant: Mahelona of Puʻuhale, Maui]
	[Manu 2006:127]

3.6.2 *Oli* in Honor of Chiefess Piʻikea and *ʻOhana*

The origin of this *oli* is uknown, though it appears in Fornander's *Collection of Hawaiian Folk-lore*. Fornander writes of the Piʻilani ʻOhana, the offspring of the *aliʻi nui* of Maui, Piʻilani. His children included his eldest son Piʻilani, daughter Piʻikea, and two youngest sons Kiha-a-Piʻilani, and Kalanipiʻilani. The *oli* below describes the chiefly lineage of the Piʻilani ʻOhana.

Kukaipaoa ka lani he ʻlii	Kukaipaoa, the lofty one is a chief,
He ʻlii ao lani, he ao-e;	A chief of the heavens, a cloud
He ia mau lani Kumakomako	Of the great heaven is Kumakomako,
He lani no Kahuku, pali pohaku,	A chief of the rocky cliffs of Kahuku,
He mau lani pohaku no Lonokaeho.	They are solid chiefs belonging to Lonokaeho.
No Lono ka lae poni ia i ka wai niu,	It was the brow of Lono that was anointed with the milk of the coconut,
I haua i ka puaa hiwa a Kane,	That was dedicated with the black pig of Kane,
I ka puaa hiwa a Lono.	The black pig of Lono.
E Lono e! Eia ko maka lani,	O Lono, here is your royal offspring,
Ko lau, ko muo, ko ao, ko liko;	Your leaf, your shoot, your offpsring, your bud,
Ko alii kapu o Kihapiilani.	Your sacred chief, Kihapiilani;
Ko maka e ku ana i ka malama,	Your chiefly offspring who stands in the light.
Malama ia ka lau kapu o Keaka,	Protect thou the sacred bud of Keaka,
Ka lau oheohe o Keakamahana,	The thrifty sprout of Keakamahana
I kupu a kapalulu ka pua,	That grew and flowered,
Ka pua oloolo o Hemahema, o Kaikilani;	The drooping flower of Hemahema, and Kaikilani,
Nani ia lau oloolo no Kanaloa,	To whom belonged the drooping leaves of Kanaloa,
No ka ilio hulu pano i ka maka,	Like the black haired dog in whose eye
I noho ka eleele i loko o ka onohi;	Blackness dwells in the pupil,
He kakai kiko onio i ka lae,	With striped marks on the forehead,
Ke kiko o ke ki-kakapu,	Marks of the kikakapu,
O ka ia kapu hilia au awahia.	The sacred fish with the bitter fall.
A wahia i ka lani Keaka wahine,	Bitter is the chiefess Keaka,
I kupu a mala o Keakealani kane,	Who grew and developed through Keakealani.
Ia laua hai ka haka o ke kapu.	By them was the sacred law broken,
Hakahaka i ka momona o na ʻlii nui,	Broken by the product of the great chiefs.
He ʻlii ku moku aimoku nui hoi nei,	Here is a great district chief standing here;

He nui hoi o Kauhi, he hono ko na moku,	Kauhi is great; it is the foundation of the isles.
He nui hoi Keaka, he awalu i waho,	Keaka is great for she has produced eight.
He kai papa nene ko na aina,	The seas of her lands are noised on the shoals,
He ulu papa kai holo papa no Kahiki,	As rolling waves from the shoals of Kahiki.
Hiki o Keawe, ke kupu kia aumoku,	Keawe the great commander has arrived,
Ka hua hookahi a ka ao i ka lani.	The only offspring of the cloud in the heaven
Na Kalani, Kalanikauleleaiwi.	By the chiefess Kalanikauleleaiwi.
No Keaka keia lani, na Keawe,	This is Keaka‘s chiefly one, by Keawe.
Na kela eke hului o Piilani.	That attraction was Piilani,
I noho o Keawe i o Piilani la,	For Keawe dwelt at Piilani’s,
Ahu kooka o na ‘lii nui,	The gathering place of great chiefs.
He ‘lii, he mau aloo ka ike ana aku,	A chief, several chiefs were seen;
He mau lani haele wale iho no;	They are the chiefs who go idly by,
Hele hehi i ka lihi o ka la.	Walking about until the close of the day.
I ka malama hanau o Ikiiki,	In the month born of Ikiiki.
Ua Ikiiki ka lani i luna,	The heaven above is panting [for breath],
Ua ui-a ia ka malama,	The rain for the month is far removed,
Ka pili o hoehu ka ua,	Far driven away is the rain.
Ke iloli nei ka honua,	The earth is suffering as one in travail,
Naku ka mauna waikahe ino,	The mountain trembles, the flood gushes with violence;
Ino ua kahuli lewa na aina,	It is indeed stormy for the lands are overturned and floating,
Ua lawe ka houpo o ka moku,	The breast of the isle is floating
Ke au o mahele o Kuala,	On the dividing current of Kuala.
O Kanaiki o ka moku,	Of Kauaiki of the isle,
O ka uuina i wawau e,	For the sound of crackling is heard,
O na ‘lii o ka nuu pule,	It is the chiefs on the place of prayer,
O kanaka o ka hale hiwa,	They are the people of the sacred house
O loko o mana ka moo,	Within the confines of mana, the lizard.
O ka Hina kii o Haloa,	One belonging to Hina, taken by Haloa.
O Kalani oi-oia i apa,	Excellent Kalani, he is being delayed.

Ke paha ala i kona makemake ia,	Boasting of his being a great favorite
A hiki mai ka olelo hoi ana,	When the word came to him
Ko aupuni la, nana ia,	To take charge of his kingdom,
No Ikiiki, no Kaaona ke ʻlii,	For the chief was of the month Ikiiki, of Kaaona;
No Hanaia, no Hinaiaeleele,	Of Hanaia, of Hinaiaeleele.
Nolaila o Piikea, wahine a Umi,	Thence came Piikea the wife of Umi,
Ka Laielohelohe hiapo ia,	She was the first-born of Laielohelohe,
A Piilani no i hanau mai.	Given birth through Piilani.
Hanau o Lonopii, he kane,	Lonopii was born, a male.
Hanau o Kihapiilani, he kane,	Kihapiilani was born, a male.
A Piilani no i hanau ai,	Given birth through Piilani,
O Kihapiilani, Kalanilonaakea,	Kihapiilani, Kalanilonaakea.
Ili kea, malo kea,	[Of] light skin [and] white loin cloth.
Malailena a Kihapiilani,	Kihapiilani shall see bitterness.
O ua ha ia o Laielohelohe,	There were four from Laielohelohe;
Ia lakou ke kae o ke kapu,	They possessed the border of the tabu
Ia Kalamaku a Kauhiholua,	Of Kalamaku, of Kauhiholua,
Na Kauhiholua, na Lupeikalani,	Of Kauhiholua, of Lupeikalani.
Na Nalu e hilo i ke aho a Makalii,	It was the Nalu that spun the fish-line of Makalii,
Ke aho kaakolu ia i kela ka loa,	The fish-line of three strands which excels in length.
Ka maawe lau huna ia o ke ʻlii,	The chief is like a hidden strand
I heia i Miloa e Hanauane.	Which was caught at Miloa by Hanauane.
Hanau mai o Kuhihewa,	Kuhihewa was then born.
He muli o Kaihikapu a Kuhihewa,	Kaihikapu of Kuhihewa was the younger,
O Kaihikapu ili manoa,	Kaihikapu with the thick skin,
Ili pepee, pepee i ke kapu,	Crackled skin crackled by the kapus.
Ka ili pee ku-e o ke ʻlii o Mano,	The thick, ugly skin of the chief Mano.
No Mano ili oi, ili kalakala,	Mano, of the sharp skin, the rough skin,
Ke kalakala o ka lau ea pu,	Like the roughness of the pumpkin leaf

Ke kalakala o ka ia ili ee,	Like the roughness of the rough-skinned fish,
Ka ili e, o Mano, lae pohaku,	The peculiar skin of Mano, he of the hard forehead.
Ka ulu a Mano, a Mano no,	The seed of Mano, belonging to Mano
He mau puha ia na Mano,	Is the loin product of Mano.
Na laua o Nohomakalii,	Together with Nohomakalii,
Noho o Mano, moe ia Pulanaieie,	Mano lived and cohabited with Pulanaieie;
Kalanipiilani kana keiki,	Kalanipiilani was his child
He niu kaukahi na Manookalanipo.	The only offspring of Manookalanipo.
He mau lani olu iho no ka maka,	The eyes are like two kindly chiefs
I luna wale nei-e lili nei la.	Who are haughty in their lofty position.
Lili ka ua i ka Makalii,	The light showers of the summer
Puehu i ke kula o Kailo,	Were scattered on the plain of Kailo.
Lulana i hauoa Keawe,	Calmness is seen at Hauoa of Keawe,
Kakaulua i ke ala wela,	Gathering on the heated road.
Hiki la i o olua ka lai ua malie,	The calm and clearness have reached you two.
Ua luhea ka iki o Puna,	Drooping is the diminutive of Puna,
O Puna maka inaina,	Puna of the angry eyes,
Ke kahu hoi o Kahinanalo,	The guardian of Kahinanalo
Moku o Ohikihokolio,	The isle of Ohikihokolio,
Ho a e ia no kuu lani,	Previously secured for my chief;
No ka ohiki; kau ka ole e,	For the sand crab; let jor prevail,
Ke ʻlii loa la malama ia.	The long-lived chief, watch over him.

[Fornander 1917:238–243]

3.6.3 *Oli* Regarding Taxation in Lāhainā

When all the islands were united under the rule of Kamehameha, many of the lesser chiefs overseeing the commoners took advantage of their power and many commoners became slaves on their own lands (Kamakau 1992:231). Kamehameha enforced a law that provided protection to the commoners and that also kept the chiefs and landlords obedient.

> The uniting of the land had brought about excessive taxation. There was an innumerable succession of landlords, and each used the commoner to further his own purpose. The chiefesses demanded such delicacies as the dried intestines of fish, sea slugs, sea cucumbers of various kinds and sea urchins. Because of these oppressions, some men migrated to Tahiti or fled to Kauai to live under Ka-umu-

ali‘i. Many chants were composed in those days telling of Hawaii as a land of robbers. Here is one:--

A Lahaina ‘ike i ka lau o na‘ulu,	In Lahaina I saw the leaves of the breadfruit,
‘Ike i ka mea maika‘i a Hawaii,	I saw the good things of Hawaii.
E humuhumu ka waha,	But I must sew up the mouth,
E noho malie ka waha,	Keep quiet,
Ka waha o ka olala e!	Keep the mouth humble!

[Kamakau 1992:232]

Section 4 Traditional and Historical Accounts

4.1 Traditional Accounts

The division of Maui's lands into political districts occurred during the rule of Kakaʻalaneo, under the direction of his *kahuna* (priest), Kalaihaʻōhiʻa (Beckwith 1970:383). This division resulted in 12 districts or *moku* during traditional times: Kula, Honuaʻula, Kahikinui, Kaupō, Kīpahulu, Hāna, Koʻolau, Hāmākua Loa, Hāmākua Poko, Wailuku, Kāʻanapali, and Lāhainā. The *moku o loko*, or *moku* as it is most commonly called, literally means "to cut across, divide, separate" (Lucas 1995:77). When used in terms of traditional land tenure, a *moku* is most readily akin to a political district, an overall land division that can contain smaller divisions of land such as *ʻokana, kalana, ahupuaʻa, ʻili,* and *moʻo*.

The *ahupuaʻa* divisions of Lāhainā are best explained by Maly and Maly (2007):

> The *ahupuaʻa* of Lāhaina are something of an anomaly in the Hawaiian Islands. Many of the *ahupuaʻa* are small, some comprising only a few acres and they are often configured as detached parcels (*lele*)—they do not run in contiguous *makai* (shore) to *mauka* (upland) sections […]
>
> Without specific documentation stating why the *ahupuaʻa* of Lāhaina are configured as they are, we must assume that the reason is linked to the nature and value of the regions' resources. This form of subdividing provided generational residents with access to fresh water, arable lands, mountain- and coastal-resources, and facilitated sustainable living through various seasons (water always being a consideration). Thus the wealth of the watered valleys of the Lahaina region was shared among all the people of the land. [Maly and Maly 2007:82–83]

Flanked by excellent fishing grounds, the *kalana* of Lāhainā served as the primary seat of the *aliʻi* when residing in West Maui (Handy et al. 1991) and later as the center of government for the Kingdom of Hawaiʻi. The *ahupuaʻa* that comprise the *kalana* of Lāhainā contained a dense collection of *kuleana*.

4.2 Early Historic Period

4.2.1 Unification under Kamehameha I

During the wars of unification, Lāhainā continued to serve as a political center as the place in which Kamehameha I established his seat of government. A two-story brick house was constructed at the Lāhainā landing (*makai* of the present-day public library) for the use of the king, when his travels brought him to Lāhainā. Kamehameha I sailed his fleet of war canoes to Lāhainā in 1802, consecrated several *heiau*, and collected taxes. His "brick palace" was noted by many contemporary European and American explorers, as were the buildings of Mokuʻula. The first horses seen on Maui landed at Lāhainā in 1803; a mare and a stallion were presented to Kamehameha, and although the king was 67 years old, he soon became an accomplished rider. Kamehameha moved his invasion forces to Oʻahu, and over the next seven years planned his invasion of Kauaʻi. His residence was then moved to Hawaiʻi Island until his death in 1819.

According to Fornander (1880:300) the custom following the death of a high chief was to re-divide and distribute the land of the region between the chiefs and favorites of the new monarch. This custom was responsible for many civil wars. The rule of Kamehameha I brought about a new degree of permanence and security, and with the accession of his son Liholiho (Kamehameha II) to the throne in 1819, no general redistribution of lands took place, thus setting a precedent for future succession. Between 1837 and 1845, the island of Mokuʻula was the preferred residence of Kauikeaouli (Kamehameha III) and the stage on which the political changes of the Hawaiian Kingdom were to play out (Klieger 1998:2).

4.2.2 Missionaries Arrive in Lāhainā

With the unification of the Hawaiian Islands in 1791 under a single sovereign, followed by the arrival of the first missionaries and first whaling vessel, the ship *Maro* of Nantucket in 1820 (Andrews 1865:556; Morison 1922), western-styled commerce and Christianization of the Native Hawaiian people swept across Lāhainā. The town of Lāhainā and the surrounding landings played a prominent role in the early economy of the Kingdom. The lands surrounding Lāhainā town were cultivated in commercial sugar (Gilmore 1931:198–203), while the whale trade, Irish potato trade (Gilman 1906), and establishment of the Lāhainā Mission Station and Lāhaināluna Seminary, drew people to the waterfront areas which ultimately resulted in a population rise (Haun and Henry 2001). This trend made Lāhainā one of the primary economic, religious, and educational centers for the early Hawaiian Kingdom (Kamakau 1992:304).

The Reverend Richards writes in the *Missionary Herald*, October 1830, discussing religious matters at the missionary station of Lāhainā:

> The state of things at Lahaina, on the island of Maui, continues to be encouraging […] Public worship on the Sabbath was established on the 18th of February, 1825. Then, ten persons were present—now more than as many hundreds […] In every considerable village from one end of the island to the other, the people have erected a house for the worship of God. At Olualu, [Olowalu] a village eight miles distant from Lahaina, we have preached during the season, nearly thirty sermons to a congregation of five to six hundred. This and a single Sabbath at Kanepale, [Kāʻanapali] a village equally distant from Lahaina in another direction, is all that we have been able to do for the people on this side of the island. [Richards and Green 1831]

The pioneer company of Protestant missionaries to reach the Hawaiian Islands arrived off the coast of Hawaiʻi Island in April 1820. In October of the same year, missionaries from Kailua "passed by Mowee and there spent a month in comfortable circumstances [with the entourage of Kamehameha II]" (Thurston 1822:63). The Lāhainā station was established by William Richards and his wife in 1823. In August 1826, the Reverend William Richards writes from Lāhainā, from a spot not far from Mokuʻula (note the reference to the "royal palace"):

> At the close of my last letter, we were living on the sea beach, a spot rendered unpleasant, not only by the roaring of the surf, which dashed within a few feet of our doors, but also, by the numerous houses recently erected on every side. . . Our houses, too, had become so bad, that they were a very indifferent shelter from the storm, and we were daily expecting that the wind would take them entirely away.

> Ka‘ahumanu soon wrote to me, that she had ordered the governor of Lahaina to make over to me, a small piece of taro and potato ground, and also a garden and building spot. Two large well built native houses were standing in the yard, to which we immediately removed, and in which we now live. Directly in front of us, are several taro gardens and fish ponds, surrounded with cocoa nuts [*sic*], hala, and kou trees, in the midst of which stands the brick house erected by Tamehameha, and called by Vancouver, ‘the royal palace’.
>
> Back of our houses, and inclosed [*sic*] in the same yard, is about an acre of excellent land, designed for a garden. It contains three breadfruit trees, and on its borders, are a few cocoa nuts. It is now covered with bananas, plantains and sugar cane, interspersed with melons, cucumbers, beans, cabbage and yams.
>
> On the 26th of October [1826], the schools of Lahaina were all publickly [*sic*] examined. There were present, nineteen schools containing *nine hundred and twenty two* [italics theirs] scholars. The school of Nahienaena, in a particular manner, distinguished itself for its improvement. [Richards in American Board of Commissioners for Foreign Missions 1827:40]

Census figures collected by Protestant missionaries throughout the Hawaiian Islands beginning in 1831 provide the earliest documentation of the size of the native population after the first decades of western contact. During the first census of Maui Island in 1831-1832, a total population of 2,982 was recorded in the Lāhainā District, which comprised 8.5% of the entire island population of 35,062 (Schmitt 1977). Between 1837 and 1845, the island of Moku‘ula was the preferred residence of Kauikeaouli, Kamehameha III and the stage on which the political changes of the Hawaiian Kingdom were to play out (Klieger 1998).

4.3 **Mid-Nineteenth Century**

4.3.1 The Māhele and the Kuleana Act

In 1845, the Board of Commissioners to Quiet Land Titles, also called the Land Commission, was established “for the investigation and final ascertainment or rejection of all claims of private individuals, whether natives or foreigners, to any landed property” (Chinen 1958:8). This led to the Māhele, the division of lands among the king of Hawai‘i, the *ali‘i*, and the common people, which introduced the concept of private property into Hawaiian society. In 1848, Kamehameha III divided the land into four divisions: Crown Lands reserved for himself and the royal house; Government Lands set aside to generate revenue for the government; Konohiki Lands claimed by *ali‘i* and their *konohiki* (supervisors); and *kuleana*, habitation and agricultural plots claimed by the common people (Chinen 1958:8–15).

Upon confirmation of a land claim, the *ali‘i* were required to pay a commutation fee to the government. This commutation (meaning a substitution of one form of payment or charge for another) could be satisfied with a cash payment or the return of land of equal value. This payment was usually one-third of the value of the unimproved land at the date of the award (Chinen 1958:9–12). The *ali‘i* usually retained some of the land they were awarded and then returned some of the land to pay the commutation fee. The returned land usually became Government Land. In 1851, Government Lands became available for purchase “in lots of from one to fifty acres in fee simple, to residents only, at a minimum price of fifty cents per acre" (U.S. Department of the Interior 1882:23). These costs did not include the survey fee, which was to be paid by the interested buyer.

Under the Kuleana Act of 1850, the *makaʻāinana* were required to file their claims with the Land Commission within a specified time period in order to apply for fee-simple title to their lands. The claim could only be filed after the claimant arranged and paid for a survey, and two witnesses testified that they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land since 1839, and knew that no one had challenged the claim. Then, the *makaʻāinana* could present their claims to the Land Commission to receive their Land Commission Award (Kameʻeleihiwa 1992).

Not everyone who was eligible to apply for *kuleana* lands did so and not all of the claims were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. In addition, some *makaʻāinana* may have been reluctant to claim *ʻāina* that had been traditionally controlled by their *aliʻi*, some may have not been familiar with the concept of private land ownership, and some may have not known about the Māhele, the process of making claims (which required a survey), or the strict deadline for making claims. Further, the Land Commission was comprised largely of foreign missionaries, so the small number of claimants and awards may reflect only those *makaʻāinana* who were in good standing with the church. Significantly, the surveying of land was not standardized (Kameʻeleihiwa 1992:296–297).

4.3.2 LCA Awards within the Project Area

Of the 16 LCAs in the project area vicinity, four are located within the current project area: LCAs 3925D:2, 3925I:1, 3935M:1, and 3925H:3 (Figure 10). According to the LCA records (Waihona ʻAina 2000), LCA 3925D was awarded to Hualii and consisted of five *ʻāpana* (lots) with four *loʻi* (taro pond field). Section 2 was described as taro land in the *ʻili* of Wainalo. LCA 3925I was awarded to Pala and consisted of six *ʻāpana* with five *loʻi*. Section 1 was described as a salt patch in Kahanaiole. LCA 3925M:1, awarded to Lili, consisted of six *ʻāpana*. Section 1 contained a house lot. The house lot is possibly depicted on a Dodge (1880) map, which shows two rectangles north of the project area (Figure 11). A Brown (1886) map depicts the vicinity as still undeveloped (Figure 12). LCA 3925H:3 was awarded to Kaʻaha and his son, Kehunalua. This parcel was a house lot in Kahananui which the claimant received from his parents. The remaining 12 LCAs, all located north of the current project area (see Figure 10), include a coastal house lot, *kula* (pasture) land, and parcels used for *kalo* (taro) or potato cultivation.

4.3.3 Whaling in Lāhainā

The whaling industry in the Pacific Ocean reached its peak in 1859 and prices for whale oil collapsed five years later. Since the 1840s, the Hawaiian economy had been dependent primarily on supplying whale ships during their long layovers in the Islands. With the number of ships arriving during the early 1860s dwindling, the population of Lāhainā Town and neighboring west Maui *ahupuaʻa* dependent on the prosperity of Lāhainā migrated to other parts of Maui and other islands. Government censuses during the second half of the nineteenth century document the diminishing population of West Maui now subsumed in an enlarged Lāhainā District. In 1853, 4,833 persons were recorded as living in the Lāhainā District. Twenty-five years later, in 1878, the total district population had dropped to 2,448; and by 1896, the number had reached 2,398 (Schmitt 1977:12–13).

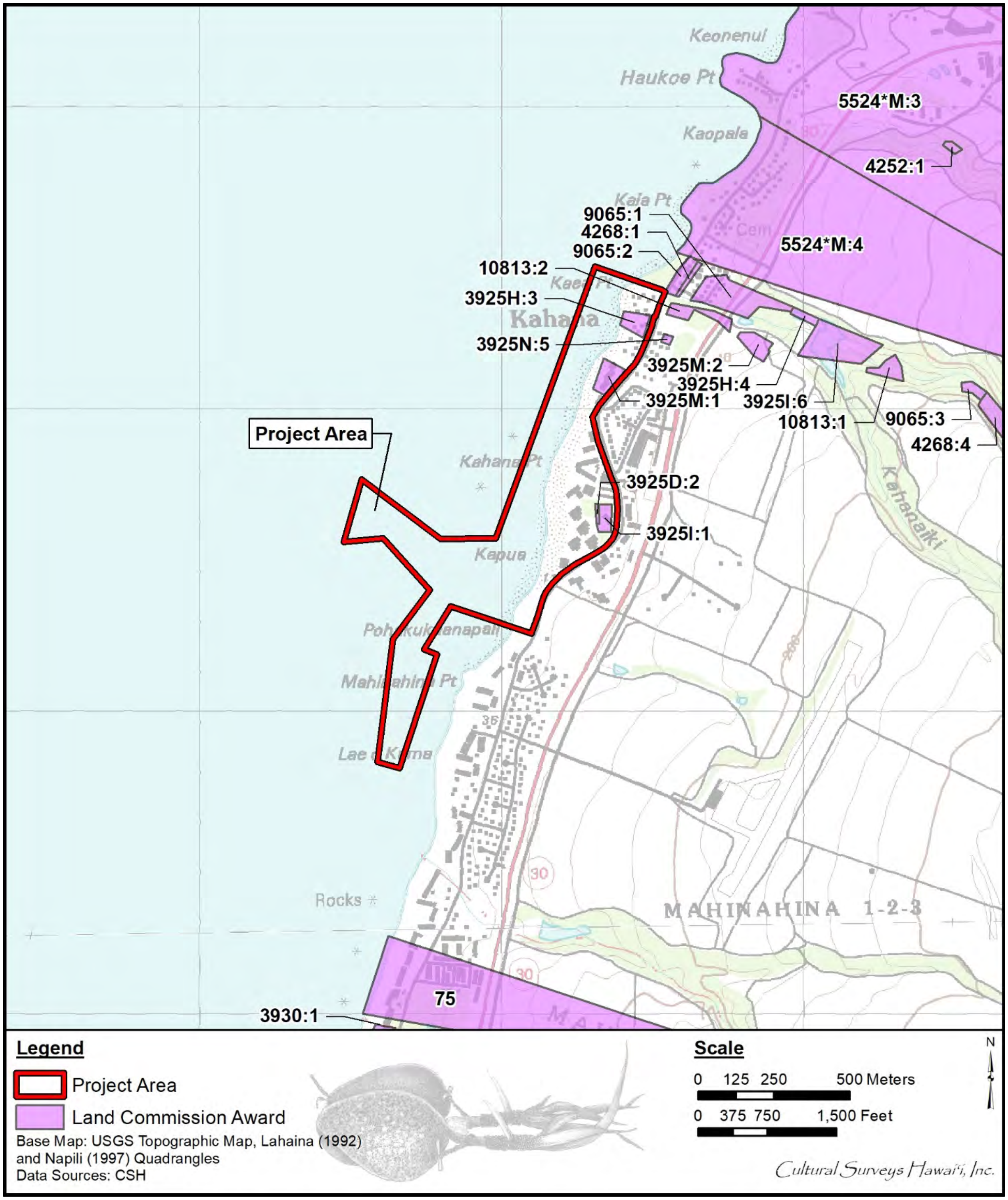

Figure 10. Portion of the 1992 Lahaina and 1997 Napili USGS 7.5-minute topographic quadrangles showing Land Commission Awards in the vicinity of the project area

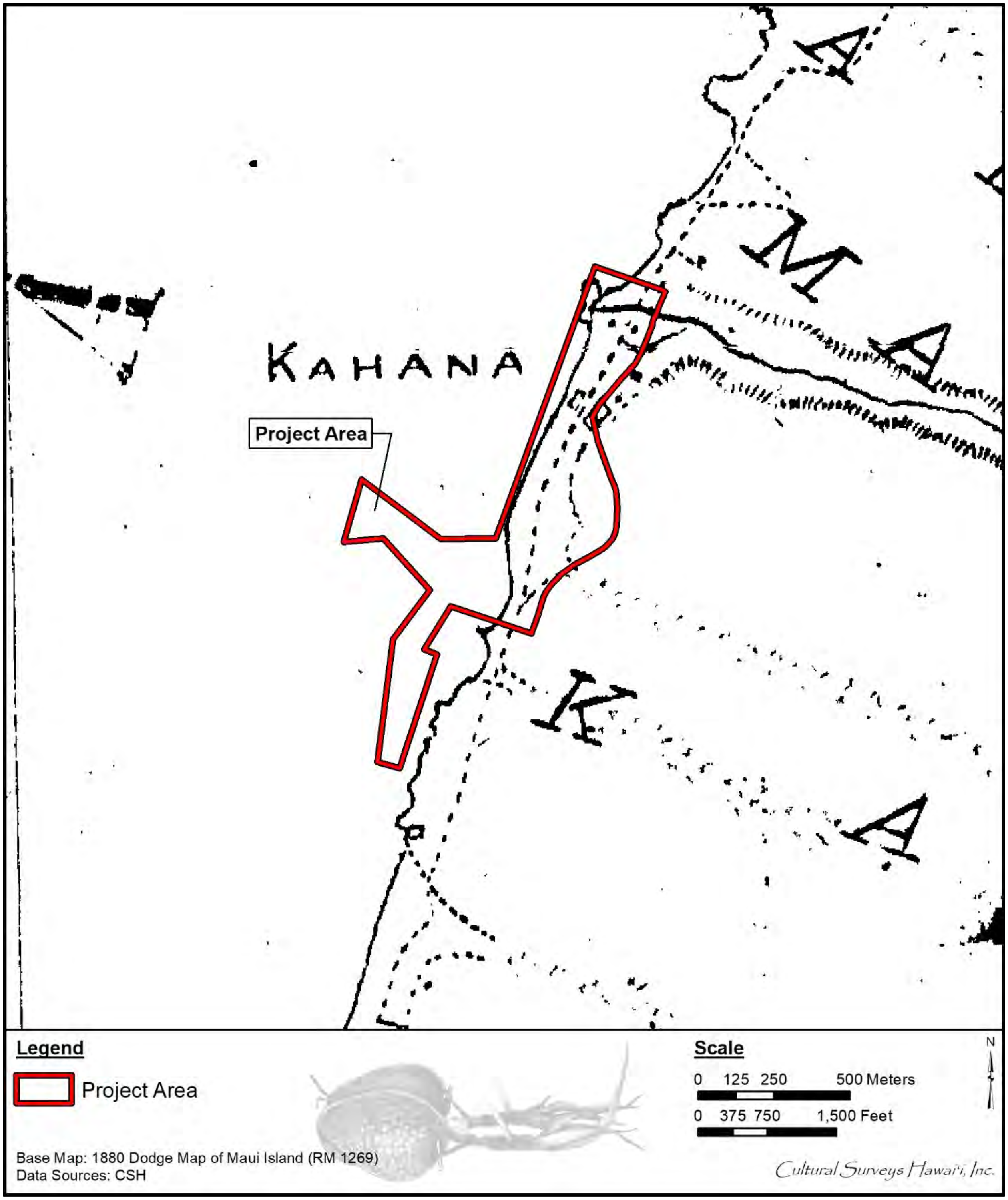

Figure 11. Portion of the Dodge (1880) map of Maui Island depicting the location of the current project area

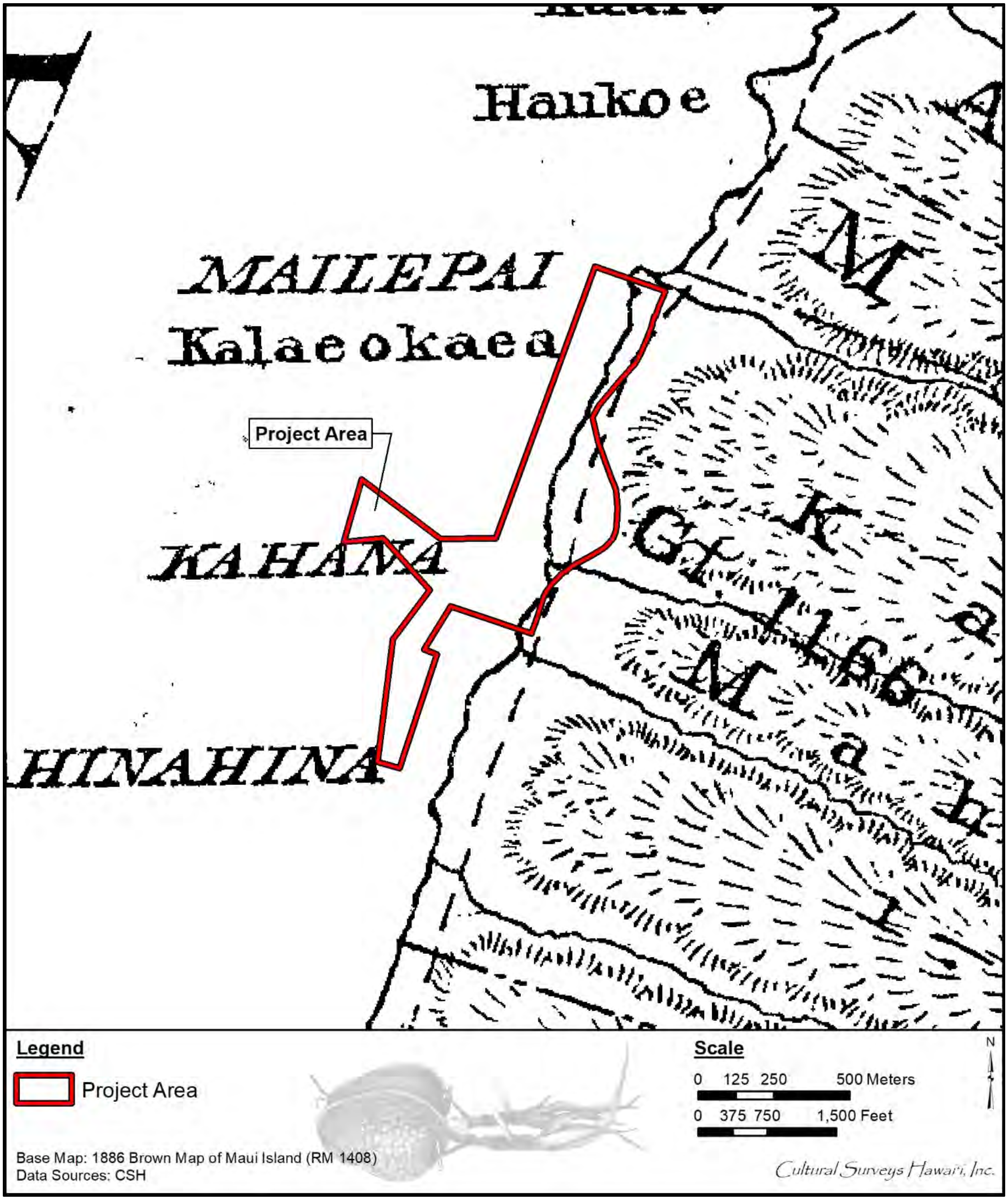

Figure 12. Portion of the Brown (1886) map of Maui Island depicting the location of the current project area

With the decline of the whaling industry in the Pacific, the Hawaiian Islands attracted a new generation of managers, professionals, and entrepreneurs who would reshape the landscape for western enterprises and pursuits. Prominent in this movement would be Samuel T. Alexander and Henry Perrine Baldwin. Alexander had been sent from his family home at Lāhaināluna to study at Oahu College (Punahou School) and Williams College in Massachusetts. Alexander returned to Lāhaināluna in 1862 as a teacher, and is credited with improving sugarcane and banana yields with his students there (Dean 1950).

Reverend Dwight Baldwin (1798-1886) had arrived in the Hawaiian Islands in 1831 and was stationed at Lāhainā between 1835 and 1870. During the early 1850s, Rev. Baldwin had been granted 2,675 acres of land in northwest Maui. This land holding would be the basis for enterprises expanding over areas of west Maui undertaken by his son, Henry Perrine Baldwin, during subsequent decades of the nineteenth century.

In the middle part of the 1800s, H.P. Baldwin and S.T. Alexander would team up to run the Waihee Plantation and go on to establish a plantation at Haʻikū. In 1876, Baldwin and Alexander started a project to bring water from east Maui to the dry leeward isthmus of central Maui. It was the first important irrigation project undertaken in Hawaiʻi, and demonstrated a process which would be repeated many times throughout the Hawaiian Islands (Hawaiian Sugar Planters' Association 1926). The system by which mountain water was brought from Honokōhau to the Pioneer Mill Company (PiMCO) fields in Lāhainā is modeled precisely on the principles developed by Alexander and Baldwin.

4.4 **Late Nineteenth Century**

4.4.1 Development of Sugar as a Commercial Crop

The Pioneer Mill Company was established as a partnership in 1863 among James Campbell, Henry Turton, and Benjamin Pittman. A plantation village, the Kāʻanapali Village, and production facility was established at Puʻu Kekaʻa, the site of present-day Sheraton Maui Resort & Spa, along with a shipping port at Kāʻanapali Landing.

The growing of sugarcane along the west coast of Maui required the development of sources for mountain water as well as the development of a shipping port. Using gravity flow water from mountain streams, PiMCo produced 500 tons of sugar in 1866 (Dorrance and Morgan 2000). Production reached 1,000 tons by 1872 with production clearing over 10,000 tons of sugar a year by the turn of the century (Thrum 1900:41).

A competing sugar venture was organized by King Kamehameha V (Lot Kapuāiwa) in 1871. The West Maui Plantation Company was formed under the pretense that the high prices of sugar set during the American Civil War would continue. Louisiana's sugar beet industry recovered in the mid-1860s, causing American sugar prices to fall. Although the terms of an 1876 Treaty of Reciprocity with the United States gave great stimulus to Hawaiian sugar producers, the West Maui Plantation Company could not overcome the lack of available water sources. The enterprise closed in 1878 (Dorrance and Morgan 2000) and the lands of Lot Kapuāiwa in Hanakaʻōʻō were eventually acquired by PiMCo.

The successful installation of wells at Kāʻanapali, Wahikuli, Māla, and Waineʻe in 1897 effectively doubled the production of sugar at PiMCo (Gilmore 1931; Stearns and MacDonald

1942). In 1898, PiMCo installed a simple galvanized iron flume in the Honokōwai Stream, but the mechanism by which arid coastal lands could receive mountain waters was perfected in 1904 on Maui's western coastline with the building of the Honokahau Ditch. The Honokahau Ditch consisted of tunnels and flumes 14 miles long, and it delivered 20 million gallons per day to the PiMCo fields. Wells and pumps at underground water sources located at Honkōwai, Kāʻanapali, Hāhākea, Wahikuli, Kahoma, Lāhainā, Olowalu, Ukumehame, and Puʻukoliʻi supplied additional water (Gilmore 1931).

Between 1908 and 1912, PiMCo was consistently shipping over 25,000 tons of sugar annually out of the Kāʻanapali Landing at Puʻu Kekaʻa (Figure 13), a production increase of over 150% following the improved supply of irrigation water made available in the early 1900s (Thrum 1912). All transportation to and from the landing was by rail. The PiMCo railroad connected the mill, 3 miles distant, to Kāʻanapali Landing.

The Kāʻanapali Landing, was the main sugar storage facility for PiMCo with a warehouse and a capacity to store 14,000 tons of sugar (Figure 14). A molasses storage tank at the port of Kāʻanapali held 2,000 tons of molasses. A fuel storage tank at the port held 25,000 barrels of fuel oil to fire the steam-powered locomotives, pumps, and power plants for PiMCo. A 20-ton steam-powered derrick was set into the bedrock at the seaward end of Kāʻanapali Landing, protected by a concrete wall that rose 10 ft above sea level (Territory of Hawaii 1910:40–42). An aqueous ammonia storage tank also was located at the port (Gilmore 1931).

The following description of the Kāʻanapali Coastline in the early twentieth century, as viewed from the ocean, was included in a compilation of the many early coastal surveys conducted from the Hawaiian Islands up to the islands and reefs westward to Midway Islands:

> The coast from Lahaina to Kekaa Point is low, back of which the country is planted in sugar cane. The coast from Kekaa Point to Lipoa Point consists of a series of low bluffs and stretches of sand beaches, along which may be seen numerous clumps of algaroba (kiawe) trees. So far as known, this section of the coast has no outlying dangers. The country slopes gently, is more or less cut up by shallow gulches, presents a brownish appearance, and is covered with short grass. Kaanapali Landing, on the northerly side of Kekaa Point, is marked by a red warehouse and a white oil tank, which are just inside the sand beach. Kaanapali is the terminus of a plantation railroad which handles most of the sugar from this district. The boat landing is alongside of a wharf which has derricks on it. Off the end of the wharf are several mooring buoys. Good anchorage can be found in 10 to 20 fathoms about a mile off the wharf in the vicinity of the mooring buoys. [U.S. Department of Commerce 1919:24]

With adequate water resources assured for the plantation, the village system by which the plantation housed its field labor, expanded greatly. Prior to acquiring fields planted in cane by the Olowalu Sugar Company (1881-1931), the PiMCo maintained villages from Māhinahina (at the Honolua Weir) to Launiupoko (at the Launiupoko Reservoir). By the turn of the century, according to plantation records, 40 villages were situated among the fields and pump stations.

A lighterage system handled with surf lines was used to bring freight ashore to load onto smaller boats (Territory of Hawaii 1910:40–42). Inter-island steamers made weekly stops at Kāʻanapali, and the bulk freighters taking on sugar and delivering supplies. No outside freight was handled

Figure 13. Off-loading bagged sugar at Kaʻānapali Landing, ca. 1912 (Baker Collection, Bernice Pauahi Bishop Museum; reprinted in Condé and Best 1973).

Figure 14. Aerial photo of Puʻu Kekaʻa with storage tanks and loading cranes visible, ca. 1940 (photo reproduced from "Dynasty in the Pacific" by Frederick Simpich, Jr., 1974)

except by special arrangement as the PiMCo refused to take public freight from this landing (Territory of Hawaii 1910:42). South of the landing, the Baldwin Packers Ltd., owners of Honolua Ranch, delivered pineapple feed bran to a large cattle holding pen, where beef cattle were fattened prior to shipment to O‘ahu (Maui Historical Society 1971).

The 1918 PiMCo map of cane fields depicts the majority of the current project area within uncultivated coastal land. The coastal road is located within or adjacent to the eastern edge of the project area at Mile Post 29 and a house lot labeled as belonging to Gus Bechert is located approximately 100 m to the south (Figure 15).

4.5 Contemporary Land Use

In the years immediately following statehood in 1959, the Kā‘anapali area north of Lāhainā was master-planned as a resort destination. With the primary emphasis on tourism and the promotion of Lāhainā and Kā‘anapali as a destination resort and vacation area, in addition to economic pressure from low sugar prices, AmFac was forced to phase out regional sugar cultivation and milling operations. The last sugar harvest for the Pioneer Mill Company occurred in 1999, and the mill closed in 2003, thereby, ending the chapter on the “Sugar Era” of West Maui (Kubota 2004). A series of aerial images depicts the development of the project area and surrounding vicinity through the twentieth century (Figure 16 and Figure 17).

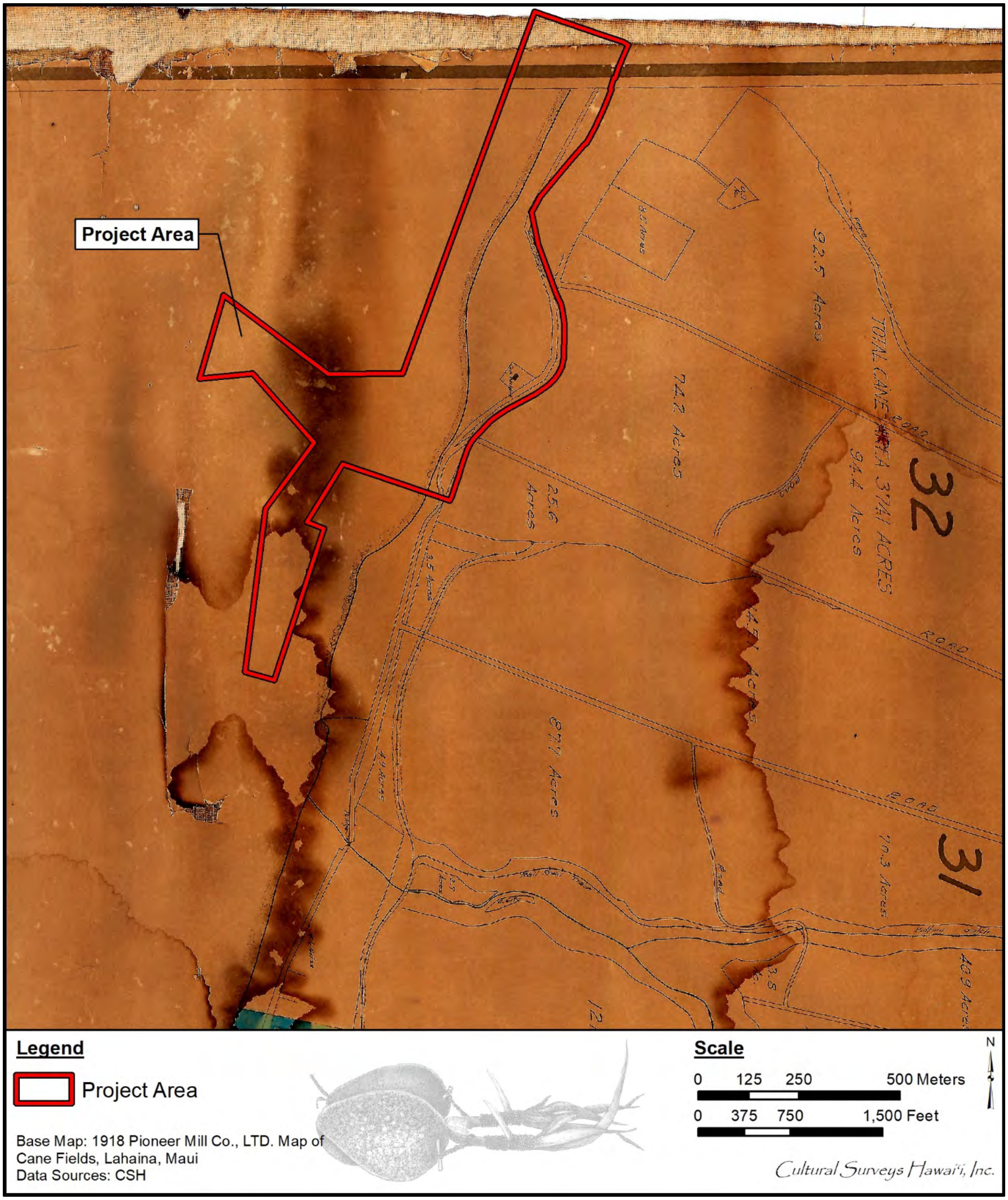

Figure 15. Portion of the 1918 PiMCo map of cane fields depicting the location of the current project area (Pioneer Mill Company 1918)

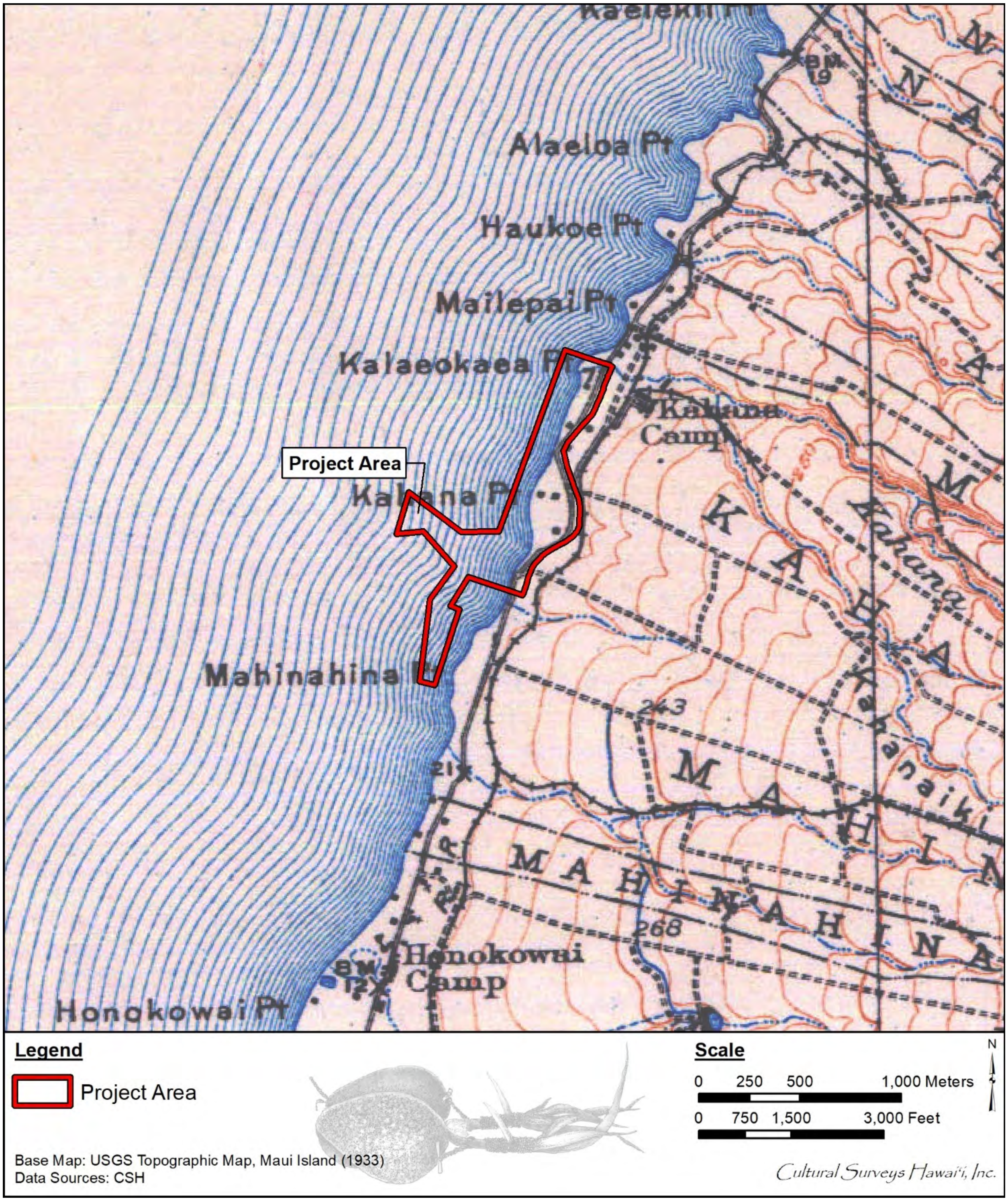

Figure 16. Portion of the 1933 U.S. Geological Survey Maui Island topographic map depicting the location of the current project area (U.S. Geological Survey 1933)

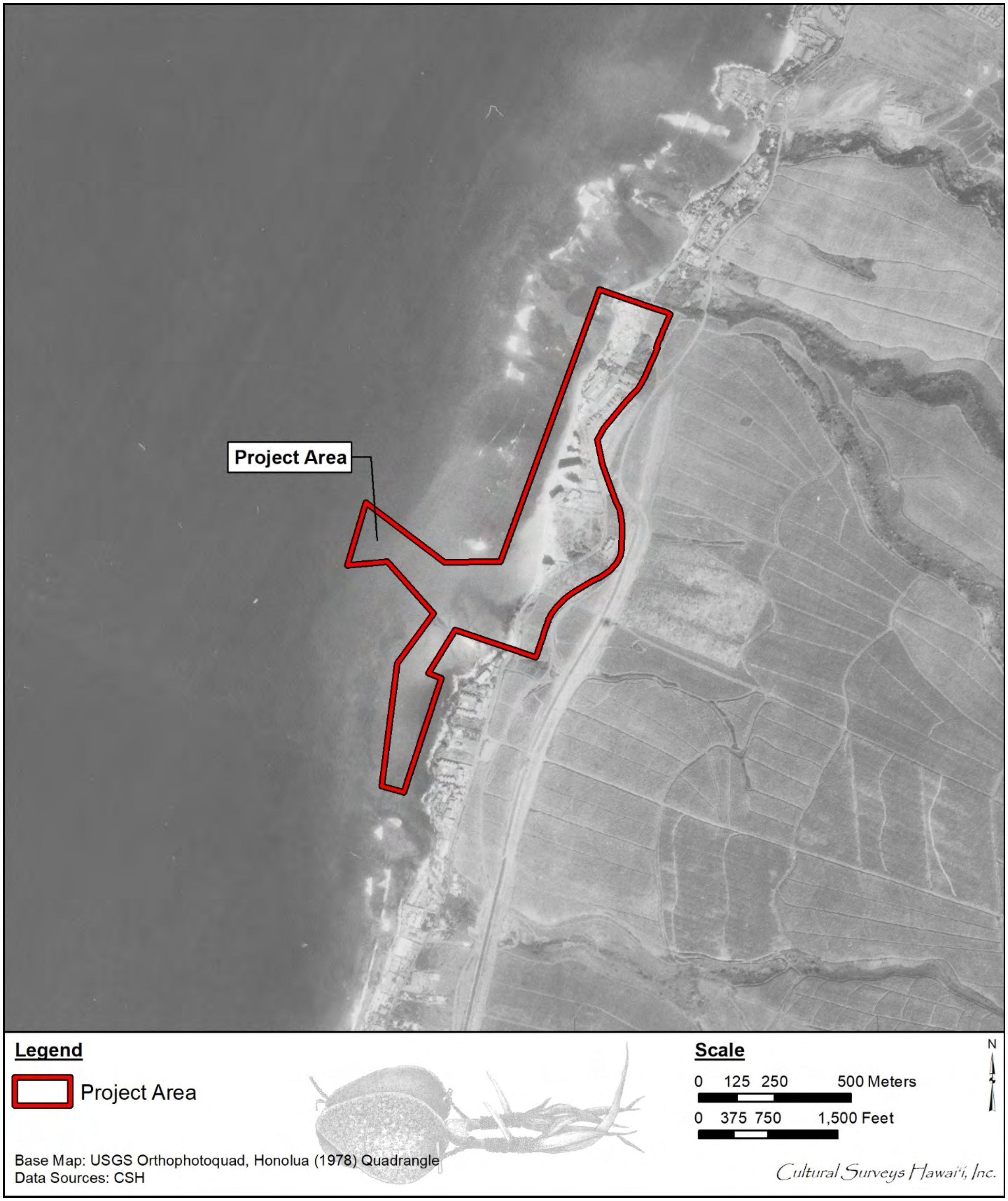

Figure 17. Portion of the 1978 U.S. Geological Survey Honolua orthophotoquad depicting several structures within the current project area (U.S. Geological Survey 1978)

Section 5 Previous Archaeological Research

Between 1931 and 1972, only sporadic archaeological studies were conducted in Lāhainā District. Following the passage of the National Historic Preservation Act in 1966 and HRS §6E, which established the Historic Preservation Program in 1976, archaeological studies occurred on a more frequent basis; although several of the areas along the shoreline already had been impacted by previous development.

Overall, previous archaeological research documents various cultural sites along the coastal region of the Nāpili-Honokōwai area, including temporary and permanent habitation areas related to marine exploitation and/or agricultural pursuits, ceremonial features, human interment sites, and other activity areas. The archaeological studies, in part with traditional knowledge and historic era observations, have shown that traditional Native Hawaiian burial practices were common within near shore sand dunes.

Previous archaeological studies in the immediate vicinity of the current project area include archaeological reconnaissance investigations, archaeological literature review and field inspections (LRFI), and archaeological inventory survey (AIS) investigations (Figure 18 and Table 3). Various pre-Contact through post-Contact historic properties were identified in the region, such as *heiau*, stone walls, and human burials (Figure 19). Of note, a study of a 50-acre property on the *mauka* side of Honoapi‘ilani Highway near the current project area identified a two-tiered basalt rock platform over a pre-Contact to early post-Contact human burial (State Inventory of Historic Places] SIHP # 50-50-01-2878) and a petroglyph pecked into a boulder that likely had been moved to the area of the platform when the area was cleared for sugarcane cultivation (SIHP # -2879) (Kennedy and Denham 1992)

5.1.1 Early Surveys

5.1.1.1 Walker (1931)

Winslow Metcalf Walker devoted much of 1928 and 1929 to systematically surveying Maui with a focus on traditional Hawaiian ceremonial structures such as *heiau.* He was aided in his reconnaissance of the Lāhainā area by Dwight David Baldwin. Walker (1931) reportedly collected legends connected with *heiau* from informant J. Kahahana. Walker (1931) and recorded three *heiau* near the project area:

- **Walker Site 12: Kahana Heiau**, located at the shore of Kahana Point in Kahana Ahupua‘a, totally destroyed
- **Walker Site 13: Mailepai Heiau**, located near point of same name in Mailepai Ahupua‘a, washed away
- **Walker Site 14: Hihiho Heiau**, located along county road near Kalaeokaea Point in Kahana Ahupua‘a, destroyed to build road.

5.1.1.2 Stokes (1937)

In 1937, John F.G. Stokes accumulated a number of historical references establishing beach sand dunes as a frequent place for human burial grounds in the Hawaiian Islands and presented his findings to the Hawaiian Historical Society, stating that “dune sepulture […] was one of the regular

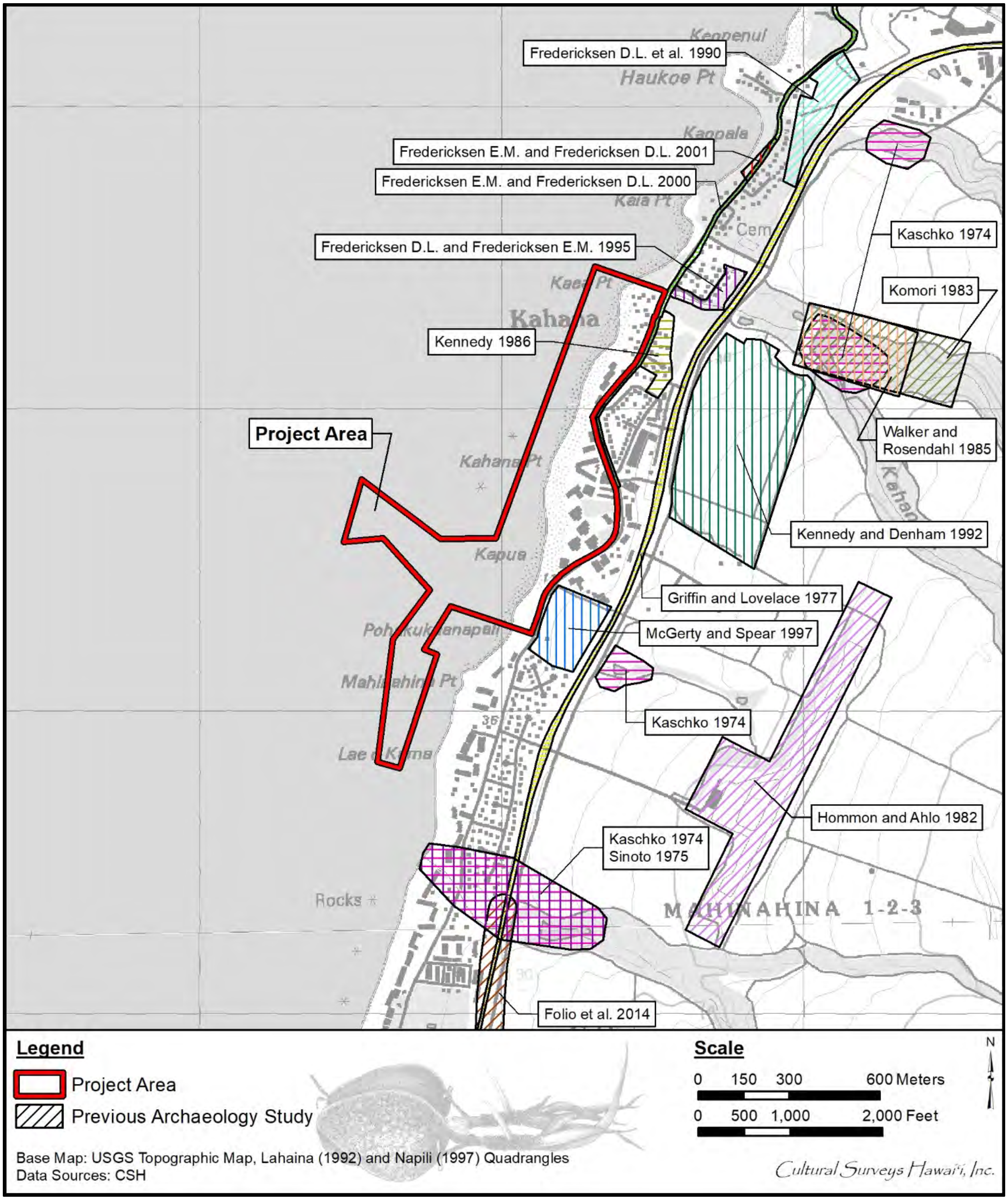

Figure 18. Portions of the 1992 Lahaina and 1997 Napili USGS 7.5-minute topographic quadrangles with an overlay of previous archaeological studies in the immediate vicinity of the project area

Table 3. Previous archaeological studies in the immediate vicinity of the project area

Reference	**Type of Study**	**General Location**	**Results (SIHP # 50-50-01****)**
Walker 1931	Archaeological reconnaissance	Island-wide, including Kahana area near present project location	Recorded three *heiau* near current project area: Walker Site 12: Kahana Heiau at Kahana Point, destroyed; Walker Site 13: Mailepai Heiau near Mailepai point, washed away; and Walker Site 14, Hihiho Heiau, near Kalaeokaea Point
Kaschko 1974	Archaeological reconnaissance	Honolua Watershed including Honokōwai Valley	Identified a complex of low stone alignments and platforms (SIHP # -1208) in Honokōwai Valley and five sites in other areas
Sinoto 1975	Archaeological survey	Honolua Watershed	Resurveyed SIHP #s -0225, -1208, -1748, -1749, -1750 previously identified by Kaschko (1974)
Griffin and Lovelace 1977	Survey and salvage archaeological investigations	Honoapi‘ilani Hwy between Honokōwai and ‘Alaeloa	Recorded SIHP #s -0217 and -0218, buried midden deposits in Māhinahina Gulch, further tested and re-designated as SIHP # -0225, an extensive pre-Contact occupation area; documented SIHP # -0215, a trail segment in Ka‘ōpala Gulch; SIHP # -0216, a freestanding stone wall, and SIHP # -0227, three retaining wall sections in Kahana Iki Gulch
Hommon and Ahlo 1982	Archaeological reconnaissance survey	Present-day Kapalua Airport	No historic properties identified

Reference	Type of Study	General Location	Results (SIHP # 50-50-01****)
Komori 1983	Archaeological investigation	Kahana Gulch	Identified seven Bishop Sites, re-designated as historic properties, most associated with cattle ranching: SIHP # -1741, overhang shelter and terracing; SIHP # -1742, three terraces, cultural deposit (traditional and historic), rectangular platform; SIHP # -1743, wall segment, two parallel stone alignments, and a crude enclosure; SIHP # -1744, wall segments and terraces; SIHP # -1745, stone walls, terraces, and natural features forming an alluvial flat enclosure; SIHP # -1746, walls and natural features forming an enclosure; SIHP # -1747, overhang shelter and stone terrace
Walker and Rosendahl 1985	Archaeological testing	Kahana Gulch	Conducted further testing and documentation of SIHP #s -1742 through -1744, previously identified by Komori (1983); reassessed “cattle ranching” features as agricultural features
Kennedy 1986	Field inspection with subsurface testing	*Mauka* side Lower Honoapi‘ilani Rd; TMK: [2] 4-3-005:013	Documented stone ruins of Kahana Church (SIHP # -1593), and three additional features: a low stone wall, historic walkway, and a stone mound
Fredericksen et al. 1990	AIS	North of current project area along *mauka* side of Lower Honoapi‘ilani Rd; TMK: [2] 4-3-001:039	Noted portions of a former railroad bed including 1,500-ft long easement and black-top surface, relating to when it was used as a cane-haul road; subsequently designated as SIHP # -4103, Pioneer Mill Co. Railway
Kennedy and Denham 1992	AIS	Kahana Ridge Subdivision; TMK: [2] 4-3-001:031	Identified SIHP # -2878, a two-tiered basalt rock platform over a human burial, and SIHP # -2879, a petroglyph in a large boulder
Fredericksen and Fredericksen 1995	AIS	Kahana-Kai Subdivision; TMK: [2] 4-3-005:011	Recorded SIHP # -4069, a stone bridge footing with retaining walls on both sides of Kahananui Stream; and SIHP # -4072, Rodrigues Family grave site dated 1918

Reference	Type of Study	General Location	Results (SIHP # 50-50-01****)
McGerty and Spear 1997	Archaeological study (report not on file)	Kapua Village Subdivision; TMK: [2] 4-3-009	No historic properties identified
Fredericksen and Fredericksen 2000	AIS	Lower Honoapiʻilani Rd from Napilihau St to Hoʻohui Rd	Identified SIHP #s -4797, a pre-Contact habitation deposit; -4798, a retaining wall and shoulder wall; and, -4799, a retaining wall
Fredericksen and Fredericksen 2001	Supplemental AIS	Lower Honoapiʻilani Rd near Kaia Point and Kaopala Gulch	Investigated SIHP # -4797, a remnant coastal habitation site, and documented five pit features and two possible features in wave-cut profiles
Folio et al. 2014	LRFI	Honoapiʻilani Hwy, Lāhainā Bypass	Recorded 15 temporary features including pre-Contact and historic agricultural features, plantation-era water control features, a pre-Contact rock shelter habitation feature; a ranch-era wall and erosion retaining wall, and an indeterminate mound; also documented two previously identified historic properties, SIHP # 50-50-03-5264, a terrace complex in Hanakaʻōʻō Gulch and SIHP # -5309, cultural material associated with the Puukolii Village site

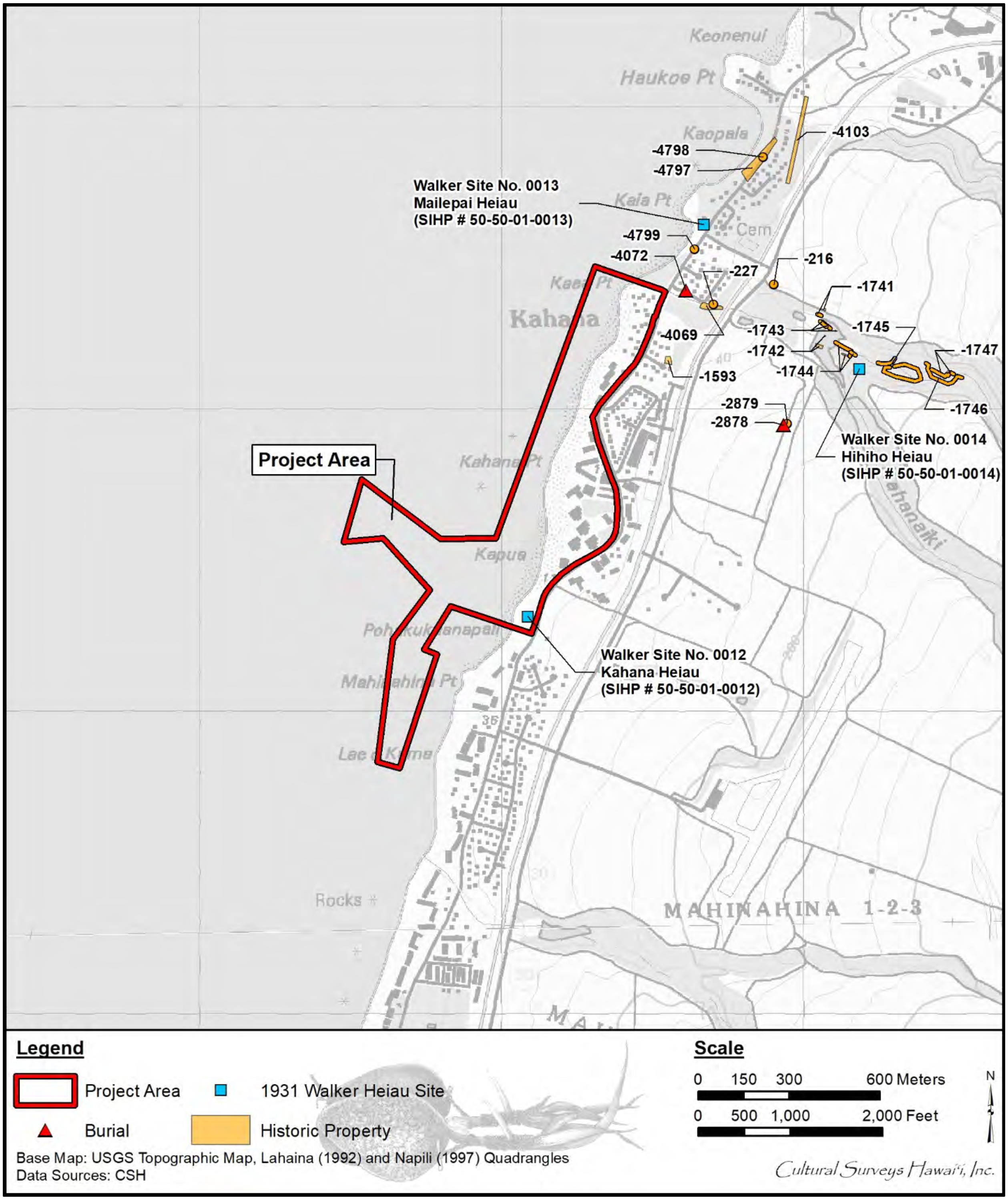

Figure 19. Portions of the 1992 Lahaina and 1997 Napili USGS 7.5-minute topographic quadrangles with an overlay of historic properties in the immediate vicinity of the project area

mortuary practices and sites of such cemeteries are known in practically all the islands," and the burials are "generally remote from sites of ancient habitations" (Stokes 1937:33).

Malo (1951:97) describes that the burials were "all placed vertically in the knee-to-face or flexed position" in the following manner:

> A rope was attached to the joints of the legs and then being passed about the neck was drawn taut until the knees touched the chest. The body was then done up in a rounded shape and at once closely wrapped in *tapa* and made ready for burial. [Malo 1951:97]

Stokes (1937) described dune burials as occurring only a few inches below the surface of the sand, which would normally result in large-scale exposure of skeletal remains during the shifting of the dunes due to wind or storm erosion. Burials exposed in this manner were described previously in the region of Puʻu Kekaʻa by Fornander (1919).

Fornander (1919c:542) assumed that the vast exposure of skeletal remains in the sands of Kekaʻa was because "this was the vicinity of several bloody battles that doubtless left their toll," such that

> Concerning the great amount of human bones at this place. On account of the great number of people at this place there are numerous skeletons, as if thousands of people died there; it is there that the Lahainaluna students go to get skeletons for them when they are studying anatomy. The bones are plentiful there; they completely cover the ground. [Fornander 1919c:542]

Stokes (1937), however, did not agree that dune burials, where many hundreds of burials may be exposed, were the end-result of gigantic battles. He maintained that reports of massed conflicts were rare in the oral tradition of pre-Contact Hawaiʻi. On the island of Maui, with the exception of large battle forces annihilated on the sand dunes of Central Maui in the Battle of Kakanilua, and the defeat of the massed armies of Maui by Kamehameha at the Battle of Kepaniwai at ʻĪao, most stories of battles involve a series of skirmishes, during which the opposing forces would have been separated into small groups and scattered in many directions (Stokes 1937:36).

In his study, Stokes (1937) concluded the majority of human interments identified within beach dunes were likely the result of customary pre-Contact burial practices, rather than from cataclysmic battles. Stokes (1937:33) established the universal manner in which these burial areas were normally uninhabited because the spirits of the dead were to be feared and known to linger near these cemeteries.

5.1.2 Kaschko (1974); Sinoto (1975)

In September 1974, the Bishop Museum conducted an archaeological survey of specific areas within the Wailuku Flood Prevention project and the Honolua Watershed for the Soil Conservation Service, U.S. Department of Agriculture to construct flood-control channels and dams (Kaschko 1974). The project included two areas (Piihana and Puuohala) within the Wailuku Flood Prevention project and eight gulches within the Honolua Watershed. These included Nāpili 2-3, Nāpili 4-5, Honokaena, Kaʻōpala, Kahana, Pahakukaʻanapali, Māhinahina, and Honokōwai. No historic properties were documented in the Wailuku areas. Six archaeological sites were documented in the Honolua Watershed gulches and five later received SIHP designations.

Site 1/SIHP # 50-50-01-1748 is a rectangular stone-and-earth platform on a natural rock outcrop in Nāpili 4-5. It was interpreted as a probable prehistoric house platform. Site 2/SIHP # -1749 is another rectangular platform likely from a prehistoric house foundation across from SIHP # -1748 in Nāpili 4-5. Site 3/SIHP # -1750 is a probable historic wall structure in Honokeana. Sites 4 and 5/SIHP # -0225 are buried cultural deposits in Māhinahina. Site 6 is a previously identified historic property, SIHP # -1208, consisting of a complex of several low stone alignments and platforms in Honokōwai. Kaschko (1974:5) recommended that areas of the Honolua Watershed be re-examined after the boundaries of the project area are established in the field, and that further testing and documentation should be conducted if any of the sites would be impacted by construction.

In June 1975, the Bishop Museum conducted an archaeological survey to confirm and document the condition of the sites reported by Kaschko (1974) within the Honolua Watershed for the Soil Conservation Service, U.S. Department of Agriculture (Sinoto 1975). The perimeters of the sites were marked with flagging tape. The condition of Site 1/SIHP # -1748, Site 2/SIHP # -1749, and Site 6/SIHP # -1208 were observed to be consistent with the description by Kaschko (1974), and no further documentation was provided. Much of the features of Sites 4 and 5/SIHP # -0225 had deteriorated due to erosion. Further details were provided for the site description of Site 3/SIHP # -1750. It was noted that “Without further excavation, however, no definite conclusions can be drawn regarding the age, function, and nay possible change of form at this site” (Sinoto 1975:2). Salvage excavations were recommended for any sites that may be affected by construction.

5.1.3 Griffin and Lovelace (1977)

Between November 1975 and October 1976, Archaeological Research Center Hawaii, Inc. (ARCH) conducted survey and salvage archaeological investigations for realignment of a section of Honoapiʻilani Highway between Honokōwai and ʻAlaeloa. The investigations were completed in subsequent phases consisting of the initial surface survey of the highway corridor (Project 14-73I) and two phases of salvage excavation at SIHP # -0225 (Project 14-73IIA and B). Griffin and Lovelace (1977) provide the cumulative results of all phases of work for the project.

From 18 to 20 November 1975, ARCH conducted the initial surface survey (Project 14-73I) of the project area and recorded five archaeological features: confirmed Kaschko (1974) Sites 4 and 5, two buried midden deposits (SIHP #s -0217 and -0218), in Māhinahina Gulch; a trail segment (SIHP # -0215) in Kaʻōpala Gulch and a freestanding stone wall (SIHP # -0216); and three retaining wall sections (SIHP # -0227) in Kahana Iki Gulch (Griffin and Lovelace 1977:iii, 2). SIHP # -0227 is north of the current project area.

From 6 to 16 April 1976, ARCH conducted salvage excavations (Project 14-73IIA) for SIHP #s -0217 and -0218 in Māhinahina Gulch and determined the features represented a continuous deposit, which was re-designated as SIHP # -0225, an extensive pre-Contact occupation area. The study included seven test pits and eight controlled test units as well as assessment of the exposed banks. SIHP # -0225 comprises a buried cultural layer that also is exposed along the main stream channel and erosion banks with midden, coral, charcoal, and various features such as fire pits, possible postholes, and other pits of undetermined function (Griffin and Lovelace 1977:31-32). Further testing was recommended prior to any construction. The occupation area was considered unusual and valued for research potential in part because it was “farther inland than most large occupation sites, being about 304.80 meters from the coast line” and it was “composed of a continuous midden deposit containing features, but no surface structural remains” (Griffin and Lovelace 1977:33).

From 23 August to 10 September 1976 and 4 to 23 October 1976, ARCH conducted further salvage excavations (Project 14-73IIB) for SIHP # -0225. The study included backhoe assistance for nine test pits and 16 test trenches and controlled areal excavations of 29 square (sq) m test units. The findings were “similar to that obtained during initial salvage excavations” (Griffin and Lovelace 1977:51).

5.1.4 Komori (1983); Walker and Rosendahl (1985)

In September 1983, the Bernice Pauahi Bishop Museum, Department of Anthropology, conducted an archaeological investigation at Kahana Gulch for the Soil Conservation Service, USDA, based on the recommendations of Kaschko (1974) (Komori 1983). The area was investigated prior to the construction of a siltation dam and associated structures that would be approximately 85 m to the west. The project area included recently bulldozed areas near the base of the gulch, which were inspected for cultural materials.

Seven Bishop Sites, re-designated as historic properties, were identified during the study:

- SIHP # 50-50-01-1741/Bishop Museum Site 50-Ma-D10-3 was interpreted as a prehistoric activity area consisting of a shallow, unmodified overhang shelter (Site 3a) and a 10-m long terrace (Site 3b). Sparse midden and manuports were observed within shallow soil pockets in the rock shelter.
- SIHP # -1742/Site D10-4 contains three terraces of stacked stones between large boulders and stone outcrops with an extensive cultural deposit of traditional and historic materials (Site 4a). A second feature was identified as a possible prehistoric rectangular platform (Site 4b).
- SIHP # -1743/Site D10-5 includes a wall segment (Site 5a), two parallel stone alignments (probable wall foundation) (Site 5b), and a “crudely constructed rectangular enclosure built against a stone outcrop” (Komori 1983:7) (Site 5c). The enclosure had likely been built recently by vagrants and included recent marked, dog burials near Feature 5a.
- SIHP # -1744/Site D10-6 was interpreted as a cattle-ranching area consisting of a complex of wall segments and terraces that are surrounded by barbed wire fences with no interior features.
- SIHP # -1745/Site D10-7 was interpreted as a probable ranching area consisting of stone walls, terraces, and natural features forming an alluvial flat enclosure with no interior features.
- SIHP # -1746/Site D10-8 was interpreted as a ranching area consisting of walls and natural features forming an enclosure with no interior features.
- SIHP # -1747/Site D10-9 contains two features consisting of a small overhang shelter that contained a hammerstone or unfinished *ʻulu maika* (game stone) (Site 9A) and a 10-m long stone terrace (Site 9b).

Additional archaeological investigations and excavations were recommended for features of SIHP #s -1741 through -1744. Notably, these sites had initially been identified by Kaschko (1974) but did not receive Bishop Museum site designations (Walker and Rosendahl 1985). No further work was recommended for the cattle ranching areas. SIHP # -1747 was determined to be outside the area affected by the proposed construction.

In October 1984, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted archaeological testing of the Kahana Desilting Basin for the USDA-Soil Conservation Service, based on the recommendations of Komori (1983) (Walker and Rosendahl 1985). The investigation included test excavations, backhoe trenches, and surface collections in areas of SIHP #s -1742 through -1744 (Sites D10-4a and -4b, D10-5b and -5c, and D10-6). No further testing was conducted at SIHP # -1741. The study documented eight major components of the three sites.

SIHP # -1742/Site D10-4a consisted of five soil and boulder terraces, fronted by stone retaining walls and containing extensive historic artifacts. Controlled surface collections supported the historic artifact concentration. Test excavations indicated no substantial subsurface cultural deposits. Site D10-4b is a rectangular platform of crudely stacked basalt. An associated backhoe trench encountered metal pieces below the platform, and no other cultural materials. The function of the platform was undetermined and believed to be a relatively recent historic feature.

Excavations at SIHP # -1743/Site D10-5b, parallel boulder alignments, contained sparse cultural materials. The feature was assessed as the remnant foundation of a historic wall. The overhang shelter (Site D10-5c) consisted of a natural overhang with a stacked basalt wall against it. Test excavations encountered charcoal and ash concentrations, but no other cultural materials.

SIHP # -1744/D10-6 contains a terrace (Site D10-6a), an alluvial bench terrace and retaining wall (Site D10-6b), and a free-standing wall (Site D10-6c). No significant subsurface cultural deposits were encountered during testing of Sites D10-6a and -6b. No further testing was conducted at Site D10-6c.

The overall artifact analysis indicated remains of the late nineteenth century. The interpretation of the investigation of SIHP #s -1741 through -1744 and the associated background information of the area, indicated that the features were likely associated with agricultural, rather than cattle ranching, as had been concluded by Komori (1983).

5.1.5 Hommon and Ahlo (1982)

In May 1982, Science Management, Inc. (SMI) conducted an archaeological reconnaissance survey for a proposed community airfield, the present-day Kapalua Airport, in Māhinahina (TMK: [2] 4-3-001:031) (Hommon and Ahlo 1982). The survey area was approximately 35 acres with a length of 1,066 m (3,500 ft) and width of 122 m (400 ft). The survey area encompassed a sugarcane field that had been cultivated for about 50 years, and “no archaeological sites were observed during the field inspection” (Hommon and Ahlo 1982:8).

5.1.6 Kennedy (1986)

In 1986, Archaeological Consultants of Hawaii, Inc. (ACH) conducted an archival and field investigation of stone ruins, SIHP # -1593, in Kahana (TMK: [2] 4-3-005:013) (Kennedy 1986). The archival study indicated the ruins were those of the Kahana Church that had been constructed in the mid-1800s and reportedly in ruins in 1861. The field inspection included mapping, photo documentation, and subsurface testing to assess the likelihood of whether a cemetery had been associated with the church. Three additional structures were documented apart from the church ruins (Site 1): Site 2 was a low stone wall; Site 3 was a rectangular low stone mound; and Site 4 was a section of concrete likely from a historic walkway or footing. Testing included five backhoe trenches around the church ruins for a total excavation of 375 linear ft. No cultural materials were encountered except for a single round nail. It was noted that preservation of the church ruins would present a hazard due to the unstable condition and high likelihood of further structural collapse.

5.1.7 Fredericksen et al. (1990)

In July 1990, Xamanek Researches conducted an AIS of a 9.976-acre parcel for a planned development community (TMK: [2] 4-3-001:039) (Fredericksen et al. 1990). During the pedestrian field survey, portions of a former railroad bed were noted. Features included an easement and black-top surface, relating to when it was used as a cane-haul road. The easement extended approximately 40 ft wide and 1,500 ft along the *makai* (western) side of the project area. The study notes the ties and tracks of the former railroad had been removed previously and was mentioned in the newspaper at the time. No SIHP numbers were designated during the study. The former railroad bed subsequently was designated as SIHP # -4103, Pioneer Mill Company Railway easement.

A large boulder concentration was noted in the southern portion of the project area and interpreted as likely relating to previous construction activities. Six soil test pits, averaging 2 m deep, had recently been excavated in the project area during a geotechnical survey. The locations were examined by the archaeologists and determined the areas to be sterile of significant cultural materials. No further subsurface testing was conducted due to time constraints, and archaeological monitoring was recommended (Fredericksen et al. 1990:10). To date, the parcel has not been developed and is currently agricultural property.

5.1.8 Kennedy and Denham (1992)

In 1990, ACH conducted an AIS of a 50-acre property in Kahana, TMK: [2] 4-3-001:031 (Kennedy and Denham 1992). The location is the present-day Kahana Ridge residential subdivision on the *mauka* side of Honoapi‘ilani Highway. At the time, a sugarcane field covered the parcel with the exception of a small uncultivated patch containing *haole koa* and other vegetation. The uncultivated patch was cleared of vegetation and two historic properties were identified: SIHP # -2878, a two-tiered basalt rock platform, and SIHP # -2879, “a single, crude petroglyph pecked into a large boulder which bordered the clearing” (Kennedy and Denham 1992:14). SIHP # -2878 was believed to contain a burial and/or function as a small religious shrine. It was determined that SIHP # -2879 may have originated from elsewhere on the property and was moved during clearing for the sugarcane field.

In May 1992, ACH conducted subsurface testing at SIHP # -2878 in order to determine the age and function of the feature. A test unit was excavated into the upper tier, through 0.9 m of the platform with a total depth of 2.1 m below the upper tier. A basalt whetstone was within the platform and small pieces of coral fragments and metal nails had filtered among the boulders and cobbles. An open space/cavity was encountered at 50 cm below ground surface. The base of the cavity was lined with loamy soil (versus the surrounding silty clay) and contained shell midden and charcoal. A mandible with three teeth had been observed then, work halted, and the platform was rebuilt. The human burial was at approximately 125 cmbs and 215 cm below the upper tier.

SIHP #s -2878 and -2879 were assessed as pre-Contact to early post-Contact. SIHP # -2878 was assessed as significant under Criteria c (embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value), d (have yielded, or is likely to yield, information important for research on prehistory or history), and e (have an important value to the native Hawaiian people due to associations with cultural practices, traditional beliefs, events, or oral accounts—these associations being important to the group's history and cultural identity). SIHP # -2879 was assessed as significant under Criteria d and e.

5.1.9 Fredericksen D. and E (1995)

In February 1995, Xamanek Researches conducted an AIS of a 4-acre parcel for the Kahana-Kai Subdivision (TMK: [2] 4-3-005:071) (Fredericksen and Fredericksen 1995), located north of the current project area. The pedestrian inspection recorded two historic properties on the surface of the parcel. SIHP # -4069 is a stone bridge footing with retaining walls on both sides of Kahananui Stream bed. SIHP # -4069 was assessed as significant under Criterion d (have yielded, or is likely to yield, information important for research on prehistory or history). The second historic property, SIHP # -4072, is an early twentieth century grave site consisting of a concrete vault and tombstone dated 1918 containing four members of the Rodrigues Family. An iron fence was constructed to enclose the grave site. The AIS investigation included 22 backhoe trenches and two test units. No historic properties were encountered during the subsurface testing.

5.1.10 McGerty and Spear (1997)

Previous archaeology was conducted by Scientific Consultant Services, Inc. (SCI) of a 12-acre parcel at TMK: [2] 4-3-009 prior to development of the Kapua Village residential subdivision (McGerty and Spear 1997). No historic properties were identified during the study. This report currently is not on file at the SHPD therefore, no further details are available at this time.

5.1.11 Fredericksen and Fredericksen (2000, 2001)

In 1999, Xamanek Researches conducted an AIS for a Lower Honoapi‘ilani Road Improvements Project (Fredericksen and Fredericksen 2000). The project area encompassed a 1.4-mile long corridor of Lower Honoapi‘ilani Road from Napilihau Street to Ho‘ohui Road. Improvements would include road widening, the installation of curbs, gutters, and sidewalks, and the relocation of utilities and other drainage improvements. The AIS included a pedestrian survey with inspection and documentation of culverts and wave-cuts. Three historic properties, SIHP #s 50-50-03-4797 through -4799, were identified during the AIS. All the historic properties are located north of the current project area.

SIHP # -4797 is a pre-Contact habitation area that was identified within a wave-cut on the *makai* side of the right-of-way at Kaia Point and Kaopala Gulch culvert. The exposed portion was approximately 90 m long and extended onto Kaia Point. No subsurface testing was done due to the location and possible instability of the bank. The cultural layer was identified as a strong brown clay loam containing marine shells, fire-cracked rock, coral, and a moderate amount of charcoal

(Fredericksen and Fredericksen 2000:9-10). Radiocarbon dating of the charcoal suggested pre-Contact occupation.

SIHP # -4798 is a historic retaining wall and shoulder wall for Lower Honoapi‘ilani Road, located north of SIHP # -4797. The retaining wall is approximately 75 m long, 2 to 4 m high, and constructed from subangular basalt boulders (Fredericksen and Fredericksen 2000:13). The road shoulder wall was between 0.4 and 0.9 m high and constructed from subangular basalt cobbles. The total length was not determined and much of it was obscured by vegetation, although it appeared to extend between seven designated construction stations, or approximately 213.35 m (700 ft).

SIHP # -4799 is a historic retaining wall on the *makai* side of Lower Honoapi‘ilani Road, located south of SIHP # -4797. It is approximately 61 m (200 ft) long, 0.8 to 1.2 m high, and presumably constructed from basalt boulders or cobbles (not described). SIHP #s -4797 through -4799 were assessed as significant under Criterion d (have yielded, or is likely to yield, information important for research on prehistory or history). No further work was recommended for SIHP #s -4798 and -4799. The SHPD recommended subsurface testing at SIHP # -4797.

In February 2001, Xamanek Researches conducted a supplemental AIS with subsurface testing at SIHP # -4797, a remnant coastal habitation site (Fredericksen and Fredericksen 2001). The supplemental AIS included documentation of two wave-cut profiles, four backhoe trenches, and a hand-excavated test unit. No features were encountered in the backhoe trenches, while five pit features and two possible features were noted in the wave-cut profiles. It was noted that the “backhoe tests may simply have missed subsurface features that are associated with this site. . .” and “The few marine shells that were observed were very weathered, a reflection of the very acidic soil conditions on this part of West Maui” (Fredericksen and Fredericksen 2001:15). SIHP # -4797 was assessed as significant under Criteria a (be associated with events that have made an important contribution to the broad patterns of our history), c (embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value), and d.

5.1.12 Folio et al. (2014)

In 2014, CSH conducted an LRFI for the Honoapi‘ilani Highway Realignment (Lāhainā Bypass), Phase ID (Folio et al. 2014). The Phase ID bypass alignment extends approximately 5.2 km (3.2 miles) from Hāhākea Gulch to south of the current project area and includes an approximate 121.9-m (400-ft) connector road corridor to Honoapi‘ilani Highway. Overall, much of the project area had been extensively modified by sugarcane plantation activity. During the field inspection, all potential historic properties were recorded at the reconnaissance level and no new historic property numbers were assigned. The temporary sites consist of 15 newly recorded features including pre-Contact and historic agricultural features such as terraces, an irrigation ditch, *‘auwai*, and retaining walls; plantation-era water control features such as a diversion box, a culvert, a reservoir and a metal pipe; a pre-Contact rock shelter habitation feature; a ranch-era wall and erosion retaining wall, and an indeterminate mound. Two previously identified historic properties were further documented during the field inspection. SIHP # 50-50-03-5264 is a terrace complex in Hanaka‘ō‘ō Gulch. SIHP # -5309 is cultural material associated with the Puukolii Village site. .

Section 6 Community Consultation

6.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with NHOs, agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise/and or knowledge of the *ahupuaʻa* where the project areas are located. CHS initiated its outreach effort in March 2019 through letters, email, telephone calls, and in person contact.

6.2 Community Contact Letter

Letters (Figure 20, Figure 21, and Figure 22) along with a map and aerial photograph of the project were mailed with the following text:

> At the request of Oceanit, Cultural Surveys Hawaiʻi, Inc. (CSH) is conducting a cultural impact assessment (CIA) for the Kahana Bay Erosion Mitigation Project, Kahana Ahupuaʻa, Lāhainā District, Maui Island, Tax Map Keys (TMKs): [2] 4-3-005:008, 009, 019, 020, 021, 029, 031; 4-3-010:001, 002, 004, 007, 009. The project area consists of approximately 110.8 acres encompassing portions of Kahana Bay and Kahana Beach. Kahana Beach is located along the coastline of West Maui, north of Honokowai and south of Napili. Kahana Beach is approximately 3,500 feet (ft) in length and is bounded by Kahana Stream mouth to the north and Pohaku "S-Turns" Beach Park to the south. To the west, a submerged fringing reef separates the beach from the Pacific Ocean. The condominium and residential buildings occupy the narrow strip of land between the shoreline and Lower Honoapiʻilani Road. The project area is depicted on a portion of the 1997 Napili U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1) and a 2015 aerial photograph (Figure 2).
>
> **Purpose of the Project**
>
> The purpose of the project is to devise a regional approach to mitigate coastal erosion at Kahana Bay. Kahana Bay has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront land, buildings, infrastructure, and amenities. Analysis of historical aerial images indicates the Kahana Bay shoreline recedes at an average rate of about 1 ft per year (Fletcher et al. 2003).
>
> The long-term coastal erosion trend is attributed to a number of factors including tropical storm and hurricane events, land subsidence, changes in sediment supply, prevalent wind and wave patterns, runoff drainage in the area, and rising sea levels. Episodes of rapid erosion caused by severe wave and current conditions have led to the installation of a variety of shore protection measures including sandbag revetments, seawalls, sand dune restoration, and sheet-pile structures on properties along Kahana Bay.

Cultural Surveys Hawaiʻi, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

399 Hualani Street Hilo, Hawaiʻi 96720 Ph: (808) 965-6478 Fax: (808) 965-6582

Job code: KAHANA 7 espencer@culturalsurveys.com www.culturalsurveys.com

May 2019

Aloha,

At the request of Oceanit, Cultural Surveys Hawaiʻi, Inc. (CSH) is conducting a cultural impact assessment (CIA) for the Kahana Bay Erosion Mitigation Project, Kahana Ahupuaʻa, Lāhainā District, Maui Island, Tax Map Keys (TMKs): [2] 4-3-005:008, 009, 019, 020, 021, 029, 031; 4-3-010:001, 002, 004, 007, 009. The project area consists of approximately 110.8 acres encompassing portions of Kahana Bay and Kahana Beach. Kahana Beach is located along the coastline of West Maui, north of Honokowai and south of Napili. Kahana Beach is approximately 3,500 feet (ft) in length and is bounded by Kahana Stream mouth to the north and Pohaku "S-Turns" Beach Park to the south. To the west, a submerged fringing reef separates the beach from the Pacific Ocean. The condominium and residential buildings occupy the narrow strip of land between the shoreline and Lower Honoapiʻilani Road. The project area is depicted on a portion of the 1997 Napili U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1) and a 2015 aerial photograph (Figure 2).

Purpose of the Project

The purpose of the project is to devise a regional approach to mitigate coastal erosion at Kahana Bay. Kahana Bay has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront land, buildings, infrastructure, and amenities. Analysis of historical aerial images indicates the Kahana Bay shoreline recedes at an average rate of about 1 ft per year (Fletcher et al. 2003).

The long-term coastal erosion trend is attributed to a number of factors including tropical storm and hurricane events, land subsidence, changes in sediment supply, prevalent wind and wave patterns, runoff drainage in the area, and rising sea levels. Episodes of rapid erosion caused by severe wave and current conditions have led to the installation of a variety of shore protection measures including sandbag revetments, seawalls, sand dune restoration, and sheet-pile structures on properties along Kahana Bay.

Ongoing studies are evaluating several alternatives for erosion mitigation such as shoreline armoring, beach restoration, and managed retreat. Currently, the preferred alternative and proposed action is beach restoration, which includes beach nourishment with stabilization structures.

Proposed Action

The Kahana Bay Steering Committee (KBSC) represents the nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline. In consultation with the Maui County Planning Department, the KBSC has developed an approach to restore, rehabilitate, and preserve the sandy beach along the bay. The plan includes nourishing the beach with 50,000 to 100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas (Figure 3).

Figure 20. Community consultation letter, page one

CIA for the Kahana Bay Erosion Mitigation Project

Page 2

The beach nourishment project would widen the beach to between 35-150 ft (approximately 50 ft average width) to provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors.

The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The layout of the proposed beach stabilization structures remains in the design phase and will depend on benthic, archaeological, cultural, and other studies conducted as part of the Environmental Impact Statement (EIS) process.

Construction Methods

The following description outlines potential construction methods for the proposed beach restoration. Construction methods may significantly change if an alternative erosion mitigation scheme is ultimately selected.

The sand source for the beach nourishment will come from nearby offshore sand deposits identified as compatible sand in the 2016 Feasibility Study (County of Maui 2016) (Figure 3). A barge or pipeline will be used to transport the sand to shore depending upon whether hydraulic or mechanical dredging is conducted at the sand source. If a hydraulic method is used, a sand/water slurry may need to be dewatered in a temporary settling basin on or near the beach prior to sand being graded to its final configuration.

To initiate the construction activities, equipment (e.g., dump trucks, backhoes, excavators or similar machines) will access the beach from the roadway through the public access way located between the Kahana Beach Resort and Sands of Kahana properties. The beach will be restored in phases along the length of the bay; as the beach is nourished and stabilized, the construction equipment will have sufficient width to traverse further along the coastline. Each section would be constructed in a step-wise progression, from south to north, until the entire shoreline project area is nourished with sand held by retaining structures. Construction equipment will primarily be limited to the nourished portions of the beach and the staging access and routes will be clearly indicated during construction activity. In-water floating sediment containment barriers will be placed around dredge and construction areas to minimize turbidity and protect water quality. In addition, a water quality monitoring plan will be implemented.

Expected Community Impacts

The proposed action may benefit the Maui community by mitigating the beach and shoreline erosion that currently poses a risk to public safety and property (County of Maui 2016). The restored public beach area would expand the potential recreational use for residents and visitors. Sea turtles and monk seals may also utilize the restored beach as a haul out area. The project engineers may design the beach stabilization structures to incorporate artificial reef elements that promote coral establishment and create microhabitats for fish and invertebrates (Foley et al. 2014). The structures could also provide new resources to fishers and gatherers. The costs of the project include the loss of community resources in the footprint of the proposed beach fill and stabilization structures. The EIS will further identify the expected community costs and benefits of the proposed project.

Figure 21. Community consultation letter, page two

CIA for the Kahana Bay Erosion Mitigation Project

Page 3

Purpose of the CIA

The purpose of this CIA is to gather information about the project area and its surroundings through research and interviews with individuals knowledgeable about this area in order to assess potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* and guidance regarding the following aspects of our study:

- **General history as well as present and past land use of the project area**
- **Knowledge of cultural sites that may be impacted by future development of the project area—for example, historic and archaeological sites, as well as burials**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing**
- **Cultural associations of the project area, such as *moʻolelo* and traditional uses**
- **Referrals of *kūpuna* or elders and *kamaʻāina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupuaʻa* lands**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area**

In advance, we appreciate your assistance in our research effort. If you are interested in participating in this study, please contact Chantellee Spencer at cspencer@culturalsurveys.com. We are also available by phone at (808) 965-6478.

Me ka haʻahaʻa,

Chantellee Konohia Spencer
Cultural Researcher

Figure 22. Community consultation letter, page three

Ongoing studies are evaluating several alternatives for erosion mitigation such as shoreline armoring, beach restoration, and managed retreat. Currently, the preferred alternative and proposed action is beach restoration, which includes beach nourishment with stabilization structures.

Proposed Action

The Kahana Bay Steering Committee (KBSC) represents the nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline. In consultation with the Maui County Planning Department, the KBSC has developed an approach to restore, rehabilitate, and preserve the sandy beach along the bay. The plan includes nourishing the beach with 50,000 to 100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas (Figure 3). The beach nourishment project would widen the beach to between 35-150 ft (approximately 50 ft average width) to provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors.

The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The layout of the proposed beach stabilization structures remains in the design phase and will depend on benthic, archaeological, cultural, and other studies conducted as part of the Environmental Impact Statement (EIS) process.

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The following description outlines potential construction methods for the proposed beach restoration. Construction methods may significantly change if an alternative erosion mitigation scheme is ultimately selected.

The sand source for the beach nourishment will come from nearby offshore sand deposits identified as compatible sand in the 2016 Feasibility Study (County of Maui 2016) (Figure 3). A barge or pipeline will be used to transport the sand to shore depending upon whether hydraulic or mechanical dredging is conducted at the sand source. If a hydraulic method is used, a sand/water slurry may need to be dewatered in a temporary settling basin on or near the beach prior to sand being graded to its final configuration.

To initiate the construction activities, equipment (e.g., dump trucks, backhoes, excavators or similar machines) will access the beach from the roadway through the public access way located between the Kahana Beach Resort and Sands of Kahana properties. The beach will be restored in phases along the length of the bay; as the beach is nourished and stabilized, the construction equipment will have sufficient width to traverse further along the coastline. Each section would be constructed in a step-wise progression, from south to north, until the entire shoreline project area is nourished with sand held by retaining structures. Construction equipment will primarily be limited to the nourished portions of the beach and the staging access and routes will be clearly indicated during construction activity. In-water floating sediment containment barriers will be placed around dredge and construction areas to minimize turbidity and protect water quality. In addition, a water quality monitoring plan will be implemented.

Expected Community Impacts

The proposed action may benefit the Maui community by mitigating the beach and shoreline erosion that currently poses a risk to public safety and property (County of Maui 2016). The restored public beach area would expand the potential recreational use for residents and visitors. Sea turtles and monk seals may also utilize the restored beach as a haul out area. The project engineers may design the beach stabilization structures to incorporate artificial reef elements that promote coral establishment and create microhabitats for fish and invertebrates (Foley et al. 2014). The structures could also provide new resources to fishers and gatherers. The costs of the project include the loss of community resources in the footprint of the proposed beach fill and stabilization structures. The EIS will further identify the expected community costs and benefits of the proposed project.

Purpose of the CIA

The purpose of this CIA is to gather information about the project area and its surroundings through research and interviews with individuals knowledgeable about this area in order to assess potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* and guidance regarding the following aspects of our study:

- **General history as well as present and past land use of the project area**
- **Knowledge of cultural sites that may be impacted by future development of the project area—for example, historic and archaeological sites, as well as burials**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing**
- **Cultural associations of the project area, such as *mo‘olelo* and traditional uses**
- **Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua‘a* lands**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area**

In most cases, two or three attempts were made to contact individuals, organizations, and agencies.

6.3 Community Contact Table

Below in Table 4 are names, affiliations and dates of contact of NHOs, individuals, organizations, and agencies contacted for this project. Results are presented below in alphabetical order and correspondence is included only from individuals who gave permission to have their statements published.

Table 4. Community contact table

Name	Affiliation	Comments
AdriAnne Haia	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Ali Renee Fulton	Nāpili Canoe Club Member	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Analise Farmer	Kahana Canoe Club Member	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Annalise Kehler	County Cultural Resource Planner	Letter and figures sent via email 4 March 2019 CSH received a response via email on 22 March 2019
Anela Guitierrez	Hui o Wa‘a Kaulua	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Anne Kūlio McCoy	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Ann Mikami	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Arika Rains	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Audrey Alvarez	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Audrey Cabrera	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019

Name	Affiliation	Comments
Brian Carey	*Kama‘āina,* VP of Nāpili Canoe Club	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Carl Meyer	Shark Research Team – Hawai‘i Institute of Marine Biology	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Cambria Reiter	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Cameron Jacome	*Kama‘āina*	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Charlie Makekau	*Kama‘āina*; *Kupuna*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Clifford Nae‘ole	*Kama‘āina*; Hawaiian Cultural Advisor	Letter and figures sent via USPS 4 March 2019 Secound round letter and figures sent via USPS 7 May 2019
Clive Ruggles	Has done archaeological work on Maui; specialist in archeoastronomy	Letter and figures sent via email on 27 March 2019 CSH received an automatic reply via email on 27 March 2019 Second round letter and figures sent via email 7 May 2019 Same automatic reply
Dane Maxwell	Maui/Lana‘i Burial Council - Lāhainā	According to Andrew Phillips, he forwarded the letter and figures to individuals on the Maui Burial Council on 5 March 2019, this would have included Mr. Maxwell.
Elle Cochran	Former Lāhainā Council Member	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019

Name	Affiliation	Comments
Etan Krupnick	*Kamaʻāina* of Kahana	Mr. Krupnick emailed CSH on 29 March 2019 in response to a Facebook post suggesting the community send in testimony. His email read the following: *To whom it may concern,* *My name is Etan Krupnick from Kahana, Maui. I'm sending this email in regards of documenting the ocean activities I've done through out my life in Kahana Bay Area. I'm 35 years old and I've lived in Kahana since I was 5 years old.* *When we go fishing, surround net and spear fish through out Kahana bay we have caught Ulua, Papio, Omilu, which are apart of the trevally fish family. We also caught Moana and other goat fish family. Schools of O'i'o and Mo'i fish colonies. Green and black Kala fish. Lots of Taco or octopus in Kahana waters. Big Eels and lots of sharks to be seen as well. We used to be able to get plenty Opihi and Wana or sea urchin. We got plenty of Limu or sea weed known as ogo. Big schools of Opelu and Ahi. Lots of whales will swim and migrate around kahana. You'll also see pods of dolphins all the time. I am saying that when we were hungry we just put our fishing nets, fishing poles and spears and we catch plenty enough food to feed the families in our house holds. It's amazing what Kahana beach has taught me on survival and how to take only what you need and that if you listen to your elders that want to teach you the ways of hunter and gathering, you can still do that today for the future generations.* *Kahana Bay Area has also been a place where my friends and I would enjoy to go surfing. Long board, paddle board and short board. While the kids are in the beach with their boogie boards and skim boards. I learned how to surf in Kahana Bay with my dad. I still remember a sunset session out there with him and a whale*

Name	Affiliation	Comments
		breached right in front of the sun as it was setting into the ocean. I was about 8 years old. *My family, friends and I still enjoy everything in Kahana Bay that I did since I was 5 years old. We want to keep Kahana coastline from sea walls and keep it maintained so that we don't destroy this coastline because it is still a thriving coastline filled with so much fish they we hunt and gather for our families and loved ones. The surf is amazing as well with uncrowded line ups.* *Just because you may not have an interest as we do in the ocean that doesn't give you the right to change it for greed or because you think it's a better solution to our infrastructure that has been on a high level of illegal building near our coastline since the overthrow of Hawaii.* *Leave Kahana Bay alone, stop al sea walls and coastline buildings of hotels and million dollar mansions that no one occupies. Kahana coast is beautiful and I vote to keep it that way. You should be getting rid of big condos and hotels that are falling into the ocean. Not helping them stand by building sea walls.* CSH replied 24 April 2019 via email: *Mahalo for your patience and for sharing your manaʻo regarding the Kahana Erosion Mitigation Project. We appreciated learning about the ocean activities and cultural practices you engage in at Kahana Bay. The cultural impact assessment (CIA) for the Kahana Erosion Mitigation Project aims to gather information about the project area and its surroundings through research and interviews with individuals knowledgeable about this area in order to assess potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. The information*

Name	Affiliation	Comments
		you have provided is critical to this effort. We would like to include your manaʻo and ʻike within our study and seek your permission to do so. The CIA will be incorporated into the Environmental Impact Statement (EIS) and will eventually become part of the public record. As such, we want to make sure that we have your permission to share your thoughts and comments within the CIA. Above all, we aim to capture your voice as you intend it to be heard by project proponents and the community. *Additionally, we are available to meet with you in person for a formal sit-down interview to discuss cultural resources, practices, and beliefs associated with Kahana Bay.*
Felimon Sadang	*Kamaʻāina, Lawaiʻa,* ʻAha Moku Council; owns the Kuleana parcel at Kahana Bay and is also part of the Kahana Bay Steering Committee	Letter and figures fowarded to Mr. Sadang from Foster Ampong on 5 March 2019 Second round letter and figures sent via email 7 May 2019
Foster Ampong	*Kamaʻāina* ; ʻAha Moku Council	Letter and figures sent via email 4 March 2019 Mr. Ampong replied 5 March saying he will forward the information to the Kāʻanapali Moku and Aha Moku o Maui, this includes Felimon Sadang, Kaipo Kekona, and Keʻeaumoku Kapu CSH replied same day thanking Mr. Ampong for his quick response and for forwarding the email along. Second round letter and figures sent via email 7 May 2019 Same day reply: *Ae, I am interested in participating in this CIA* CSH called Mr. Ampong 15 May 2019 to scheduled an interview. Tentative dates set, 5/23 -5/24

Name	Affiliation	Comments
Friends of Moku‘ula, Inc.	Contact: Ms. Blossom Feiteira (Executive Director)	Letter and figures sent via email 4 March 2019 Immediate reply, invalid email address Second round letter and figures sent via USPS 7 May 2019
Glen Kamaka	*Kama‘āina,* Member of Nā Pāpa‘i Wawae ‘Ula‘ula	Contacted John Seebart to see if he could forward consultation packet to Mr. Kamaka
Hailama Farden	Incoming President, Association of Hawaiian Civic Clubs Regional Director, Kona, O‘ahu, Community Engagement & Resources Group – Kamehameha Schools	Letter and figures sent via email 27 March 2019 Second round letter and figures sent via email 7 May 2019
Hervey Takitani	*Kama‘āina* (Kailihou ‘Ohana)	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Hokulani Holt-Padilla	Director, Ka Hikina O Ka La, UHMC (former director of FOM)	Letter and figures sent via email 4 March 2019 Mrs. Holt-Padilla replied 5 March 2019 CSH replied same day thanking Ms. Holt for her quick response and guidance
Ikaika Nakahashi	Cultural Historian, SHPD	Letter and figures sent via email 4 March 2019 Mr. Nakahashi replied via email on 12 March 2019 with recommendations on who to contact regarding this project. CSH replied 15 March 2019 with thanks
Ivan Lay	Chair, Maui County Cultural Resources Commission	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Jacinth Lum Lung	*Kama‘āina* of Kahana	Mr. Lum Lung emailed CSH on 21 March 2019 in response to a Facebook post suggesting the community send in testimony CSH replied 27 March 2019 via email asking permission to use his testimony in

Name	Affiliation	Comments
		the CIA and if he would like a follow up meeting with CSH Mr. Lum Lung did not reply
James Buika	Maui County Planner	Ms. Annalise Kehler discussed aspects of the CIA with Mr. James Buika, the Maui County Planner involved with the Kahana Bay Erosion Mitigation Project. Ms. Kehler copied Mr. Buika on an email response to CSH on 22 March 2019.
Jay Carpio	*Lawaiʻa*	Refered by Mike Foley, Coastal Engineer with Oceanit Called Mr. Carpio twice; 15 May 2019, no answer. Voicemail full, unable to leave message Scheduled group interview with Foster Ampong CSH sent Mr. Carpio his summary for review on 31 December 2019 Mr. Carpio acknowledged CSH reached out on 6 January 2020 for a status check Mr. Carpio replied 16 January 2020 saying he will review his summary CSH acknowledged on 17 January 2020 CSH emailed Mr. Carpio on 27 January 2020 for a status check on his interview summary Mr. Carpio replied 29 January 2020 saying he is unable to approve his portion of the interview summary CSH replied 30 January 2020 informing Mr. Carpio of the removal of his portion from the interview summary Mr. Carpio acknowledged same day
John Seebart	*Kamaʻāina,* Member of Kahana Beach Steering Committee (KBSC)	Letter and figures sent via email 5 March 2019 Second round letter and figures sent via email 7 May 2019 Called CSH on 8 May 2019 and gave referrals for Felimon Sadang and Kaipo Kekona, who know the PA more; Mr. Seebart was born in Makawao and lived in

Name	**Affiliation**	**Comments**
		Lāhainā until he was five years old. Came back to Lāhainā in 1999. Called CSH later and gave Felimon's phone number
Josephine Jordan	Former member Aha Moku Council - Lāhainā	Letter and figures sent via email 4 March 2019 Immediate return, email address invalid
Kaʻau Abraham	Maui Nui Education and Outreach Coordinator for the Hawaiian Islands Humpback Whale National Marine Sanctuary	Letter and figures sent via email 4 March 2019 Immediate reply, Mr. Abraham no longer handles inquiries regarding education or outreach. Contact info for Patty Miller was included.
Kai Nishiki	Former member Aha Moku Council - Lāhainā	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Kaipo Kapu	*Kamaʻāina,* Son of Keʻeaumoku	Letter and figures fowarded to Mr. Kapu from Foster Ampong on 5 March 2019
Kaipo Kekona	*Kamaʻāina/*Vice President, Hawaiʻi Farmers Union United Lāhainā Chapter/Vice Chair, Na Leo Kalele/Aha Moku o Maui Kaʻanāpali Shoreline Committee	Originally ccʻd in a response from Keʻeaumoku Kapu Letter and figures sent via email 9 May 2019
Kala Baybayan	*Kamaʻāina*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Kamanaʻopono Crabbe	*Ka Pouhana* - OHA	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Kaponoai Molitau	Cultural Practitioner	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019

Name	Affiliation	Comments
Kealana Phillips	Burial Sites Specialist (Maui, Molokai, and Lanai)	Letter and figures sent via email 4 March 2019 Mr. Phillips replied 5 March that he will forward the email to individuals on the Maui Burial Council CSH replied same day thanking Mr. Phillips for his help and quick response. Second round letter and figures sent via email 7 May 2019
Ke‘eaumoku Kapu	*Kama‘āina,* ‘Aha Moku Council, Nā ‘Aikane o Maui	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019 Mr. Kapu replied via email 8 may 2019 CSH replied via email on 9 May 2019
Kekai Kapu	Cultural Director, Maui Ocean Center	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Keoki Sousa	President, Kahuna Lā‘au Lapa‘au o Maui	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Lāhainā Hawaiian Civic Club		Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Lāhainā Restoration Foundation		Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Lehua I‘i	*Kama‘āina*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Lillian Suter	*Kama‘āina*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019

Name	Affiliation	Comments
Malihini Keahi-Heath and Keahi ‘Ohana	*Kama‘āina*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via email 7 May 2019
Martha Martin	President, Native Hawaiian Plant Society	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Maui Nui Marine Resource Council	Community group responsible for protection of Maui Nui’s nearshore ocean environment	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Mihana Souza	*Kama‘āina*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Nā ‘Aikane o Maui	Contact: Uilani Kapu (Treasurer)	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019 CSH received same day reply via email CSH replied via email on 9 May 2019 Mrs. Kapu replied via email 10 May 2019
Patty Miller	Education, Outreach, and Volunteer Opportunities for NOAA	Letter and figures sent via email 5 March 2019 Second round letter and figures sent via email 7 May 2019
Patty Nishiyama	*Kupuna*	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019
Paul Hanada	*Kama‘āina, lawai‘a*	Contacted John Seebart to see if he could forward consultation packet to Mr. Hanada
Polanui Hiu	Maui Nui Makai Network – CMMA; *Kama‘āina* group restoring Nā Papalimu ‘O Pi‘ilani (reef)	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Sissy Lake-Farm	Executive Director, Maui Museum/ Kumu	Letter and figures sent via USPS 4 March 2019

Name	Affiliation	Comments
	Hula, Nā Hanona Kūlike ʻo Piʻilani	Second round letters and figures sent via USPS 7 May 2019
Skippy Hau	*Kamaʻāina*; Aquatic Biologist, DLNR Division of Aquatic Resources	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019 Mr. Hau replied same day CSH replied via email on 9 May 2019:
Tamara Paltin	Ocean Safety Lieutenant, Maui County	Originally ccʻd in a rpely from Keʻeaumoku Kapu Letter and figures sent via email 9 May 2019
Tara Owens	Coastal processes and hazards specialist with the University of Hawaii Sea Grant College Program	Ms. Kehler copied Ms. Owens on an email response to CSH on 22 March 2019.
Theo Morrison	Lāhainā Restoration Foundation	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Tiare Lawrence	*Kamaʻāina*	Letter and figures sent via email 4 March 2019 A public social media posting about the project and the CIA process, as discussed in the EISPN, was made via Facebook by Ms. Tiare Lawrence on 1 March 2019. The post was commented on eleven times and shared by 42 other Facebook users. CSH reached out to Ms. Lawrence via email on 25 March 2019 with the following: *As a follow-up to the March 4, 2019 consultation letter that was mailed to you by our cultural research staff, I wanted to reach out to let you know that we are only just beginning the consultation effort for the Cultural Impact Assessment for the Kahana Bay Erosion Mitigation Project. The information included in the project's recently published EIS preparation notice, prepared by a different consultant, does*

Name	Affiliation	Comments
		not reflect this accurately. We look forward to hearing from you and members of the West Maui community as we move forward with the consultation process. Second round letter and figures sent via email 7 May 2019
Timothy Paulokaleioku Bailey	Aha Kiole Advisory Committee (Maui)	Letter and figures sent via email 4 March 2019 Second round letter and figures sent via email 7 May 2019
Yolanda Dizon	President of Hoʻea, Inc., and Manager of Kuʻikahi, LLC	Letter and figures sent via USPS 4 March 2019 Second round letter and figures sent via USPS 7 May 2019

Section 7 *Kamaʻāina* Interviews

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *manaʻo* and *ʻike* with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and in no way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

7.1.1 Foster Ampong and Jay Carpio

> *Though the interview was initially conducted with Mr. Ampong and Mr. Carpio, Mr. Carpio was not able to review and approve his portion of the interview summary. The summary was edited to include only Mr. Ampong's manaʻo, which he approved.*

On 30 May 2019, Mr. Foster Ampong led Cultural Surveys Hawaiʻi on a site visit to the proposed project area for the Kahana Bay Erosion Mitigation Project. The project area encompasses portions of Kahana Bay and Kahana Beach—coastal areas which Mr. Ampong and his family once utilized for gathering.

Mr. Ampong is a recognized lineal descendant of Kekaʻa (the traditional name for Kāʻanapali) and through his own research is able to trace his genealogy back to the days of the *aliʻi*. His mother's family lived in Kekaʻa and he has shared areas where his family's remains were once laid to rest and later exhumed for the construction of the Sheraton Maui Resort.

The start of the *huakaʻi* began in Waiʻehu at the home of Mr. Ampong. On the drive over to Lāhainā, Mr. Ampong noted the boundaries of each *ahupuaʻa* we entered. As we departed the *moku* of Wailuku, we entered Kealaloloa then passed the *ahupuaʻa* of Pāpalaua, Ukumehame, and Olowalu before entering the *moku* of Lāhainā. Mr. Ampong commented that this coastal area of Maui is rather popular for shark attacks. He mentioned one attack in the waters off Olowalu that killed the wife of then Pioneer Mill manager.

To get a better perspective of the proposed project area, we first stopped at Pohaku Beach Park (also called "S-Turns") and examined the coast just south of the project area. What was evident in this area, which Mr. Ampong pointed out, was that it was mostly utilized by tourists. He recalled a time when the beaches were almost always empty, before Lāhainā became overwhelmed with tourists. Upon looking beyond Pohaku Beach toward the condominiums, it was clear that mitigation measures were already put in place.We made our way to the nearby Valley Isle Resort and when we got out to the shore, large sand bags were stacked and lined the coast to create a buffer of protection for the beach area fronting the condo (Figure 23-Figure 27).

Mr. Ampong mentioned that as a child, he was always taught to only take what was needed and it was second nature to share your catch with friends and family—especially the older generation who were too old to make it to the shore. In this way of *mālama,* and only taking what was needed, the ocean resources were always maintained and could provide for the next generations to come. Though fewer people gather from within the project area, Mr. Ampong shares that there are *kuleana* families just beyond the boundaries of the project area that still gather, fish, and dive today.

The overall attitude gathered from talking with Mr. Ampong is that Hawaiian science and the knowledge passed on from *kūpuna* should not be discredited. In many ways, Western science has alway been viewed as superior but working together, especially with this project, and combining traditional Hawaiian practices, could be the answer for a somewhat natural beach replenishment.

Mr. Ampong strongly recommends a marine environmental impact assessment be conducted first before any movement of sand or placement of any structure is considered, be it traditional or introduced. Mr. Ampong believes the idea of dredging sand offshore to replenish the Kahana shoreline will have a negative impact on the marine ecosystem and he is against taking sand from one area to replenish another. If a marine environmental impact assessment is not conducted, Mr. Ampong will not support this project as he believes all factors must be considered. The ocean holds just as much importance as land in considering adverse effects of mitigation procedures.

Figure 23. Large sand bags on the shore (CSH 2019)

Figure 24. Visitors still utilize the beach even with large sand bags on the shore (CSH 2019)

Figure 25. Sand bags on the beach with Molokaʻi in the distance (CSH 2019)

Figure 26. Sand bags are stacked and line the coast as a buffer of protection (CSH 2019)

Figure 27. Looking west, sandbags stacked to prevent further coastal erosion (CSH 2019)

7.1.2 Felimon Sadang

On 31 May 2019, Cultural Surveys Hawaiʻi (CSH) met with Mr. Felimon Sadang at his family's oceanfront property in Kahana. The Sadang family property is one of the original homes left on the coast amidst the rise of resorts and condominiums.

Upon reaching Mr. Sadang's family property, it became evident that they are truly a family of fishermen. Nets are hung neatly and large fish coolers are scattered about the property. An outdoor kitchen area allows quick preparation of any fresh catch. Nothing obstructs the view of the water so weather and water conditions are clearly visible and observed daily.

The interview took place in the back garage of the property which is just a few feet from the water. Mr. Sadang casually broke the ice by saying, "So, what you like know?" The property immediately to the left is a condominium. Since the erosion began, a rock wall was constructed fronting the condominium to act as a buffer against the waves but we watched closely as the water softly crashed against the wall. Mr. Sadang pointed out that before the stone wall was built, the beach was as wide as 200 feet. He also shared that the family property first belonged to his mother. She was a stay-at-home mom while his father worked on the nearby plantation as a Supervisor. He'd also make fishing nets on the side. His mother spoke Hawaiian and his father spoke Filipino so together everyone learned English as a common ground. He spoke of his mother who would often hear Hawaiian music as if it traveled with the breeze to find her. The property was eventually portioned equally between Mr. Sadang and his four other siblings.

Mr. Sadang attended Lāhaināluna School and graduated in 1961. In retelling his childhood memories to me, it was clear that the Sadang family lived a very simple and sustainable life. They raised pigs and cooked meals on a kerosene stove. He mentioned that no food was wasted or thrown out because whatever wasn't eaten by the family was mixed with squash and pumpkin and fed to the pigs and chickens on the property. He mentioned that for generations a shark would come in in the evening and swim right in front of their property, never once harming the family. Acting almost like a guardian. Salt was produced and harvested right on the property. Mr. Sadang also mentioned a *tohei* (Conger eel) that they would constantly feed until it became sizable to eat.

Mr. Sadang spoke proudly of his great-granddaughter that she learned how to clean fish and right now his daughter and grandson are slowly taking over the reigns to continue to perpetuate this way of life for the family. Mr. Sadang mentioned that tako (octopus) was and still is prominent in the area, same with the *nehu* (Hawaiian anchovy) and *ogo* (a type of seaweed, *Gracilaria parvisipora*). He also mentioned cooking up simple dishes like fried fish or fish soup with rice. Figure 28-Figure 30 are pictures of the beach fronting the Sadang property back in the 70s and early 80s.

During my conversation with Mr. Sadang, he mentioned that he was waiting for his family to get back as they left that morning on the boat to go fishing. Sure enough, as we continued on with the interview, a boat slowed to the front of the property with eight or so people on board. Mr. Sadang could tell just in the way the boat sat in the water that they did not come back with a great catch. I watched closely as the boat came closer to shore and a number of people jumped out to start helping with bringing the boat out the water. Getting the boat out of the water involved two trucks. One truck stayed on higher ground near the house and was used to pull the second truck and attached trailer up from the sand. It was an amazing thing to see. Everyone knew their *kuleana*. I watched as some people stayed in the water to shimmy the boat to fit snug on the trailer. A few

Figure 28. The Sadang family preparing to bring up their dinghy (Courtesy of Mr. Felimon Sadang)

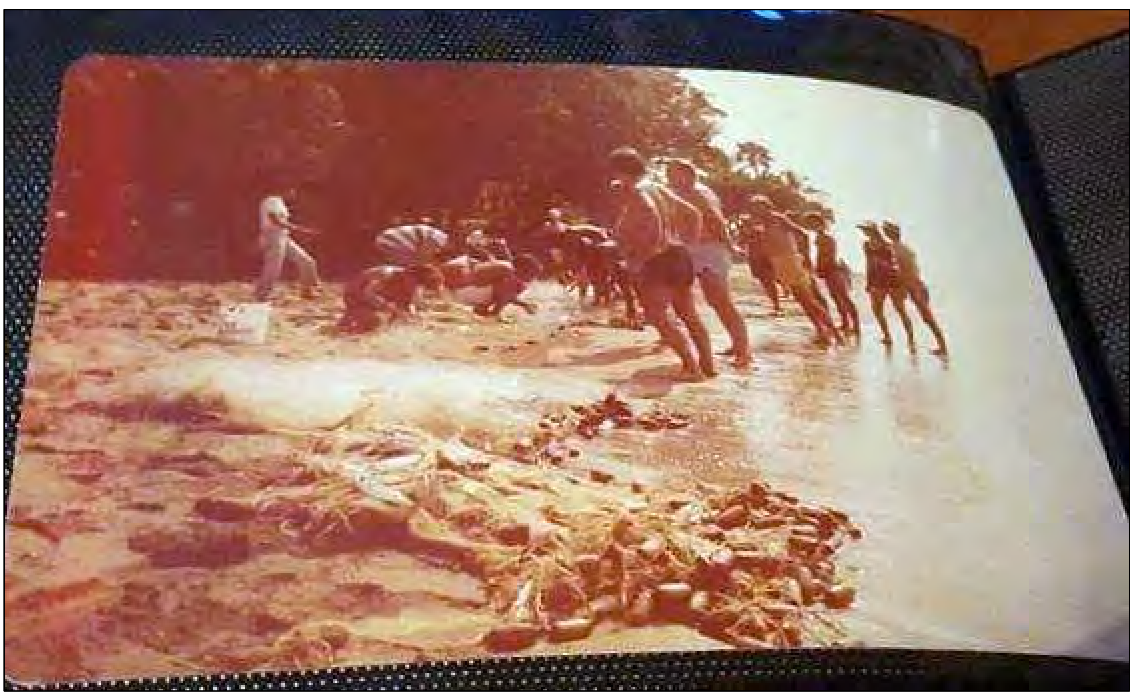

Figure 29. Beachgoers watching the Sadang family pull their catch from the nets (Courtesy of Mr. Felimon Sadang)

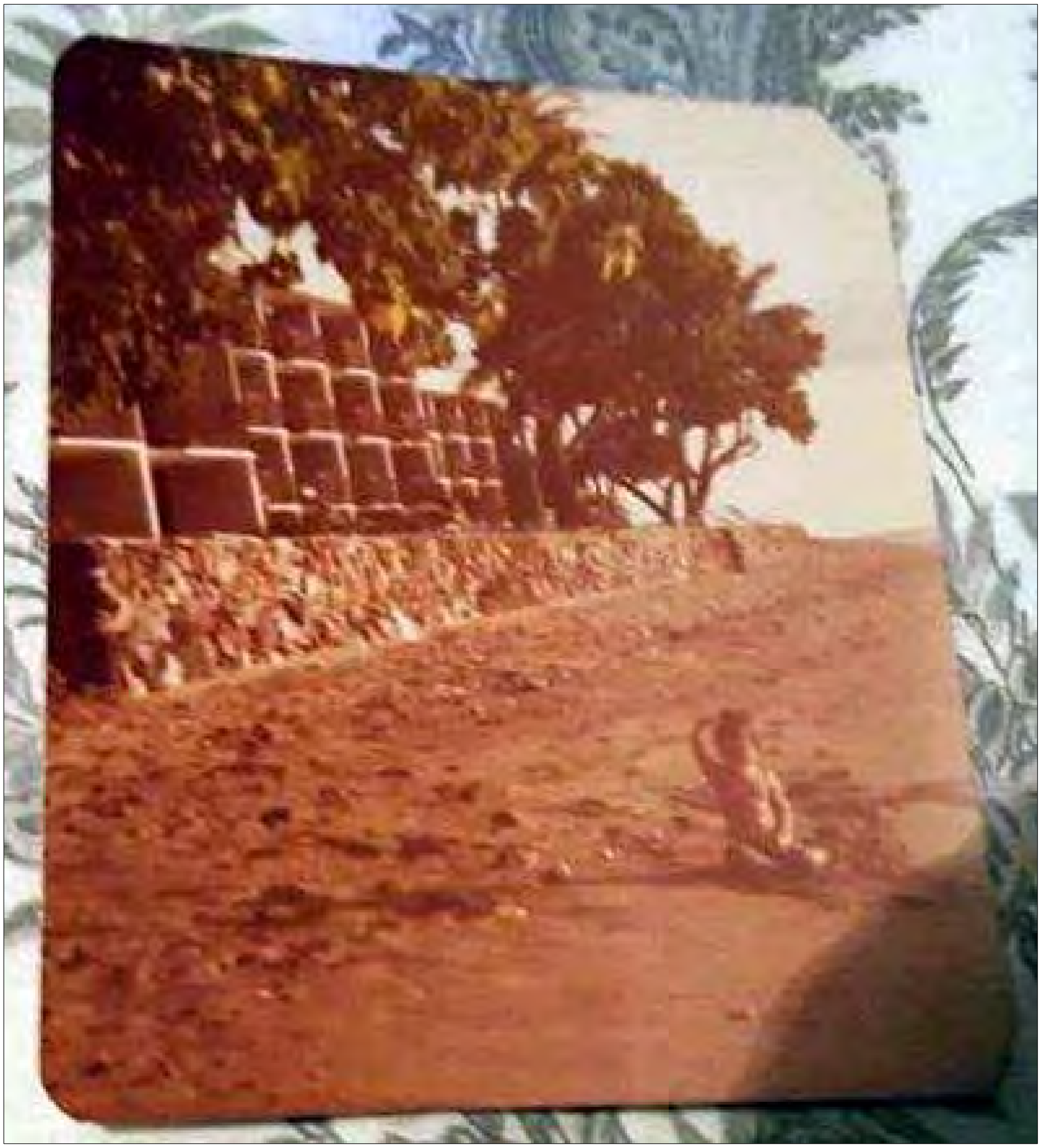

Figure 30.Family photo of Sadang child on Kahana beach with condo in the background (Courtesy of Mr. Felimon Sadang)

people stayed on the boat to keep watch that the propellor was clear of the sand. Mr. Sadang casually pointed out some people to me; his daughter, son, grandson, a boyfriend of his grand daughter. They all had *kuleana* and moved accordingly without needing to be directed. This was more than just a routine but a way of life (Figure 31-Figure 34).

As the boat was brought out of the water and they began offloading their catch, Mr. Sadang offered to give me some fish to take home. Such a generous offer to someone he just met but with no cooler or any way to transport the fish on the plane, I humbly declined the offer.

The overall message I received from Mr. Sadang was that man does not come before nature. Effort may be put forth and millions of dollars used to build seawalls but the sea level is continuously rising and as humans, all we can do is adapt to the changing tides. Mr. Sadang mentioned that too much money is being used on mitigation efforts when the underlying problem is the infrastructure in place. One of Mr. Sadang's biggest concerns regarding this project is changing the natural flow of the environment. He is worried that moving sand from outer regions to replenish the shoreline will be destructive to the in-shore species and may have rippling effects along the coast. In the same way, he believes that building any strucutres to lessen the coastal erosion will again disrupt the natural cycle of sand washing in and out with the tides. He also voiced that the chemicals in the fertilizers used by nearby condos are leaking into the ocean and killing *limu*. Mr. Sadang and his family are all involved with fishing and they intend to adapt to the changing tides with reason.

During the time Mr. Sadang spent reviewing his interview summary, there was even more coastal erosion at his property. Compared to the pictures above, the following images are the damages from early November 2019 (Figure 35-Figure 46). In recent conversations with Mr. Sadang, he believes that retreating from the shore and working to provide some kind of beach nourishment is necessary at this point. However, as a *kamaʻaina* of Kahana, he also understands the natural movement of sand that wash in and out with the tides. He sent additional pictures after a big swell that brought some sand back to the beach (Figure 47-Figure 50).

Figure 31. Mr. Sadang's family bringing the boat out of the water (CSH 2019)

Figure 32. Mr. Sadang's son in the truck, other family members shifting the boat onto the trailer (CSH 2019)

Figure 33. The second truck used to pull the truck and trailer out from the sand and water (CSH 2019)

Figure 34. The boat making it up towards the garage. Note the shallow clearance of the trailer and cement .(CSH 2019)

Figure 35. Property damage that took place November 2019. Major erosion at the Sadang family property (Courtesy of Mr. Felimon Sadang)

Figure 36. Beach erosion at the Sadang property. Orange fencing in the background lines the boundary of the condo (Courtesy of Mr. Felimon Sadang)

Figure 37. Erosion at the Sadang property (Courtesy of Mr. Felimon Sadang)

Figure 38. Coastal erosion at the Sadang property. Notice the difference from the previous figures. Trees and cement are gone and now sandbags are present (Courtesy of Mr. Felimon Sadang)

Figure 39. Looking east at the Sadang property. Cement foundation is gone, rocks are exposed, and sandy beach is gone (Courtesy of Mr. Felimon Sadang)

Figure 40. Coastal erosion at the Sadang property (Courtesy of Mr. Felimon Sadang)

Figure 41. Coastal erosion at the Sadang property. Compare this to Figure 7. Cement foundation gone and sandy area fronting the property (Courtesy of Mr. Felimon Sadang)

Figure 42. Coastal erosion at the Sadang property. Compare this with Figure 4 and Figure 5, sandy beach has eroded and all rocks exposed (Courtesy of Mr. Felimon Sadang)

Figure 43. Coastal erosion at the Sadang property (Courtesy of Mr. Felimon Sadang)

Figure 44. Coastal erosion at the Sadang property (Courtesy of Mr. Felimon Sadang)

Figure 45. Coastal erosion at the Sadang property (Courtesy of Mr. Felimon Sadang)

Figure 46. Coastal erosion at the Sadang property (Courtesy of Mr. Felimon Sadang)

Figure 47. Sand brought back to the beach by a big swell (Courtesy of Mr. Felimon Sadang)

Figure 48. Sand brought back to the beach by a big swell (Courtesy of Mr. Felimon Sadang)

Figure 49. Sand brought back to the beach by a big swell (Courtesy of Mr. Felimon Sadang)

Figure 50. Sand brought back to the beach by a big swell (Courtesy of Mr. Felimon Sadang)

7.1.3 Etan Krupnick

Mr. Krupnick sent CSH a statement in response to a Facebook post about the project.

To whom it may concern,

My name is Etan Krupnick from Kahana, Maui. I'm sending this email in regards of documenting the ocean activities I've done through out my life in Kahana Bay Area. I'm 35 years old and I've lived in Kahana since I was 5 years old.

When we go fishing, surround net and spear fish through out Kahana bay we have caught Ulua [Giant trevally], Papio [*pāpio*; young *ulua*], Omilu [*ʻōmilu*; Bluefin trevally], which are apart of the trevally fish family. We also caught Moana [*moano*, Manybar goatfish] and other goat fish family. Schools of O'i'o [*ʻōʻio*, Bonefish] and Mo'i [*moi*, Threadfish] fish colonies. Green and black Kala [Surgeonfish] fish. Lots of Taco or octopus in Kahana waters. Big Eels and lots of sharks to be seen as well. We used to be able to get plenty Opihi [limpet] and Wana or sea urchin. We got plenty of Limu or sea weed known as ogo. Big schools of Opelu [*ʻōpelu*, Mackerel scad] and Ahi [tuna]. Lots of whales will swim and migrate around kahana. You'll also see pods of dolphins all the time. I am saying that when we were hungry we just put our fishing nets, fishing poles and spears and we catch plenty enough food to feed the families in our house holds. It's amazing what Kahana beach has taught me on survival and how to take only what you need and that if you listen to your elders that want to teach you the ways of hunter and gathering, you can still do that today for the future generations.

Kahana Bay Area has also been a place where my friends and I would enjoy to go surfing. Long board, paddle board and short board. While the kids are in the beach with their boogie boards and skim boards. I learned how to surf in Kahana Bay with my dad. I still remember a sunset session out there with him and a whale breached right in front of the sun as it was setting into the ocean. I was about 8 years old.

My family, friends and I still enjoy everything in Kahana Bay that I did since I was 5 years old. We want to keep Kahana coastline from sea walls and keep it maintained so that we don't destroy this coastline because it is still a thriving coastline filled with so much fish they we hunt and gather for our families and loved ones. The surf is amazing as well with uncrowded line ups.

Just because you may not have an interest as we do in the ocean that doesn't give you the right to change it for greed or because you think it's a better solution to our infrastructure that has been on a high level of illegal building near our coastline since the overthrow of Hawaii.

Leave Kahana Bay alone, stop al sea walls and coastline buildings of hotels and million dollar mansions that no one occupies. Kahana coast is beautiful and I vote to keep it that way. You should be getting rid of big condos and hotels that are falling into the ocean. Not helping them stand by building sea walls.

Sincerely,

Etan Krupnick

Kahana, Maui resident

7.1.4 Jacinth Lum Lung

Mr. Lum Lung sent CSH a statement in response to a Facebook post about the project.

Aloha,

I've lived in Kahana most of my life

Fishing, Diving, or Surfing every chance I get. I catch a variety of fish like Moi, Kala, Manini [Surgeonfish], Kumu [*kūmū,* Goatfish], Papio, Oama [*ʻoama*, young *weke* (Goatfish)], Halalu [*halalū*, young *akule* (goggle-eyed scad)], Moilua [*moelua/moilua*; goatfish], Nabeta [Deep-water parrot fish], Uku [Deep-sea snapper; *Aprion virescens*]

Just to name a few and many more including He'e [squid], lobster, and Kona crab

Also inshore or on the rocks

There's A'ama [*ʻaʻama*; Grapsus tenuicrustatus] and Pa'ea [*paiʻea*; edible crab] crab also Pipipi [small mollusks] and Kupe'e [*kūpeʻe*; *Nerita polita*]

Also seaweed like Ogo and Waiwaiole [*wāwaeʻiole*; *Codium edule*]

and Wana and opihi

and the list goes on

My Ohana and I never want to see it all disappear due to wrong decision making

My children and I also surf a lot from

S-turns to Napili pt.

There's a lot of beautiful Undisturbed

Breaks on the outer reef.

Kahana has provided for my Ohana for generations. "Keep it Kahana"

Mahalo

The Lum Lung Ohana

Section 8 Traditional Cultural Practices

Timothy R. Pauketat succinctly describes the importance of traditions, especially in regards to the active manifestation of one's culture or aspects thereof. According to Pauketat,

> People have always had traditions, practiced traditions, resisted traditions, or created traditions . . . Power, plurality, and human agency are all a part of how traditions come about. Traditions do not simply exist without people and their struggles involved every step of the way. [Pauketat 2001:1]

It is understood that traditional practices are developed within the group, in this case, within the Hawaiian culture. These traditions are meant to mark or represent aspects of Hawaiian culture that have been practiced since ancient times. As with most human constructs, traditions are evolving and prone to change, resulting from multiple influences including modernization as well as other cultures. It is well known that within Hawaiʻi, a "broader 'local' multicultural perspective exists" (Kawelu 2015:3).While this "local" multicultural culture is deservedly celebrated, it must be noted that it often comes into contact with "traditional Hawaiian culture." This contact between cultures and traditions has undoubtedly resulted in numerous cultural entanglements. These cultural entanglements have prompted questions regarding the legitimacy of newly evolved traditional practices. The influences of "local" culture are well noted throughout this section, and understood to represent survival or "the active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy and victimry" (Vizenor 1999:vii). Acknowledgement of these "local" influences helps to inform nuanced understandings of entanglement and of a "living [Hawaiian] contemporary culture" (Kawelu 2015:3). This section strives to articulate traditional Hawaiian cultural practices practiced within the *ahupuaʻa* in ancient times, and the aspects of these traditional practices that continue to be practiced today; however, this section also challenges "tropes of authenticity" (Cipolla 2013) and acknowledges the multicultural influences and entanglements that may "change" or "create" a tradition.

This section integrates information from Sections 3-6 in examining the cultural resources and practices identified within or in proximity of the project area in the broader context of the encompassing Lāhainā landscape.

8.1 Habitation and Subsistence

Of the 16 LCAs in the vicinity of the project area, four are located within the project area: LCAs 3925D:2, 3925I:1, 3935M:1, and 3925H:3. Many of these parcels contained coastal house lots and almost every parcel had a *loʻi.* At the time of the Māhele, there was alot of movement of Hawaiians from the rural country to port towns like Lāhainā where abandonment of cultural practices was inevitable. To note the cultivation of *kalo* at the coast at the time of the Māhele shows signs of a steadfast culture attempting to work around times of drastic change and also a need to supply food for private use (within the immediate family unit) or to supply to *aliʻi*.

Lāhainā served as the primary seat of the *aliʻi* when residing in West Maui (Handy et al. 1991) and later as the center of government for the Kingdom of Hawaiʻi. This could have been due to its location but also due in part to the excellent fishing grounds of Lāhainā.

Mr. Foster Ampong shared that though fewer people gather from Kahana's coast, from what he remembered as a child, there are *kuleana* families who live just outside of the project area that still fish and dive along the coast of Kahana today.

Mr. Felimon Sadang is a fisherman and has lived in Kahana all his life. His children and grandchildren have now taken part in the tradition of fishing. Mr. Sadang mentioned that tako was and still is prominent in the area, same with the *nehu* and *ogo.*

Mr. Etan Krupnick, who has lived in Kahana since he was five years old, mentioned the following about fishing in Kahana:

> When we go fishing, surround net and spear fish through out Kahana bay we have caught Ulua [Giant trevally], Papio [young trevally], Omilu [Bluefin trevally], which are apart of the trevally fish family. We also caught Moana [*Moano*] and other goat fish family. Schools of O'i'o [*ʻōʻio*, bonefish] and Mo'i [*moi*, threadfish] fish colonies. Green and black Kala [Surgeonfish] fish. Lots of Taco or octopus in Kahana waters. Big Eels and lots of sharks to be seen as well. We used to be able to get plenty Opihi [limpet] and Wana or sea urchin. We got plenty of Limu or sea weed known as ogo. Big schools of Opelu [Mackerel scad] and Ahi [tuna].

8.2 *Kaʻao* and *Moʻolelo*

8.2.1 Legend of Maui

Māui wrangles the rays of the sun, Moemoe, and forces it to travel slowly through the sky. This allowed his mother and others enough time to complete their daily tasks that required much sunlight. Māui broke one of Moemoe's rays and as it hit land it turned to stone. This stone can be found *makai* (seaward) of the current Sheraton Maui Resort and Spa.

8.3 Natural Features

8.3.1 Puʻu Kekaʻa

Puʻu Kekaʻa is known as a *leina a ka ʻuhane* or leaping of place for the souls. In the traditions of Maui Island, the soul has three abiding places: the volcano, in the water, and on dry plains like the plains of Kamaomao and Kekaʻa. The tall cliffs of Puʻu Kekaʻa serve as a spiritual portal, the leaping place for the souls of the departed to return to the afterlife. It is said that when a person dies, his spirit journeys to Kekaʻa (Fornander 1919) and from this *leina a ka ʻuhane* one is oriented directly west, towards the setting of the sun and the Hawaiian afterlife.

8.3.2 Pōhaku o Kāʻanapali

Espeth P. Sterling (1998:50-51) in *Sites of Maui* discussed the Pōhaku o Kāʻanapali, a large boulder located between Kapua and Lae O Kama at Kāʻanapali in Kahana. According to the *moʻolelo*, a young *aliʻi* from the island of Molokaʻi sailed across the narrow channel between Molokaʻi and Kāʻanapali and when he landed in Maui, wagered his life with a challenge by the Maui chief. The challenve was for the man to "stand with his heels together, and moving both feet at the same time, see if you can ascend the rock" (Sterling 1998:50-51). After failing the challenge and accepting defeat, the Maui chief was impressed by his sportsmanship and let him live.

8.4 **Religious Structures**

Two *heiau* were recorded in the *ahupuaʻa* of Kahana. The first *heiau*, Hihiho, was constructed near Kalaeokaea Point but was later destroyed to build the County Road. The second, named Kahana, was constructed near the shore at Kahana Point but notes say it was totally destroyed.

Section 9 Summary and Recommendations

CSH undertook this CIA at the request of Oceanit Coastal Corporation. The research broadly covered the *ahupuaʻa* of Kahana and emphasized parts particularly close to the location of the project area.

9.1 Results of Background Research

Background research for this study yielded the following results, in approximate chronological order:

1. The project area is located on the shores of Mauna Kahalawai, (West Maui Mountains) in the Kahana Ahupuaʻa and Lāhainā District. The project area is north of historic Lāhainā Town. Kahana is bordered by Mailepai Ahupuaʻa to the north and Mahinahina 4 Ahupuaʻa to the south. The *mauka* portion is bordered by the *ahupuaʻa* of Honokahua at the northeast and Honokōwai at the southeast.
2. The most imposing geological features surrounding the project area are the West Maui Mountains. Macdonald, Abbot, and Peterson (1983:50) indicate that there are three volcanic series that comprise the shield volcano making up the West Maui Mountains. The Wailuku Volcanic Series is the oldest. Next in age is the Honolua Volcanic Series and the youngest rocks are associated with the Lāhainā Volcanic Series.
3. The *kalana* of Lāhainā has been known by three other names in the past: “Nā-hono-a-Piʻilani”, “Lele”, and “Kekaʻa”.
4. Puʻu Kekaʻa, also referred to as Black Rock, is a popular feature in Lāhainā. This rock formation that juts out to sea is considered a sacred *leina*, a place where spirits could “leap” into the nether world (Pukui and Elbert 1986).
5. Though numerous *heiau* were recorded in Lāhainā, only two have been noted in Kahana. These *heiau* are Hihiho and Kahana and have both been destroyed.
6. In the *moʻolelo* of Māui, he wrangles the rays of the sun (Moemoe) and forces it to travel slowly through the sky. The purpose was to allow his mother and others enough time to complete their daily tasks. Māui breaks one of Moemoe’s rays, which immediately turned to stone once it hit the ground. This stone can be seen *makai* of the current Sheraton Maui Resort and Spa.
7. Kakaʻalaneo was an early ruler of Maui who directed his attention to agriculture and the domestic industry (Nakuina 1904:53). Kakaʻalaneo was famous for planting the highly valued breadfruit grove of Lāhainā known throughout the Hawaiian Islands as Malu Ulu o Lele (“the shady breadfruit grove of Lele [Lāhainā]”).
8. Piʻilani was the famous *aliʻi nui* of Maui known for his peaceful rule of Maui, Molokaʻi, and Lanaʻi.
9. During the wars of unification, Lāhainā continued to serve as a political center as the place in which Kamehameha I established his seat of government. A two-story brick house was constructed at the Lāhainā landing (*makai* of the present-day public library, further south of the project area) for the use of the king, when his travels brought him

to Lāhainā. Kamehameha I sailed his fleet of war canoes to Lāhainā in 1802, consecrated several *heiau*, and collected taxes.

10. With the unification of the Hawaiian Islands in 1791, the town of Lāhainā and the surrounding landings played a prominent role in the early economy of the Kingdom. The lands surrounding Lāhainā town were cultivated in commercial sugar (Gilmore 1931:198-203), while the whale trade, Irish potato trade (Gilman 1906), and establishment of the Lāhainā Mission Station and Lāhaināluna Seminary, drew people to the water front areas which ultimately resulted in a population rise (Haun and Henry 2001).
11. Land Commission Award documentation LCA 3925M:1 was awarded to Lili and includes a house lot. The detail of the Māhele Record states that the claimaint inherited these lands from his parents who were caretakers from the days of Kamehameha I. LCA 3925D:2 was awarded to Hualiʻi and included *loʻi* in the *ʻili* of Wainalo. The details state that he received this particular parcel from his parents in “ancient times”. LCA 3925H:3 was awarded to Kaʻaha and his son, Kehunalua. This parcel was a house lot in Kahananui which the claimant received from his parents. The last LCA claim within the project area is LCA 3925I:1 which belonged to Pala. This parcel was a salt patch in Kahanaiole.The claimant received these lands from his parents.
12. By 1855, land use in the areas surrounding the major port towns of Lāhainā, Wailuku, and Hāna was changing. The whaling industry had seen its best days and by 1860, the progressive scarcity of whales led to the industry’s fall.
13. With the decline of the whaling industry in the Pacific, the Hawaiian Islands attracted a new generation of managers, professionals, and entrepreneurs who would reshape the landscape for Western pursuits. Samuel T. Alexander and Henry Perrine Baldwin were prominent in this movement. In 1876, the duo started a project that brought water from East Maui to the dry leeward isthmus of Central Maui. It was the first major irrigation project throughout the Hawaiian Islands, which was later repeated by other entrepreneurs.
14. By 1936, the Pioneer Mill Company was either employing or housing 65% of the total population of Lāhainā. A sugar analyst noted that “not only were good living quarters supplied [to] employees of all classes, but attention is given social welfare and recreational facilities” (A.B. Gilmore 1936:202). In addition, a well-equipped hospital with regular medical staff and free medical was available to employees and their families.
15. In the years immediately following statehood in 1959, the Kāʻanapali area north of Lāhainā was master planned as a resort destination. The parent company of the Pioneer Mill Company, American Factors [AmFac], developed the cane lands located in Kāʻanapali into the Royal Kāʻanapali Golf Course and the first hotel along the coastline, the Sheraton Maui Hotel, opened on Kāʻanapali Beach in 1963. Some 325 prime acres, including the promontory of Puʻu Kekaʻa, was dedicated to the project.

9.2 Results of Community Consultations

CSH attempted to contact 67 Native Hawaiian Organizations, agencies, and community members. Of the 14 people who responded, two submitted written testimony, and two participated in formal interviews for more in-depth contributions to the CIA. Below is a list of individuals who shared their *mana‘o* and *‘ike* about the project area.

1. Foster Ampong, Lineal Descendant of Keka‘a
2. Felimon Sadang, *Kama‘āina* of Kahana, Fisherman
3. Etan Krupnick, *Kama‘āina* of Kahana
4. Jacinth Lum Lung, *Kama‘āina* of Kahana

9.3 Identification of Cultural Practices

Community consultation conducted as part of this CIA have identified the following cultural, historical, and natural resources where cultural practices (including traditional and customary native Hawaiian rights) are being exercised within the project area:

1. Mr. Foster Ampong mentioned that though fewer people gather (dive/fish) from within the project area, *kuleana* families who live just outside of the project area still dive and fish along the coast.
2. Mr. Etan Krupnick gathers from the coast and surfs out in Kahana Bay. He has gathered *ulua*, *pāpio*, *‘ōmilu*, *moano*, schools of *‘ō‘io*, *moi*, *kala*, octopus, *opihi*, *wana*, *limu*, *‘ōpelu*, and *ahi* from Kahana Bay.
3. Mr. Jacinth Lum Lung has lived in Kahana for most of his life and aside from gathering at the shore, he and his family also surf from "S-Turns" to Napili Point. He shared that there are a lot of beautiful and undisturbed breaks on the outer reef.

Based on the results of community consultation and background research conducted as part of this CIA, CSH has identified the following on-going cultural practices within the project area.

1. Gathering of ocean resources
2. Fishing for ocean resources
3. Diving for ocean resources
4. Surfing

9.4 Identification of Impacts to Cultural Practices

Community members that participated in this CIA have noted the potential for cultural impacts as follows:

1. Mr. Felimon Sadang is against the movement of sand from outer regions for replenishment as it will be destructive to the in-shore species and may have rippling effects along the coast.
2. Mr. Felimon Sadang believes the placement of any beach stabilization structure will affect the natural movement of the sand washing in and out with the tides.
3. Mr. Etan Krupnick is against the building of sea walls as he says it will destroy the coastline which is still thriving with sea life.

Based on the results of community consultation, CSH has identified the following potential cultural impacts related to the proposed project:

1. The project has the potential to impact gathering of near-shore ocean resources including from fishing and diving.
2. The project has the potential to impact the ocean environment and the natural processes of beach erosion and accretion.

9.5 Mitigation Recommendations

Community members that participated in this CIA have provided the following recommendations:

1. Mr. Ampong strongly recommends a marine environmental impact study be conducted before any movement of sand takes place. If a marine environmental impact study is not conducted, he does not support this support.
2. Mr. Sadang believes that some kind of beach nourishment is necessary, however, he has witnessed the beach come and go seasonally and ultimately believes the placement of any beach stabilization structure will affect the natural movement of the sand washing in and out with the tides.

Based on the results of community consultation and CSH’s expertise in conducting cultural impact assessments, the following actions are recommended to promote and preserve cultural beliefs, practices, and resources of Native Hawaiian and other ethnic groups.

1. A marine environmental study including evaluation of the effected adjacent marine habitat to be undertaken and followed up with periodic monitoring and reporting to allow evaluation of the effects of the project on the adjacent marine biota. The results of this study would be useful in evaluation and planning for the potential effects of future projects of this kind which will become more frequent throughout the shorelines of the Hawaiian Islands as the effects of rising sea levels become more prominent. Further consultation with community members which could take the form of a community advisory group which is informed of and involved in all aspects of planning and implementation of the project.
2. A specific community member could be appointed in consultation with the involved community and project representatives to serve as a cultural monitor and liaison between the project proponent and the community and monitor daily activities.
3. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that iwi kūpuna (Native Hawaiian skeletal remains) are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended
4. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants

of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

These recommendations have the potential to mitigate impacts of the proposed project.

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Appendix I:

EISPN and Pre-Consultation Comments and Responses

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DAVID Y. IGE
GOVERNOR OF
HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
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

DLNR:OCCL:SH

Correspondence OA-19-123
MAR 27 2019

Michael Foley, Ph.D, P.E., Coastal Engineer
828 Fort Street Mall, Suite 600,
Honolulu, HI, 96813

SUBJECT: RE: Environmental Impact Statement Preparation Notice (EISPN) for the Kahana Bay Erosion Mitigation Project

Dear Dr. Foley,

The Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has received your Environmental Impact Statement Preparation Notice (EISPN), dated February 5, 2019.

We thank you for your submission and offer the following feedback and recommendations regarding preparation of the Draft Environmental Impact Statement (DEIS):

- We appreciate that the project gives serious consideration to beach restoration. The DLNR generally favors projects designed to mitigate coastal erosion by restoring beach ecosystems rather than by hardening the shoreline with seawalls and revetments, which has led to widespread beach loss in Hawaii.

- When preparing the DEIS, we recommend that you discuss potential impacts, if any, to offshore ecosystems and surf breaks that may result from sand migration/equilibration that generally occurs following beach nourishment projects.

- We recommend that you include a more detailed discussion regarding the methods (i.e., modeling, calculations, data analyses) that informed the design and tuning of T-head groins. Please also discuss the expected lifetime of the nourished beach and groin structures, and discuss the expected response of each to magnitudes of sea-level rise expected within those timeframes. For reference, sea-level rise projections are reported in the State Sea Level Rise Report and associated mapping tools can be accessed by visiting the following website: hawaiisealevelriseviewer.org.

- From the project description it appears that the offshore sand borrow areas would need to be nearly entirely emptied to obtain intended sand volumes (50-100K cy, total). There is

concern that doing so may cause changes to the benthos and may increase the chance of encountering fines and course material when dredging through the entire sand column. We recommend that a discussion be included in the DEIS that describes the potential impacts of doing so, if this is what is intended. We also recommend that a discussion be included regarding the long-term sustainability of beach nourishment in this area, for at least the next few decades or expected lifespan of the groins based on sand availability and intended usage.

- We recommend that you provide more detail to the discussion regarding the potential for increased stream blockage at the Kahana Stream mouth. On page 82 you state that "the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean. In its current state, the channelized portion of the stream's outlet is often plugged with accreted sand and sediment, causing ponding in the channel." You go on to state that your method of reducing blockage would be to place coarse grained material in this area to limit migration of sand by waves. This section would benefit from a more thorough discussion regarding intended grain sizes, potential sources of the coarse-grained material, and alternatives to the described mitigation method.

- We recommend that you clarify which season the project would take place, reasoning behind the choice in timing, and any foreseeable challenges associated with conducting the project during the chosen season (i.e., coral spawning, seasonal wave regime).

- We recommend that you provide more detail to the discussion regarding the overall design and footprint of the beach restoration project. For instance, please explain why the the design footprint extends beyond any documented beach extent featured in aerial photography dating back to 1912[1]. We raise this question because widening the beach beyond the limits of its former footprint will raise questions regarding possibly undesirable effects to nearshore ecosystems and offshore coral colonies. Please describe the potential environmental impacts, if any, and establish the benefit of filling the beach beyond historical extents, if that is a goal of the project

- We recommend that you provide more detail to the discussion on page 23 regarding the synchronization between sand placement and groin construction. The present description makes it seem as though sand would be placed prior to groin construction. We are concerned that 1) sand may be lost from the project before groins are constructed, and 2) that placement of armor-stones atop placed sand may lead to destabilization of the structure following subsequent beach equilibration and natural sand migration.

- We recommend that you include a description detailing how groins will be designed such that they do not hinder/block lateral beach access.

1 University of Hawaii Coastal Geology Group. Hawaii Coastal Erosion Website. http://www.soest.hawaii.edu/coasts/erosion/index.php

- When applying for a CDUA, DLNR OCCL will request that you submit sand samples from multiple locations along the beach and from each offshore borrow site. From information included in the EISPN, it appears that sand recovered from deposit 19 consists of greater than 2% fines. While DLNR OCCL guidelines state that sand is required to contain less than 6% fines, we may ask that a lower percentage (< 2%) is considered owing to the large amount of sediment being placed and presence of coral ecosystems located directly offshore. We also recommend that you amend Figure 4-7 to include the grain size distributions for each sand sample taken at onshore and offshore sample sites. Also, it is unclear why the 20% grain size distribution envelope uses a Kahana beach sample to determine the concentration limit for coarse grained material and a Honokowai beach sample to determine the concentration limit for fine grained material.

- On page 23 of the EISPN it is stated that the dredging barge cannot withstand waves greater than one to two feet. The offshore location from which sand would be dredged features swell that regularly exceeds this height and may rise unexpectedly. Thus, you may want to reconsider use of this particular barge system, or seek out alternative sand fields.

- We recommend the following three amendments to section 4.2.5 *Sea Level Rise* on page 79 of the EISPN. 1) Amend the following statement to include the contribution of land-based ice melt to present rates of sea-level rise, "Tide gauges at Hawai'i's major harbors, including Kahului Harbor, show an upward trend in sea level (Figure 4-11). This trend is primarily caused by the thermal expansion of seawater as it increases in temperature." 2) Amend the following statement to recognize present acceleration in the rate of global mean sea level rise, "The average global SLR over the last century was approximately 1.88 mm (0.074 inches) per year, with studies indicating that this rate may accelerate in the coming decades." 3) Correct the inactive link cited in the following statement, "UH SOEST provides a SLR scenario for Honolulu projecting a one-foot increase in sea level by midcentury, and about three feet by the end of the century (SOEST, 2018)."

- We recommend that you include a suite of alternative project designs that feature scaled-down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groin structures).

- Regarding the potential use of hydraulic slurry pumps for sand transport as stated on page 23 and 35, we are concerned that the method may cause sand to fracture; this in turn can lead to sand loss and elevated turbidity. This was the observed during the 2012 Waikiki Beach nourishment project, in which hydraulic pumping was identified as the likely culprit[2]. Beach quality sand is a valuable and diminishing resource among the Hawaiian Islands and it is important to realize that, owing to its composition, sand used for local nourishment projects is generally more fragile than sand used for the majority of large-scale efforts accomplished within the continental United States.

2 Habel, S., Fletcher, C. H., Barbee, M., & Anderson, T. R. (2016). The influence of seasonal patterns on a beach nourishment project in a complex reef environment. *Coastal Engineering*, *116*, 67-76.

- Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. As part of the section in the DEIS that describes potential cultural impacts, please provide information that satisfies the following:
  - Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.
  - Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.
  - What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai'i rights?

Given our experience with permitting and conducting beach restoration projects, please consider staff at the DLNR-OCCL as an additional resource for questions and guidance as you continue to develop the proposed project. Should you have any questions on the matter, please feel free to contact Shellie Habel, Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or via email at Shellie.L.Habel@Hawaii.gov.

Sincerely,

SAMUEL J. LEMMO, ADMINISTRATOR
OFFICE OF CONSERVATION AND COASTAL LANDS

February 13, 2020

Samuel J. Lemmo, Administrator
ATTN: Shellie Habel
Office of Conservation and Coastal Lands (OCCL)
State of Hawaii Department of Land and Natural Resources (DLNR)
1151 Punchbowl Street #131
Honolulu, HI 96813

Dear Mr. Lemmo:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for your comment letters dated March 29, 2019 and August 23, 2019 commenting on the above referenced EISPN following the request for comments published on March 8, 2019 and July 23, 2019 respectively, in *The Environmental Notice*. Your comments have been documented and will be included in the Draft Environmental Impact Statement (DEIS).

Oceanit values your general support of beach restoration over shoreline hardening and will address your recommendations and concerns in the DEIS. Please see the attached response to comments table that addresses your specific concerns and suggestions and references DEIS sections in which they will be described.

We appreciate your input and insight to help develop prudent actions for Kahana Beach and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Attachment:
Response to comments table

Response to Comments
Kahana Bay Erosion Mitigation Project - Environmental Impact Statement Preparation Notice (EISPN)
Correspondence OA-19-123 and OA-20-42
March 2019 and August 2019

Reviewer	Organization	Contact	Comments Received
Mr. Samuel J. Lemmo	State of Hawai'i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL)	(808) 587-0377 Sam.J.Lemmo@hawaii.gov	March 27, 2019 and August 23, 2019

Comment No.	Section	Comment	Response
1		We appreciate that the project gives serious consideration to beach restoration. The DLNR generally favors projects designed to mitigate coastal erosion by restoring beach ecosystems rather than by hardening the shoreline with seawalls and revetments, which has led to widespread beach loss in Hawaii.	Oceanit values the DLNR's opinions and are pleased to share the common goal of beach restoration.
2		When preparing the DEIS, we recommend that you discuss potential impacts, if any, to offshore ecosystems and surf breaks that may result from sand migration/equilibration that generally occurs following beach nourishment projects.	Discussion of potential impacts to offshore ecosystems from beach nourishment projects will be included in Section 3.3.4 of the DEIS and included in the marine benthic study (which will be included as an appendix to the DEIS). Impacts to surf breaks from sand mitigation/equilibration will be discussed in Section 3.5.1 Recreational Activities.
3	2.3.4	We recommend that you include a more detailed discussion regarding the methods (i.e., modeling, calculations, data analyses) that informed the design and tuning of T-head groins. Please also discuss the expected lifetime of the nourished beach and groin structures, and discuss the expected response of each to magnitudes of sea-level rise expected within those timeframes. For reference, sea-level rise projections are reported inthe State	Thank you for the resources and suggestions. The sea level rise viewer was used to prepare the DEIS. Details about the proposed action design, modeling, calculations, data analyses, expected lifetime, and resistance to SLR will be discussed in Section 2.1 Proposed Action of the DEIS. Current and wave modeling in the

		Sea Level Rise Report and associated mapping tools can be accessed by visiting the following website: hawaiisealevelriseviewer.org.	nearshore area is being performed and will be discussed in Section 3.2.1 of the DEIS.
4	1.5	From the project description it appears that the offshore sand borrow areas would need to be nearly entirely emptied to obtain intended sand volumes (50-100K cy, total). There is concern that doing so may cause changes to the benthos and may increase the chance of encountering fines and course material when dredging through the entire sand column. We recommend that a discussion be included in the DEIS that describes the potential impacts of doing so, if this is what is intended. We also recommend that a discussion be included regarding the long-term sustainability of beach nourishment in this area, for at least the next few decades or expected lifespan of the groins based on sand availability and intended usage.	A discussion of impacts from dredging the sand borrow areas will be included in Section 3.3.4 in the DEIS. An additional sand study to evaluate sand depth and cores form the borrow sites and determine the sand grain size and ensure sand quality is discussed in Section 3.1.4 of the DEIS. A discussion of the long-term sustainability of the proposed action and expected longevity of the stabilizing structures will be included in Section 2.1 Proposed Action.
5	4.3.2	We recommend that you provide more detail to the discussion regarding the potential for increased stream blockage at the Kahana Stream mouth. On page 82 you state that "the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean. In its current state, the channelized portion of the stream's outlet is often plugged with accreted sand and sediment, causing ponding in the channel." You go on to state that your method of reducing blockage would be to place coarse grained material in this area to limit migration of sand by waves. This section would benefit from a more thorough discussion regarding intended grain sizes, potential sources of the coarse-grained material, and alternatives to the described mitigation method.	Additional discussion about potential effects to Kahana Stream and stream mouth will be discussed in Section 3.3.2 of the DEIS. A more thorough discussion of the grain size distribution of the current beach sand and sand sources will be included in Section 3.1.4 of the DEIS. The sand quality confirmation report for the study conducted in June 2019 will be included as an appendix of the DEIS.
6	1.7.4	We recommend that you clarify which season the project would take place, reasoning behind the choice in timing, and any foreseeable challenges associated with conducting the project during the chosen season (i.e., coral spawning, seasonal wave regime).	We will clarify that the project will take place during the summer months and will clarify the reasoning for this choice in Section 2.1.4 of the DEIS. Any foreseeable challenges that may occur during the chosen season will also be discussed in this section.

7		We recommend that you provide more detail to the discussion regarding the overall design and footprint of the beach restoration project. For instance, please explain why the design footprint extends beyond any documented beach extent featured in aerial photography dating back to 1912. We raise this question because widening the beach beyond the limits of its former footprint will raise questions regarding possibly undesirable effects to nearshore ecosystems and offshore coral colonies. Please describe the potential environmental impacts, if any, and establish the benefit of filling the beach beyond historical extents, if that is a goal of the project.	The beach will not be widened past historical widths. Instead, the beach will be *restored* to a shoreline from a historical year. Design of the proposed action will be discussed in Section 2.1 of the DEIS. It should be noted that the conceptual drawing included in the EISPN is not to scale and not completely representative of the proposed action, as the final design will be determined only after federal, state, and county regulatory review as well as input from specialized studies and the public.
8	1.7.1	We recommend that you provide more detail to the discussion on page 23 regarding the synchronization between sand placement and groin construction. The present description makes it seem as though sand would be placed prior to groin construction. We are concerned that 1) sand may be lost from the project before groins are constructed, and 2) that placement of armor-stones atop placed sand may lead to destabilization of the structure following subsequent beach equilibration and natural sand migration.	More details on construction sequence and synchronization between sand placement and groin construction will be included in Section 2.1 of the DEIS. The points of concern will be considered when developing the construction sequence.
9	1.6	We recommend that you include a description detailing how groins will be designed such that they do not hinder/block lateral beach access.	More detail on beach stabilization structure and design elements of the sand stabilization structures will be included in Section 2.1 of the DEIS.
10	4.1.4	When applying for a CDUA, DLNR OCCL will request that you submit sand samples from multiple locations along the beach and from each offshore borrow site. From information included in the EISPN, it appears that sand recovered from deposit 19 consists of greater than 2% fines. While DLNR OCCL guidelines state that sand is required to contain less than 6% fines, we may ask that a lower percentage (< 2%) is considered owing to the large amount of sediment being placed and presence of coral ecosystems located directly offshore. We also recommend that you amend Figure 4-7 to include the grain size distributions for each sand sample taken at onshore and offshore sample sites. Also, it is unclear why the 20% grain size distribution envelope uses a Kahana beach sample	Any sand grain size information included in the EISPN was from pre-existing reports and may be outdated. Sand on the beach and offshore is dynamic and moves under seasonal, storm, and natural conditions. An updated sand quality confirmation study characterizing the sand grain size distribution on the existing beach sand and at the sand deposits was performed in June 2019 and discussed in Section 3.1.4. The full study will be included as an appendix to the DEIS and contains updated grain size distributions and data. We look forward to discussing sand quality standards in more detail for the project with the DLNR OCCL.

		to determine the concentration limit for coarse grained material and a Honokowai beach sample to determine the concentration limit for fine grained material.	
11	1.7.1	On page 23 of the EISPN it is stated that the dredging barge cannot withstand waves greater than one to two feet. The offshore location from which sand would be dredged features swell that regularly exceeds this height and may rise unexpectedly. Thus, you may want to reconsider use of this particular barge system, or seek out alternative sand fields.	Thank you for this information. Various dredging and construction methods will be compared and need to be carefully assessed to ensure their success under site conditions. Construction operations for the proposed action will be discussed in more detail in Section 2.1 of the DEIS.
12	4.2.5	We recommend the following three amendments to section 4.2.5 Sea Level Rise on page 79 of the EISPN. 1) Amend the following statement to include the contribution of land-based ice melt to present rates of sea-level rise, "Tide gauges at Hawaii's major harbors, including Kahului Harbor, show an upward trend in sea level (Figure 4-11). This trend is primarily caused by the thermal expansion of seawater as it increases in temperature." 2) Amend the following statement to recognize present acceleration in the rate of global mean sea level rise, "The average global SLR over the last century was approximately 1.88 mm (0.074 inches) per year, with studies indicating that this rate may accelerate in the coming decades." 3) Correct the inactive link cited in the following statement, "UH SOEST provides a SLR scenario for Honolulu projecting a one-foot increase in sea level by midcentury, and about three feet by the end of the century (SOEST, 2018)."	Thank you for the recommendations for the Sea Level Rise Section. These recommendations will be reflected in Sections 1.2 and 3.2.3 of the DEIS.
13	2	We recommend that you include a suite of alternative project designs that feature scaled down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groin structures).	An extensive project alternatives analyses will be conducted as part of the DEIS process. Discussion of alternate designs and scale down features will be included in Section 2.2 of the DEIS. All alternatives considered will be evaluated by their ability to meet project need and objectives, as well as their environmental, social, cultural, and recreational impacts.
14	1.7.3	Regarding the potential use of hydraulic slurry pumps for sand transport as stated on page 23 and 35, we are concerned that the	We appreciate the DLNR's insight on and concerns about results of this particular dredging method on sand grains and will make sand

		method may cause sand to fracture; this in turn can lead to sand loss and elevated turbidity. This was the observed during the 2012 Waikiki Beach nourishment project, in which hydraulic pumping was identified as the likely culprit. Beach quality sand is a valuable and diminishing resource among the Hawaiian Islands and it is important to realize that, owing to its composition, sand used for local nourishment projects is generally more fragile than sand used for the majority of largescale efforts accomplished within the continental United States.	quality a priority when determining the suitability for offshore sand sources. Oceanit will consider this when assessing and deciding on dredging and construction methods, which will be discussed in Section 2.1 of the DEIS.
15	5	Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. As part of the section in the DEIS that describes potential cultural impacts, please provide information that satisfies the following: o Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area. o Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action. o What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai`i rights?	A discussion on Articles IX and XII of the State Constitution, other state laws, the courts of the State, and the requested information will be included in Sections 3.4.4 and 4.2 of the DEIS.
16	From 8/23/19	As stated in our previous letter we recommend you include a suite of alternative project designs that feature scaled down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groins structures). More specifically, we recommend that you consider multiple design structures, consider various numbers, sizes, and configurations of groins, consider integrating construction materials in the groins that promote native intertidal and aquatic	Extensive discussion of the design and development of the proposed action will be included in Section 2 of the DEIS. The proposed action will consider the design options in this section, as well as take into account wave and current patterns, marine resources, cultural and social effects, and other factors. The extent of the beach will only be widened to restore the beach to a known historical width). Within the beach nourishment with stabilizing structure approach, various scales, sizes, and configurations of stabilization structures and beach width are being considered. The layout of the stabilization

		ecosystems (e.g., artificial reef components), and alternatives that would limit nourishment to a historical extent of the beach.	structures included in the EISPN and DEIS documents is for conceptual purposes only, and the final design will be dependent on feedback gleaned from the DEIS process, permit regulations, and regulatory agency allowances.
17	From 8/23/19	We recommend that additional shoreline accessways and public parking be made available to the public to facilitate increase beach use.	Thank you for the suggestion. Discussion of this possible mitigation measure will be included in Section 3.6.1 of the DEIS.
		END OF COMMENTS	Thank you for your comments.

Taylor Chock

From: Jess Oliveira <jess.oliveira444@gmail.com>
Sent: Thursday, March 14, 2019 7:53 AM
To: Kahana Bay Comments
Subject: Kahana coastal erosion

I do not support the construction of t-groins in Kahana Bay for the following reasons:
-Groins occasionally improve the shape of surfing waves by creating a rip current next to the rocks. The rip can be a hazard to swimmers. The rip can also divert beach sand onto offshore sand bars, thereby accelerating erosion. Groins can also ruin the surf. If the waves are reflected off the rocks, the waves may lose their shape and "close-out."
- groins simply "steal" sand from one part of the beach so that it will build up on another part. There will always be beach erosion downdrift of the last groin.
- Using groins in conjunction with beach nourishment projects is of dubious value as well. When big storms occur, groins direct strong currents that carry large amounts of sand seaward, in an offshore direction parallel to the groins.
- groins are man made structures that don’t belong on our beaches

Please do not build any coastal hardening projects such as seawalls or groins simply to protect investments that didn’t belong there in the first place. It is well documented that these buildings were built on sand dunes.

Mahalo for your time,
Concerned local Kahana resident
Jessica Oliveira
4310 L. Honoapiilani Rd #506
Lahaina, HI 96761

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Jessica Oliveira
4310 Lower Honoapiʻilani Road, Unit #506
Lahaina, HI 96761

Dear Ms. Oliveira:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated March 14, 2019. We acknowledge your comments and concerns, which have been considered in the preparation of the Draft EIS in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC). We have taken your comments into consideration in preparing the Draft EIS and offer the following responses to your comments relating to the content of the Draft EIS.

We note that your concerns include the use of and effects of shoreline stabilization structures and coastal hardening projects. Beach nourishment with stabilization structures is only one of the general project alternatives for the Kahana Bay shoreline that is analyzed and discussed in detail in Section 2 of the DEIS. All alternatives in the DEIS were considered equally and without bias and were evaluated based on their ability to meet project objectives and goals and include:

1) Beach Nourishment with Stabilizing Structures;
2) Stand Alone Beach Nourishment;
3) Shoreline Armoring Structures;
4) Managed Retreat; and
5) No Action.

An extensive alternatives analyses was a critical step in the DEIS process to select a proposed alternative that best met the project goals and objectives.

Within the beach nourishment with stabilizing structure approach, various scales, sizes, and configurations of stabilization structures and beach width are being considered. The layout of the stabilization structures included in the EISPN and DEIS documents is for conceptual purposes only, and the final design will be dependent on feedback gleaned from the DEIS process, permit regulations, and regulatory agency allowances. Stabilization structures would be designed by professional coastal engineers, using tested and proven methods to retain sand on the beach and minimize impacts. Section 2 of the DEIS will describe the proposed action design in detail. Wave and current modelling using specialized software is being performed to determine how the effects of sand dredging and stabilization structures, if any, would alter currents or waves and adjacent beaches (will be addressed in Section 3.2.1 of the DEIS).

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Taylor Chock

From: Max Becerra <maxangel808@gmail.com>
Sent: Thursday, March 14, 2019 12:42 PM
To: Kahana Bay Comments
Subject: T Groins in Kahana Bay

Aloha,

This is in regards to the T Groins proposed for Kahana Bay..

In their EIS one of the alternatives is to build t-groins. I do not support the construction of these structures in Kahana Bay for the following reasons:
-Groins occasionally improve the shape of surfing waves by creating a rip current next to the rocks. The rip can be a hazard to swimmers. The rip can also divert beach sand onto offshore sand bars, thereby accelerating erosion. Groins can also ruin the surf. If the waves are reflected off the rocks, the waves may lose their shape and "close-out."
- groins simply "steal" sand from one part of the beach so that it will build up on another part. There will always be beach erosion downdrift of the last groin.
- Using groins in conjunction with beach nourishment projects is of dubious value as well. When big storms occur, groins direct strong currents that carry large amounts of sand seaward, in an offshore direction parallel to the groins.
- groins are man made structures that don't belong on our beaches

NO GROINS, SAVE THE BEACH!

Mahalo,

Max Becerra
Concerned Lahaina Fisherman/Resident

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Max Becerra
4955 Hanawai Street, Apt. 9-103
Lahaina, HI 96761
Email: maxangel808@gmail.com

Dear Mr. Becerra:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated March 14, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include the use of and effects of shoreline stabilization structures and coastal hardening projects. Beach nourishment with stabilization structures is only one of the general project alternatives for the Kahana Bay shoreline that is analyzed and discussed in detail in Section 2 of the DEIS. All alternatives in the DEIS were considered equally and without bias and were evaluated based on their ability to meet project objectives and goals. The other alternatives evaluated include:

1) Beach Nourishment with Stabilizing Structures;
2) Stand Alone Beach Nourishment;
3) Shoreline Armoring Structures;
4) Managed Retreat; and
5) No Action.

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Within the beach nourishment with stabilizing structure approach, various scales, sizes, and configurations of stabilization structures and beach width are being considered. The layout of the stabilization structures included in the EISPN and DEIS documents is for conceptual purposes only, and the final design will be dependent on feedback gleaned from the DEIS process, permit regulations, and regulatory agency allowances. Stabilization structures would be designed by professional coastal engineers, using tested and proven methods to retain sand on the beach and minimize impacts. Section 2 of the DEIS will describe the proposed action design in detail. Wave and current modelling using specialized software is being performed to determine how the effects of sand dredging and stabilization structures, if any, would alter currents or waves and adjacent beaches (Section 3.2.1 of the DEIS).

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Taylor Chock

From: Angel Becerra <angelbec@hawaii.edu>
Sent: Friday, March 22, 2019 2:42 PM
To: Kahana Bay Comments
Subject: Re: T Groins in Kahana Bay

Thank you for your response.

4955 Hanawai St. Apt. 9-103
Lahaina, HI
96761

On Thu, Mar 21, 2019 at 2:49 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Angel,
>
> We appreciate your feedback on Kahana Bay Project and are working to address your concerns. May you please provide an adddress to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **Taylor Chock** | Resiliency and Sustainability Scientist
>
> Email: **tchock@oceanit.com**
>
> Office: 808.531.3017 x 117 | Direct: 808.954.4117
>
> **From:** Angel Becerra <angelbec@hawaii.edu>
> **Sent:** Thursday, March 14, 2019 12:43 PM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** T Groins in Kahana Bay
>
> Aloha,

This is in regards to the T Groins proposed for Kahana Bay..

In their EIS one of the alternatives is to build t-groins. I do not support the construction of these structures in Kahana Bay for the following reasons:

-Groins occasionally improve the shape of surfing waves by creating a rip current next to the rocks. The rip can be a hazard to swimmers. The rip can also divert beach sand onto offshore sand bars, thereby accelerating erosion. Groins can also ruin the surf. If the waves are reflected off the rocks, the waves may lose their shape and "close-out."

- groins simply "steal" sand from one part of the beach so that it will build up on another part. There will always be beach erosion downdrift of the last groin.

- Using groins in conjunction with beach nourishment projects is of dubious value as well. When big storms occur, groins direct strong currents that carry large amounts of sand seaward, in an offshore direction parallel to the groins.

- groins are man made structures that don't belong on our beaches

NO GROINS, SAVE THE BEACH, MOVE THE HOTEL!

Mahalo,

Angel F.

Concerned Lahaina Resident

oceanit

innovation through engineering & scientific excellence

February 13, 2020

Angel Becerra
4955 Hanawai Street, Apt. 9-103
Lahaina, HI 96761
Email: angelbec@hawaii.edu

Dear Ms. Becerra:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated March 14, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include the use of and effects of shoreline stabilization structures and coastal hardening projects. Beach nourishment with stabilization structures is only one of the general project alternatives for the Kahana Bay shoreline that is analyzed and discussed in detail in Section 2 of the DEIS. All alternatives in the DEIS were considered equally and without bias and were evaluated based on their ability to meet project objectives and goals. The other alternatives evaluated include:

1) Beach Nourishment with Stabilizing Structures;
2) Stand Alone Beach Nourishment;
3) Shoreline Armoring Structures;
4) Managed Retreat; and
5) No Action.

An extensive alternatives analyses was a critical step in the DEIS process to select a proposed alternative that best met the project goals and objectives.

Within the beach nourishment with stabilizing structure approach, various scales, sizes, and configurations of stabilization structures and beach width are being considered. The layout of the stabilization structures included in the EISPN and DEIS documents is for conceptual purposes only, and the final design will be dependent on feedback gleaned from the DEIS process, permit regulations, and regulatory agency allowances. Stabilization structures would be designed by professional coastal engineers, using tested and proven methods to retain sand on the beach and minimize impacts. Section 2 of the DEIS will describe the proposed action design in detail. Wave and current modelling using specialized software is being performed to determine how the effects of sand dredging and stabilization structures, if any, would alter currents or waves and adjacent beaches (Section 3.2.1 of the DEIS).

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Taylor Chock

From: Jody Bowman <bowmanjody@hotmail.com>
Sent: Saturday, March 16, 2019 5:15 PM
To: Kahana Bay Comments
Subject: T-groins

Hi,
I grew up here on Maui and believe that if people or companies, foolishly build close to the ocean, they run the risk of being negatively impacted by their actions. I absolutely believe that we should leave the shoreline ALONE. No t-groins, no seawalls, no messing with nature. One of my main concerns is that T-groins have been shown to create riptides which are dangerous to swimmers and changes the shape of the ocean floor, impacting the shoreline forever.

It seems absurd to me that t-groins are even being considered. Have we not learned repeatedly to let nature take it's course, otherwise we pay dearly years later.

Thank you,
Jody Bowman

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Jody Bowman
P.O. Box 1643
Makawao, HI, 96768
Email: bowmanjody@hotmail.com

Dear Ms. Bowman:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated March 16, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʽi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include the use of and effects of shoreline stabilization structures and coastal hardening projects. Beach nourishment with stabilization structures is only one of the general project alternatives for the Kahana Bay shoreline that is analyzed and discussed in detail in Section 2 of the DEIS. All alternatives in the DEIS were considered equally and without bias and were evaluated based on their ability to meet project objectives and goals. The other alternatives evaluated include:

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We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Taylor Chock

From: Paula Alcoseba <paula33@hawaii.edu>
Sent: Monday, March 18, 2019 4:53 PM
To: Kahana Bay Comments; Sam.j.lemmo@hawaii.gov
Subject: NO TO COASTAL HARDENING/GROINS & BEACH NOURISHMENT!

Aloha pumehana,

I am a student of Sustainability and Marine Science at Maui College and I humbly asking you to oppose the the proposed plans of beach nourishment and coastal hardening at Kahana Bay and Ka'anapali Beach. Please look into more sustainable options like managed retreat and dune restoration!

There is not a single scientific article that has concluded that beach nourishment is positive for the surrounding ecosystem. Do we want these Maui beaches to turn into Waikiki? Or do we want these beaches to remain a living shoreline with living nearshore and offshore resources for fishing, diving, snorkeling, surfing, shoreline protection and cultural use? We do not see many people hitting Waikiki for its living resources because it is an artificial, biologically sterile beach. Beach nourishment will effectively kill the animals living on the beach and in nearshore waters.

During nourishment, the beach becomes a major construction zone. The heavy machinery used to truck in and distribute new sand also kills beach animals and disturbs wildlife. The new sand may not be the same grain size or chemical makeup of the natural sand, changing the habitat that beach animals rely upon. This results in a catastrophic loss of intertidal and nearshore species.

Nourishment is not a long-term solution to beach erosion. The erosive forces of waves, storms, and rising sea levels do not disappear after nourishment takes place. Waves will continue to hit the sand, and eventually it erodes away, moving down the coast and offshore. Therefore, nourishment can protect coastal structures for as long as the sand lasts, but after a certain period of time, the beach will have to be re-nourished. The associated price tag can be quite high and unsustainable. Repeated or frequent episodes of nourishment can severely impede recovery of the beach community and ecosystem.

As for coastal hardening/groins/seawalls, the negative impacts of these structures on downdrift shorelines is well understood. When a groin works as intended, sand moving along the beach in the so-called downdrift direction is trapped on the updrift side of the groin, causing a sand deficit and increasing erosion rates on the downdrift side. This well-documented and unquestioned impact is widely cited in the engineering and geologic literature. A groin interrupts the natural ebb and flow of the coastal ecosystem and can cause substantial negative impacts to adjacent beaches. Not only that, but groins and seawalls have been shown to cause a significant loss of biodiversity in the areas they have been placed. As coastal development increases, the type and location of shoreline hardening could greatly affect the habitat value and functioning of nearshore ecosystems.

Groins are dangerous to swimmers, these can create a rip current next to the rocks. The rip can also divert beach sand onto offshore sand bars, thereby accelerating erosion. Groins can also ruin the surf. If the waves are reflected off the rocks, the waves may lose their shape and "close-out." Groins simply "steal" sand from one part of the beach so that it will build up on another part. There will always be beach erosion downdrift of the last groin. These are man made structures that do not belong on our beaches!

Please think of my generation, and the loss of biodiversity and resources of our beautiful Hawai'i! Please DO NOT prioritize tourist dollars, and instead protect our local community and the resources we depend on! PLEASE DO THE RIGHT THING and PROTECT the 'āina, not the hotels!!

Mahalo for reading my email and I await your response!

Sincerely,

Paula Alcoseba

February 13, 2020

Ms. Paula Alcoseba
Maui College
Kahului, Hawaiʻi 96732
Email: paula33@hawaii.edu

Dear Ms. Alcoseba:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated March 18, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʽi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include the use and effects of groins, coastal hardening, the loss of biological resources in the area, and sand quality and composition.

The DEIS evaluates the amount of impact of the proposed action on a particular resource, if that effect is significant or irreversible, and if mitigation measures can be applied. Anticipated impacts to various environmental, ecological, and other resources and potential mitigation measures are discussed in Section 3 of the DEIS. Several specialized studies, such as current and wave modelling and marine benthic resources studies, were performed as part of the DEIS process to estimate potential impacts of beach restoration at the site. All specialized studies prepared to supplement and support the EIS process will be fully disclosed and included in full as appendices to the DEIS document.

An extensive marine biological resources study was conducted in June 2019 in and around the proposed dredging, possible construction sand transport routes, and in the nearshore beach stabilization structure areas to quantify existing marine biological resources such as coral, fish, and algal abundance and density in the project area and to determine if any effects from the

proposed action would impact biological habitat. Discussion of potential impacts and mitigation measures are included in Section 3.3.3 of the DEIS.

We note that your concerns include the use of and effects of shoreline stabilization structures and coastal hardening projects. Beach nourishment with stabilization structures is only one of the general project alternatives for the Kahana Bay shoreline that is analyzed and discussed in detail in Section 2 of the DEIS. All alternatives in the DEIS were considered equally and without bias and were evaluated based on their ability to meet project objectives and goals. The other alternatives evaluated include:

1) Beach Nourishment with Stabilizing Structures;

2) Stand Alone Beach Nourishment;

3) Shoreline Armoring Structures;

4) Managed Retreat; and

5) No Action.

An extensive alternatives analyses was a critical step in the DEIS process to select a proposed alternative that best met the project goals and objectives.

Within the beach nourishment with stabilizing structure approach, various scales, sizes, and configurations of stabilization structures and beach width are being considered. The layout of the stabilization structures included in the EISPN and DEIS documents is for conceptual purposes only, and the final design will be dependent on feedback gleaned from the DEIS process, permit regulations, and regulatory agency allowances. Stabilization structures would be designed by professional coastal engineers, using tested and proven methods to retain sand on the beach and minimize impacts. Section 2 of the DEIS will describe the proposed action design in detail. Wave and current modelling using specialized software is being performed to determine how the effects of sand dredging and stabilization structures, if any, would alter currents or waves and adjacent beaches (Section 3.2.1 of the DEIS).

Construction activities go through stringent permitting review and approvals from federal, state, and county agencies. All construction activities will include a Best Management Practices Plan that includes procedures such as those to reduce and contain turbidity in the water and to minimize dust emissions and spills on land.

Previous studies at Kahana Bay have identified several offshore borrow areas that contained good quality sand upon initial testing. Any sand planned for beach restoration in the State of Hawaiʻi must first be tested and meet specific criteria of the State of Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Land's Small Scale Beach Nourishment criteria for cleanliness, color, coarseness, limited fines or silt, and grain size before it can be used. The sand will be tested by laboratory analyses to ensure that it does not contain too many fines and does not have pollutants before being placed on the beach will be discussed in detail in Section 3.1.4 of the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Taylor Chock

From:	Michael Foley
Sent:	Tuesday, March 19, 2019 4:46 PM
To:	Thorne Abbott
Cc:	Jeremy Michelson; Taylor Chock; Dayan Vithanage
Subject:	FW: Kahana Beach Restoration and Renourishment

FYI

Aloha,
Mike

-----Original Message-----
From: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>
Sent: Tuesday, March 19, 2019 4:34 PM
To: Michael Foley <mfoley@OCEANIT.COM>
Subject: FW: Kahana Beach Restoration and Renourishment

Thanks

-----Original Message-----
From: Warren Vinzant <wvinzant@gmail.com>
Sent: Tuesday, March 19, 2019 1:59 PM
To: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>
Subject: Kahana Beach Restoration and Renourishment

Mr. Lemmo,

We have watched for years the continuous (and sometimes rapid) deterioration of our beach and shoreline along Kahana Bay. We've seen the "temporary" seawalls march from north to south with further beach erosion moving farther south as each seawall is added. We've seen Valley Isle and Sands of Kahana erect emergency sandbag measures to prevent the loss of structures. The Royal Kahana already lost an out building. Mother nature will continue to destroy this shoreline and then move on to S-Turns unless strong action is taken. Eventually, all that will be left is sea walls to protect the buildings.

Allowing this to happen would be a shame. This shoreline and the beach from S-Turns north are a vital and singular refuge for all in the Kahana area. There are no other comparable beaches between North Kaanapali up to Napili. It is a regular place for thousands of residents from Honokowai, Kahana, and Napili to enjoy a day off. It is a vital element that brings tourism to these areas, keeping a hundred local businesses in business. Unlike so many of the "richer" areas of Maui, this unique area would suffer greatly without reversing the erosion and restoring the Kahana beach area.

We want to express our support for aggressive (100,000+ cubic yards) beach renourishment. The more the better. The sand washed from our beach is just off the coast. We support T-groins to stabilize the beach and shoreline. We know that the T-groins may not be the most attractive, but unless there is a better long term protection we support installing them. We'd then like to see the "temporary" sea walls removed and an aggressive planting of coastal vegetation at the beach/land boundary.

Thank you for taking the time to hear our concerns.

Warren and Tracy Vinzant
4299 Lower Honoapiilani Rd, #243
Lahaina, HI 96761

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

Warren and Tracy Vinzant
4299 Lower Honoapiʻilani Road, Unit #243
Lahaina, HI 96761

Dear Mr. and Mrs. Vinzant:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process and for your letters dated April 8, 2019 and August 10, 2019 in regard to the Kahana Bay Erosion Mitigation Project. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We appreciate your input and look forward to your continued involvement in the environmental review process.

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Taylor Chock

From: Amy Stephens <rainbowcountrymaui@gmail.com>
Sent: Monday, April 8, 2019 10:16 AM
To: Kahana Bay Comments
Subject: Re: Beach Restoration Kahana Bay Testimony

Amy Stephens
81 Loa Place
Lahaina, HI 96761

> On Apr 8, 2019, at 9:11 AM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Amy,
>
> We appreciate your feedback on Kahana Bay Project and are working to address your concerns. May you please provide an address to which we can mail a hard copy response?
>
> Mahalo,
> Taylor
>
> -----Original Message-----
> From: Amy Stephens <rainbowcountrymaui@gmail.com>
> Sent: Friday, April 5, 2019 8:03 PM
> To: sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> Subject: Beach Restoration Kahana Bay Testimony
>
> What has happened to Kahana Bay over the last 20 years is shocking.
> 1)I support a policy of managed retreat. No one property is worth sacrificing our beaches and health of our shoreline ecosystem. No one property has the right to prioritize their property over the adjacent land and beach through shoreline hardening or other means 2)I am for beach nourishment from deposits off shore that are determined similar quality sand as the existing beach 3)I am strongly against groins of any kind. These should NEVER be approved.
> 4)I am strongly against any shoreline hardening/sea walls of any kind. I think existing sea walls should be removed.
> 5)No more sandbags ever. If they must be used for a brief period it should be required to be removed.
> 6)Properties should not be allowed to claim beaches with excessive vegetation.
> Thank you for your time and registering my testimony.
> Amy Stephens
> Napili, Maui
>

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Amy Stephens
81 Loa Place
Lahaina, HI 96761

Dear Ms. Stephens:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated April 5, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʽi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include managed retreat, sand source quality, sand stabilization structures, temporary erosion measures such as the use of sand bags, and vegetative encroachments.

We note that your concerns include the use of and effects of shoreline stabilization structures and coastal hardening projects. Beach nourishment with stabilization structures is only one of the general project alternatives for the Kahana Bay shoreline that is analyzed and discussed in detail in Section 2 of the DEIS. All alternatives in the DEIS were considered equally and without bias and were evaluated based on their ability to meet project objectives and goals. The other alternatives evaluated include:

1) Beach Nourishment with Stabilizing Structures;
2) Stand Alone Beach Nourishment;
3) Shoreline Armoring Structures;
4) Managed Retreat; and
5) No Action.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

An extensive alternatives analyses was a critical step in the DEIS process to select a proposed alternative that best met the project goals and objectives.

Within the beach nourishment with stabilizing structure approach, various scales, sizes, and configurations of stabilization structures and beach width are being considered. The layout of the stabilization structures included in the EISPN and DEIS documents is for conceptual purposes only, and the final design will be dependent on feedback gleaned from the DEIS process, permit regulations, and regulatory agency allowances. Stabilization structures would be designed by professional coastal engineers, using tested and proven methods to retain sand on the beach and minimize impacts. Section 2 of the DEIS will describe the proposed action design in detail. Wave and current modelling using specialized software is being performed to determine how the effects of sand dredging and stabilization structures, if any, would alter currents or waves and adjacent beaches (Section 3.2.1 of the DEIS).

Any sand planned for beach restoration in the State of Hawaiʻi must first be tested and meet specific criteria of the State of Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Land's Small Scale Beach Nourishment and State Department of Health criteria for cleanliness, color, coarseness, limited fines or silt, and grain size before it can be used. The sand will be tested by laboratory analyses to ensure that it does not contain too many fines and does not have pollutants before being placed on the beach will be discussed in detail in Section 3.1.4 of the DEIS.

The condominiums were constructed forty (40) feet from the shoreline, as was legally allowed by Maui County and the State of Hawaiʻi at the time of their construction. Eight of the properties along this section of Kahana Bay shoreline have some form of armoring to prevent damage to buildings or infrastructure and/or to deter further erosion. Emergency sand bag structures are generally permitted to be in place for three years while a long-term solution is sought.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Written Testimony Opposing
Kahana Bay Erosion Mitigation Program
By Foster Ampong

April 7, 2019

Michael Foley, Ph.D., P.E. Coastal Engineer
mfoley@oceanit.com
(808) 531-3017 828 Fort Street Mall, Suite 600
Honolulu, HI, 96813

Aloha Mr. Foley,

My name is Foster Ampong. Growing up in Lahaina I have witnessed the ocean aka Mother Nature take away/bring back the beaches in cycles – I respect and accept this fundamental fact of life.

I respectfully submit this written testimony in **opposition** of the Kahana Bay Erosion Mitigation Environmental Impact Statement Preparation Notice and its Proposed Beach Nourishment and Restoration and the subsequent proposed alternatives documented in pages 13 – 47 on the grounds these proposed alternatives are short term and unsustainable; as well as for the **absence of a Marine Impact Study** - Some of these proposed alternatives endanger the fish and wildlife, any Island community that depend on these resources for subsistence.

A Marine Impact Study is essential and therefore, must be conducted and made available to the public before any final decision is made.

Remedy:

In place of Beach Nourishment, groining, dredging, etc. I suggest we look off-shore, as well as up/down the coast of Kahana for restoring the reef system and fish ponds. The redirecting and redistribution of ocean currents/surges will inherently mitigate these erosion cycles.

The benefits to our community is 1) a sustainable marine ecosystem-to- a food-rich economy, 2) protection for property owners and investors, 3) the establishing of a sustainable habitat for visitors, educators, residents, and businesses.

Mahalo.

Foster Ampong
Email: Kekahunakeaweiwi@yahoo.com
Phone: (808) 281-3894

Taylor Chock

From: Kekahuna Keaweiwi <kekahunakeaweiwi@yahoo.com>
Sent: Sunday, April 7, 2019 9:20 PM
To: Kahana Bay Comments
Subject: RE: Kahana Bay Erosion Mitigation Project - Deadline for SubmittingWritten Comments
Attachments: Kahana Bay - Testimony7Apr2019.pdf

Aloha Taylor,

I am submitting (attached pdf file) my written testimony - My mailing address is:

Foster Ampong
58 Ho'ola Hou Street.
Wailuku, HI 96793

Mahalo
Foster

Sent from Mail for Windows 10

From: Kahana Bay Comments
Sent: Friday, March 29, 2019 12:19 PM
To: Kekahuna Keaweiwi; Kahana Bay Comments
Subject: RE: Kahana Bay Erosion Mitigation Project - Deadline for SubmittingWritten Comments

Aloha Foster,

The deadline for submitting comments is April 8, 2019. If you send your comments via email, please include a physical address to which we can send a hard copy response. We look forward to hearing from you.

Mahalo,
Taylor

From: Kekahuna Keaweiwi <kekahunakeaweiwi@yahoo.com>
Sent: Thursday, March 28, 2019 8:02 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Kahana Bay Erosion Mitigation Project - Deadline for Submitting Written Comments

To Whom This Concerns - Aloha

Please, when is the deadline for submitting written comments for the Kahana Bay Erosion Mitigation Project?

Mahalo
Foster Ampong

Sent from Mail for Windows 10

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Foster Ampong
58 Ho'ola Hou Street
Wailuku, HI 96793

Dear Mr. Ampong:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated April 5, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include impacts to marine resources, fish and wildlife, developing long-term solutions, and restoring the reef ecosystem. An extensive marine biological resources study was conducted in June 2019 in and around the proposed dredging, possible construction sand transport routes, and in the nearshore beach stabilization structure areas to quantify existing marine biological resources such as coral, fish, and algal abundance and density in the project area and to determine if any effects from the proposed action would impact biological habitat. Discussion of potential impacts and mitigation measures are included in Section 3.3.3 of the DEIS and the marine benthic study is included in full as an appendix to the document. Results from the benthic surveys and EFH assessment will be made publicly available in the Draft EIS.

Sand stabilization structures, such as groins and breakwaters, can be designed so that the submerged portion acts as an artificial reef, providing habitat and substrate for fish and sessile organisms. In some cases, stabilization structures that are thoughtfully designed into reefs can actually enhance marine habitat by providing niches and interspaces for fish and invertebrates.

Options to incorporate these types of "living" elements into the design will be discussed in Section 2 of the DEIS and will be explored through the EIS process.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Brooke Barrett
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Cc: Kevin Blair (AOAO bd president)
Subject: [External] Re: Public Comment re: Kahana Beach EIS
Date: Wednesday, August 21, 2019 5:20:47 PM

Aloha and Good Evening,

We are writing in regards to the request for comment on the EIS.

At this time, as owners at 4299 Lower Honoapiilani Rd. #456, Lahaina, Hawai'i 96761, we cannot endorse the EIS as we have not been given sufficient notice to review the 157 page document provided to us earlier today.

We, again, reiterate our desire to be good stewards of the bay and for the committee to engage in transparent and authentic engagement with the community on the next steps regarding this important natural resource. Our previous comments follow this one, in the email, below.

Given the lack of notice and the anticipated increase of the project to as much as $20m, we are deeply concerned that our requests for transparency and engagement are being disregarded. I know that there has been much debate on how to proceed, and it appears that a single approach which was favored in the beginning of these discussions has already been decided. I'm not clear as to how or whom is making these decisions.

Furthermore, is appears that this is being conducted as a private effort making decisions about public lands. If that is the case, we cannot support it.

We remain committed to finding a solution that incorporates and includes all of the members of the West Maui community.

Sincerely,
Ken & Brooke Barrett

On Thu, Aug 1, 2019, 3:45 PM Brooke Barrett <hawaiianhaven@gmail.com> wrote:

> Aloha,
>
> We own a home at Sands of Kahana: 4299 Lower Honoapiilani Road, #456, Lahaina, Hawai'i, 96761. We are writing today to put on record our concerns and desire to be good stewards of Kahana Bay.
>
> First and foremost, as owners who front the bay and Kahana beach, we take pride and a degree of responsibility for ensuring that the beach and bay remain healthy and available to the community.
>
> However, we are unfamiliar with the on-going activities that are acting in our name as owners under the guise of the Kahana Bay Steering Committee. Our condo board at the Sands of Kahana is questionable at best in terms of how it operates from a legal standpoint and rarely communicates with owners, even when prompted. Given that their engagement of

owners is so poor and the overall lack of transparency regarding this steering committee, we also question to what extent the greater Maui community has been meaningfully engaged in this effort.

Furthermore, while we fully support contributing resources to this effort, the beach and bay are public assets. As such, we do not feel that only owners of properties immediately adjacent to the beach should have to fully fund the efforts to restore and maintain it. Whether we contribute 50% or some other proportion of the overall cost, we believe that the cost should be shared, just as the solutions should be made collaboratively with the entire community.

Given that we make quarterly lease payments to the leaseholder of the land, as well as pay significant property taxes given the beachfront value of our home, we already make significant financial investments into our home and the community. We believe that the responsibility of the leaseholder and the local/state/federal government should all be factored into the cost-sharing of the solutions.

We are following these developments as best as we can and remain eager to be a part of the solution. We thank you for your work on behalf of the Bay and community and for your consideration of our comments.

Mahalo,
Brooke and Ken Barrett

From: Brooke Barrett
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: Public Comment re: Kahana Beach
Date: Thursday, August 1, 2019 10:46:08 AM

Aloha,

We own a home at Sands of Kahana: 4299 Lower Honoapiilani Road, #456, Lahaina, Hawai'i, 96761. We are writing today to put on record our concerns and desire to be good stewards of Kahana Bay.

First and foremost, as owners who front the bay and Kahana beach, we take pride and a degree of responsibility for ensuring that the beach and bay remain healthy and available to the community.

However, we are unfamiliar with the on-going activities that are acting in our name as owners under the guise of the Kahana Bay Steering Committee. Our condo board at the Sands of Kahana is questionable at best in terms of how it operates from a legal standpoint and rarely communicates with owners, even when prompted. Given that their engagement of owners is so poor and the overall lack of transparency regarding this steering committee, we also question to what extent the greater Maui community has been meaningfully engaged in this effort.

Furthermore, while we fully support contributing resources to this effort, the beach and bay are public assets. As such, we do not feel that only owners of properties immediately adjacent to the beach should have to fully fund the efforts to restore and maintain it. Whether we contribute 50% or some other proportion of the overall cost, we believe that the cost should be shared, just as the solutions should be made collaboratively with the entire community.

Given that we make quarterly lease payments to the leaseholder of the land, as well as pay significant property taxes given the beachfront value of our home, we already make significant financial investments into our home and the community. We believe that the responsibility of the leaseholder and the local/state/federal government should all be factored into the cost-sharing of the solutions.

We are following these developments as best as we can and remain eager to be a part of the solution. We thank you for your work on behalf of the Bay and community and for your consideration of our comments.

Mahalo,
Brooke and Ken Barrett

February 13, 2020

Ken and Brooke Barrett
4299 Lower Honoapiʻilani Road, Unit #456
Lahaina, HI 96761

Dear Mr. And Mrs. Barrett:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated August 1, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments will be included in an appendix of the Draft EIS. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concern related to communication thus far on project activities and related decision-making. We clarify that Oceanit is retained by the Kahana Bay Steering Committee (KBSC), a collaboration of individuals from each condominium. We understand that KBSC is acting on behalf of the condominium owners that are directly affected by the project. Oceanit suggests reaching out to the KBSC member associated with your condominium, as we are not involved in how the KBSC disseminates information to its apartment owners.

You can be assured that, in addition to working closely with KBSC, we are conducting extensive public outreach to local kupuna, surfers, landowners, and other stakeholders as part of the environmental review process. Additionally, more public outreach and public meeting events will be convened, and we hope you can attend. The insight gleaned from these interviews and public meeting events will be incorporated and summarized in Section 6 of the DEIS.

We appreciate your input and insight to help develop prudent actions for Kahana Beach and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Rajeev Vachani
To:	askthemayor@mauicounty.gov; Sam.j.lemmo@hawaii.gov; dlnr@hawaii.gov; tegarden@mauicounty.gov; Kahana Bay Comments; mayors.office@co.maui.hi.us
Cc:	76sokco@gmail.com; Pat Sullivan; Bob_Allen; cgudde; cvetka; cvetka; cynthia; d4outpost; hipcatt2002; ebarker; Marc Nelson SoKco; finchgreg Finch; Gary Guardino; gratefull14; howardoweissman; jallen; gtichy; Jeannette_Allen; John Alpine; kennithompson; kerrymcfadden1; Kevin Blair AOAO bd president; kkriem; Lisa Alpine; MARIE - TERRY SCHROEDER; mauieast; mauisnj; marylynnpinto; mike; mmarranzino1; mycpa; Rajeev Vachani; rchavez; robbayer; rorynpaulq; s_Martin__owners_SOK__Martin; samvmiller; stonegarden Smith; Tim_Ella_Adams___382_; Timothy C O"Connor; Wayne Cober; alanfox2@rogers.com; alyterri@gmail.com; e-thoma@sbcglobal.net; ebarker@capitalbenefitservices.com; jbond@vinson.la; kahana134@gmail.com; mfhendrick@aol.com; miguel@pierpoint.com; samvmiller90@gmail.com; EllaAdams; torchy@fastmail.com; wvinzant; SOK Front Desk; Charmaine Dyson; Rowena Pinheiro; SOK Front Desk; Randy Balmores; Heidi Berlyn
Subject:	[External] URGENT HELP NEEDED - Kahana Bay Erosion Has Reached An Emergency Situation
Date:	Thursday, August 22, 2019 10:00:00 AM
Attachments:	image.png image.png image.png image.png image.png image.png

TO:

Mayor: Michael Victorino
Chairman Of Department of Land and Natural Resources: Suzanne Case
Office of Conservation and Costal Lands: Sam Lemmo

Our community urgently needs your help!

I am an owner of a condo at the Sands of Kahana, in Kahana, Maui. I would like to urge the Department of Land and Natural Resources to take urgent action to mitigate and resolve the extreme beach erosion, and property damage, taking place in Kahana, and to approve the Kahana Bay Erosion Mitigation project proposed by the Kahana Bay Steering Committee (KBSC). **The erosion has become an emergency situation and has been causing significant damage to the beaches, property grounds, and condos mentioned in the proposal by KBSC.**

Every year each condo that is rented to tourists pays approximate $20,000 in General Excise Taxes, Transient Accommodation Taxes, and Property Taxes. This amounts to millions of dollars in revenue for the City, County and State. In addition these properties provide 1000s of jobs to the local community. The erosion has reached an emergency situation and and continues to degrade the property values, property taxes, tourist revenue, and jobs. We urgently request the state to take all necessary measures immediately to nourish the beaches with transported sand so we can continue to provide vacation experiences to the tourism community that we depend on for the revenues and jobs. It is also critical that more permanent measures are taken by constructing the necessary structures to retain the nourished beaches and reduce the impact of swells.

THE SITUATION IS EXTREMELY DIRE AND URGENT AND WE URGE YOU TO EXPEDITE THE ACTION NEEDED TO RESOLVE THIS AS SOON AS WE CAN.

Mahalo for your urgent help.
Rajeev Vachani

==

BELOW ARE SOME PICTURES OF THE EXTENSIVE DAMAGE WE ARE EXPERIENCING.

THE WAVES ARE ENTERING CONDOS CAUSING $1000'S IN DAMAGE:

OCEAN ENTERING THE GROUNDS - BEACH ENGULFED:

NUMEROUS TREES CONTINUE TO BE CONSUMED BY THE SWELLS:

NOT JUST THE BEACH, BUT THE PROPERTY GROUNDS ARE BEING ERODED:

PROPERTIES ARE BEING FORCED TO CONTINUOUSLY RETREAT THEIR FENCED BOUNDARIES AS THE SWELLS REDUCE AND ERODE PROPERTY LINES EVERY DAY!

EXISTING BEACHES HAVE BEEN DECIMATED / BEACH EXPERIENCES HAVE BEEN RUINED:

From: Kelly Robinson
To: Kahana Bay Comments
Subject: Robinson - Kahana multi generation residents
Date: Sunday, August 4, 2019 10:30:16 AM

My name is Kelly Robinson. Born & raised in Kahana, I still reside on the family property at 4695 Lower Honoapiilani Road. Named “Kalaeokai’a,” (literal translation, *point of fish*) for its abundant food source, is located in the ahupua’a of Mailepai has been in my family for 4 generations. My great-grandmother, Yu Yen Choi acquired it while serving as a school teacher at the Honokahua Plantation. Honokahua Plantation is known today as, Kapalua and is renowned as a luxury resort with million dollar residences.

In 2009, after many attempts resolve family issues regarding the property (stay *versus* sell), we ended up in court. Judge Loo ruled on our case & ordered us to proceed with subdividing the 2.4 acre property. Almost 10 years later, we are still going through the process, working with the County of Maui to subdivide.

I am writing to you today to e-voice my support for the Kahana Bay Sand Nourishment project. In fact, I am hopeful there will be a way to include our property in this project - or at least in a "phase 2" that again, I am hoping will occur.

I see it as very basic:

1) Beach Nourishment has proven successful in other parts of the world

2) The State of Hawaii allows Waikiki to do it (mostly paid for by Kyoya, i think - and could that have something to do with their approval?!). Why wouldn't they allow this project to proceed? Furthermore, this project has a better plan & focus on infrastructure as compared to Waikiki.

3) Let's talk about an environmental impact...... Option 1 - beach nourishment (as opposed to hardening the shoreline). Option 2 - a 12 story building falling into the ocean. Hmmm...that's thousands of tons of concrete, toilets, pipes, furniture, dishware, etc... now severely affecting our ocean, marine life, corals, etc... Seems a pretty easy choice to me.

Please let me know if I can help in anyway or if you need further comments.

Mahalo,

Kelly Robinson
808-264-7232
Realtor (S)
Moffett Properties LLC

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Kelly Robinson
4695 Lower Honoapiʻilani Road
Lahaina, HI 96761

Dear Ms. Robinson:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the above referenced project following the publication of the EISPN in the July 23, 2019 publication of *The Environmental Notice*. We acknowledge your comments and concerns, and they are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Elaine Baker
To:	Kahana Bay Comments
Subject:	Kahana Bay Erosion Mitigation
Date:	Thursday, August 8, 2019 5:46:42 PM

Hi Michael Foley:
The County of Maui Solid Waste Division has no comments on the Environmental Impact Statement Preparation Notice for the Kahana Bay Erosion Mitigation project. Thank you, Elaine Baker, P.E.

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innovation through engineering & scientific excellence

February 13, 2020

Elaine Baker, P.E.
Solid Waste Division
Department of Environmental Management
County of Maui
2200 Main St., #225
Wailuku, HI 96793

Dear Ms. Baker:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for your letter dated August 8, 2019 acknowledging receipt of the above referenced EISPN following the request for comments published on July 23, 2019 in *The Environmental Notice.* We acknowledge your comments and concerns, which will incorporated in the Draft EIS (DEIS) in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the County of Maui Department of Environmental Management Solid Waste Division has no comments on the EISPN. We appreciate your response and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: [Warren Vinzant]
To: [Kahana Bay Comments]
Subject: Kahana Bay Erosion Mitigation project and EISPN
Date: Saturday, August 10, 2019 5:24:15 AM

Aloha,

I'm writing to express our very strong support for the plans of the The Kahana Bay Steering Committee and Maui County Planning Department for the Kahana Bay Erosion Mitigation Project, to reverse the rapid and dangerous beach erosion in Kahana Bay as described in the EISPN. My wife and I are residents of the Sands of Kahana. We have watched beach after beach disappear in west Maui. Kahana Bay will be the next beach to disappear without your help. Kahana Bay beach erosion is also threatening a number of buildings. If allowed to continue, the homes of many people will be lost. It could take just one more large storm.

Something needs to be done and soon! The Sands of Kahana and other at-risk shoreline properties at Kahana Bay represent the personal and financial interests of many Maui residents. Many other Maui residents regularly enjoy the beach from S-turns north. The nine (9) condominium properties, plus one residential property pump tens of millions of dollars a year into the Maui economy. It is not just the many homes at risk. It is not just the more than $10 million in annual tax revenue that is at risk. It is also the livelihood of hundreds of other Maui residents whose jobs directly depend on these properties, and many others (such as contractors and local shops) who also benefit.

We encourage the expedited approval of the EISPN. We understand it will take financial resources to make this project happen. My wife and I also support establishing a Community Facilities Districts (CFD) as part of the total funding package. Please keep in mind the financial contribution that this area makes to Maui County as a whole, and the human cost of not addressing this problem. My wife and I sincerely appreciate your attention to our concerns, and look forward to your assistance in saving the Kahana Bay shoreline, environment, and properties.

Mahalo,
Warren and Tracy Vinzant
4299 Lower Honoapiilani Road, #243
Lahaina, HI 96761

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Warren and Tracy Vinzant
4299 Lower Honoapiʻilani Road, Unit #243
Lahaina, HI 96761

Dear Mr. and Mrs. Vinzant:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009.

Thank you for participating in the scoping process and for your letters dated April 8, 2019 and August 10, 2019 in regard to the Kahana Bay Erosion Mitigation Project. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We appreciate your input and look forward to your continued involvement in the environmental review process.

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Standard Comments for Land Use Reviews
Clean Air Branch
Hawaii State Department of Health

If your proposed project:

Requires an Air Pollution Control Permit

You must obtain an air pollution control permit from the Clean Air Branch and comply with all applicable conditions and requirements. If you do not know if you need an air pollution control permit, please contact the Permitting Section of the Clean Air Branch.

s

Includes construction or demolition activities that involve asbestos

You must contact the Asbestos Abatement Office in the Indoor and Radiological Health Branch.

Has the potential to generate fugitive dust

You must control the generation of all airborne, visible fugitive dust. Note that construction activities that occur near to existing residences, business, public areas and major thoroughfares exacerbate potential dust concerns. It is recommended that a dust control management plan be developed which identifies and mitigates all activities that may generate airborne, visible fugitive dust. The plan, which does *not* require Department of Health approval, should help you recognize and minimize potential airborne, visible fugitive dust problems.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance complaints.

You should provide reasonable measures to control airborne, visible fugitive dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing airborne, visible fugitive dust from shoulders and access roads;
e) Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

If you have questions about fugitive dust, please contact the Enforcement Section of the Clean Air Branch

Clean Air Branch (808) 586-4200 cab@doh.hawaii.gov	Indoor Radiological Health Branch (808) 586-4700

April 1, 2019

From: Cab General
To: Lemmo, Sam J; Kahana Bay Comments
Subject: Comments on 2nd EIS Preparation Notice for Kahana Bay Erosion Mitigation Project
Date: Monday, August 12, 2019 10:40:42 AM

Hi

Thank you for the opportunity to provide comments on the subject project.
Please see our standard comments at:
https://health.hawaii.gov/cab/files/2019/04/Standard-Comments-Clean-Air-Branch-2019.pdf

Please let me know if you have any questions.

Barry Ching
Clean Air Branch
Hawaii Department of Health
(808) 586-4200

oceanit
innovation through engineering & scientific excellence

February 13, 2020

State of Hawai'i Department of Health – Clean Air Branch
2827 Waimano Home Rd., Room 130
Pearl City, HI 96782

ATTN: Mr. Barry Ching

Dear Mr. Ching:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 12, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments will be included in an appendix of the Draft EIS. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

Thank you for the resources for mitigation measures to ensure air quality. Your suggestions to mitigate these impacts will be included in Section 3.1.5 of the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Stuart Goldberg - NOAA Federal
To:	Kahana Bay Comments; Taylor Chock
Cc:	Gerry Davis - NOAA Federal; Malia Chow - NOAA Federal; Ian Lundgren - NOAA Affiliate; Anne Chung - NOAA Affiliate
Subject:	[External] Re: Environmental Impact Statement Preparation Notice - Kahana Bay Erosion Mitigation Pre-Consultation
Date:	Wednesday, August 14, 2019 12:38:25 PM

Aloha,

The National Marine Fisheries Service, Pacific Islands Regional Office (PIRO) received your request for comments and technical assistance on the Environmental Impact Statement Preparation Notice (EISPN), Kahana Bay Erosion Mitigation (hereafter, EISPN) on July 23, 2019. Our technical assistance is provided below and is intended to help you comply with the essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; Section 305(b)(2) as described by 50 CFR 600.920), which will be required as part of the U.S. Army Corps of Engineers, Honolulu District, Regulatory Branch's (hereafter, USACE; CC'd here) permitting process. This technical assistance does not fulfill any federal responsibilities and does not constitute an EFH consultation. In addition to being the federal regulatory agency responsible for implementing the MSA, PIRO oversees consultations for compliance with the Endangered Species Act (ESA) and other statutory mandates. Compliance with the EFH provisions of the MSA can also be achieved through pursuance to the Fish and Wildlife Coordination Act (FWCA, 16 U.S.C. 661-666c). For all questions related to consultations with us in the future, please contact us through the email address EFHESAconsult@noaa.gov.

The Kahana Bay Steering Committee's EISPN proposes beach nourishment and installation of T-groins to mitigate erosion near private property along Kahana Bay, Island of Maui, Hawaiʻi. Kahana Beach is approximately 3,500-feet (ft) long and bounded by a submerged fringing reef and nine condominium complexes landward. Kahana Bay has undergone chronic and episodic coastal erosion leading to shoreline recession, beach narrowing, and a reduction in coastal access; coastal infrastructure, buildings, and amenities are at increased risk from sea level rise and natural hazards. The preferred alternative proposes nourishing the beach with 50,000-100,000 cubic yards of sand dredged and transported from offshore borrow areas, and retaining this sand T-head groin stabilization structures. The beach project would widen the beach by 35-150 ft and provide enhanced buffering against erosion. The project would require extensive in-water and land-based construction activities using heavy construction equipment (e.g., dredges, barges, dump trucks, excavators, underwater pumps, submerged polyvinylchloride piping, etc) and installing avoidance and minimization control measures (e.g., berms, turbidity curtains, dewatering stations, sand drainage basins, etc.). Beach sand for nourishing would be dredged (e.g., by mechanical or suction) from offshore borrow stations along Kahana Bay and either piped or transported back to shore by barge. Sand offloading by barge may require installing temporary trestles and secondary transfer to dump trucks for subsequent unloading.

PIRO Habitat Mandates
Magnuson Stevens Fishery Conservation and Management Act
A consultation with NMFS is required when a federal agency works in an area that will adversely affect EFH (i.e. the federal agency is directly conducting the work, funding work, or permitting work) (Section 305(b)(2) as described by 50 CFR 600.920). The EFH consultation process entails the federal action agency contacting NMFS and providing an EFH assessment

(EFHA), which contains key information: a description of the proposed action, a determination from the federal agency as to how the action will affect EFH, an assessment of those adverse effects, and proposed ways to mitigate for the adverse effects, if applicable. An adverse effect to EFH is anything that reduces the quality and or quality of EFH. It may include direct, indirect, and site specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of an action. NMFS will then review the EFHA and may provide conservation recommendations to avoid, minimize, offset for or otherwise mitigate expected adverse effects.

EFH consultations are scalable and commensurate to the severity and type of adverse effects to EFH. The greater the adverse effect, the greater the scrutiny in making a determination. As the order of effect increases, qualitative, semi-quantitative, and quantitative EFH Assessments are appropriate, sequentially. Often, once EFH resources need to be quantified, PIRO is likely to request an "expanded" EFH consultation as opposed to "abbreviated" (50 CFR 600.920(h)(i)), unless sufficient quantification of unavoidable losses has been provided. Although we have provided you with our most recent EFH Draft Consultation Guidance document to assist with the EFH consultation process, below we provide detail specific to your proposal that should be included within the EFHA for this beach nourishment consultation.

In the main Hawaiian Islands, EFH has been designated in the marine water column from the surface to a depth of 1,000 meters (m), from the shoreline to the outer boundary of the Exclusive Economic Zone (5,150 kilometers/200 nautical miles/230 miles), and the seafloor from the shoreline out to a depth of 700 m. These waters and submerged lands are designated as EFH because they support various life stages for the management unit species (MUS) identified under the Western Pacific Regional Fishery Management Council's, Pelagic and Hawaiʻi Archipelago Fishery Ecosystem Plan (hereafter, Hawaiʻi FEP). The MUS and life stages found in these waters include: eggs, larvae, juveniles, and adults of Bottomfish MUS; eggs, larvae, juveniles, and adults of Crustacean MUS; and eggs, larvae, juveniles, and adults of Pelagic MUS. Specific types of habitat considered as EFH include coral reefs, patch reefs, hard substrate, seagrass beds, soft substrate, artificial or man-made structures, mangrove, lagoon, estuarine, surge zone, deep-slope terraces and pelagic/open ocean.

For clarity, federal agencies may incorporate the EFHA into documents prepared for other purposes, such as Endangered Species Act Biological Assessments, National Environmental Policy Act documents, or public notices. If an EFHA is contained in another document, it must still include all of the mandatory contents as per the EFH guidelines. It must also be clearly identified in the table of contents and text of the document as an EFHA. Alternatively, an EFHA may incorporate by reference other relevant environmental assessment documents that have already been completed. The referenced document must be provided to NMFS with the EFHA.

The EFHA process can also be combined with existing environmental consultation and review processes. The EFH guidelines at 50 CFR 600.920(f) enable Federal action agencies to use existing consultation or environmental review procedures to satisfy the MSA consultation requirements if the procedures meet the following criteria: 1) the existing process must provide NMFS with timely notification of actions that may adversely affect EFH; 2) notification must include an assessment of the proposed action's impacts on EFH that meet the requirements for EFHA discussed in section 600.920(e); and 3) NMFS must have made a finding pursuant to section 600.920(f)(3) that the existing process satisfies the requirements of section 305(b)(2) of the MSA. For the purposes of this beach nourishment proposed action, the EFHA should be integrated with the FWCA (see below) coordination process. In situations where a Federal action may adversely affect designated EFH for Federally managed fisheries, EFH Conservation Recommendations can be considered within the FWCA reporting recommendations.

Fish and Wildlife Coordination Act
The FWCA (16 U.S.C. 661-666c) mandates that wildlife, including fish, receive equal consideration and be coordinated with other aspects of water resource development. This is accomplished through consultation with NMFS, the U.S. Fish and Wildlife Service (USFWS), and appropriate state agencies whenever any body of water is proposed to be modified in any way and a Federal permit or license is required. These agencies determine the possible harm to fish and wildlife resources, the measures needed to both prevent the damage to and loss of these resources, and the measures needed to develop and improve the resources, in connection with water resource development. NMFS, the USFWS, and state agencies submit comments to Federal licensing and permitting agencies on the potential harm to living marine resources caused by the proposed water development project, and recommendations to prevent harm (NMFS 2004). In all, the FWCA compliance process includes the following four steps: consultation (notice of initiation); reporting (e.g., field surveys and summary reports) and recommendations to protect, mitigate, and restore natural resources; Action agency consideration of recommendations, and Action agency implementation of recommendations.

NMFS Concerns
NMFS appreciates the need to manage coastal erosion in using hybrid "soft" and "hard" approaches, including beach nourishment with T-groin stabilization. We are concerned that there are a variety of adverse effects from stressors on EFH that have not been fully considered in the EISPN. Short-term, long-term to permanent, and cumulative adverse effects to EFH are likely to occur from the preferred alternative due to physical damage, sedimentation and turbidity, and nutrients and chemical contamination.

Stressor Effects
Physical Damage: Direct contact to habitat forming EFH resources (e.g., corals and submerged aquatic vegetation) from construction equipment and materials, as well as from installation activities, can lead to permanent and lesser adverse effects. The level of these adverse effects (i.e., short-term, long-term to permanent, and cumulative) will depend on the density and extent of EFH resources present and the dredge and/or sediment retention designs that are chosen. For example, the 2012 Waikiki Beach Nourishment and Dredging Project resulted in physical damage to the fossil limestone reef rock bordering sand borrow areas that were dredged. In addition, recent projects in Waikiki have chosen to use a geotextile material to construct a sandbag groin. If such material is chosen for the T-groins in the preferred action, the long-term durability of this material is currently unknown and therefore carries a possibility of becoming compromised and potentially posing a risk to surrounding EFH. Due to this stressor, a variety of measures to avoid and minimize physical damage to EFH may be needed to reduce unavoidable losses. Overall, steps should be taken during dredging and sand transport to avoid and minimize physical damage to corals and submerged aquatic vegetation. Sand pipes and pathways, dredging equipment, and turbidity control measures should consider wave energy and provide appreciable buffer space between construction equipment and nearby EFH resources.

Sedimentation and Turbidity: Enhanced sedimentation and turbidity may occur from: mechanical and suction dredging at borrow areas (e.g., pump heads causing re-distribution and settlement of fine sediment), land-based beach filling activities, after-the-fact leaching of micritic calcium carbonate from beach fill, and sediment resuspension from groins if they alter local hydrodynamics.

Nutrients and Chemical Contamination: Adverse effects may occur during dredging from borrow areas and after beach fill is placed due to release of sediment-bound nutrients and chemical contaminants. The latter may also occur from leaking construction equipment and introduction of treated materials into the marine environment, including lumber during multiple types of beach restoration projects.

EFH Assessment Content

An EFHA should be included for the upcoming EFH consultation, and specific content should be considered for inclusion to inform an EFH determination and the EFH effects analysis. Before you initiate the USACE permit application process, we recommend that you complete quantitative marine resource survey assessments (see our April 30, 2019 technical assistance email), new sediment modeling, and robust sediment testing; in addition, we recommend that your water quality monitoring plan include assessments before (e.g., baseline), during, and after construction activities (see below). The EFHA should consider the full suite of potential stressors to habitat forming EFH. Below we provide details related to these concerns and guidance on how these issues can be resolved through continued early coordination. In addition, we provide an Enclosure at the end of this letter with specific avoidance and minimization measures that would be applicable to the preferred alternative.

Quantitative Resource Survey Assessments

We provided technical assistance and guidance on conducting quantitative resource survey assessments on April 30, 2019; a brief summary follows. We recommend that you conduct preliminary, quantitative benthic marine survey assessments of the entire project footprint area within the littoral cell—hard and soft bottom, groin footprints, between groins, offshore of the groins, where sediment models predict deposition (see below), along or nearby sand pipeline pathways, and nearby the sand borrow areas—before an EFH consultation is initiated. The level of complexity of surveys will scale proportionally with the extent of habitat forming EFH resources (e.g., corals and submerged aquatic vegetation) that may suffer adverse effects (i.e., direct, indirect, and cumulative). Contingencies should be designed to accommodate analyses that require greater replication and higher statistical power to avoid the need to obtain higher resolution data. Hard-bottom and areas with habitat forming EFH should be prioritized over soft bottom substrate, though it will be important to characterize the latter. Post-action monitoring plans would reduce uncertainty during potential EFH offset determinations. Completing the survey work and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any potential offset determinations for unavoidable loss. NMFS is ready and willing to provide assistance to further refine and clarify the types and complexity of survey information that will be needed.

Sediment Modeling

Sediment modeling will be needed to predict how the preferred alternative may adversely affect EFH substrate (e.g., hard and soft bottom), habitat forming EFH (e.g., corals and submerged aquatic vegetation), and water column EFH. Modeling should consider how T-groins may alter sediment deposition. We are particularly concerned about redistribution and settling of fine sediment (e.g., 3000-6000 cubic yards), including limestone mud (i.e., microcrystalline calcium carbonate <4 microns in diameter) that may leach from beach fill and smother habitat forming EFH that may be nearby. The modelling effort should include and consider the following areas: the groin footprints, between the groins, offshore of the groins, along or nearby sand pipeline pathways, and nearby the sand borrow areas. If there is a high probability that sediment deposition will occur over sensitive and hard-to-replace hard-bottom habitat, corals, and submerged aquatic vegetation, these areas should be prioritized survey areas both before and after construction. Completing the modelling effort and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any offset determinations.

Sediment Testing

Sediment testing should be robust and specific. Information about sediment chemistry, nutrient content, and other chemical characterization should be considered for both bulk samples (i.e., all size fractions) and within each size fraction or sediment class (e.g., mud, silt, fine sand, sand, etc.). This would be helpful because smaller size fractions that include silt and mud classes typically retain higher organic carbon content and are more detrimental to habitat forming EFH than those sediment types with larger sizes. This information should also be considered for inclusion in the Draft EIS and EFHA to inform conservation recommendations and potential offset determinations. Completing the sediment testing effort and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any offset determinations.

Water Quality Monitoring

Robust water quality monitoring (e.g., turbidity, sedimentation rates, nutrients, dissolved oxygen, etc.) would be helpful to assess conditions before (i.e., baseline), during, and after beach restoration activities. These activities should be informed by the sediment modeling and daily tide and current velocity predictions (https://www.pacioos.hawaii.edu/voyager/) to select sampling locations. Special attention and consideration should be placed on collecting turbidity and sedimentation rate information at areas where there are habitat forming EFH resources, including corals and submerged aquatic vegetation. For other criteria needed for beach restoration projects, NMFS would defer to the requirements of the Environmental Protection Agency (EPA) delegated through the state of Hawaiʻi, Department of Health, Clean Water Branch's (DOH), 401 Water Quality Certification (WQC), Applicable Monitoring and Assessment Plans (AMAP). Completing the water quality monitoring planning effort and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any offset determinations.

Summary

We greatly appreciate your early EFH coordination and the opportunity to provide comments on your EISPN. In summary, we expect that the proposed beach nourishment project may have short-term, long-term to permanent, and cumulative adverse effects to EFH. Depending on the results from the marine resource survey assessment, sediment modeling, sediment testing, and proposed water quality monitoring, the preferred alternative may result in unavoidable loss of EFH, which would require offset considerations. The prospective EFH consultation led by the USACE would be better informed with an increased level of information and monitoring data, careful evaluation of potential stressor effects to EFH, a post-project resource survey assessment monitoring plan, and quantification of the expected unavoidable loss of EFH resources; these have not yet been so far addressed in the EISPN. We have described the stressor impacts to EFH from the preferred alternative; and have previously provided guidance on the EFH consultation process and mandatory content needed to include in an EFHA. In the Enclosure at the end of this email, we also provide specific avoidance and minimization recommendations by stressor-type.

For all additional questions related to consultations with us (e.g., ESA, EFH, and FWCA) in the future, please contact us through the email address: EFHESAconsult@noaa.gov. For ESA-related topics please also contact Ann Garrett (ann.garrett@noaa.gov) and Ron Dean (ron.dean@noaa.gov); for FWCA contact Steve Kolinski (steve.kolinski@noaa.gov).

Enclosure

Recommended Avoidance and Minimization Measures
Below is a list of avoidance and minimization measures that you could anticipate to include in your Draft EIS potential EFHA during EFH consultation.

Physical Damage

1. Restrict all physical contact with the bottom to unconsolidated sediments devoid of coral and seagrass.
2. Work platforms should be selected based on the following preferential hierarchy:
  a. conduct all work from land;
  b. use a barge with auto-positioning systems where thrusters will not cause increased turbidity;
  c. anchor barges to (1) shoreline infrastructure; (2) nearby existing moorings; (3) anchors or spuds in/on sand only (as possible, have SCUBA divers lay anchors by hand in sand areas).
3. Prior to mobilizing, ensure all construction equipment, ballast, and vessel hulls do not pose a risk of introducing new invasive species and will not increase abundance of those invasive species present at the project location.
4. Minimize physical contact by divers and construction related tools, equipment, and materials with live benthic organisms, regardless of size, especially corals and seagrass.
5. Prevent trash and debris from entering the marine environment through the use of nets or barriers.
6. Relocate infrastructure materials (e.g., riprap, piles, boulders) that are colonized with benthic communities according to an approved relocation plan. Approved plans must ensure corals are moved to adjacent area(s) with similar habitat conditions, onto suitable substrates, using reliable attachment methods, in similar orientations. Monitoring is not required. If infrastructure materials (e.g. riprap, piles, boulders) that are colonized with benthic communities will be removed or destroyed as part of permitted activities, relocate these materials to an appropriate receiving site.
7. Have a qualified marine biologist identify and relocate hard corals that would be otherwise lost to project activities and which can be logistically moved according to an approved relocation plan. Approved plans must ensure corals are moved to adjacent area(s) with similar habitat conditions, onto suitable substrates, using reliable attachment methods, in similar orientations; and corals must be monitored for success (more frequently at the beginning, and for a duration of no less than 2 years). To provide accountability reference corals or a reference reef site should also be monitored concurrently to compare observed changes.
8. Ensure that new structures minimize shading impacts to marine habitats. Incorporate measures that increase the ambient light transmission under structures. Some of these measures include: maximizing the height of the structure and minimizing the width of the structure to decrease shade footprint; grated decking material; using the fewest number of pilings necessary to support the structures to allow light into under-pier areas and minimize impacts to the substrate; and aligning the boardwalk in a north-south orientation for the path of the sun to cross perpendicular to the length of the structure and reduce the duration of shading
9. Perform pre-deployment reconnaissance (e.g., divers, drop cameras) to ensure that all anchors are set on hard or sandy bottom devoid of corals and seagrass and that chosen anchor locations take into consideration damage that could occur from the anchor chain if the vessel swings due to currents or tides.
10. Require a long-term maintenance plan for gear, instrumentation, and equipment to prevent failures that lead to permanent adverse effects to EFH (e.g., vessel groundings).
11. Ensure structures are properly weighted to prevent movement from currents or waves and implement a maintenance plan to ensure integrity over time.
12. Lower utility lines or cables and maneuver the placement in a controlled manner using SCUBA in order to avoid all coral resources, when practicable.
13. Develop a Wave and Storm Contingency Plan for construction materials and equipment.
14. Develop a monitoring plan to consistently assess the condition of groin materials as well as a contingency plan if the condition is endangering EFH.

Sedimentation and Turbidity

1. Conduct intertidal work at low and or slack tide.
2. Conduct work during calm sea states; stop work during high surf, winds, and currents.
3. Perform work outside of the main coral spawning period in summer (May to August) to minimize sedimentation and turbidity effects to coral eggs and larvae in the area. Peak spawning periods vary by species and geography, and are based on best available science.
4. If appropriate, consider using cofferdams to dewater the project impact site.
5. Install sediment, turbidity, and/or pneumatic curtains, and use real-time monitoring (automated or manual) for barges and dredge vessels to detect failure and implement stop-work processes if pre-determined project thresholds are reached (use standards from Clean Water Act 401 water quality certification). In areas of soft sediment, consider partial length turbidity curtains in order to reduce resuspension of sediment during high winds and currents.
6. Use soft and/or natural engineering solutions to maintain/restore natural flow volumes and velocity.
7. Minimize disturbances to stream banks, and place abutments outside of the floodplain whenever possible. Seek to maintain baseline water flow volume and velocity within the system.
8. Utilize environmental clamshell buckets for mechanical dredging.
9. Design the nourishment activities to maintain or replicate natural stream channel and flow conditions to the greatest extent practicable.
10. Revegetate shoreline areas with appropriate native species and fully stabilize disturbed upland areas prior to removing silt fences and erosion prevention measures.

Chemical Contamination

1. Conduct work during the dry season when possible; stop work during storms or heavy rains. Neutralize or treat contaminated sediments and/or waters prior to release from the project site.
2. Inspect all equipment prior to beginning work each day to ensure the equipment is in good working condition, and there are no contaminant (oil, fuel, etc.) leaks.
3. All equipment found to be leaking contaminants must be removed from service until repaired.
4. All fueling or repairs to equipment must be done in a location with the appropriate controls that prevents the introduction of contaminants to marine environment.
5. Prevent discharges of chemicals and other fluids dissimilar from seawater into the water column.
6. Use materials that are nontoxic to aquatic organisms, such as untreated wood, concrete, or

steel (avoid pressure treated lumber).
7. Use diffusers on the end of subtidal discharge pipes to minimize impacts from discharges.
8. Prevent bentonite drilling fluid from contacting live benthic organisms.

On Tue, Jul 30, 2019 at 2:14 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

Mahalo, Stu!

We look forward to NMFS's feedback on the EISPN.

Thank you,

Taylor

Taylor Chock | Resiliency and Sustainability Scientist

Email: **tchock@oceanit.com**

Office: 808.531.3017 x 117 | Direct: 808.954.4117

From: Stuart Goldberg - NOAA Federal <stuart.goldberg@noaa.gov>
Sent: Tuesday, July 30, 2019 10:41 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Re: Environmental Impact Statement Preparation Notice - Kahana Bay Erosion Mitigation Pre-Consultation

Aloha,

NMFS has received your request for comments on this EA. We'll provide any by August 22.

Stu

On Tue, Jul 23, 2019 at 7:04 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha,

On behalf of the Kahana Bay Steering Committee (KBSC), Oceanit respectfully invites comments on the Environmental Impact Statement Preparation Notice (EISPN) as pre-consultation with your agency or office. The EISPN addresses proposed erosion mitigation at the subject properties located at Kahana Bay on the Island of Maui. The EISPN document is available for review in the State Office of Environmental Quality Control (OEQC) *Environmental Notice*, published on July 23, 2019 at: *http://oeqc2.doh.hawaii.gov/EA_EIS_Library/2019-07-23-MA-2nd-EISPN-Kahana-Bay-Erosion-Mitigation.pdf*

The public comment period is 30 days until Thursday, August 22, 2019. Please send any comments to the physical or email addresses below:

Oceanit
c/o Michael Foley
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

E-mail: kahana@oceanit.com

A hard copy letter requesting EISPN comments has also been sent to you. We appreciate your timely review and response to this request, and look forward to hearing from you.

Mahalo,

The Kahana Bay EIS Preparation Team

--

Stuart Goldberg, Ph.D.

EFH Consultation Specialist

NOAA Fisheries, Pacific Islands Regional Office

Habitat Conservation Division

Inouye Regional Center
1845 Wasp Blvd.
Honolulu, HI 96818

--
Stuart Goldberg, Ph.D.
EFH Consultation Specialist

NOAA Fisheries, Pacific Islands Regional Office
Habitat Conservation Division
Inouye Regional Center
1845 Wasp Blvd.
Honolulu, HI 96818

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innovation through engineering & scientific excellence

February 13, 2020

National Marine Fisheries Service (NMFS), Pacific Islands Regional Office (PIRO)
Habitat Conservation Division, Inouye Regional Center
1848 Wasp Blvd.
Honolulu, HI 96818

ATTN: Dr. Stuart Goldberg

Dear Dr. Goldberg:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 14, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments will be included in an appendix of the Draft EIS. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We appreciate your thorough review and note that an Essential Fish Habitat Assessment and consultation with NMFS is required as part of the DEIS in accordance with the Magnuson Stevens Fishery Conservation and Management Act. We are also complying with the Fish and Wildlife Coordination Act compliance process for the project which includes consultation, reporting and recommendations, agency consideration of recommendations, and action agency implementation of recommendations. The following concerns and issues identified by NMFS will be addressed in the Section 3 of the DEIS:

- Stressor effects of physical damage, sedimentation and turbidity, nutrients and chemical contamination (Section 3.1);
- Quantitative resource survey assessment (Section 3.3.4);
- Sediment testing (Section 3.1.4); and
- Water quality (Section 3.1.6).

Thank you for your comments recommending avoidance and minimization measures for physical damage, sedimentation and turbidity, and chemical contamination that was provided. These considerations will be included in their respective sections of the DEIS.

We appreciate your input and guidance to help develop prudent actions for Kahana Beach and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Mahinahina Beach

Association of Apartment Owners

Managed by Hawaiiana Management Company, Ltd.
1305 North Holopono Street Suite 3A
Kihei HI 96753

Department of Land and Natural Resources
State of Hawaii
Samuel Lemmo, Administrator
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, HI 96809-0621

August 18, 2019

Re: Kahana Sand Mitigation

Dear Mr. Lemmo:

I am contacting you to raise our concerns regarding the proposed Kahana Sand Mitigation (the "KSM"). According to the Environmental Impact Statement Preparation Notice for the Kahana Sand Mitigation (the "EISPN"), sand would be dredged potentially from three (3) ocean sites, Sites 18, 19, and 22. Two of the borrow sites, 18 and 19, are adjacent to the specified Kahana Bay area as defined in the study. However, Site 22 sits south of the defined area which terminates at Pohakau Park also known as S Turns. Site 22, which is the closest nearshore site, only approximately 400 ft offshore, is in the Mahinahina/Honokowai area and this proposed site sits are directly makai to four (4) condominium /AOAO properties and three private residences. Most of the information in the EISPN references the impact on properties that surround Kahana Bay. However, the EISPN provides little or no information about the impact the KSM will have on the properties and land closest to where the sand would be removed from proposed Site 22 between street addresses 3875 Lower Honoapiilani Road to 4057 Lower Honoapiilani Road. All of the information in the EISPN references possible effects on properties within the confines of Kahana Bay exclusively. As Site 22 lies south of Kahana Bay it would be prudent for additional information to be required that would address any projected effects to the Mahinahina/Honokowai area due to the sand borrowing including what steps would be taken to minimize those impacts. Like Kahana Bay, the Mahinahina area of West Maui is also a unique area rich with its own assets, including a large and active Hawaiian Sea Turtle population, monk seals, several living reefs just at or near the projected sand borrow site and a host of living and thriving marine animals and benthic communities. The shoreline is a popular fishing spot for locals, opihi picking, and octopus hunting. These activities are weekly common occurrences. It is also known as a very popular snorkeling spot for both locals and visitors and a destination for many of the recreational boats and outrigger canoes that frequently bring visitors to view the turtles. Additionally, the weekly canoe races that start at Canoe Beach go through this area. The area is used widely for ocean recreation as well, with SUP and kite boarding and there is a favorite surf spot just at the edge of Site 22, at the Polynesian Shores and Kuleana properties.

Portions of this area of Mahinahina do occasionally have a seasonal beach. In 2002 / 2003 there was a large sandy beach at this area's shoreline and when a November storm brought in large waves that broke on the offshore reef, the entire beach was washed away within 2 days. This phenomenon has occurred again and again and unfortunately with increasing frequency as stated in the study. At present, there is no beach outside of our property, nor has there been for a few years. In fact, with all of the south swells witnessed this summer in this area, not much sand has been

cc: The Kahana Bay Steering Committee (KBSC)
10 Ho'ohui Rd Suite 201
Lahaina, HI 96761

cc: Oceanit
828 Front Street Mall, Ste. 600
Honolulu, HI 96813

cc: Ed Reder, President Kuleana I

cc: Donald Clary Jr., President Polynesian Shores

cc: Thomas Roberts, President Mahina Surf

cc: Lloyd White Trust

Mahinahina Beach

Association of Apartment Owners
Managed by Hawaiiana Management Company, Ltd.
1305 North Holopono Street Suite 3A
Kihei HI 96753

visible on shore or even in the waves as they often break on shore. When present the beach area, however small, is often a favorite spot for the sea turtles to haul out, rest and warm up. Even now with no sand or very little sand, the rocks on the coastline still serve as a honu respite. Additionally, the EISPN does not address the affects the sand mitigation will or could have on these sea animals in the Site #22. The EISPN only addresses Kahana Bay and that sand removal would stop when an animal is in the affected area. Green sea turtles are in Site 22 almost hourly. There are two (2) green sea turtle pull-outs located on shore next to Site 22 between street addresses 3875 Lower Honoapiilani Road to 4057 Lower Honoapiilani Road. Additionally, green sea turtles pull out at Pohaku Park (S Turns) and from time to time even a monk seal pulls out at S Turns.

Of note, the information presented in the EISPN was collected in 2016. With the storms of the last few winters, are we certain that the ocean floor and sand deposits are still present in the depth and volume noted in the EISPN? The updated studies in 2018 demonstrate sand samples but there do not seem to be any surface samples from Site 22. Will core samples also be collected? Both sand removal methods include, mechanical dredging and/or hydraulic suctioning as well as a need for a barge or barges. At what depth would this barge be able to operate? It seems Site22 might be as shallow as 15 to 20 feet or less. As Site 22 is a distance away from Kahana Bay, what if any construction vehicles may need to access to this area? This is a densely populated area with little public access.

Unlike our Kahana neighbors, we have thus far been fortunate not to have the devastating effects to property and homes that some have endured. We are certainly sympathetic to those who are facing this and applaud the efforts that all engaged in this endeavor of finding solutions to mitigate the erosion problem at Kahana Bay. But it seems as if there is a need to look at the whole picture, and additional information is needed before making a decision. It is now know that shoreline hardening is indeed a bad practice and will most certainly have deleterious effects on adjacent areas. The problem of erosion remains, seawalls just move the problem elsewhere, in a domino like fashion. Frankly, our association is concerned that removal of sand from Site 22, with predicted sea level rise and increasing frequency of storms may now put the shoreline area near Site 22 at risk of erosion such as what has occurred in Kahana Bay. If this occurs, what is then the solution? Do we continue to borrow sand from elsewhere?

We would ask that the authors and consulting experts of this EISPN to address the questions posed in this letter regarding Site 22and the potential untoward effects to the shoreline near it. There is no certainty that removing sand from this area so close to shore will not cause more than a minimal environmental effect. What effects does this proposed borrow site, Site 22, have on the nearshore climate, alongshore currents and will the shoreline be further compromised by this? What direct effects will be on turbidity and sediment transport in the area of Site 22? Will new erosional hot spots now be created? Can the authors of the EISPN estimate the untoward effects on the reef and the benthic community concerning Site 22? What alterations will be made to the wave field by the borrowing of sand from Site 22 and what effects will the Site 22 area of shoreline undergo as a result of possible changes in wave energy? The EISPN states that "50,000 –100,000 cy of sand would be removed from the offshore sand source, altering the bathymetry and disrupting the ecology of the dredged area until it recovers or normalizes ."

cc: The Kahana Bay Steering Committee (KBSC)
10 Ho'ohui Rd Suite 201
Lahaina, HI 96761

cc: Oceanit
828 Front Street Mall, Ste. 600
Honolulu, HI 96813

cc: Ed Reder, President Kuleana I

cc: Donald Clary Jr., President Polynesian Shores

cc: Thomas Roberts, President Mahina Surf

cc: Lloyd White Trust

Mahinahina Beach

Association of Apartment Owners
Managed by Hawaiiana Management Company, Ltd.
1305 North Holopono Street Suite 3A
Kihei HI 96753

We are very concerned about the water turbidity that this project would cause in the area of Site 22. This area is used for recreation by residents as well as visitors. The EISPN does not address the affects or length of time that the turbidity caused by KSM will effect this area of land and ocean (pg. 69). The EISPN does not provide any information regarding any possible deleterious effects of removing the sand from Site 22 will have on coastal properties like ours which abut Site 22. Nor does the EISPN address what effects the KSM's sand removal will have on wave action in the area around Site 22. Dredging sand from Site 22 may change the seafloor morphology, which could alter the wave transformation and result in changes in the wave climate in the Mahinahina/ Honokowai area. If effects on the wave climate extend to nearshore regions makai of our property, the breaking wave characteristics (significant height and peak wave direction), which dictate alongshore sediment transport magnitude and direction, could be altered. These changes in sediment transport processes may alter patterns in erosion in the Mahinahina/Honokowai area. We are concerned that the KSM sand removal will likely change wave action and be a cause for potential flooding. The wave modeling studies in the EISPN were from a property north of Kahana Bay. No wave modeling studies have been completed regarding the Site 22. Nor, is there any information in the EISPN about the time it will take for the sand removal sites to recover or normalize.

Also, [a]ll 19 sampled beaches in West Maui are *"impaired"* and exceed the state standard for allowable amounts of sediment and potentially harmful runoff nutrients in coastal waters, according to data collected by the Hui O Ka Wai Ola program", according to an article published in the Maui News on August 1, 2019. This means the sand being considered for the KSM contains harmful runoff which then will be in close contact with humans.

We are concerned about the noise of this endeavor. We are a residential community and worried that the noise of sand dredging may be a major disturbance.

Since the Site 22 is makai of our property and not the Kahana Bay properties we are very worried about the impact this project will have on our homes. In looking through articles on long term effects on sand borrow sites, it seems there are many unanswered questions and we would hope more was known about this before action is taken. Further, if KSM does occur, what type of monitoring process will be done to assess any untoward effects and how will these issues be handled and by whom? These are just a few of the questions we would like to see answered in order to determine true environmental impacts on all areas involved, in this project, and not just Kahana Bay.

Regards,

Edwina M.G. Graham

Edwina M.G. Graham
President of the Mahinahina Beach Association of Apartment Owners

cc: The Kahana Bay Steering Committee (KBSC)
10 Ho'ohui Rd Suite 201
Lahaina, HI 96761

cc: Oceanit
828 Front Street Mall, Ste. 600
Honolulu, HI 96813

cc: Ed Reder, President Kuleana I

cc: Donald Clary Jr., President Polynesian Shores

cc: Thomas Roberts, President Mahina Surf

cc: Lloyd White Trust

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Ms. Edwina M.G. Graham
Mahinahina Beach Association of Apartment Owners
1305 North Holopono Street Suite 3A
Kihei, HI 96753

Dear Ms. Graham:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN your written comments dated August 18, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments will be included in an appendix of the Draft EIS. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include impacts from dredging the sand source site (i.e., Site 22), impacts to marine resources and rare, threatened, and endangered species, and water quality issues.

Extracting sand from borrow areas to nourish the beach will affect the organisms and within and potentially areas near to the sand source sites. The DEIS is evaluating the amount of impact of the proposed action on the marine resources in and around the sand sources and identifying mitigation measures. Discussion will be presented in Section 3.3.

A specialized marine benthic resources study is being conducted to evaluate impacts of sand dredging on biological resources (Section 3.3.4 of the DEIS) and wave height/current modeling with specialized software is being performed to determine how the effects of sand dredging, if any, would alter currents or waves (Section 3.2.1 of the DEIS). These studies will be included in their entirety as appendices to the DEIS.

A thorough discussion of anticipated impacts to water quality will be included in Section 3.1.6 of the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Oceanit
828 Front Street Mall, Ste. 600
Honolulu, HI 96813

August 18, 2019

Re : Kahana Bay Sand Mitigation

I am writing to give testimony to the EISPN Kahana Bay Erosion Mitigation Project as recently published in local news publications.
Being a full-time owner/ resident here in West Maui for close to 17 years am I am acutely aware of all of the issues that have been directly impacting the beaches, coastline and properties and in particular in Kahana, our neighbors just to the north. I am sympathetic to those who are facing this erosion issue and applaud the efforts of all those engaged in this endeavor of finding solutions to mitigate this issue.

I read with great interest that an abundance of sand was found offshore & it was felt that this sand reserve could potentially serve as a source for a beach replenishment project. I was surprised to see that one of the 'Borrow sites ", # 22 sits outside and to the South of Kahana, while the other two sites are off shore to the proposed beach nourishment project. I also saw that there was extensive information posted about the Kahana area, identifying its resources, beach use, residential uses etc. It did appear fairly complete.

However, one question remains for me as a resident in the Mahinahina area, south of the Kahana project. And that is what are the anticipated effects of removing 50,000 to 100, 000 cy of sand just 400 feet from near shore just off of my neighborhood? Just like Kahana, we also are a community and per the graphs, it appears that site # 22 lies just off shore to 5 Condominiums and 3 private homes which are all makai to this proposed site, and the closest to shore of the other sites identified. Like Kahana Bay, this area of West Maui is also a unique area rich with its own assets and resources including a large and active Hawaiian Sea Turtle population, monk seals and a living reef just at or on projected borrow site #22 which is a host to living and thriving marine animals and benthic communities. The shore area is a popular fishing spot for locals and Opihi picking and Tako hunting is a common occurrence. It is also a very popular snorkeling spot for both locals and visitors and a destination for many of the recreational boats and outrigger canoes that frequently bring visitors to view the turtles. The area is used widely for ocean recreation as well, with SUP and kite boarders and surfers at S Turns and just off shore at the Kuleana property.

Portions of this shoreline area do occasionally have a seasonal or accretionary beach. Back in 2002/2003 there was a large sandy beach out front Mahinahina Beach and when a November storm brought in large waves (and world-famous surfers) that broke at the reef roughly 400 yards off shore, the beach disappeared totally with in 2 days. We have witnessed this several times over these last several years and unfortunately with in increasing frequency, as stated in the document. At present, there is no visible beach here, but a small sandy beach has again accumulated just to our south. In fact, with all of the many south swells we have witnessed here this summer, we have not even seen loose sand in the waves as we once did when they break on shore. Our lava rock coastline seems to be a protector, at least for now.

Unlike our Kahana neighbors to the north we have thus far been fortunate to not have the devastating effects to property and homes that some have endured. And again, am grateful there are dedicated folks looking to mitigate the issue. But I do feel as if I have a responsibility to ask what effects this sand mining via mechanical dredging or hydraulic suctioning will have directly on the near shore and on shore areas from S turns (Pohaku Park) all the way down to Kuleana and perhaps cumulatively even further south ? All of the information in the EISPN references possible effects within the confines of Kahana Bay exclusively as site # 22 lies outside of this study it seems it would be prudent for additional information to be required that would address any projected effects to this area due to sand borrowing in order to minimize those impacts.

I do see included in the document is a statement that says "....50,000 to 100,000 cy of sand would be removed from the offshore sand source, altering the bathymetry and disrupting the ecology of the dredged area until it recovers or normalizes ". Frankly, I did not find this statement very comforting and when I did an on line search I found many scientific articles that discuss beach nourishment, sand borrowing and what I learned is that there are many unanswered questions about near- and long-term effects on sand borrowing. I did not see anything that felt like a guarantee that the nearshore area here would recover to a pre borrowing homeostasis.

It seems just like shoreline hardening was once an acceptable practice, we have learned that it does indeed have deleterious effects on adjacent properties and areas. The problem of erosion remains, the walls just move the problem elsewhere in a domino like fashion. While I agree it's pragmatic to find a workable solution, I ask when this project get completed, are we certain that it will not put another area at risk of developing a similar erosion issue with effects to marine environment, usable beach and properties? Are we certain that removing sand from this area so close to shore will not cause more than a minimal environmental effect, and how is that defined? I have read that barges will be required. At what depth would the barges be allowed to operate? The data in this study appears to have been collected in 2016. And with the frequency of storms over the last few winters are we certain that the ocean floor and sand deposits are still present in depth and volume? Do we specifically know what effects this proposed borrow site pit will have on the nearshore climate, alongshore currents and will the shoreline be further compromised by this? How will changes in turbidity, sediment transport, wave action, and ocean floor changes be observed and expressed? Along with all of the predictions of sea level rising and effects of global climate change with a predicted increase in ambient, oceanic temperatures and increased frequency in storms, is this all factored in?

Who will be monitoring for any untoward effects and how will these issues be handled and by whom? And who will bear these costs?
Before a project of this potential impact is advanced, I would look to the authors, consultants of this study to provide information to these and other questions about environmental impacts to areas outside of Kahana Bay. I do hope we are not looking to solve one problem without creating another.

Thank you for this opportunity to express my concerns.

Respectfully submitted

Nancy Mitchell
4007 L. Honoapiilani Rd, 201
Lahaina, HI 96761

Cc: Kahana Bay Steering Committee

Cc: DLNR

oceanit

innovation through engineering & scientific excellence

February 13, 2020

Nancy Mitchell
4007 Lower Honoapiʻilani Road, Unit #201
Lahaina, HI 96761

Dear Ms. Mitchell:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 18, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments will be included in an appendix of the Draft EIS. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include impacts from dredging the sand source site (i.e., Site 22), impacts to marine resources and rare, threatened, and endangered species, water quality issues, and monitoring. We have taken your comments into consideration in preparing the Draft EIS and offer the following responses to your comments relating to the content of the Draft EIS.

Extracting sand from borrow areas to nourish the beach will affect the organisms and within and potentially areas near to the sand source sites. The DEIS is evaluating the impact of the proposed action on the marine resources in and around the sand sources and is identifying mitigation measures. Discussion is presented in Section 3.3. A specialized marine benthic resources study is being conducted to evaluate impacts of sand dredging on biological resources (Section 3.3.4 of the DEIS) and wave height/current modeling with specialized software is being performed to determine how the effects of sand dredging, if any, would alter currents or waves (Section 3.2.1 of the DEIS). These studies will be included in their entirety as appendices to the DEIS. A thorough discussion of anticipated impacts to water quality will be included in Section 3.1.6 of the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 21, 2019

Oceanit Laboratories Inc.
Attn: Mr. Michael Foley, Ph.D., P.E
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

via email: kahana@oceanit.com

Dear Mr. Foley:

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project** located at Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division and (b) Division of Forestry & Wildlife on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2019 AUG -7 AM 10: 30
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2019

MEMORANDUM

~~TO:~~ FROM

DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

~~FROM:~~ TO Russell Y. Tsuji, Land Administrator

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**

LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: [signature]

Print Name: Carty S. Chang, Chief Engineer

Date: 8/5/19

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Environmental Impact Statement Preparation Notice for the Kahana Bay Erosion Mitigation Project
TMK(s): (2) 4-3-005: Various and (2) 4-3-010: Various
Location: Kahana Bay, Island of Maui
Applicant: Oceanit on behalf of The Kahana Bay Steering Committee

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed: [signature]
CARTY S. CHANG, CHIEF ENGINEER

Date: 8/5/19

oceanit

innovation through engineering & scientific excellence

February 13, 2020

Carty S. Chang, P.E., Chief Engineer
ATTN: Darlene Nakamura
Engineering Division
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Chang,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 5, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We acknowledge your comments regarding compliance with the rules and regulations of the National Flood Insurance Program (NFIP) and Title 44 of the Code of Federal Regulations (CFR) as the project area falls within a high-risk Special Flood Hazard Area. These regulations will be considered when preparing the DEIS, and discussion of flood hazard mitigation of the project will be included in Section 3.2.3 of the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

2050

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2019

RECEIVED
LAND DIVISION
2019 AUG -2 AM 11:05
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

~~TO:~~ From:

DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

~~FROM:~~ To:
Russell Y. Tsuji, Land Administrator

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**

LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

(✓) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:

Print Name: **DAVID G. SMITH, Administrator**

Date: 7/31/19

Attachments
cc: Central Files

oceanit
innovation through engineering & scientific excellence

February 13, 2020

David G. Smith, Administrator
ATTN: Darlene Nakamura
Division of Forestry and Wildlife
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Smith:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated July 31, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the DLNR DFW did not have any comments on the above referenced EISPN.

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer, Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Michael Foley
To:	Taylor Chock; Jeremy Michelson
Subject:	Fwd: [External] FW: Kahana Bay Erosion Mitigation EISPN - Comments
Date:	Wednesday, August 21, 2019 10:23:21 AM
Attachments:	Kahana Bay Sand Mitigation.docx

FYI

Aloha,
Mike

From: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>
Sent: Wednesday, August 21, 2019 8:31:23 AM
To: Michael Foley <mfoley@OCEANIT.COM>
Cc: Habel, Shellie L <shellie.l.habel@hawaii.gov>
Subject: [External] FW: Kahana Bay Erosion Mitigation EISPN - Comments

From: Marq Bresnan <marq.b@osgbilling.com>
Sent: Wednesday, August 21, 2019 8:02 AM
To: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>
Subject: Kahana Bay Erosion Mitigation EISPN - Comments

Dear Mr. Lemmo –

Enclosed please find comments on the proposed Kahana Bay Erosion Mitigation EISPN.

A letter is also being mailed to your office.

Thank you in advance for your review and consideration.

Sincerely,

Marq and Diana Bresnan
4007 Lower Honoapiilani Rd., #107
Lahaina, HI 96761

copying, or other use is strictly prohibited. *

8/20/19

Department of Land and Natural Resources – State of Hawaii

Attn: Samuel Lemmo, Administrator, Office of Conservation and Coastal Lands

PO Box 621

Honolulu, HI 96809-0621

In Re: Kahana Bay Erosion Mitigation EISPN

Dear Mr. Lemmo,

As owners of West Maui shoreline property, we are very concerned about the proposed Kahana Bay Erosion Mitigation project. From the plan documents, it is clear that there are more questions/impacts than there are answers/outcomes. Specifically:

- "Borrow areas" is a complicated concept and most definitely falls under several State and Federal jurisdictions. We believe that sand in the ocean cannot be used for personal or private use. This sand moves continuously and benefits the whole west Maui shoreline. It cannot be sourced to benefit a single entity as there will be numerous downstream consequences.
- Proposed Site 19 and Site 22 are 500 feet and 400 feet offshore, respectively. Both of these areas are very close to the shoreline that provide a delicate marine habitat for reef, fish and a large population of sea turtles. If disturbed, this could potentially be disastrous for the delicate ecosystem this area enjoys.
- As detailed in the Hui O Ka Wai Ola project, all 19 sampled beaches in West Maui are already "impaired" and exceed the state standard for allowable amounts of sediment and turbidity. Potentially moving thousands of cubic yards of sand can only make this matter worse.
- Beach replenishment by using "borrow areas" sand does not provide any guarantees that the erosion problem will be solved. So even if millions of dollars are spent that negatively impact the ecosystem and water quality, the overall outcome may at best be a temporary solution. There must be other ways to save these properties' beach areas without the potentially larger impact on all of west Maui.

In summary, although we understand and empathize with the specific properties that are impacted by beach erosion, we cannot endorse a potential solution that negatively impacts all of west Maui to benefit a single entity.

Sincerely,

Marq and Diana Bresnan

4007 Lower Honoapiilani Rd. #107

Lahaina, HI 96761

Cc: Kahana Bay Steering Committee

Cc: Oceanit

February 13, 2020

Marq and Diana Bresnan
4007 Lower Honoapiilani Rd., #107
Lahaina, HI 96761

Dear Mr. and Mrs. Bresnan:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated August 20, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that your concerns include disruption of sand patterns and movement, impacts to marine habitat and protected turtles, water quality impairment, and project sustainability and longevity. Extracting sand from borrow areas to nourish the beach will potentially affect habitats and organisms in proximity to sand source sites. The DEIS is evaluating the amount of impact of the proposed action on the marine resources in and around the sand sources and identifying mitigation measures. Please refer to Section 3.3.

A specialized marine benthic resources study is being conducted to evaluate impacts of sand dredging on biological resources (Section 3.3.4 of the DEIS) and wave height/current modeling with specialized software is being performed to determine how the effects of sand dredging, if any, would alter currents or waves (Section 3.2.1 of the DEIS). These studies will be included in their entirety as appendices to the DEIS.

A thorough discussion of anticipated impacts to water quality will be included in Section 3.1.6 of the DEIS.

The proposed action is being designed by coastal engineers to withstand projected sea level rise to a specific timeline (e.g., 50 years) and to a protection factor against storm events. Specifics on the design of the proposed action will be described in Chapter 2 of the DEIS. A suite of alternatives to meet project goals and objectives was considered for the Kahana Bay area, and each are discussed and detailed in the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
E-mail: kahana@oceanit.com

August 18, 2019

Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

RE: Kahana Bay Restoration

Extensive studies have been conducted to identify offshore sources for sand which could be transported to restore a sandy beach along Kahana Bay.

Do not these identified sources currently provide an erosion buffer to absorb and dissipate wave energy, thus protecting the shoreline of properties located further south of Kahana Bay.

As a West Maui oceanfront condo resident for 35 years, I have witnessed beaches building and receding naturally responding to seasonal ocean conditions year after year. These offshore sand sources must be left in place to maintain a health ecosystem.

Stop the export of sand from Maui to build more condos on Oahu. Even though a far more costly alternative, use it to restore Kahana Bay beaches.

Mahalo for your time and consideration.

Aloha,

Julie Leis

Julie Leis
4007 Lower Honoapiilani Road #109
Lahaina, HI 96761

Cc: Kahana Bay Steering Committee and DLNR

RECEIVED
AUG 21 2019

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innovation through engineering & scientific excellence

February 13, 2020

Julie Leis
4007 Lower Honoapiʻilani Road #109
Lahaina, HI 96761

Dear Ms. Leis:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated August 18, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

Regarding your comments related to sand source, we clarify that no sand will be exported from Maui to Oʻahu. The project purpose is to develop a sustainable and resilient solution to mitigate the regional erosion along the Kahana Bay shoreline on the island of Maui. The proposed offshore dredged sand will be placed on Kahana Beach in Lahaina. Although offshore sand patches may provide an erosion buffer to an extent, sand on a dry beach provides more direct protection to people and property that reside on shore. Sandy beaches naturally dissipate wave energy and prevent wave run up. Specifics on the proposed action design will be described in Chapter 2 of the Draft EIS.

We appreciate your input look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Debby
To:	Kahana Bay Comments
Subject:	[External] Kahana Bay Erosion Mitigation EIS
Date:	Wednesday, August 21, 2019 4:55:01 PM

We, Mike and Debby Kinsley, are owners at Sands of Kahana, and very much support the EIS study and recommendation by The Kahana Bay Steering Committee to restore sand and protect Kahana Bay from further serious erosion. We support the thoughtful plan of restoring our sand and using proven technology, tested and successful in Oahu, to stabilize the beach.
The two recent South swells that hit our beach just this July have further eroded our coastline and added more risk of endangering buildings two and three at Sands of Kahana.
Please move forward to save Kahana Bay as soon as possible.
Sincerely, Debby and Mike Kinsley
4252474984

Sent from my iPhone

From:	Mike and Debby Kinsley
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Bay Erosion Mitigation EIS
Date:	Thursday, August 22, 2019 11:25:26 AM

26239 NE 34 th street Redmond wa 98053

Sent from my iPhone

> On Aug 22, 2019, at 11:31 AM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Kinsley,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
>
> -----Original Message-----
> From: Debby <gratefull14@yahoo.com>
> Sent: Wednesday, August 21, 2019 4:55 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Kahana Bay Erosion Mitigation EIS
>
> We, Mike and Debby Kinsley, are owners at Sands of Kahana, and very much support the EIS study and recommendation by The Kahana Bay Steering Committee to restore sand and protect Kahana Bay from further serious erosion. We support the thoughtful plan of restoring our sand and using proven technology, tested and successful in Oahu, to stabilize the beach.
> The two recent South swells that hit our beach just this July have further eroded our coastline and added more risk of endangering buildings two and three at Sands of Kahana.
> Please move forward to save Kahana Bay as soon as possible.
> Sincerely, Debby and Mike Kinsley
> 4252474984
>
> Sent from my iPhone

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Debby and Mike Kinsley
26239 NE 34th Street
Redmond, WA 98053

Dear Debby and Mike Kinsley,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Tichy, George J.
To: Kahana Bay Comments
Cc: Sheila Tichy (gjtichy@aol.com); Shannon Tichy; megansticker@gmail.com; Daniel Tichy; Daniel Tichy (dgtichy@aol.com)
Subject: [External] Kahana Bay Erosion Mitigation Project and EIS
Date: Wednesday, August 21, 2019 5:17:33 PM

My wife, Sheila, and I hold the leasehold interest to unit # 234 at the Sands of Kahana. The fee simple interest for that unit is held by our adult children, Shannon Tichy, Megan Seidensticker Tichy and Daniel Tichy. I am writing on behalf of all of us to clearly and emphatically support the Kahana Bay Erosion Mitigation Project.

George J. Tichy II, Attorney At Law
415.433.1940 main 415.743.6608 fax GTichy@littler.com
333 Bush Street, 34th Floor | San Francisco, CA 94104
Littler | littler.com
Employment & Labor Law Solutions Worldwide

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February 13, 2020

George and Sheila Tichy
333 Bush Street, 34th Floor
San Francisco, CA 94104

Dear George and Sheila Tichy,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: David Llewellyn
To: Kahana Bay Comments
Subject: [External] Kahana beach replenishment
Date: Wednesday, August 21, 2019 5:21:03 PM

To whom it may concern,

We need to allow the restoration of the beach shoreline along Kahana beach bay. Without beaches Maui would lose all of it's tourism and without the tourism their would be no economy for the island.

The cost for the replenishment is being levied on the property owners along the shore line so no government funds would be used affecting other interests. Their seems to be plenty of sand off shore (based on the studies) so their would not be an impact on using sand from another shoreline.

Please allow this process to begin and restore a beautiful beach on Maui!

David Llewellyn

From: David Llewellyn
To: Kahana Bay Comments
Subject: RE: [External] Kahana beach replenishment
Date: Thursday, August 22, 2019 9:24:30 AM

Aloha Taylor,

Yes you can mail it to David Llewellyn PO Box 683667 Park City, Utah, 84068

Mahalo,

David

On August 22, 2019 at 12:34 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. Llewellyn,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

February 13, 2020

David Llewellyn
PO Box 683667
Park City, UT 84068

Dear David Llewellyn,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: gary sandler
To: Kahana Bay Comments
Subject: [External] Kahana Bay Erosion Mitigation EIS....in favor
Date: Wednesday, August 21, 2019 7:51:32 PM

Hello, I'm an owner at Sands of Kahana and I'm writing you to let you know I'm in favor of the efforts to save the coast due to erosion. Whatever is necessary (sand bags, large lava rocks, seawall.....) I am in favor of protecting the properties and the grounds (plants/trees).

Sincerely,

Gary Sandler

From:	gsandler2004@yahoo.com
To:	Kahana Bay Comments
Subject:	RE: [External] Kahana Bay Erosion Mitigation EIS....in favor
Date:	Thursday, August 22, 2019 12:47:43 PM

Here you go: 4299 Lower Honopiilani Hwy Lahaina. HI. 96761 #334

Also when not in HI:.

Gary Sandler
3016 Swan Hill Dr
Las Vegas. NV 89134

Thanks

Sent from Yahoo Mail on Android

On Thu, Aug 22, 2019 at 8:34 AM, Kahana Bay Comments
<kahana@oceanit.com> wrote:

> Aloha Mr. Sandler,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> ---
>
> **From:** gary sandler <gsandler2004@yahoo.com>
> **Sent:** Wednesday, August 21, 2019 7:51 PM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana Bay Erosion Mitigation EIS....in favor
>
> Hello, I'm an owner at Sands of Kahana and I'm writing you to let you know I'm in favor of the efforts to save the coast due to erosion. Whatever is necessary (sand bags, large lava rocks, seawall.....) I am in favor of protecting the properties and the grounds (plants/trees).
>
> Sincerely,
>
> Gary Sandler

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February 13, 2020

Gary Sandler
3016 Swan Hill Dr
Las Vegas NV 89134

Dear Gary Sandler,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Martha Sauter
To: Kahana Bay Comments
Subject: [External] Comment
Date: Thursday, August 22, 2019 4:48:58 AM

I strongly approve of your efforts to help save the beaches and stop the Kahana Beach erosion. Thank you. Martha Sauter. /owner of condo 353. Sands of Kahana.

From:	Richard Chavez
To:	Kahana Bay Comments
Cc:	Suzan Chavez; Amelia Chavez; Patrick T. Sullivan
Subject:	[External] Kahana Bay Erosion Mitigation EIS
Date:	Thursday, August 22, 2019 5:31:32 AM

My wife and I are owners of unit 381 at the Sands of Kahana for nearly 20 years and have sadly watched the erosion and loss of beach during this period. We support the Kahana Bay Steering Committee in its efforts to resolve this matter in an equitable manner.

We recognize that the solution to the erosion issue is a costly endeavor and we are willing to contribute our fair share to the resolution of the problem and hope that all participants are willing to do the same for all of our collective benefits.

Sincerely,

Richard & Suzan Chavez
Owner Unit 381, Sands of Kahana
425-301-9875

--

From:	Tracey Novy
To:	Kahana Bay Comments
Subject:	Re: [External] In support of Kahana Bay Erosion EIS
Date:	Thursday, August 22, 2019 10:58:11 AM

Hi Taylor,

Our mailing address is:

Park-Shoreline, Inc.
2960 Greenleaf Dr.
St. Charles, MO 63303

Tracey Novy
Broker
Thoma Novy Properties LLC
Thomanovyproperties@yahoo.com
636-699-9648

On Thursday, August 22, 2019, 1:37 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Ellen and Tracey,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> ---
>
> **From:** Tracey Novy <thomanovyproperties@yahoo.com>
> **Sent:** Thursday, August 22, 2019 6:30 AM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] In support of Kahana Bay Erosion EIS
>
> To whom it may concern,
>
> As an owner of a unit at Sands of Kahana and former full time resident of Maui,
>
> we support the continued efforts of the Kahana Bay Erosion Mitigation EIS.

Shoreline erosion has been and will continue to be something that needs consistent monitoring

and we support all necessary measures being performed to keep the shoreline safe.

Thank you for your continued efforts.

Sincerely,

Ellen Thoma & Tracey Novy

Park-Shoreline, Inc.

Tracey Novy

Broker

Thoma Novy Properties LLC

Thomanovyproperties@yahoo.com

636-699-9648

oceanit

innovation through engineering & scientific excellence

February 13, 2020

Tracey Novey and Ellen Thoma
Park-Shoreline, Inc. 2960 Greenleaf Dr.
St. Charles, MO 63303

Dear Tracey Novey and Ellen Thoma,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	R BRESCIANI
To:	Kahana Bay Comments
Subject:	[External] Kahana bay errosion
Date:	Thursday, August 22, 2019 8:34:12 AM

We are both fractional condo owners as well as time share owners at sands of kahana and we support the plans to mitigate the errosion.
Rick and Pat Bresciani

From:	R BRESCIANI
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana bay errosion
Date:	Thursday, August 22, 2019 10:01:29 AM

Richard and Helen P Bresciani
167 Longspoon Drive
Vernon, B.C.
V1H2H6

> On Aug 22, 2019, at 11:39 AM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Bresciani,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: R BRESCIANI <rbresciani@shaw.ca>
> Sent: Thursday, August 22, 2019 8:34 AM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Kahana bay errosion
>
> We are both fractional condo owners as well as time share owners at sands of kahana and we support the plans to mitigate the errosion.
> Rick and Pat Bresciani
>

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February 13, 2020

Richard and Helen P Bresciani
167 Longspoon Drive
Vernon, B.C. V1H2H6

Dear Richard and Helen P Bresciani,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
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Lahaina, HI 96761
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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Terry Edwards
To: Kahana Bay Comments
Subject: [External] Kahana Bay
Date: Thursday, August 22, 2019 9:18:41 AM

The KBSC needs to act with a sense of urgency. Landscaping and trees are falling every day causing a hazard to people on property and on beach. It inches everyday closer to building structures. I realize this is a long process. Everything you try to do in Maui county is. The time to do the reclamation is long past. We are now in a critical stage of saving structures from millions of dollars of damage. This would result in a lot of personal loss and financial loss to Maui county. Property value is already shown to be lower in sales at Sand of Kahana do to fear of loss of beach and land supporting the buildings. Please act immediately in restoring our land and shoreline.

Terry Edwards

From: Terry Edwards
To: Kahana Bay Comments
Subject: RE: [External] Kahana Bay
Date: Thursday, August 22, 2019 9:42:51 AM

Sands od Kahana. 4299 Lower Honoapiilani Rd. #317 Lahaina, HI. 96761-8997

On August 22, 2019 at 12:35 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Terry,
Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
Thank you,
Taylor

From: Terry Edwards <lvedwards@cox.net>
Sent: Thursday, August 22, 2019 9:19 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay

The KBSC needs to act with a sense of urgency. Landscaping and trees are falling every day causing a hazard to people on property and on beach. It inches everyday closer to building structures. I realize this is a long process. Everything you try to do in Maui county is. The time to do the reclamation is long past. We are now in a critical stage of saving structures from millions of dollars of damage. This would result in a lot of personal loss and financial loss to Maui county. Property value is already shown to be lower in sales at Sand of Kahana do to fear of loss of beach and land supporting the buildings. Please act immediately in restoring our land and shoreline.

Terry Edwards

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Terry Edwards
4299 Lower Honoapiilani Road #317
Lahaina, HI 96761-8997

Dear Terry Edwards,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	George Lasher
To:	Kahana Bay Comments
Cc:	Pat Sullivan
Subject:	[External] Kahana Beach Erision
Date:	Thursday, August 22, 2019 9:27:12 AM

Gentlemen

Hawaii is supposed to be a leader in preserving the environment.

Over the past 20 years, the beaches in front of the Sands of Kahana, and those north and south of it, have eroded to the point wherein some cases, structures are in jeopardy.

But even where they are not, the beach is heading out to sea. We must take action now. The problem has been studied, and studied and studied. Enough with the studies.

Take action

George Lasher
Sands of Kahana 255

Sent from my iPad

Sent from my iPad

From:	John Alpine
To:	sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Invited Comments on the Kahana Bay Erosion Mitigation Case
Date:	Thursday, August 22, 2019 10:01:29 AM
Attachments:	Kahana Bay Erosion Mitigation EIS comments.docx

To:

The applicant: Kahana Bay Steering Committee, 10 Ho'ohui Road, Suite 201, Lahaina, HI 96761.

The approving agency/accepting authority: Department of Land and Natural Resources, State of Hawaii, Samuel Lemmo, Administrator, Office of Conservation and Coastal Lands, P.O. Box 621, Honolulu, HI, or Sam.j.lemmo@hawaii.gov.

Oceanit; 828 Fort Street Mall, Suite 600, Honolulu, HI, 96813, or kahana@oceanit.com.

Re: Kahana Bay Erosion Mitigation EIS

John and Lisa Alpine
SOK 337, 4299 Lower Honoapiilani Rd,
Lahaina, HI 96761
August 22, 2019

To Whom this may Concern;

As whole owners of 337 of the Sands of Kahana condominium property at 4299 Lower Honoapiilani Rd, we are intensely interested in the proposed Kahana Bay restoration project. Over the past years we have watched the significant erosion of the beach and listen to the experts from the committee and University of Hawaii on the long-term projection for continued erosion as well as prospects of applying a mitigation strategy.

We realize that mitigation has risk, certainly has high costs and is never "permanent". Nevertheless, we are in full support of the mitigation plan and more than willing to participate as agreed in financial support.

We believe that restoring the beach will not only preserve the value of our home, and the structural integrity of the buildings, but restore beachfront used by the wider community of west Maui. The combined value of the properties directly affected by the erosion is in the millions of dollars and in total represent significant property tax income for the state. I anticipate as the problem becomes more widespread in Maui and the other Islands, the work done at Kahana can serve as an example and experiment for the best way to address the long-term effects of beach erosion in the Islands.

We encourage and support all the efforts of the committee and look forward to seeing the plan move forward with all possible speed.

John and Lisa Alpine
Sands of Kahana, Unit 337

John Alpine
Mobile: 801-694-7472
john_alpine@hotmail.com

oceanit
innovation through engineering & scientific excellence

February 13, 2020

John and Lisa Alpine
4299 Lower Honoapiilani Road Unit #337
Lahaina, HI 96761

Dear John and Lisa Alpine,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Bill Carter
To:	Kahana Bay Comments; Sam.j.lemmo@hawaii.gov; pat@mauiresorts.com
Subject:	[External] Kahana Bay Erosion Mitigation Project
Date:	Thursday, August 22, 2019 10:11:07 AM

I strongly endorse the approval and implementation of the Beach nourishment project to restore the Coastline. As a interval owner of unit #334 at the Sands of Kahana, I personally have witnessed, over the years, an alarming loss of the shoreline in front of the SoK and, in particular, the northwest corner of Building #3 where my unit is located.

It is obvious the "temporary fix" of placing sand-bags on the shoreline is only a "band-aid" that will eventually succumb to the tides. I was on site in my unit this past June and watched as the ocean took out over 10 feet of "sandy shoreline" in front of the now defunct volleyball court and exposed the underlying lava rocks making the beach unusable and dangerous .

Feel free to contact me to assist in any way possible to make this proposal a reality and save the Kahana Coastline.

Thank you,

Bill & Diana Carter

From:	JOHN DOMMES
To:	Kahana Bay Comments; sam.j.lemmon@hawaii.gov
Subject:	[External] Kahana Beach erosion
Date:	Thursday, August 22, 2019 10:29:02 AM

Dear Sirs

I am a recent owner of a condo at Sands of Kahana on Kahana Bay.
In the short time that I have owned it I have seen tremendous devastation of our beach. You can this this in the pictures I have enclosed.
The wave action has horribly eroded the shoreline
which has caused loss of the embankment and loss of trees. The trees in themselves should be a deterrent to any erosion. This is not happening because the waves are too strong and the sand beach is not there to protect.
I am a STRONG proponent of taking action to stave off any future erosion. Such as the placement of T-groins and the replenishment of sand from offshore
deposits.
The stop gap measure has been placement of sandbags. This not working! The erosion is getting dangerously close to our buildings.

ACTION NEEDS TO BE TAKEN IMMEDIATELY

This loss of beach will definitely be a deterrent to Tourism which affects all of us.

John Dommes
jdommes@yahoo.com

Sands of Kahana condo owner.

Sent from Yahoo Mail for iPhone

From:	JOHN DOMMES
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Beach erosion
Date:	Thursday, August 22, 2019 11:51:38 AM

What office is this from. I think ther

189 Silver Pine Ln
Danville, CA 94506e was a problem delivering to Sam Lemmon

Thank you

John Dommes

Sent from Yahoo Mail for iPhone

On Thursday, August 22, 2019, 1:30 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. Dommes,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: JOHN DOMMES <jdommes@yahoo.com>
Sent: Thursday, August 22, 2019 10:28 AM
To: Kahana Bay Comments <kahana@oceanit.com>; sam.j.lemmon@hawaii.gov
Subject: [External] Kahana Beach erosion

Dear Sirs

I am a recent owner of a condo at Sands of Kahana on Kahana Bay.

In the short time that I have owned it I have seen tremendous devastation of our beach. You can this this in the pictures I have enclosed.

The wave action has horribly eroded the shoreline

which has caused loss of the embankment and loss of trees. The trees in themselves should be a deterrent to any erosion. This is not happening because the waves are too strong and the sand beach is not there to protect.

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The stop gap measure has been placement of sandbags. This not working! The erosion is getting dangerously close to our buildings.

ACTION NEEDS TO BE TAKEN IMMEDIATELY

This loss of beach will definitely be a deterrent to Tourism which affects all of us.

John Dommes

jdommes@yahoo.com

Sands of Kahana condo owner.

Sent from Yahoo Mail for iPhone

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

John Dommes
189 Silver Pine Ln
Danville, CA 94506

Dear John Dommes,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Wilma Reynolds
To: Kahana Bay Comments
Cc: Pat Sullivan
Subject: [External] Kahana Beach Erosion
Date: Thursday, August 22, 2019 11:13:46 AM

Kahana Beach in West Maui has been subject to severe coastal erosion due to sea level rise, frequent storm events and past construction of individual seawalls and shoreline armoring.

In consultation with the Maui County Planning Department, the Kahana Bay Steering Committee (KBSC) plans to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards of sand transported from previously identified offshore sources.

The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

As a long term owner at The Sands of Kahana, it is apparent that if action is not taken our properties are in jeopardy and the economic impact to the owners as well as the tourism industry that comes to the island are in grave danger. Let us not ignore the precautions we can take to continue our love of Hawaii and all those that come to the West side of Maui to enjoy it.

Sincerely,

Wilma J. Reynolds

POA for Carole A. Gudde

SOK 275

From: Kahana Bay Comments
To: "Vance Vanevenhoven"
Subject: RE: [External] Urgent - Beach erosion.
Date: Friday, August 23, 2019 1:53:00 PM

Aloha,

Received. Many thanks!

Best,
Taylor

-----Original Message-----
From: Vance Vanevenhoven <vance@cbblackstone.com>
Sent: Friday, August 23, 2019 12:15 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Re: [External] Urgent - Beach erosion.

Thank you

5032 Laredo Pl
Alta Loma, CA 91737

Sent from my iPhone

> On Aug 23, 2019, at 11:55 AM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. Vanevenhoven,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Vance Vanevenhoven <vance@cbblackstone.com>
> Sent: Thursday, August 22, 2019 11:17 AM
> To: Sam.j.lemmo@hawaii.go; Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Urgent - Beach erosion.
>
> Aloha,
>
> My name is Vance Vanevenhoven and I am owner of Sands of Kahana 326. We have been coming to Kahana for over 20 years and have slowly seen the beach erosion take place. Restoring the beach is essential to not only the homeowners but the entire community, county of Mayi and state of Hawaii. These beaches and properties are an immense contribution economically for the residents of Maui. The jobs that are created by these condos ranges from construction workers, housekeepers, maintenance, resort staff, to also store owners. If nothing is done people will slowly stop coming to Maui and that will hurt the economy and there will be job loss. The state and county also benefit from the taxes that are generated, not only in property tax but the general and transient tax which is in the millions of dollars. Lastly, we need to preserve the beauty of the Island for our children and grandchildren.
>
> Mahalo,
>
> Vance Vanevenhoven

>
> Sent from my iPhone

February 13, 2020

Vance Vanevenhoven
5032 Laredo Pl.
Alta Loma, CA 91737

Dear Vance Vanevenhoven,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Paul Quagliata
To:	Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Cc:	Pat Sullivan
Subject:	[External] Kahana Bay Erosion
Date:	Thursday, August 22, 2019 11:31:30 AM

I am an owner of a condo at the Sands of Kahana, Maui and have been for the past 16 years. In all those years we have never experienced an erosion situation as severe as we are experiencing now.

THIS IS AN EXTREMELY SERIOUS SITUATION, as I am sure you are aware.

I would like to take this opportunity to urge the Department of Land and Natural Resources and/or whomever to take whatever action is necessary to mitigate and hopefully resolve this issue as quickly as possible. Needless to say, **THIS IS AN URGENT, EMERGENCY SITUATION.** In the past two years, I've watched our beach disappear, our property/grounds and trees wash away and have seen the water approach our buildings to a dangerous level. This not only impacts our visits to the island but also any folks that we may want to rent to. And that negatively impacts the taxes that we pay to the State.

I have attended several meetings regarding this erosion situation and have heard the suggestions to bring in thousand of yards of sand, the construction of structures that extend from the shoreline into the ocean to help stabilize the sand/beach which will all help with the planting of new vegetation along our shoreline and ultimately add additional stabilization and restore the beauty to our property.

So I ask you ask you to please take immediate action to help us resolve this situation as soon as possible.
Respectfully and Mahalo,

Paul Quagliata

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Paul Quagliata
21011 King Hezekiah Wy.
Bend OR 97702

Dear Paul Quagliata,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Andy Barnes
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External] Resolution of Beach Erosion
Date: Thursday, August 22, 2019 11:50:36 AM

Thank you for your attention to this matter.

Please make sure you do everything possible to save the beach and minimize the erosion.

We fully support the Kahana Bay beach nourishment project.

--
Thank You,

Andy and Diana Barnes

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Andy and Diana Barnes
2231 57th St., SE
Auburn, WA 98092

Dear Andy and Diana Barnes,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	rick thompson
To:	Kahana Bay Comments
Subject:	[External] Save the HAWAIIAN Beach at the Sands of Kahana
Date:	Thursday, August 22, 2019 11:59:04 AM

Please Please save the wonderful HAWAIIAN beach at the Sands of Kahana

Sent from Yahoo Mail on Android

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innovation through engineering & scientific excellence

February 13, 2020

Rick and Kathy Thompson
284 Buttercup Loop
Kalispell, MT, 59901

Dear Rick and Kathy Thompson,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Windy Vannimwegen
To:	Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Kahana Beach Nourishment
Date:	Thursday, August 22, 2019 12:03:08 PM

Hello,
I read the proposal and an contacting you to advise my position on the Erosion Mitigation EIS and that is ... I fully support taking this action.

Please contact me with any questions or additional information I may need going forward with this step.

Aloha and Mahalo

Warm Regards,

Darrell & Wind yVannimwegen
Owner, Sand of Kahana Resort

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innovation through engineering & scientific excellence

February 13, 2020

Darrell and Windy Vannimwegen
P.O. Box 1095
Lake Havasu City, AZ 86405

Dear Darrell and Windy Vannimwegen,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kiehn, Julaine R.
To:	Kahana Bay Comments
Subject:	[External] Beach erosion
Date:	Thursday, August 22, 2019 12:04:49 PM

As a Sands of Kahana vacation owner, I urge you and others to take immediate action to replace the sand that has eroded from the beach on Northwest Maui. We must preserve one of the most beautiful places on earth!

Thank you and others for any help you are able to provide.

Julaine Kiehn

Sent from my iPhone

oceanit

innovation through engineering & scientific excellence

February 13, 2020

Juliane Kiehn
4044 Baurichter Drive
Columbia MO 95203

Dear Juliane Kiehn,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Steve Wolnitzek
To: Kahana Bay Comments
Subject: [External] Beach erosion
Date: Thursday, August 22, 2019 12:05:12 PM

Please resolve this issue. It needs to be handled sooner rather than later. We cannot afford to lose more beach. Thank you for your attention to this matter.

Stephen D. Wolnitzek
Wolnitzek & Rowekamp
502 Greenup Street
Covington, KY 41011
Phone: 859-491-4444
Fax: 859-491-1001

Sent from my iPhone

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

Stephen D. Wolnitzek
Wolnitzek & Rowekamp, 502 Greenup Street
Covington, KY 41011

Dear Stephen D. Wolnitzek,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Jen Knight
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External] Sands of Kahana beach erosion
Date: Thursday, August 22, 2019 12:06:32 PM

Good afternoon,
I am an owner at the Sands of Kahana and have been watching the continuing erosion of the beach in front of the property. One of the best parts of staying in Lahaina at this property is being able to walk out on the beach directly and not worry about it going away or high tide. Also it would seem that, by building up the beach and setting measures to decrease further erosion you are in turn protecting structures and the economy of Lahaina by being able to have tourists stay and not go elsewhere where the actual building isn't in jeopardy. Please encourage the Kahana Bay beach erosion project to go through.

Thank you for your time,
Jen Knight

Owner at Sands of Kahana

Get Outlook for Android

From: abzcsaplar
To: Kahana Bay Comments
Subject: [External] Kahana Beach
Date: Thursday, August 22, 2019 12:09:37 PM

Please support the Kahana Beach Nourishment Project. Thank you for your help. Roberta Csaplar, owner Sands of Kahana

Sent via the Samsung GALAXY S® 5, an AT&T 4G LTE smartphone

From:	ricchiocpa@aol.com
To:	Kahana Bay Comments
Subject:	[External] Kahana Bay Erosion
Date:	Thursday, August 22, 2019 12:12:06 PM

I am a Sands of Kahana Timeshare owner. We desperately need help with the erosion of the beach in Kahana. Please support the project and help find solutions that will work and save our beautiful property.

Thank you for your help!
Gloria Ricchio

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Gloria Ricchio
1017 Vista Dr.
Gurnee, IL 60031

Dear Gloria Ricchio,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Don Taylor
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External]
Date: Thursday, August 22, 2019 12:12:13 PM

As an owner of a condo at the Sands of Kahana for over 20 years we have seen the constant beach erosion and the loss of almost all of our palm trees near the beach. We request the immediate approval of the Kahana Bay Mitigation project because the erosion will soon be eroding the beach to the corner of at least 2 of our buildings. We thank you for the progress on the mitigation study now please approve the actions to restore some of the beach.
Respectively,
William D. Taylor and Dorothy S. Taylor, Owners

Sent from Mail for Windows 10

oceanit
innovation through engineering & scientific excellence

February 13, 2020

William D. and Dorothy S. Taylor
1465 Baytowne Ave. East
Miramar Beach, FL 32550

Dear William D. and Dorothy S. Taylor,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Alice Redmond-Neal and G David Neal

From:	Alice Redmond-Neal
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Beach erosion mitigation plan
Date:	Friday, August 23, 2019 12:36:33 PM

Our home address is 7900 Sartan Way NE, Albuquerque, NM 87109.
Thank you,

-- *Alice Redmond-Neal*

On Fri, Aug 23, 2019 at 3:59 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. Neal,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Alice Redmond-Neal <aredmondneal@gmail.com>
> **Sent:** Thursday, August 22, 2019 12:14 PM
> **To:** Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana Beach erosion mitigation plan
>
> We would like to add my support and urgency to the proposed beach nourishment plan for the Kahana Bay shore. We have been owners at Sands of Kahana since 1995, purchasing the timeshare for the location and beauty of the property. Seeing the beach erosion over the years, sharply accelerated in recent years, has been alarming and discouraging. This is not to mention the negative effect on the property value.
>
> We strongly urge you to take necessary steps to manage the ongoing erosion using reasonable methods, specifically importing and strategically laying sand to manage wave energy and serve as an erosion buffer.
>
> Respectfully,

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Alice Redmond-Neal and G David Neal
7900 Sartan Way NE
Alburquerque, NM 87109

Dear Alice Redmond-Neal and G David Neal,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Debbie
To: Kahana Bay Comments
Subject: Re: [External] Beach erosion at Sands of Kahana
Date: Friday, August 23, 2019 12:50:06 PM

Debbie Rogers
972 Ezie Ave.
Clovis CA 93611

Thank you!
Debbie

On Fri, Aug 23, 2019 at 2:59 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Ms. Rogers,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Debbie <trymeatmyotheremail@gmail.com>
> **Sent:** Thursday, August 22, 2019 12:18 PM
> **To:** Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Beach erosion at Sands of Kahana
>
> To Whom it may concern:
>
> The beach erosion in front of the Sands of Kahana has drastically become worse.
>
> We were there in 2017. The beach extended as normal, and the vegetation and trees were as always. After that visit a storm came in and washed out numerous trees, and almost all of the beachfront. The buildings to the NW were almost undermined.
>
> We visited in May of 2019 and the beach is almost gone.
>
> (See picture below and my caption of May 31,2019: This pic is LOW tide-7:00am. Notice how close to entry. Last night we could hear the waves crashing over the berm.

You can see the water line in the sand. Nature is having its way and it seems that as soon as the waves take out the remaining border of plants, there will be rapid encroachment into the pool area).

This is an email I sent to Marc, someone who keeps us updated on the beach, of suggestions to temporarily fix the problem.

When we were there the tides came in heavily, and every night the sand from the beach washed onto the sidewalk just the other side of the pool. Every morning a maintenance person had to wash the sand back up to the beach side. This should be our main focus!!!! How to fix the waterfront area. Perhaps a short in height, wide decorative concrete wall at the sidewalk on the beach side where the sand gets washed in every night could be put up. It would stop the sand and provide a sitting wall for people to gaze at the water/sunset in the evening.

Seeing the continuing undermining of the plants on both sides of the beachfront is VERY disconcerting, as this winter we feel that much, much more will be washed away. The ocean currents doing the damage (higher, stronger waves) are the ones from the more southwesterly direction, rather than the northwesterly direction. Something needs to be temporarily done, or there will be no grass area left either, once the plants are gone. Hate to say it, until the ocean front is legally addressed and managed, even sandbags would be preferable to losing all the remaining land and plants at the ocean's edge.

More recent pictures emailed to me show that MORE trees and plants have NOW been lost.

This is appalling. SOK is very special to me and my family, and it would be appropriate to save the remaining beach area and reestablish vegetation. However, please do this in an environmentally safe manner. it would be just as bad to damage all the marine life and corals off-shore.

I would like to be on your email list for the situation as it is being addressed by the state of HI.

Thank you!

Debbie Rogers

SOK owner (in family ownership since 1997).

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Debbie Rogers
972 Ezie Ave.
Clovis, CA 93611

Dear Debbie Rogers,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Troy Warman
To:	Kahana Bay Comments
Subject:	Re: [External] Sand of Kahana beach erosion
Date:	Friday, August 23, 2019 12:55:50 PM

1851 e Mulberry st
Prescott Valley, Az. 87314

Sent from my iPhone

> On Aug 23, 2019, at 3:01 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. Warman,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
>
>
> -----Original Message-----
> From: Troy Warman <troynsvca@outlook.com>
> Sent: Thursday, August 22, 2019 12:19 PM
> To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Sand of Kahana beach erosion
>
> I've been an SOK owner since 2015 and it's sad how much of the beach that's gone out to sea since then. We used to have a good 50+ feet of beach beyond the volleyball court and lots of vegetation and palm trees which are all gone. It would be such an improvement to the property with a beach erosion project to increase the beachfront of the property. I've witnessed the same sort of project when working in Waikiki and watched for months as they pumped sand from sand bars off shore to the beachfront and saw the improvement over a period of months and my family and I got to enjoy the increased beachfront. I would love to be able to use the beachfront at SOK instead of having to drive to other beaches which isn't always convenient.
>
> Thank you for your time.
>
> Troy Warman.
>
> Sent from my iPhone

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Troy Warman
1851 E. Mullberry St.
Prescott Valley, AZ 87314

Dear Troy Warman,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	pinkersc
To:	Kahana Bay Comments
Subject:	RE: [External] Beach erosion
Date:	Monday, August 26, 2019 7:08:21 AM

466 wagon wheel rd
Big bear city ca 92314

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 15:01 (GMT-08:00)
To: pinkersc <pinkersc@aol.com>
Subject: RE: [External] Beach erosion

Aloha Mr. Pinkerton,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: pinkersc <pinkersc@aol.com>
Sent: Thursday, August 22, 2019 12:20 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach erosion

As a sands of Kahana property owner I am concerned about the beach erosion. I feel this erosion needs to be mitigated asap before more is lost.

Sincerely

Scott m Pinkerton

Sent from my Verizon, Samsung Galaxy smartphone

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February 13, 2020

Scott M. Pinkerton
466 Wagon Wheel Rd.
Big Bear City, CA 92314

Dear Scott M. Pinkerton,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "B.Waldo"
Subject: RE: [External] Kahana Beach
Date: Monday, August 26, 2019 9:59:00 AM

Aloha,

Received. Many thanks!

Best,
Taylor

From: B.Waldo <wcwally@yahoo.com>
Sent: Sunday, August 25, 2019 10:33 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Re: [External] Kahana Beach

Hello Taylor,
Mahalo for you response. I was out of town over the weekend. Here is my mailing address:
Bill Wallace
851 Fairway Lane
Gunnison, CO 81230

-Bill

On Friday, August 23, 2019, 04:01:31 PM MDT, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. Wallace,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: B.Waldo <wcwally@yahoo.com>
Sent: Thursday, August 22, 2019 12:21 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach

As an owner at the Sands of Kahana resort I urge approval of the Kahana Bay Erosion Mitigation project. Over the years I have unfortunately watched the beach erode without refurbishing naturally as it had in the past. This project is most necessary for the survival of the beach.

Sincerely,

William C Wallace

Gunnison, CO

Owner at Sands of Kahana

oceanit
innovation through engineering & scientific excellence

February 13, 2020

William C. Wallace
851 Fairway Lane
Gunnison, CO 81230

Dear William C. Wallace,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	"j8av8r ."
Subject:	RE: [External] Kahana Bay Erosion Mitigation PUBLIC COMMENT
Date:	Friday, August 23, 2019 12:01:00 PM

Aloha Mr. Draper,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: j8av8r . <jetav8r@gmail.com>
Sent: Thursday, August 22, 2019 12:23 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Erosion Mitigation PUBLIC COMMENT

Hi -

I have been an owner at Sands Of Kahana Vacation Resort since 1994 (25 years).

We have witness BIG changes in all those years. But the beach erosion over the last several years is VERY ALARMING.

I cannot overstress the need for a plan to mitigate and hopefully replenish the damage that has been done.

Respectfully Yours,

David Draper
1294 Swan Dr
Annapolis, MD

443-994-5740

oceanit
innovation through engineering & scientific excellence

February 13, 2020

David Draper
1294 Swan Dr.
Annapolis, MD 21409

Dear David Draper,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: KMK
To: Kahana Bay Comments
Subject: [External] Beech Erosion Resolution
Date: Thursday, August 22, 2019 12:24:45 PM

Dear Sir/Madam

I sm an even year owner of an Orchid unit. This Resolution NEEDS to be passed.

Thank You
Karen M Kulik
Act# 00800882

Sent from my iPhone

From: David Wertheim
To: Kahana Bay Comments
Subject: RE: [External] West Maui Beach Nourishment
Date: Friday, August 23, 2019 12:25:04 PM

Yes.

David Wertheim
2837 Carradale Drive
Roseville, CA 95661-4047

Thanks,

Dave

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 3:03 PM
To: David Wertheim <dwertheim@surewest.net>
Subject: RE: [External] West Maui Beach Nourishment

Aloha Mr. Wertheim,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: David Wertheim <dwertheim@surewest.net>
Sent: Thursday, August 22, 2019 12:26 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] West Maui Beach Nourishment

I am a timeshare owner at the Sands of Kahana and enjoy time there every year (2 weeks). Please proceed with the West Maui Beach Nourishment project. Clearly, over the last few years the erosion has been creeping in and is making a very difficult situation worse. You have my full support to proceed.

Thank you,

Dave Wertheim
dwertheim@surewest.net
Home: (916) 791-3137
Moblie: (916) 390-6107

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February 13, 2020

David Wertheim
2837 Carradale Dr.
Roseville, CA 95661-4047

Dear David Wertheim,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Cyndy Gomes
To: Kahana Bay Comments
Subject: Re: [External] SANDS OF KAHANA Erosion
Date: Friday, August 23, 2019 5:48:03 PM

311 N 5 th Street, Patterson, Ca 95363

Sent from my iPhone

On Aug 23, 2019, at 3:02 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Ms. Gomes,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Cyndy Gomes <cyndygomes@yahoo.com>
Sent: Thursday, August 22, 2019 12:26 PM
To: sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] SANDS OF KAHANA Erosion

This is Cyndy Gomes and I'm an owner at Sands of Kahana. I was there for two weeks in June/July and amazed at the amount of erosion that had occurred since last summer. When we were there another palm tree fell into ocean and the huge tree that has been there forever was roped off as they felt it was next to go.

The ropes that roped off the property were moved in about 3 feet because they were afraid of cave ins.

I asked why we weren't sandbagging and trying to prevent more damage and was told that they can not sand bag until it was closer to the buildings.

I don't understand why nothing is being done now and why would we wait for more of the property and trees to be washed away before any action is taken.

I really feel that something should be done now.

Thank you Cyndy Gomes
209-404-2507

oceanit

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February 13, 2020

Cyndy Gomes
311 N. 5th St.
Patterson, CA 95363

Dear Cyndy Gomes,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: kboling1
To: Kahana Bay Comments
Subject: RE: [External] Beach erosion
Date: Friday, August 23, 2019 12:08:41 PM

Ken boling

4329 biscay st nw. Olympia. Wa

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 3:03 PM (GMT-08:00)
To: kboling1 <kboling1@comcast.net>
Subject: RE: [External] Beach erosion

Aloha,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a name and physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: kboling1 <kboling1@comcast.net>
Sent: Thursday, August 22, 2019 12:29 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach erosion

I am a sands of kahana owner and I implore you to help resolve this matter.

Sent from my Verizon, Samsung Galaxy smartphone

From:	Ken Boling
To:	gstockton@asny.com; boardofdirectors@sandsbod.com; kblair@asny.com; jsantiago@asny.com; davidlint@hotmail.com
Cc:	rrodriguez@soleilmanagement.com; gmano@soleilmanagement.com; Kahana Bay Comments; 76sokco@gmail.com; kboling1@comcast.net
Subject:	[External] SOK Beach Erosion
Date:	Wednesday, August 28, 2019 10:20:25 AM

On August 22 I received an email from SOKCO who as you know is a group of concerned time share owners at the Sands of Kahana. The email requested that we contact Sam Lemmon with the State of Hawaii and send an email to kahana@oceanit.com to urge immediate action to solve the beach erosion at the Sands where the beach continues to erode. Apparently the time to receive comments ended on the 22nd. My question is why was I not contacted by the Board of Directors about this in a timely fashion? I received a communication from the Board a few weeks ago telling me that Glenn Stockton from the board was deeply involved in this issue. Why no heads up from him? This beach erosion is a grave threat to every owners investment and more importantly the enjoyment of our time at the Sands. If this is an example of Mr. Stockton's looking out for the owners interest I fear we are as doomed as the passengers of the Titanic who were relying on the lookout to avoid icebergs. We all know how that ended!!! I fear that the Board is asleep at the helm and the Sands of Kahana, as I have known it for the past 23 years, is in peril. Please keep us informed in a timely fashion of what is occurring and, more importantly, work to resolve this issue with a sense of urgency."
(Sands time share owner).

I have been a SOK owner for close to 20 years and I love this place. I would hate to see any further damage done to the beach than what has already happened. I can't believe you guys have not made more of an effort to start to resolve this issue or more important to communicate with the owners that have voted you in. Please step up and do the right thing. I can't believe that all of you are not concerned with this issue.

Please inform me and everyone else what you plan to do to get involved. I hope what I am hearing about the Board members are not true and that has to do with your close relationship with ASNY, Inc could be part of the reason why you are not concerned. I just believe that, because you have to have sort of interest in this multi-million dollar resort. Thank you.

Ken and Lois Boling
4329 Biscay ST NW
Olympia, WA 98502

Customer ID – 50017

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Ken and Lois Boling
4329 Biscay St. NW
Olympia, WA 98502

Dear Mr. And Mrs. Boling,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 18, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that you expressed concern related to communication thus far on project activities and related decision-making. We would like to clarify that Oceanit is retained by the Kahana Bay Steering Committee (KBSC), a collaboration of individuals from each condominium. We understand that KBSC is acting on behalf of the condominium owners that are directly affected by the project. Oceanit suggests reaching out to the KBSC member associated with your condominium, as we are not involved in how the KBSC disseminates information to its apartment owners.

You can be assured that community outreach is an important part of this environment review process. In addition to working with KBSC, there is extensive public outreach to local kupuna, surfers, landowners, and other stakeholders. Additional public outreach and public meeting events will be convened and we hope that you can attend. The insight gleaned from these interviews and public meeting events will be incorporated and summarized in Section 6 of the DEIS.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

From:	rk5555
To:	Kahana Bay Comments
Subject:	RE: [External] Kahana bay beach nourish beach project
Date:	Saturday, August 24, 2019 3:41:13 AM

4403 139th PL SW, lynnwood ,wa, 98087

Sent from my T-Mobile 4G LTE Device

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 3:03 PM (GMT-08:00)
To: rk5555 <rk5555@comcast.net>
Subject: RE: [External] Kahana bay beach nourish beach project

Aloha Mr. and Mrs. Wegner,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: rk5555 <rk5555@comcast.net>
Sent: Thursday, August 22, 2019 12:30 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana bay beach nourish beach project

We have been owners at Kahana Sands for over 15 years and we support the beach project

It is urgent that this happens.

Thank you

Kathy & Rolen Wegner , Lynnwood Wa

Sent from my T-Mobile 4G LTE Device

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February 13, 2020

Kathy and Rolen Wegner
4403 139th Pl. SW
Lynnwood, WA 98087

Dear Kathy and Rolen Wegner,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

From:	Anne Javier
To:	Kahana Bay Comments
Subject:	[External] Kahana Bay,
Date:	Thursday, August 22, 2019 12:31:19 PM

Dear Consultants,
Please suggest additional sand that would provide an erosion buffer. We want to keep our beach,Please! Sincerely, Anne Javier

From: David Kulisch
To: Kahana Bay Comments
Subject: Re: [External] Beach Erossion
Date: Friday, August 23, 2019 1:58:27 PM

2125 E. Overbluff Road
Spokane, WA 99203

Thank you!

Sent from my iPhone

> On Aug 23, 2019, at 12:03 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. Kulisch,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: David Kulisch <dakulis16@gmail.com>
> Sent: Thursday, August 22, 2019 12:32 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Beach Erossion
>
> To Whom It May Concern
>
> We are currently in the Sands of Kahana and the beach erosion is horrible. The proposed fix is necessary and the sooner the better.
>
> We are hopeful the State and County will agree to the fix and it can be implemented quickly and successfully.
>
> David A. Kulisch
> Sent from my iPhone

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February 13, 2020

David A. Kulisch
2125 Overbluff Road
Spokane, WA 99203

Dear David A. Kulisch,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Richard Yang
To: Kahana Bay Comments
Subject: Re: [External] Kahana Bay Erosion Mitigation
Date: Friday, August 23, 2019 2:03:32 PM

749C Loma Verde Ave
Palo Alto, CA 94303

Regards,
Richard

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 3:04 PM
To: Richard Yang
Subject: RE: [External] Kahana Bay Erosion Mitigation

Aloha Mr. and Mrs. Yang,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Richard Yang <richardyyang@yahoo.com>
Sent: Thursday, August 22, 2019 12:35 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Erosion Mitigation

We are owner at Sands of Kahana and have been following the severe erosion at Kahana Bay in the recent years impacting our resort. We have reviewed the recent environment impact report published by Oceanit. We strongly urge the Maui County Planning Department and Kahana Bay Steering Committee to move forward with recommended restoration and rehabilitation program.

Regards,
Richard & Candice Yang
Sands of Kahana Owner
(650) 813-1889

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Richard and Candice Yang
749C Loma Verde Ave.
Palo Alto, CA 94303

Dear Richard and Candice Yang,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Betsy Bryant
To: Kahana Bay Comments
Subject: Re: [External] Kahana beach replenishment
Date: Friday, August 23, 2019 6:06:31 PM

PO Box 3316
wrightwod, CA 92397

> On Aug 23, 2019, at 15:04, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Ms. Bryant,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Betsy Bryant <skyslug737@gmail.com>
> Sent: Thursday, August 22, 2019 12:35 PM
> To: Kahana Bay Comments <kahana@oceanit.com>; Sam.j.lemmo@hawaii.gov
> Subject: [External] Kahana beach replenishment
>
> This sounds like a very good plan and we applaud the effort. We encourage you to go through with it. Please save our Kahana beaches. They add value to all our lives.
>
> Mahalo,
> Betsy Bryant
>
>
>
>

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February 13, 2020

Betsy Bryant
P.O. Box 3316
Wrightwood, CA 92397

Dear Betsy Bryant,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Pat Hall
To:	Kahana Bay Comments
Subject:	Re: [External] COMMENT ON KAHANA BAY EROSION MITIGATION EIS
Date:	Friday, August 23, 2019 12:13:02 PM

Please mail to:
946 Marisa Lane
Encinitas, CA 92024

Thank you!

Sent from my iPad

On Aug 23, 2019, at 3:04 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Ms. Hall,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Pat Hall <pathall1@gmail.com>
Sent: Thursday, August 22, 2019 12:35 PM
To: Sam.j.lemmo@hawaii.gov
Cc: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] COMMENT ON KAHANA BAY EROSION MITIGATION EIS

Dear Sirs:
I have been made aware today of the new comment period open for Kahana Bay Erosion Mitigation EIS which closes this evening.
My husband and I are timeshare owners at the Sands of Kahana Resort and are sending this email urging you on the need for resolution on beach erosion in Kahana.

We have all been aware of this problem for some time now, and we feel it is critical to devise a regional approach to provide erosion mitigation at Kahana Bay. According to the document I read, Kahana Beach in West Maui has been subject to severe coastal erosion due to the rise in sea level from frequent storms and the past construction of individual seawalls and shoreline armoring.
I have been told that the Kahana Bay Steering Committee (KBSC) plans to restore, rehabilitate and preserve the sandy beaches along Kahana Bay by nourishing the beach with 50,000-100,000 cubic yards of sand, which would widen the existing beach by 35150 feet (with approximately 50 feet average width). The additional sand would also provide an erosion buffer along our Kahana Bay coastline threatened by shoreline erosion.

Please take action to protect our coastline and beaches in Kahana Bay.

Sincerely,
Patricia Hall
Owner

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February 13, 2020

Patricia Hall
946 Marisa Lane
Encinitas, CA 92024

Dear Patricia Hall,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: greg monroe
To: Kahana Bay Comments
Subject: Re: [External] Katana Bay Beach Nourishment Project
Date: Friday, August 23, 2019 12:28:48 PM

1662 157 Street Surrey BC, Canada
V4A 4W2

Cheers, Greg

> On Aug 23, 2019, at 3:05 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Monroe,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: greg monroe <greg_monroe@hotmail.com>
> Sent: Thursday, August 22, 2019 12:47 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Katana Bay Beach Nourishment Project
>
> Hello,
>
> My wife and I are time share owners at the Sands of Kahana. We are in full support of this much needed project to conserve the beach in the Kahana Bay Area. Like other resorts to the North, we have lost a ton of the beach in recent years due to sea level rise. Furthermore, one of the buildings in our resort is becoming dangerously close to severe water damage.
>
> Kind Regards , Greg

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February 13, 2020

Greg Monroe
1662-157 Street
Surrey, BC, Canada V4A 4W2

Dear Greg Monroe,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Debbie Barrett
To: Kahana Bay Comments
Subject: Re: [External] Fw: Beach Nourishment Project
Date: Friday, August 23, 2019 12:53:53 PM

52 Pickwick Court
Kalispell, MT. 59901

Sent from my LG X venture, an AT&T 4G LTE smartphone

------ Original message------
From: Kahana Bay Comments
Date: Fri, Aug 23, 2019 4:05 PM
To: Debbie Barrett;
Cc:
Subject:RE: [External] Fw: Beach Nourishment Project

Aloha Mr. and Mrs. Barrett,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Debbie Barrett <debbiebarrett39@msn.com>
Sent: Thursday, August 22, 2019 12:51 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Fw: Beach Nourishment Project

Sent from my LG X venture, an AT&T 4G LTE smartphone

------ Original message------
From: Debbie Barrett
Date: Thu, Aug 22, 2019 4:44 PM
To: Sam.j.lemmo@hawaii.gov;
Cc:
Subject: Beach Nourishment Project

As a owner of a 2 week per year timeshare at the Sands of Kahana we fully support the beach nourishment project and hope you will support it as well. Coming from Montana we look forward to spending time on the beach and have been very sad to see the condition of the beach. If something isn't done it will continue to deteriorate. Please help to stop this.
Thank you
Debra and Roger Barret

Sent from my LG X venture, an AT&T 4G LTE smartphone

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Debra and Roger Barrett
52 Pickwick Court
Kalispell, MT 59901

Dear Debra and Roger Barrett,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Rick Bowman
To: Kahana Bay Comments
Subject: RE: [External] Kahana Beach Project
Date: Friday, August 23, 2019 12:36:17 PM

My address on the mainland:
8819 Sunridge Hollow Road
Parker, CO 80134

Thanks!
Rick Bowman
cell 720-219-7850

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 4:06 PM
To: Rick Bowman <rick@logostuff.com>
Subject: RE: [External] Kahana Beach Project

Aloha Mr. Bowman,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Rick Bowman <rick@logostuff.com>
Sent: Thursday, August 22, 2019 12:53 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach Project

As an owner at the Sands of Kahana, I strongly support the beach project. The erosion has become severe. Please save our beach!!

Thanks!
Rick Bowman
cell 720-219-7850

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Rick Bowman
8819 Sunridge Hollow Road
Parker, CO 80134

Dear Rick Bowman,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	cherylhaws
To:	Kahana Bay Comments
Subject:	RE: [External] Kahana Bay Erosion Mitigation EIS
Date:	Friday, August 23, 2019 12:17:41 PM

Hi Taylor,

Thanks for your response. Our address is:

1824 South Belvoir Blvd
S. Euclid, OH 44121

Cheryl Haws

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 6:06 PM (GMT-05:00)
To: Cheryl Haws <cherylhaws@sbcglobal.net>
Subject: RE: [External] Kahana Bay Erosion Mitigation EIS

Aloha Mr. and Mrs. Haws,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: Cheryl Haws <cherylhaws@sbcglobal.net>
Sent: Thursday, August 22, 2019 12:54 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Erosion Mitigation EIS

We are owners at the Sands of Kahana and wish to express our support of the Kahana Bay beach nourishment project. Something needs to be done urgently as we have lost most of our beach and many of our beautiful trees.

Warren and Cheryl Haws

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Warren and Cheryl Haws
1824 South Belvoir Blvd S.
Euclid, OH 44121

Dear Warren and Cheryl Haws,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	rmmevanston@aol.com
To:	Sam.j.lemmo@hawaii.gov
Cc:	mlavin921@aol.com
Subject:	[External] Kahana Bay Erosion
Date:	Thursday, August 22, 2019 12:56:57 PM

Dear Mr. Lemmo:

As 15 year time-share owners at Sands of Kahana (SOK) we passionately request that the Department of Land and Natural Resources Support the Beach Nourishment Project. Our last visit to SOK was this past March; it was disconcerting to see the degree of erosion since the prior year. Recent pictures that we have seen have caused alarm. Action is needed - we hope you and your committee will provide the leadership to move this project forward.

We thank you in advance for your consideration of this request.

Sincerely,

Robert M. Mardirossian and Mary Alice Lavin
2521 Thayer Street
Evanston, IL 60201
847.864.3269

From: robert brymer
To: Kahana Bay Comments
Subject: Re: [External]
Date: Friday, August 23, 2019 12:10:59 PM

Please.
Robert Brymer
11343 Joshua Rd.
Apple Valley, Ca.
92308

Thank You

On August 23, 2019, at 12:07 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. and Mrs. Brymer,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

-----Original Message-----
From: robert brymer <avsports1@msn.com>
Sent: Thursday, August 22, 2019 12:59 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External]

We are a timeshare owner at the sands of kahana.
We have 6 grown children and 9 grandchildren all of whom have either visited or want to visit in the future this wonderful piece of paradise, even if only for a partial piece of time.

We certainly hope that this beach restoration will occur and that we fully support the plan.

Thank you for your time and consideration

Robert and Wendy Brymer

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Robert and Wendy Brymer
11343 Joshua Rd.
Apple Valley, CA 92308

Dear Robert and Wendy Brymer,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Stuart Root
To: Kahana Bay Comments
Subject: Re: [External] Kahana beach restoration
Date: Friday, August 23, 2019 6:06:21 PM

Our address is as follows:
S&D Root
Box 6028
Peace River,AB
T8S 1S1
Canada.
Thankyou for your quick response!

Sent from my iPhone

> On Aug 23, 2019, at 4:07 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Root,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Stuart Root <drsroot@telus.net>
> Sent: Thursday, August 22, 2019 1:00 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Kahana beach restoration
>
> Please be advised that I Stuart A Root and my wife Denise G Root support the restoration and restitution of Kahana Beach as soon as possible! We are vacation club owners at Sands of Kahana! Thankyou for your anticipated response to this request!
>
> Sent from my iPhone

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February 13, 2020

Stuart A. and Denise G. Root
Box 6028
Peace River, AB T8S 1S1. Canada

Dear Stuart and Denise Root,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Marjorie Schultz
To: Kahana Bay Comments
Subject: Re: [External] Beach Erosion
Date: Sunday, August 25, 2019 6:39:39 PM

Our address is:

Robert & Marjorie Schultz
570 Caber Ct
Santa Rosa, CA 95409-4428

Sent from my iPhone

On Aug 23, 2019, at 4:44 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. and Mrs. Schultz,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: mschultz6972@aol.com <mschultz6972@aol.com>
Sent: Thursday, August 22, 2019 5:14 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach Erosion

To Whom It May Concern,

My wife Margie and I have owned a condo at Sands of Kahana for over 20 years. We have seen a lot of changes. But when the storms and high tide came, it showed we were not prepared to maintain our beach and retaining walls. We always enjoy going to the beach when we are staying at the Sands of Kahana, but with the beach erosion there will be no place to enjoy
having a beach on our property.

It is important to make repairs on the beach and wall ASAP in order to save what is left of the beach and the grounds.

Bob & Margie Schultz

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Bob and Margie Schultz
570 Caber Ct.
Santa Rosa, CA 95409-4428

Dear Bob and Margie Schultz,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: carly oliver
To: Kahana Bay Comments
Subject: Re: [External] Kahana Bay Nourishment Project
Date: Friday, August 23, 2019 8:09:34 PM

1662-157 St. Surrey BC V4A4W2

Sent from my iPhone

On Aug 23, 2019, at 3:07 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Ms. Monroe,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: carly oliver <carlyoliver76@hotmail.com>
Sent: Thursday, August 22, 2019 1:05 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Nourishment Project

Hello,

I am an owner of the Sands of Kahana resort and am extremely concerned about the beach area out front of our resort as well as all the resorts north of ours. In the last 25 years as owners we have noticed the coast line disappearing as a result of storms and water surge levels. As we all know the oceans are rising and weather patterns are affected by these changes, let's not ignore the obvious need for coastline nourishment or it will be devastating for all. If left any longer I fear a much more costly and drastic consequence will be the result of improper action taken now.

Sincerely,
Carly Monroe

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Carly Monroe
1662-157 Street
Surrey, BC, Canada V4A 4W2

Dear Carly Monroe,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Johnson, Paul G.
To:	Kahana Bay Comments
Subject:	[External] Kahana Bay Erosion Mitigation Project
Date:	Thursday, August 22, 2019 1:07:30 PM

Dear Sir or Madam: : I am a Navy veteran who spent time in the service in Hawaii, and who subsequently bought at timeshare at the Sands of Kahana. I am writing to you to indicate my strong support for the Kahana Bay Erosion Mitigation Program to help restore the beautiful beaches in this part of West Maui. Sincerely, Paul G. Johnson

PAUL G. JOHNSON
Jennings, Strouss & Salmon, PLC
One East Washington Street | Suite 1900
Phoenix, AZ 85004-2554
t: (602) 262-5948
f: (602) 495-2665
pjohnson@jsslaw.com

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Paul G. Johnson
Jennings, Strouss, and Salmon, PLC, One East Washington Street, Suite 1900
Phoenix, AZ 85004-2554

Dear Paul G. Johnson,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Esker
To:	Kahana Bay Comments
Subject:	Re: [External] Stop the Kahana Bay Erosion
Date:	Friday, August 23, 2019 12:30:01 PM

Email is fine but another address is,
Gerry and Bonnie Esker
934 Gold Nugget Circle
Lincoln CA 95648.

Sent from Gerry's iPad

> On Aug 23, 2019, at 3:08 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Esker,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Bonnie Esker <gesker@att.net>
> Sent: Thursday, August 22, 2019 1:10 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Stop the Kahana Bay Erosion
>
> Please, the destruction of our property must be stopped. Please take all actions necessary to resolve and save the Kahana Bay properties. Watching is slip into the sea has been gut wrenching and you can HELP NOW.
>
> We have owned our property for many years and consider Maui to be our second home. Together we can make a difference.
>
> Gerard and Bonnie Esker
> Owners, Sands of Kahana

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February 13, 2020

Gerard and Bonnie Esker
934 Gold Nugget Circle
Lincoln, CA 95648

Dear Gerard and Bonnie Esker,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	"ROBERT STELLMACHER"
Subject:	RE: [External] Kanana Bay Erosion Mitigation EIS
Date:	Friday, August 23, 2019 12:09:00 PM

Aloha Mr. Stellmacher,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: ROBERT STELLMACHER <resjas1@comcast.net>
Sent: Thursday, August 22, 2019 1:11 PM
To: sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kanana Bay Erosion Mitigation EIS

As a timeshare owner at Sands of Kahana I have witnessed the continual erosion of the beach area at the Sands of Kahana and surrounding properties over the last several years. The only attempt to stop this has been the placement of sand bags but this has done little to stop the erosion. We need a resolution on the beach erosion before it is too late to act. Please support the Beach Nourishment Project. Thank you

Robert Stellmacher

630 Brookside Drive

Danville, CA 94526

resjas1@comcast.net

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

Robert Stellmacher
630 Brookside Drive
Danville, CA 94526

Dear Robert Stellmacher,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: John Wiseman 1
To: Kahana Bay Comments; Sam.j.lemmo@hawaii.gov
Subject: [External] Beach erosion
Date: Thursday, August 22, 2019 1:12:06 PM

Please, please, please, escalate, approve, and speed up the process to repair the beaches at the Sands Of Kahana. We go every year to Maui. We were there last March and the erosion is getting so bad.

It is hard to watch the destruction of what was a beautiful coast line. When we were there in March we went up north to a beach at Napili. We parked down the street and walked along to beach to get to where we could sit. The waves were washing up the beach so high my grandson was caught in a wave washing him out to sea. Fortunately, there were 3 of us who swam out and got him. That was so scary for him and all 8 of us.

The next day we went to the Sheraton Black Rock. So much of the beach was gone there was huge coral boulders sticking out that weren't there 2 years ago and the amount of beach had greatly diminished.

It is becoming hard to talk about anything great about Maui now as the erosion is so bad. It is also. Hard to recommend people to go. On Social Media, like Facebook, its hard to say anything positive about Maui.

It is really shameful the commission is taking so long to resolve this issue. Maui use to be paradise. Its hard to understand why the commission has let this, once loved island, go to a place people talk badly about.

I paid a lot of money for my Timeshare 17 years ago. I'm on the verge of selling it for whatever I can get for it. Maui now has become a negative to me and my family.

Shame on you!

John Wiseman
Owner at the Sands Of Kahana.

From: Kahana Bay Comments
To: Bob Brown
Subject: RE: [External] Kahana Beach erosion on Maui
Date: Friday, August 23, 2019 12:10:00 PM

Aloha Mr. Brown,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: Bob Brown <boomerbrown65@msn.com>
Sent: Thursday, August 22, 2019 1:24 PM
To: Sam.j.lemmo@hawaii.gov
Cc: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach erosion on Maui

Gentlemen: I am highly concerned about what is happening to our beach at the Sands of Kahana. We have been time share owners at the Sands for over 20 years and have always enjoyed our time there. What is happening with the beach is deplorable but I lack a good answer for you as to what should be done to prevent further erosion. It would seem to me that simply adding more sand back to the beach by itself will not be the long term solution. If the previous sand has been washed away what would prevent a recurrence? Something of a more permanent nature would seem to be the answer. Time is of the essence and critical for the property. Cheers! Bob

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Bob Brown
7711 S. Foresthill Ct.
Littleton, CO 80120

Dear Mr. Brown,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Michelle Baringer
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External] Kahana Bay Beach Nourishment
Date: Thursday, August 22, 2019 1:24:31 PM

Good afternoon,
I am writing about my concerns with the disappearing beach and land. I am a one week owner at Sands of Kahana. My first trip was three islands in 10 days in Dec 2001. I fell in love with Maui shortly after getting off the plane. The following year I brought my husband and we purchased our week. I have been coming every year since. I have brought family and friends with every year. We rent weeks at other resorts, condos and private homes. Maui is my second home. I have friends that live on the island. For the last few years, we make a point of volunteering at Whale Tales so we can give back to the whales, island and the people.

My friend, Gretchen, and I do not sit on the beach with cocktails. We love walking on the beaches while carefully exploring the tide pools, rocks and vegetation. We appreciate the land and the water and do our best not to harm any of it. Sands of Kahana isn't the only resort that has lost many trees, vegetation, beach and property. This may be a natural cycle for the island's beaches but the ocean does NOT need buildings falling into it. That is not beneficial to the ecology at all.

I strongly urge you to work on the resolution to stop and prevent the beach erosion. Time is running out and something needs to be done. Please help, the island needs your help.

Mahalo in advance for any and all help.
Aloha and a hui hoi makou,
Michelle Baringer
1328 Phelps St
Red Wing, MN 55066
daisyandtaz@gmail.com

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Michelle Baringer
1328 Phelps Street
Red Wing, MN 55066

Dear Michelle Baringer,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Dawn Adams
To: Kahana Bay Comments
Subject: Re: [External] Kahana Bay restoration project
Date: Saturday, August 24, 2019 2:55:37 AM

Our address is:
Steve and Dawn Adams
37123 NE Reed Rd
Corbett, OR 97019

Sent from my iPhone

> On Aug 23, 2019, at 3:12 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Adams,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Dawn Adams <adamsdawn56@yahoo.com>
> Sent: Thursday, August 22, 2019 1:25 PM
> To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Kahana Bay restoration project
>
> Dear Mr. Lemmo,
>
> I appeal to you to consider the need at hand for the beach at Kahana Bay. It is a natural resource that will be gone very soon if this project isn't approved quickly so that work can begin. Every time we have been back to visit our property at Sands of Kahana, there is more beach gone. We have lost many trees and hedges. The property is literally being decimated by the encroaching water/surf.
>
> I understand and fully agree with the need to preserve our natural resources and the natural beauty of the island. However, you must admit that if the beach is allowed to completely erode, you will have effectively chosen to allow a precious resource to disappear from the island. This doesn't even make sense to us as property owners. The very thing we all seem to want is to preserve the beach.
>
>
> No choice or a slow choice = a choice to allow a precious part of Maui to be lost.
>
> Respectfully submitted,
> Steve and Dawn Adams
> Owners - Sands of Kahana

February 13, 2020

Steve and Dawn Adams
37123 NE Reed Rd.
Corbett, OR 97019

Dear Steve and Dawn Adams,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Chris Engdall
To: Kahana Bay Comments
Subject: Re: [External] FW: Beach Nourishment Project
Date: Friday, August 23, 2019 12:36:06 PM

2531 highland Hills drive
El dorado hills ,CA. 95762

On Aug 23, 2019, at 3:13 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. Engdall,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Chris Engdall <cengdall@hotmail.com>
Sent: Thursday, August 22, 2019 1:12 PM
To: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>
Subject: Beach Nourishment Project

My name is Chris Engdall and I am a timeshare owner in the Sands Of Kahana. I just wanted you to know that I totally support the project

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February 13, 2020

Chris Engdall
2531 Highland Hills Drive
El Dorado Hills, CA 95762

Dear Chris Engdall,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "ebarker@capitalbenefitservices.com"
Subject: FW: [External] FW: Kahana beach erosion
Date: Friday, August 23, 2019 12:15:00 PM

Aloha Mr. Barker,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: Ed Barker <ebarker@capitalbenefitservices.com>
Sent: Thursday, August 22, 2019 9:18 AM
To: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>
Subject: Kahana beach erosion

This message was sent securely using Zix®

My name is Ed Barker. I have owned a condo at the Sands of Khana for ten years. The beach used to be beautiful and my family and I spent many a day playing and swimming at there. However the last two years the beach has basically been destroyed. It is a very sad sight. I have had three renters cancel once they saw the beach and one even accised me of false afvertising because my beach pictures were from 4 years ago. Recently, my family attended a wedding on Maui and rather than stay free at our own beautiful condo we ended up renting a place at Kaanapali Alii ...solely because of the differences.

I urge you Please move forward with beach replenishment project in Khana.

Thank you for your time.

Sincerely,

Ed Barker SOK unit 215

Get Outlook for iOS

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February 13, 2020

Ed Barker
4299 Lower Honoapiilani Road Unit #215
Lahaina, HI 96761

Dear Ed Barker,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Ronni Rosenfeld
To:	Kahana Bay Comments
Subject:	Re: [External] FW: Kahana Bay Erosion
Date:	Monday, August 26, 2019 12:59:13 PM

Dear Taylor,
My address is 2028 Guizot St., San Diego, CA 92107

Sent from my iPhone

> On Aug 26, 2019, at 2:25 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Ronni,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: hmlfutures@aol.com <hmlfutures@aol.com>
> Sent: Thursday, August 22, 2019 9:34 AM
> To: Lemmo, Sam J <sam.j.lemmo@hawaii.gov>; Kahana@oceanit.com <Kahans@oceanit.com>
> Subject: Kahana Bay Erosion
>
> Please, I can’t urge you enough on the urgency for the beach nourishment project.
> It is imperative that you act on the Kahana Bay Erosion.
> Sincerely,
> Ronni Rosenfeld
>
>
> Sent from my iPhone

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February 13, 2020

Ronni Rosenfield
2028 Guizot St.
San Diego, CA 92107

Dear Ronni Rosenfield,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Andrea Nissim
To:	Kahana Bay Comments
Subject:	[External] Kahana Beach Erosion
Date:	Thursday, August 22, 2019 1:37:59 PM

Why is the erosion problem going on and on without serious remedies being done? This has been going on for a ling time with beaches disappearing at an alarming rate. Please do something to stop this and restore the beaches before it's too late!
Andrea Nissim

Sent from my iPhone

From: rbakervertipm@aol.com
To: Kahana Bay Comments
Subject: Re: [External] Kahana Bay Beach Nourishment Project
Date: Friday, August 23, 2019 1:26:06 PM

REX BAKER
24652 GLENEAGLES
CORONA, CA
92883

-----Original Message-----
From: Kahana Bay Comments <kahana@oceanit.com>
To: rbakervertipm@aol.com <rbakervertipm@aol.com>
Sent: Fri, Aug 23, 2019 3:18 pm
Subject: RE: [External] Kahana Bay Beach Nourishment Project

Aloha Mr. Baker,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: rbakervertipm@aol.com <rbakervertipm@aol.com>
Sent: Thursday, August 22, 2019 1:41 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Beach Nourishment Project

Sir,
As a long time owner at the Sands of Kahana I strongly support this badly needed project! We have helplessly watched many beautiful palm trees and other landscape plants as well as the sandy beach disappear over the last few years due to the rising ocean and rough surf. This was sad knowing that without government permits etc we could do nothing to protect our investment and the resort we have come to love and call our home away from home. Completion of this project will not bring back the beautiful palm trees that Hawaii is so well known for but it would certainly restore the beach, prevent damage to the buildings, protect surviving landscape plants and stabilize the property value which is surely sliding as the damage continues to destroy the beautiful Island look!
Thank you for your service and consideration.
God Bless!
Rex O. Baker
909-938-7223

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innovation through engineering & scientific excellence

February 13, 2020

Rex O. Baker
24652 Gleneagles
Corona, CA 92883

Dear Rex O. Baker,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: aarkebauer@aol.com
To: Kahana Bay Comments
Subject: Re: [External] Beach Erosion
Date: Saturday, August 24, 2019 5:15:09 AM

Annie Arkebauer
5055 Foothills Dr. Unit H
Lake Oswego, Or. 97034

-----Original Message-----
From: Kahana Bay Comments <kahana@oceanit.com>
To: aarkebauer@aol.com <aarkebauer@aol.com>
Sent: Fri, Aug 23, 2019 3:18 pm
Subject: RE: [External] Beach Erosion

Aloha,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a name and physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: aarkebauer@aol.com <aarkebauer@aol.com>
Sent: Thursday, August 22, 2019 1:44 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach Erosion

We need to take action about the beach erosion to save the beautiful beach at Sands of Kahana. Owner

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February 13, 2020

Annie Arkebauer
5055 Foothills Dr., Unit H
Lake Oswego, OR 97034

Dear Annie Arkebauer,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Ron Glassman
To:	Kahana Bay Comments
Subject:	Re: [External]
Date:	Friday, August 23, 2019 12:47:00 PM

Thank you for your reply.

Regards,

Ron Glassman
13513 Rose St
Cerritos, CA 90703

-----Original Message-----
From: Kahana Bay Comments <kahana@oceanit.com>
To: Ron Glassman <brooklyn.ron1@verizon.net>
Sent: Fri, Aug 23, 2019 3:19 pm
Subject: RE: [External]

Aloha Mr. Glassman,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Ron Glassman <brooklyn.ron1@verizon.net>
Sent: Thursday, August 22, 2019 1:52 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External]

Please move forward with the beach nourishment project by the sands of kahana. Thank you, Ron Glassman

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February 13, 2020

Ron Glassman
13513 Rose St.
Cerritos, CA 90703

Dear Ron Glassman,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Tori Bahoravitch
To:	Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Kahana Bay beach nourishment comment
Date:	Thursday, August 22, 2019 1:56:32 PM

We own a timeshare at one of the properties located in the Kahana Bay area (Sands of Kahana) that has been severely affected by the beach erosion. I strongly encourage you to move forward as quickly as possible with the beach nourishment project along the Kahana shore. The erosion mitigation action is critical to long-term enjoyment of the area and the associated properties. Millions of dollars are at stake, short-term and over the long-term. Please preserve this beach!

Sincerely,

Tim and Tori Bahoravitch
264 N 1020 E
American Fork, UT 84003
801-367-5686

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Tim and Tori Bahoravitch
264 N 1020 E
American Fork, UT 84003

Dear Tim and Tori Bahoravitch,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: joann fawver
To: Kahana Bay Comments
Subject: RE: [External] Kahana Beach Erosion Mitigation
Date: Friday, August 23, 2019 1:41:17 PM

7340 S Fawver Rd, Canby,Oregon 97013

Sent from Mail for Windows 10

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 3:19:39 PM
To: joann fawver <jfawver@hotmail.com>
Subject: RE: [External] Kahana Beach Erosion Mitigation

Aloha Mr. and Mrs. Fawver,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: joann fawver <jfawver@hotmail.com>
Sent: Thursday, August 22, 2019 2:03 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach Erosion Mitigation

Dear sir:

We are in favor of the restoration, rehabilitation, and preservation of our sandy beach along Kahana Bay.

Sincerely,

Bud and JoAnn Fawver, owners
Sands of Kahana

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innovation through engineering & scientific excellence

February 13, 2020

Bud and JoAnn Fawver
7340 S Fawver Rd.
Canby ,Oregon, 97013

Dear Bud and JoAnn Fawver,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: David Jenkins
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Cc: Pat Jenkins
Subject: [External] Sands of Kahana beach erosion
Date: Thursday, August 22, 2019 2:03:51 PM

Dear Mr. Lemmo,

As you are well aware the situation at Kahana beach is now dire. An overall and immediate beach nourishment project is needed immediately. The devastating impact to the neighborhood if no action is taken will be long lasting.

Thanks in advance for your support.

David and Patricia Jenkins
Sands of Kahana (time share owners)
20453 Valley Falls Square
Ashburn, VA 20147

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innovation through engineering & scientific excellence

February 13, 2020

David and Patricia Jenkins
20453 Valley Falls Square
Ashburn, VA 20147

Dear David and Patricia Jenkins,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: [Rik Tarnoff]
To: [Kahana Bay Comments]
Subject: Re: [External] Beach Renourishment
Date: Friday, August 23, 2019 4:50:11 PM

Richard Tarnoff
4730 Sungate Dr
Palmdale, CA 93551

Sent from my iPad

> On Aug 23, 2019, at 3:20 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. Tarnoff,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Rik Tarnoff <1soccerdad@roadrunner.com>
> Sent: Thursday, August 22, 2019 2:04 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Beach Renourishment
>
> To whom it may concern,
>
>
> I am reaching out to you as a 15/16 yr owner at the Sands of Kahana. The West Maui beaches and the resort where I own have much sentimental value to myself and my family. It is literally, our home away from home. I urge you Sir to do everything in your power to do what must be done to restore the beaches. At our resort, it's to the point there is no beach. Please don't let this happen.
>
> R. Tarnoff
> Palmdale, CA
>
>
>

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innovation through engineering & scientific excellence

February 13, 2020

Rik Tarnoff
4730 Sungate Dr.
Palmdale, CA 95331

Dear Rik Tarnoff,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: rick harter
To: Kahana Bay Comments
Subject: [External] Beach Eroison
Date: Thursday, August 22, 2019 2:22:21 PM

I am a owner at the Sands of Kahana and have watched over the last several years as our beach in this area has been eroding away. I believe that now is the time to act on keeping this from going further. I support the Kahana Bay beach nourishment program to hel[and hopefully stop the beach from eroding.

Thanks,

Rick Harter

From: Kelli Robertson
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External] Kahana Bay Erosion Mitigation EIS
Date: Thursday, August 22, 2019 2:25:26 PM

We need a resolution for the beach erosion. Please help restore our beach front.

Thank you,

Kelli Robertson, CISR Elite
Executive Vice President
Director of Operations

Risk Concepts Insurance Brokers
Acrisure of California, LLC
3480 Buskirk Ave., Suite 260
Pleasant Hill, CA 94523
(925) 933-9200 Office
(925) 350-6856 Fax

kellir@rcibrokers.com www.rcibrokers.com
CA License # 0K07568

"Integrity Builds Trust - Trust Builds Loyalty"

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Kelli Robertson
Risk Concepts Insurance Brokers, Acrisure of California, LLC, 3480 Buskirk Ave., Suite 260
Pleasant Hill, CA 94523

Dear Kelli Robertson,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʽi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Linda Springer
To: Kahana Bay Comments
Subject: [External] Beach erosion urgency!
Date: Thursday, August 22, 2019 2:25:55 PM

We need beach erosion nourishment ASAP. This is a major problem that affects the enjoyment of properties! I am an owner at Sands of Kahana.

Regards,
Linda Springer

From:	Ronald Brauer
To:	Kahana Bay Comments
Subject:	RE: [External] Kahana Beach Nourishment and Protection Project
Date:	Friday, August 23, 2019 3:12:39 PM

Aloha Taylor:

Mahalo for the fast response….

Sorry I forgot to add our physical address it is:

Ron & Cindy Brauer
1550 Baines Ave
Sacramento, CA 95835

Ron & Cindy

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 3:22 PM
To: Ronald Brauer <rgbrauer@comcast.net>
Subject: RE: [External] Kahana Beach Nourishment and Protection Project

Aloha Mr. and Mrs. Brauer,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Ronald Brauer <rgbrauer@comcast.net>
Sent: Thursday, August 22, 2019 2:33 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach Nourishment and Protection Project

To Whom It May Concern:

As owners at the Sands of Kahana Resort, we see it of vital importance for replenishment and protection of the beach area at Kahana Bay. Not only will that regain the beauty of the Kahana Beach area, but also protect the property. We were shocked and dismayed by the erosion that we noticed during our visit earlier this year and are saddened by the loss of such a beautiful stretch of beach. The area of beach behind the Sands of Kahana have always been a beautiful sight and a place of enjoyment for everyone. As owners since 2002 we have many great memories of that beautiful expanse of Kahana Beach!

We feel that replenishing the beach area and placing some type of protection to mitigate erosion in the future is extremely important and something that we hope the Hawaiian Government sees as just as important. Thank you for your time and consideration.

Sincerely,

Ron & Cindy Brauer

February 13, 2020

Ron and Cindy Brauer
1550 Baines Ave.
Sacramento, CA 95835

Dear Ron and Cindy Brauer,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Michelle Kubo
To: Kahana Bay Comments
Subject: Re: [External] Kahana beach erosion
Date: Friday, August 23, 2019 12:51:12 PM

Sure, here it is. 1609 Hackberry Lane, Lincoln, CA 94648

On Fri, Aug 23, 2019 at 3:21 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Ms. Kubo,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Michelle Kubo <mrrkubo@gmail.com>
> **Sent:** Thursday, August 22, 2019 2:39 PM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana beach erosion
>
> I am writing to urge you to take whatever steps are necessary to renew the Kahanna beach area and prevent further erosion. Beach protection is vital to the economy of Maui and the tourism. In addition Orlando owners and timeshare owners will leave for better beach areas if this is not resolved.
>
> Respectfully
>
> Michelle Kubo

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innovation through engineering & scientific excellence

February 13, 2020

Michelle Kubo
1609 Hackberry Lane
Lincoln, CA 94648

Dear Michelle Kubo,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: Corky Smith
Subject: RE: [External] Kahana Beach Erosion Mitigation Project
Date: Friday, August 23, 2019 12:22:00 PM

Aloha Mr. Smith,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

-----Original Message-----
From: Corky Smith <stonegarden@fastmail.com>
Sent: Thursday, August 22, 2019 2:49 PM
To: sam.j.lemmo@hawaii.gov
Cc: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach Erosion Mitigation Project

To Whom it May Concern,

In the past, winter brought the major concern and the major damage to Kahana Beach. Summer allowed respite, even rebuilding.

This year, summer has been a disaster! High seas and surf have caused the undercutting of lawn and the loss of even more trees (a total now of SIXTEEN palms and several shade trees).

In the course of two days in July, the beach in front of Sands of Kahana became inaccessible due to a cornice of exposed coral and lava rock. The beach, for that matter, disappeared; waves were topping the cornice and reaching the wall marking the edge of the pool area. Where there had been sand there were now exposed shoals of coral.

This development sounds a note of even greater urgency for action and immediate resolution of the beach erosion problems on Kahana Beach.

Please work with renewed urgency to complete the Kahana Bay Erosion Mitigation EIS.

Sincerely,
Corliss L. Smith
SOK 372

February 13, 2020

Corliss L. Smith
4299 Lower Honoapiilani Road Unit #372
Lahaina, HI 96761

Dear Corliss L. Smith,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: MARK SHERROD
To: Kahana Bay Comments
Subject: RE: [External] SOK Beach Nourishment Project
Date: Friday, August 23, 2019 1:15:00 PM

Certainly!

Mark Sherrod

PO Box 2465

Corrales, NM 87048

On August 23, 2019 at 4:22 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. and Mrs. Sherrod,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: MARK SHERROD <dandmsherrod@comcast.net>
Sent: Thursday, August 22, 2019 2:55 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] SOK Beach Nourishment Project

To whom it may concern,

As owners at both the Sands of Kahana and the Kahana Beach resorts on the upper west side of Maui, we respectfully ask you to support further study, mitigation and protection of the beaches adjacent to both resorts. This area is a true treasure to Hawaii and its visitors. There is no place better and we hope the beach can be restored to what it was when we first visited many years ago.

Thank you,

Mark & Debby Sherrod

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innovation through engineering & scientific excellence

February 13, 2020

Mark & Debby Sherrod
P.O. Box 2465
Corrales, NM 87048

Dear Mark & Debby Sherrod,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: David Bates
To: Kahana Bay Comments
Subject: [External] Erosion at the Sands of Kahana
Date: Thursday, August 22, 2019 3:03:04 PM

I am an owner at the Sands of Kahana since 2003. My wife and I have been watching the erosion at the Sands of Kahana. and the adjacent property. We have lost over 20 Palm trees and a large amount of our beach area. we need immediate action to prevent further loss of our property.

PLEASE TAKE ACTION.

Sincerely,

David Bates
14898 Snafflebit
Sisters, Oregon 97759

541-549-6329.

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February 13, 2020

David Bates
14898 Snafflebit
Sisters, OR 97759

Dear David Bates,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Larry Smith
To:	sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Kahana Beach Erosion Mitigation Project
Date:	Thursday, August 22, 2019 3:05:48 PM

To Whom it May Concern,

In the past, winter was the time of high seas and major concern and brought major damage to Kahana Beach. Summer brought some relief, even rebuilding of the beach.

This year, summer has been a disaster as well. High seas and surf have caused the undercutting of grassy areas and the loss of even more trees. A total now of 16 palms and some other shade trees have now been lost. Very little naupauka is left to stop erosion.

In the course of two days in July, the beach in front of Sands of Kahana became inaccessible due to a ledge of exposed coral several feet high. The beach all but disappeared. Waves were crashing as far as the wall at the edge of the pool area. Instead of sand there was exposed coral.

This development means there is even greater urgency for action and immediate resolution of the beach erosion problems on Kahana Beach.

Please work with renewed urgency to complete the Kahana Bay Erosion Mitigation EIS.

Sincerely,
Larry L. Smith
Sands of Kahana
Unit #372

From:	Biggs, Corie
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Beach Erosion
Date:	Friday, August 23, 2019 1:54:07 PM

11421 North 1650th St
Palestine, IL 62451

Thanks.

On Aug 23, 2019, at 5:23 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Corie,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> **From:** Biggs, Corie <jcbiggs@marathonpetroleum.com>
> **Sent:** Thursday, August 22, 2019 3:11 PM
> **To:** Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana Beach Erosion
>
> I am an owner at the Sands of Kahana resort, and am writing to request your support of the Kahana Bay beach nourishment project.
>
> Over the past few years, significant portions of the beach at our resort have been lost. Prior to mitigation efforts, the beach had been eroded to within 20 feet of one of the resort housing buildings. Since then, temporary efforts have been somewhat effective, but now the situation has recently gotten worse, moving farther south down the beach. A large number of trees and other vegetation have been lost to the sea.
>
> Thank you for your consideration.
> Corie Biggs

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Corie Biggs
11421 North 1650th St.
Palestine, IL 62451

Dear Corie Biggs,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Steven Iversen
To:	Kahana Bay Comments
Subject:	Re: [External] Beach nourishment
Date:	Friday, August 23, 2019 3:40:58 PM

Steven and Heather Iversen
908 34th Ave
Vernon BC Canada
V1T 9V7

Sent from my iPhone
Steven

> On Aug 23, 2019, at 3:23 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:
>
> Aloha Mr. and Mrs. Iverson,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> -----Original Message-----
> From: Steven Iversen <steven.iversen@hotmail.com>
> Sent: Thursday, August 22, 2019 3:15 PM
> To: Kahana Bay Comments <kahana@oceanit.com>
> Subject: [External] Beach nourishment
>
> Dear Sirs:
>
> We have been timeshare owners at the Sands of Kahana property since 2011. When we first visited the property , one of the things we were impressed with was the beach and adjoining property in front of the Sands of Kahana. It has been very concerning to see not only the beach, but the oceanfront property as well, so quickly disappearing. We have discussed the possible building damage that could occur as the ocean encroaches upon the buildings. Beach nourishment and shore break infrastructures are urgently required to prevent further damage. Please expedite this process to protect the properties along this section of shoreline.
> Thank you for your consideration of our concerns.
> Steven and Heather Iversen
> Vernon BC Canada
>
>

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February 13, 2020

Steven and Heather Iverson
908 34th Ave.
Vernon, BC Canada, V1T 9V7

Dear Steven and Heather Iverson,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	shirley messinger
To:	Kahana Bay Comments
Subject:	Re: [External] Please help save the beach at Sands of Kahana! We are owners and go back every year for 3 months! Thanks Shirley and Daniel Messinger
Date:	Friday, August 23, 2019 1:54:56 PM

Shirley and Daniel Messinger
2864 woodbine st
slatington, pa
18080

On August 23, 2019, at 6:24 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Ms. Messinger,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: shirley messinger <sam1973@ptd.net>
Sent: Thursday, August 22, 2019 3:29 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Please help save the beach at Sands of Kahana! We are owners and go back every year for 3 months! Thanks Shirley and Daniel Messinger

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February 13, 2020

Shirley and Daniel Messinger
2864 Woodbine St.
Slatington, PA 18080

Dear Shirley and Daniel Messinger,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	mauijoyce@sbcglobal.net
To:	Kahana Bay Comments
Subject:	[External] Beach nourishment
Date:	Thursday, August 22, 2019 3:31:36 PM

To whom it may concern,

I agree with a project to replenish the beaches on the west side of Maui. It is our favorite spot in the world go to. We enjoy the Sands of Kahana time share that we own and would like to enjoy again the great beach that was just outside of the pool area. We noticed that lack of sand and vegetation that was lost on a visit in March 2019.

Please allow the funds to complete this project so we don't lose any more of a beautiful spot on Maui.

Thank you so much,

Joyce and Sid Fender/Timeshare owners and frequent visitors of a beautiful island.

From: mschultz6972@aol.com
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External] Beach Erosion
Date: Thursday, August 22, 2019 5:14:34 PM

To Whom It May Concern,

My wife Margie and I have owned a condo at Sands of Kahana for over 20 years. We have seen a lot of changes. But when the storms and high tide came, it showed we were not prepared to maintain our beach and retaining walls. We always enjoy going to the beach when we are staying at the Sands of Kahana, but with the beach erosion there will be no place to enjoy having a beach on our property.

It is important to make repairs on the beach and wall ASAP in order to save what is left of the beach and the grounds.

Bob & Margie Schultz

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innovation through engineering & scientific excellence

February 13, 2020

Bob and Margie Schultz
570 Caber Ct.
Santa Rosa, CA 95409-4428

Dear Bob and Margie Schultz,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Helen Gauthier
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Beach Erosion mitigation project
Date:	Friday, August 23, 2019 12:42:21 PM

Aloha,

We are at 2 Harold Ave, Biddeford, ME 04005.

Mahalo for your quick response. We love coming to Maui every year, and can't wait to get there again soon.

Mike and Helen Gauthier

On Fri, Aug 23, 2019, 6:26 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. Gauthier,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> ---
>
> **From:** Helen Gauthier <helenagau@gmail.com>
> **Sent:** Thursday, August 22, 2019 4:18 PM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana Beach Erosion mitigation project
>
> Please help mitigate the erosion at Kahana Beach. From the pictures I have seen, we are in danger of losing our buildings very soon if nothing is done. I appreciate your efforts in this.
>
> Sincerely,
>
> Michael and Helen Gauthier, owners at Sands of Kahana and Kahana Beach Club.
>
> Sent from Mail for Windows 10

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innovation through engineering & scientific excellence

February 13, 2020

Michael and Helen Gauthier
2 Harold Ave.
Biddeford, ME 04005

Dear Michael and Helen Gauthier,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Donald Geahlen
To:	sam.j.lemmo@hawaii.gov; Kahana Bay Comments; Donald Geahlen
Subject:	[External] Beach Nourishment Project
Date:	Thursday, August 22, 2019 4:53:24 PM

My wife & I own a 2 bedroom and 3 bedroom timeshare every year for many years at the Sands of Kahana. We are disappointed that something like this has taken so long to begin and as a result a large portion of the grass and tree landscaping has eroded at the beach. We want our input in going ahead with this work as soon as possible. Thank you for your cooperation.

Don & Connie Geahlen

--
don@MesaRealtyInc.com
www.MesaRealtyInc.com
Mesa Realty, Inc.
1461 E Garnet Avenue
Mesa, Arizona 85204
Don Geahlen, CRS, GRI
Designated Broker
Realtor Emeritus
480-507-8066 Office
1-888-816-7223 Fax
602-999-9350 Don Cell
Connie Geahlen GRI
602-999-9351 Connie Cell
April Barnett Realtor
480-406-1071 April Cell

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innovation through engineering & scientific excellence

February 13, 2020

Don and Connie Geahlen
Mesa Realty, Inc., 1464 E Garnet Avenue
Mesa, AZ 85204

Dear Don and Connie Geahlen,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "Wayne Matin"
Subject: RE: [External] beach erosion on West Maui shore
Date: Monday, August 26, 2019 9:58:00 AM

Aloha,

Received. Many thanks!

Best,
Taylor

From: Wayne Matin <optodoc2@yahoo.com>
Sent: Friday, August 23, 2019 6:48 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Re: [External] beach erosion on West Maui shore

Our address is: 36 Cuesta Way, Walnut Creek, CA, 94597.
Hopefully, you will make the right decision to expediently put the project into fruition.

We look forward, next year, to have a larger beach we can utilize without having to watch Sands of Kahana erode away along with the value of the property.

Thank you for expediting this project,

Wayne and Carol Martin

On Friday, August 23, 2019, 03:27:34 PM PDT, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Dr. and Mrs. Martin,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: Wayne Matin <optodoc2@yahoo.com>
Sent: Thursday, August 22, 2019 4:55 PM

To: sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Cc: Marc Nelson <76sokco@gmail.com>
Subject: [External] beach erosion on West Maui shore

To whom it may concern,

I have been a time share owner for 15 years at Sands of Kahana. Each year we come, the beach has eroded more and more to the point we do not have a beach we can sit on or use effectively.

Each big storm is taking more of the beach away and nothing is being done. Foundations for some of the hotels are getting closer to having erosions. We can stop this trend and reclaim much of the beaches by doing the noursehment erosion project.

Utilizing sand brought in of 50,000 cubic feet would reclaim 50 ft average along the whole stretch. We should not wait any longer as time is of the essence!

Please finalize the plans to go ahead with the project ASAP before more damage happens and we can't reclaim the beach at all unless we have huge structures to hold it back. Properties would go down in value and you would loose owners and tourists along with timeshare owners. This is a serious problem that needs immediate attention.

Please vote now to put the project into affect!

Thank you,

Dr. Wayne and Carol Martin

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innovation through engineering & scientific excellence

February 13, 2020

Dr. Wayne and Carol Martin
36 Cuesta Way
Walnut Creek, CA 94597

Dear Dr. Wayne and Carol Martin,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	"Ken Hughes"
Subject:	RE: [External] Kahana Bay Erosion Mitigation Project
Date:	Friday, August 23, 2019 12:28:00 PM

Aloha Mr. Hughes,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: Ken Hughes <hugos92128@gmail.com>
Sent: Thursday, August 22, 2019 4:57 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Erosion Mitigation Project

I am a Sands of Kahana owner and I urge approval of the Maui County Planning Department and the Kahana Bay Steering Committee's plan to restore, rehabilitate and preserve the sandy beach along Kahana Bay.

Please approve this effort without further delay.

Thank you,

Kenneth Hughes
17816 Frondoso Dr
San Diego, CA 92128

619-992-9666

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

Kenneth Hughes
17816 Frondoso Dr.
San Diego, CA 92128

Dear Kenneth Hughes,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	Marjorie Schultz
Subject:	RE: [External] Beach Erosion
Date:	Monday, August 26, 2019 9:59:00 AM

Aloha,

Received. Many thanks!

Best,
Taylor

From: Marjorie Schultz <mschultz6972@aol.com>
Sent: Sunday, August 25, 2019 6:39 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Re: [External] Beach Erosion

Our address is:

Robert & Marjorie Schultz
570 Caber Ct
Santa Rosa, CA 95409-4428

Sent from my iPhone

On Aug 23, 2019, at 4:44 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. Schultz,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> **From:** mschultz6972@aol.com <mschultz6972@aol.com>
> **Sent:** Thursday, August 22, 2019 5:14 PM
> **To:** Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Beach Erosion
>
> To Whom It May Concern,
>
> My wife Margie and I have owned a condo at Sands of Kahana for over 20 years. We have seen a lot of changes. But when the storms and high tide came, it showed we were not prepared to maintain our beach and retaining walls. We always enjoy going to the beach when we are staying at the Sands of Kahana, but with the beach erosion there will be no place to enjoy
> having a beach on our property.
>
> It is important to make repairs on the beach and wall ASAP in order to save what is left of the beach and the grounds.
>
> Bob & Margie Schultz

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February 13, 2020

Bob and Margie Schultz
570 Caber Ct.
Santa Rosa, CA 95409-4428

Dear Bob and Margie Schultz,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "Bright house"
Subject: RE: [External] Beach erosion sands of katana
Date: Friday, August 23, 2019 1:45:00 PM

Aloha Mr. and Mrs. Covey,

Mahalo for your feedback on and photos of Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

-----Original Message-----
From: Bright house <mccovey@bak.rr.com>
Sent: Thursday, August 22, 2019 5:17 PM
To: sam.j.lemmo@hawaii.gov
Cc: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach erosion sands of katana

I am an owner(timeshare) at Sands of Kahana. The erosion has gotten so bad that sand bags are being used to keep the sand from eroding. We come twice a year and I don't remember our board of directors telling us that there is a problem. I will send pictures following this e-mail. It is bad and getting worse. Please help
Thank you,
Martha and Bob Covey.

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February 13, 2020

Martha and Bob Covey
7305 Panorama Drive
Bakersfield, CA 93306

Dear Mr. and Mrs. Covey,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	"Carol Miller"
Subject:	RE: [External] Kahana Beach Nourishment Project
Date:	Friday, August 23, 2019 1:45:00 PM

Aloha Mr. and Mrs. Miller,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Carol Miller <carolwinthermiller@gmail.com>
Sent: Thursday, August 22, 2019 5:26 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach Nourishment Project

We are the owners of two Condo's in the Sands of Kahana. The beach erosion is very serious and needs to be dealt with as soon as possible.
Without this action, serious problems will continue. We hope that you take this into consideration and respect our need for the Kahana Beach Nourishment Project so we all can continue to enjoy Maui. It is beneficial to all the citizens of Maui that this project happen as soon as possible. Please keep us informed as to the progress on this important project.

Carol & Sam Miller

Sands of Kahana Owners of Unit #264 and #282

Contact: cell phone: 415-686-8123
Email: carolwinthermiller@gmail.com

From:	KENT CARDWELL
To:	Kahana Bay Comments
Subject:	RE: [External] Kahana Beach restoration
Date:	Monday, August 26, 2019 7:19:51 AM

My home address follows:
2316 East Hintze Dr.
Salt Lake City, UT. 84124

Sent from Mail for Windows 10

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 5:45:51 PM
To: KENT CARDWELL <kentcardwell@msn.com>
Subject: RE: [External] Kahana Beach restoration

Aloha Mr. Cardwell,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: KENT CARDWELL <kentcardwell@msn.com>
Sent: Thursday, August 22, 2019 5:34 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach restoration

Kahana Beach in West Maui has been subject to severe coastal erosion due to sea level rise, frequent storm events and past construction of individual seawalls and shoreline armoring.

As a property owner on this beach I would strongly propose that the beach remediation proposal be completed. Failure to do so will have fatal impact on the properties along this beach. This in turn will strongly discourage owners and future guests from visiting these properties---say goodbye to millions of tourist dollars.

Thank you,

Kent Cardwell

385-261-1236

Sent from Mail for Windows 10

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Kent Cardwell
2316 East Hintze Dr.
Salt Lake City, UT 84124

Dear Kent Cardwell,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Joel Mur
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject: [External] Comments on Kahana Bay Erosion Mitigation EIS
Date: Thursday, August 22, 2019 6:14:44 PM

Dear Sirs:

We are time-share owners at Sands of Kahana on 4299 Lower, Honoapiilani Hwy, Lahaina, HI 96761 and wish to express our support of the proposal to devise a regional approach to provide erosion mitigation at Kahana Bay. The Kahana Bay Steering Committee plan would restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards of sand transported from previously identified offshore sources.

The plan also proposes constructing structures that extend from the shoreline seaward to retain the nourished sand and stabilize the beach. This beach nourishment project would widen the existing beach by 35,150 feet (approximately 50 feet average width). The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

Based on what we observed when last at Sands of Kahana, this proposed project is necessary to restore and preserve the Kahana Bay coastline threatened by shoreline erosion. We whole heartedly support the proposal.

Thank you for the opportunity to comment.

We can be reached at joelmur@mac.com or at the following mailing address:

4511 Pomona Ave.
La Mesa, CA 91942

Sincerely,

Joel Mur & Joanne Nivison

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Joel Mur and Joanne Nivison
4511 Pomona Ave
La Mesa, CA 91942

Dear Joel Mur and Joanne Nivison,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Barbara Stanley
To:	Kahana Bay Comments
Subject:	[External] Kahana Beach Project
Date:	Thursday, August 22, 2019 6:19:56 PM

I support the Kahana Beach nourishment project. It is needed.

Thank you,

Barbara Stanley

Sent from Yahoo Mail on Android

From:	Robert Miske
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Beach Erosion
Date:	Friday, August 23, 2019 5:35:44 PM

Thanks Taylor...

Robert Miske
13709 Sherman Blvd
Marina, CA 93933

On Fri, Aug 23, 2019, 4:47 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. Miske,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Robert Miske <rmiske@alumni.nd.edu>
> **Sent:** Thursday, August 22, 2019 6:30 PM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana Beach Erosion
>
> To Whom it May Concern,
>
> I am an 18-year US Army Officer and have been a 2 Bedroom Timeshare Owner at Sands of Kahana Resort for more than ten years and have enjoyed the resort with family and friends for even longer. I have witnessed the considerable beach erosion over the years (especially in recent years) and strongly advocate for the beach nourishment project, to include individual seawalls and shoreline armoring, that is being considered.
>
> Thank you for your consideration.

Respectfully,

Robert C. Miske

Lieutenant Colonel

US Army

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February 13, 2020

Robert C. Miske, Lieutenant Colonel
13709 Sherman Blvd
Marine, CA 93933

Dear Robert C. Miske, Lieutenant Colonel,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "Betty Steinke"
Subject: RE: [External] Beach Nourishment Project
Date: Friday, August 23, 2019 1:47:00 PM

Aloha Mr. and Mrs. Steinke,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Betty Steinke <lbsteinke@shaw.ca>
Sent: Thursday, August 22, 2019 6:53 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach Nourishment Project

To whom it may concern:
We have been owners at Sands of Kahana since the early 1990's. We have seen erosion take place over time. We agree with the maintenance of the beach that should be looked after now. The State and County should be concerned also and should be interested in making sure the beaches are in tact.
Thank you in advance for keeping this resort an attraction for tourists.

Regards,
Lloyd & Betty Steinke
Vancouver, BC

From: Patrick LeDoux
To: Kahana Bay Comments
Subject: Re: [External] Kahana Beach restoration project.
Date: Sunday, August 25, 2019 3:23:59 AM

Good morning. Yes. Our permanent residence address is
126 194th ST SE
Bothell WA 98012

Thank you
Patrick and Jamie LeDoux
206-300-7775

On Fri, Aug 23, 2019, 4:47 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. LeDoux,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Patrick LeDoux <patrickjledoux@gmail.com>
> **Sent:** Thursday, August 22, 2019 8:41 PM
> **To:** sam.j.lemmo@hawaii.gov
> **Cc:** Kahana Bay Comments <kahana@oceanit.com>; Jamie LeDoux <jbledoux@msn.com>
> **Subject:** [External] Kahana Beach restoration project.
>
> Please add me to the list of supporters for this much needed restoration project. We love the Kahana Beach areas and this project is a must for the viability of the beach and community.
>
> Respectfully
>
> Patrick and Jamie LeDoux
>
> 206-300-7775

oceanit

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February 13, 2020

Patrick and Jamie LeDoux
126 194th St. SE
Bothell, WA 98012

Dear Patrick and Jamie LeDoux,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "john.newlin13"
Subject: RE: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard wou
Date: Monday, August 26, 2019 9:57:00 AM

Aloha,

Received. Many thanks!

Best,

Taylor

From: john.newlin13 <john.newlin13@gmail.com>
Sent: Friday, August 23, 2019 3:59 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: RE: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard wou

John newlin
2402 krikland dr
Grayling, mi 49738
Thanks

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 7:47 PM (GMT-05:00)
To: "john.newlin13" <john.newlin13@gmail.com>
Subject: RE: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard wou

Aloha Mr. Newlin,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: john.newlin13 <john.newlin13@gmail.com>
Sent: Friday, August 23, 2019 3:40 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard woul...

Thanks John Newlin

Sent from my Verizon, Samsung Galaxy smartphone

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

John Newlin
2402 Kirkland Dr.
Grayling, MI 49738

Dear John Newlin,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Thaddeus Bettner
To:	Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Fw: URGENT ACTION NEEDED TODAY
Date:	Friday, August 23, 2019 5:26:55 AM

Hello,

We own property at the Sands of Kahana and are urgently requesting this work be completed. Please provide any information or websites where the status of this project will updated.

Also, please add my email to any database you are keeping that will send updates of the project.

Thank you,

Thaddeus Bettner

----- Forwarded Message -----
From: SOK Email <76sokco@76sokco.com>
To: SOK Email <76sokco@76sokco.com>
Sent: Thursday, August 22, 2019, 02:55:02 PM PDT
Subject: URGENT ACTION NEEDED TODAY

Dear Sands of Kahana Vacation Club Owner:

The below is very self-explanatory, take the time today, if possible , to send an email supporting the Kahana Bay beach nourishment project. Thanks.

Marc

Marc,
I'm going to forward you an email from Sullivan. All SOK owners and timeshare owners need to send in their comments urging the the need for the resolution on beach erosion. Please help in getting as many as we can involved in sending a note to the 2 email addresses. THIS IS DUE TODAY.

Due Date: End of day today, Aug 22 2019
What: Dept of Land and Natural Resources is reviewing comments from residents on the Erosion CAse
SOK Owner Action Needed: Please mail Sam.j.lemmo@hawaii.gov and kahana@oceanit.com with your comments on the urgency for the Beach Nourishment Project. PLEASE FEEL FREE TO ADD PICTURES. WE MUST MAKE THIS HAPPEN.

READ THE NEWS ARTICLE:

http://www.lahainanews.com/page/content.detail/id/565963/New-comment-period-open-for-Kahana-Bay-Erosion-Mitigation-EIS.html?nav=19

New comment period open for Kahana Bay Erosion Mitigation EIS

August 8, 2019

Lahaina News

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KAHANA - The public has until Aug. 22 to comment on the second Environmental Impact Statement Preparation Notice for a project to devise a regional approach to provide erosion mitigation at Kahana Bay.

The EIS notice for the Kahana Bay Erosion Mitigation project is posted in the July 23 edition of the state Office of Environmental Quality Control's "The Environmental Notice" (available via health.hawaii.gov/oeqc/).

According to the document, Kahana Beach in West Maui has been subject to severe coastal erosion due to sea level rise, frequent storm events and past construction of individual seawalls and shoreline armoring.

In consultation with the Maui County Planning Department, the Kahana Bay Steering Committee (KBSC) plans to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards of sand transported from previously identified offshore sources.

The plan also envisages constructing structures that extend from the shoreline seaward to retain the nourished sand and stabilize the beach.

This beach nourishment project would widen the existing beach by 35150 feet (approximately 50 feet average width).

The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

KBSC represents nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline threatened by shoreline erosion.

The applicant is publishing a modified version of the EIS Preparation Notice originally published on March 8, 2019. Another 30-day public review and comment period starts.

The EIS will include comments and responses from all comment periods.

Comments should be sent to three parties:

The applicant: Kahana Bay Steering Committee, 10 Ho?ohui Road, Suite 201, Lahaina, HI 96761.

The approving agency/accepting authority: Department of Land and Natural Resources, State of Hawaii, Samuel Lemmo, Administrator, Office of Conservation and Coastal Lands, P.O. Box 621, Honolulu, HI 96809-0621, or Sam.j.lemmo@hawaii.gov.

And the consultant: Oceanit; 828 Fort Street Mall, Suite 600, Honolulu, HI, 96813, or kahana@oceanit.com.

From:	Macewen, Malcolm
To:	sam.j.Lemmo@hawaii.gov
Cc:	Kahana Bay Comments
Subject:	[External] Fwd: Kahana Bay beach erosion.
Date:	Friday, August 23, 2019 5:39:09 AM

Subject: Kahana Bay beach erosion.

I’ve been a timeshare owner of multiple units at Sands of Kahana and Kahana Beach Resort for a 25 years, currently with 5 separate units. The erosion the past years has taken away nearly all of our useable beach. Also, the erosion. Is now removing old growth trees and our lawn area. The proposed beach nourishment project is an absolute necessity to save our developments value, beauty and pleasures. Thank you. Malcolm MacEwen. 11324 N 129th Way, Scottsdale, Arizona 85259. 1-480.276.3142.
https://images.app.goo.gl/pVLVZM1Gex4jUDk39

Malcolm MacEwen Sent from my iPhone

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Malcom MacEwen
11324 N 129th Way
Scottsdale, AZ 85259

Dear Malcom MacEwen,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: rbakervertipm@aol.com
To: Kahana Bay Comments
Subject: [External] Kahana Bay Beach Nourishment Project
Date: Thursday, August 22, 2019 1:41:10 PM

Sir,
As a long time owner at the Sands of Kahana I strongly support this badly needed project!
We have helplessly watched many beautiful palm trees and other landscape plants as well as the sandy beach disappear over the last few years due to the rising ocean and rough surf.
This was sad knowing that without government permits etc we could do nothing to protect our investment and the resort we have come to love and call our home away from home.
Completion of this project will not bring back the beautiful palm trees that Hawaii is so well known for but it would certainly restore the beach, prevent damage to the buildings, protect surviving landscape plants and stabilize the property value which is surely sliding as the damage continues to destroy the beautiful Island look!
Thank you for your service and consideration.
God Bless!
Rex O. Baker
909-938-7223

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Rex O. Baker
24652 Gleneagles
Corona, CA 92883

Dear Rex O. Baker,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Pat Scheibel
To: Kahana Bay Comments
Subject: Re: [External] Fwd: Beach erosion
Date: Friday, August 23, 2019 3:04:42 PM

Thank you Taylor,
Our address
Bob & Pat Scheibel
13108 Overbrook Rd
Leawood, KS 66209

Sent from my iPad

On Aug 23, 2019, at 6:50 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Mr. and Mrs. Scheibel,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Pat Scheibel <rscheibel@kc.rr.com>
Sent: Friday, August 23, 2019 8:28 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Fwd: Beach erosion

Sent from my iPad

Begin forwarded message:

From: Pat Scheibel <rscheibel@kc.rr.com>
Date: August 23, 2019 at 1:22:02 PM CDT
Subject: Beach erosion

To whom it may concern,
We have been owners at the Sands of Kahana for 25 years. We have enjoyed the beautiful beach and palm trees. The recent erosion is so sad and although they have placed special sand bags on the north side it is continuing to erode. Something needs to be done to protect the land, sand, trees, and buildings. Please help!
Sincerely,

Patricia B Scheibel
Robert C Scheibel

Sent from my iPad

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Patricia and Robert Scheibel
13108 Overbrook Rd.
Leawood, KS 66209

Dear Patricia B Scheibel and Robert C Scheibel,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: John Kober
To: Kahana Bay Comments
Subject: Re: [External] Beach Nourishment Project at Kahan Bay
Date: Monday, August 26, 2019 10:01:48 AM

My address is 3423 Fordham Ct., St. Anthony Village, MN 55420

On Mon, Aug 26, 2019 at 2:57 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. Kober,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** John Kober <jrkober@gmail.com>
> **Sent:** Friday, August 23, 2019 2:21 PM
> **To:** sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Cc:** Marc Nelson <76sokco@gmail.com>
> **Subject:** [External] Beach Nourishment Project at Kahan Bay
>
> Greetings,
>
> I have been a timeshare owner at the Sands of Kahana for nearly 20 years. Over the years, my family and I have enjoyed the beach at the Sands and adjoining properties; however, over the last several years we have unfortunately witnessed a severe erosion of the beach and the adjoining property due to increased wave activity.
>
> I am writing to support your efforts to restore, rehabilitate, and preserve the sandy beach area. I believe that the proposed beach nourishment project will mitigate the severe erosion and once again provide a stable beach for visitors to Kahana Bay to enjoy, as well as prevent more erosion of the land abutting the beach area. I believe the beach erosion has reached a critical stage, and without the nourishment project, it will continue to increase and be disastrous to property owners in the very near future.
>
> Please move forward with the project and keep the many visitors returning to Maui and Kahana Bay year after year. You have what seems to be a solid plan, now let's move forward with it.
>
> Sincerely,
>
> John Kober
>
> Minneapolis, MN
>
> Sands of Kahana owner

February 13, 2020

John Kober
3423 Fordham St., St.
Anthony Village, MN 55420

Dear John Kober,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DLNR:OCCL:SH

Correspondence OA-20-42

AUG 23 2019

Michael Foley, Ph.D, P.E., Coastal Engineer
828 Fort Street Mall, Suite 600,
Honolulu, HI, 96813

SUBJECT: RE: (Second) Environmental Impact Statement Preparation Notice (EISPN) for the Kahana Bay Erosion Mitigation Project

Dear Dr. Foley,

The Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has received your (Second) Environmental Impact Statement Preparation Notice (EISPN), dated August 8, 2019.

We thank you for your submission and offer the following feedback and recommendations regarding preparation of the Draft Environmental Impact Statement (DEIS). Further, for your convenience we have provided our comments regarding the previously published EISPN dated February 5, 2019.

- As stated in our previous letter we recommend that you include a suite of alternative project designs that feature scaled-down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groin structures). More specifically, we recommend that you consider multiple design alternatives including those that do not employ groin structures, use only terminal groin structures, consider various numbers, sizes, and configurations of groins, consider integrating construction materials in the groins that promote native intertidal and aquatic ecosystems (e.g., artificial reef components), and alternatives that would limit nourishment to a historical extent of the beach.

- We recommend that additional shoreline accessways and public parking be made available to the public to facilitate increased beach use.

Given our experience with permitting and conducting beach restoration projects, please consider staff at the DLNR-OCCL as an additional resource for questions and guidance as you continue to develop the proposed project. Should you have any questions on the matter, please feel free to contact Shellie Habel, Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or via email at Shellie.L.Habel@Hawaii.gov.

Correspondence OA-20-42

Sincerely,

SAMUEL J. LEMMO, ADMINISTRATOR
OFFICE OF CONSERVATION AND COASTAL LANDS

Attachment

DAVID Y. IGE
GOVERNOR OF
HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
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

DLNR:OCCL:SH

Correspondence OA-19-140
MAR 2 7 2019

Michael Foley, Ph.D, P.E., Coastal Engineer
828 Fort Street Mall, Suite 600,
Honolulu, HI, 96813

SUBJECT: RE: Environmental Impact Statement Preparation Notice (EISPN) for the Kahana Bay Erosion Mitigation Project

Dear Dr. Foley,

The Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has received your Environmental Impact Statement Preparation Notice (EISPN), dated February 5, 2019.

We thank you for your submission and offer the following feedback and recommendations regarding preparation of the Draft Environmental Impact Statement (DEIS):

- We appreciate that the project gives serious consideration to beach restoration. The DLNR generally favors projects designed to mitigate coastal erosion by restoring beach ecosystems rather than by hardening the shoreline with seawalls and revetments, which has led to widespread beach loss in Hawaii.
- When preparing the DEIS, we recommend that you discuss potential impacts, if any, to offshore ecosystems and surf breaks that may result from sand migration/equilibration that generally occurs following beach nourishment projects.
- We recommend that you include a more detailed discussion regarding the methods (i.e., modeling, calculations, data analyses) that informed the design and tuning of T-head groins. Please also discuss the expected lifetime of the nourished beach and groin structures, and discuss the expected response of each to magnitudes of sea-level rise expected within those timeframes. For reference, sea-level rise projections are reported in the State Sea Level Rise Report and associated mapping tools can be accessed by visiting the following website: hawaiisealevelriseviewer.org.
- From the project description it appears that the offshore sand borrow areas would need to be nearly entirely emptied to obtain intended sand volumes (50-100K cy, total). There is

concern that doing so may cause changes to the benthos and may increase the chance of encountering fines and course material when dredging through the entire sand column. We recommend that a discussion be included in the DEIS that describes the potential impacts of doing so, if this is what is intended. We also recommend that a discussion be included regarding the long-term sustainability of beach nourishment in this area, for at least the next few decades or expected lifespan of the groins based on sand availability and intended usage.

- We recommend that you provide more detail to the discussion regarding the potential for increased stream blockage at the Kahana Stream mouth. On page 82 you state that "the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean. In its current state, the channelized portion of the stream's outlet is often plugged with accreted sand and sediment, causing ponding in the channel." You go on to state that your method of reducing blockage would be to place coarse grained material in this area to limit migration of sand by waves. This section would benefit from a more thorough discussion regarding intended grain sizes, potential sources of the coarse-grained material, and alternatives to the described mitigation method.

- We recommend that you clarify which season the project would take place, reasoning behind the choice in timing, and any foreseeable challenges associated with conducting the project during the chosen season (i.e., coral spawning, seasonal wave regime).

- We recommend that you provide more detail to the discussion regarding the overall design and footprint of the beach restoration project. For instance, please explain why the the design footprint extends beyond any documented beach extent featured in aerial photography dating back to 1912[1]. We raise this question because widening the beach beyond the limits of its former footprint will raise questions regarding possibly undesirable effects to nearshore ecosystems and offshore coral colonies. Please describe the potential environmental impacts, if any, and establish the benefit of filling the beach beyond historical extents, if that is a goal of the project

- We recommend that you provide more detail to the discussion on page 23 regarding the synchronization between sand placement and groin construction. The present description makes it seem as though sand would be placed prior to groin construction. We are concerned that 1) sand may be lost from the project before groins are constructed, and 2) that placement of armor-stones atop placed sand may lead to destabilization of the structure following subsequent beach equilibration and natural sand migration.

- We recommend that you include a description detailing how groins will be designed such that they do not hinder/block lateral beach access.

1 University of Hawaii Coastal Geology Group. Hawaii Coastal Erosion Website. http://www.soest.hawaii.edu/coasts/erosion/index.php

- When applying for a CDUA, DLNR OCCL will request that you submit sand samples from multiple locations along the beach and from each offshore borrow site. From information included in the EISPN, it appears that sand recovered from deposit 19 consists of greater than 2% fines. While DLNR OCCL guidelines state that sand is required to contain less than 6% fines, we may ask that a lower percentage (< 2%) is considered owing to the large amount of sediment being placed and presence of coral ecosystems located directly offshore. We also recommend that you amend Figure 4-7 to include the grain size distributions for each sand sample taken at onshore and offshore sample sites. Also, it is unclear why the 20% grain size distribution envelope uses a Kahana beach sample to determine the concentration limit for coarse grained material and a Honokowai beach sample to determine the concentration limit for fine grained material.

- On page 23 of the EISPN it is stated that the dredging barge cannot withstand waves greater than one to two feet. The offshore location from which sand would be dredged features swell that regularly exceeds this height and may rise unexpectedly. Thus, you may want to reconsider use of this particular barge system, or seek out alternative sand fields.

- We recommend the following three amendments to section 4.2.5 *Sea Level Rise* on page 79 of the EISPN. 1) Amend the following statement to include the contribution of land-based ice melt to present rates of sea-level rise, "Tide gauges at Hawai'i's major harbors, including Kahului Harbor, show an upward trend in sea level (Figure 4-11). This trend is primarily caused by the thermal expansion of seawater as it increases in temperature." 2) Amend the following statement to recognize present acceleration in the rate of global mean sea level rise, "The average global SLR over the last century was approximately 1.88 mm (0.074 inches) per year, with studies indicating that this rate may accelerate in the coming decades." 3) Correct the inactive link cited in the following statement, "UH SOEST provides a SLR scenario for Honolulu projecting a one-foot increase in sea level by midcentury, and about three feet by the end of the century (SOEST, 2018)."

- We recommend that you include a suite of alternative project designs that feature scaled-down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groin structures).

- Regarding the potential use of hydraulic slurry pumps for sand transport as stated on page 23 and 35, we are concerned that the method may cause sand to fracture; this in turn can lead to sand loss and elevated turbidity. This was the observed during the 2012 Waikiki Beach nourishment project, in which hydraulic pumping was identified as the likely culprit[2]. Beach quality sand is a valuable and diminishing resource among the Hawaiian Islands and it is important to realize that, owing to its composition, sand used for local nourishment projects is generally more fragile than sand used for the majority of large-scale efforts accomplished within the continental United States.

2 Habel, S., Fletcher, C. H., Barbee, M., & Anderson, T. R. (2016). The influence of seasonal patterns on a beach nourishment project in a complex reef environment. *Coastal Engineering, 116*, 67-76.

- Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. As part of the section in the DEIS that describes potential cultural impacts, please provide information that satisfies the following:
  - Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.
  - Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.
  - What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai'i rights?

Given our experience with permitting and conducting beach restoration projects, please consider staff at the DLNR-OCCL as an additional resource for questions and guidance as you continue to develop the proposed project. Should you have any questions on the matter, please feel free to contact Shellie Habel, Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or via email at Shellie.L.Habel@Hawaii.gov.

Sincerely,

SAMUEL J. LEMMO, ADMINISTRATOR
OFFICE OF CONSERVATION AND COASTAL LANDS

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Samuel J. Lemmo, Administrator
ATTN: Shellie Habel
Office of Conservation and Coastal Lands (OCCL)
State of Hawaii Department of Land and Natural Resources (DLNR)
1151 Punchbowl Street #131
Honolulu, HI 96813

Dear Mr. Lemmo:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for your comment letters dated March 29, 2019 and August 23, 2019 commenting on the above referenced EISPN following the request for comments published on March 8, 2019 and July 23, 2019 respectively, in *The Environmental Notice*. Your comments have been documented and will be included in the Draft Environmental Impact Statement (DEIS).

Oceanit values your general support of beach restoration over shoreline hardening and will address your recommendations and concerns in the DEIS. Please see the attached response to comments table that addresses your specific concerns and suggestions and references DEIS sections in which they will be described.

We appreciate your input and insight to help develop prudent actions for Kahana Beach and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Attachment:
Response to comments table

From: [Kahana Bay Comments]
To: ["Mike Brazeal"]
Subject: RE: [External] Beach Repair Solution Wanted
Date: Friday, August 23, 2019 1:47:00 PM

Aloha Mr. Brazeal,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Mike Brazeal <mikebrazeal1@gmail.com>
Sent: Thursday, August 22, 2019 6:58 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach Repair Solution Wanted

Hello,

I am an owner at Sands of Kahana and I am encouraging a quick and permanent repair and reconstruction of the eroded beach. It has become unusable, unsightly and an embarrassment.

Please do what you can to find a fix for this.

Thank you,

Michael Brazeal
--
Sent by Michael Brazeal

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Michael Brazeal
324 Burke Dr.
Canano Island, WA 98282

Dear Michael Brazeal,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	"Carl Jackson"
Subject:	RE: [External] Fw: Sands of Kahana - Beach erosion
Date:	Friday, August 23, 2019 1:44:00 PM

Aloha Mr. Jackson,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

-----Original Message-----
From: Carl Jackson <chj512@earthlink.net>
Sent: Thursday, August 22, 2019 5:04 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Fw: Sands of Kahana - Beach erosion

Attached are photos of the Sands of Kahana Beach erosion. Please look and see that much more and the Sands of Kahana, a bequtiful resort in West Maui could crumble into the ocean.   It is so past due for something to be done about this area. Please, as soon as possible get the project started to restore the beach and make the buildings safe.

Regards,
Carl Jackson
SOK Timeshare owner

From:	Kahana Bay Comments
To:	"c21hettwer"
Subject:	RE: [External] Kahana Erosion
Date:	Friday, August 23, 2019 1:55:00 PM

Aloha,

Received. Many thanks!

Best,

Taylor

From: c21hettwer <c21hettwer@aol.com>
Sent: Friday, August 23, 2019 1:08 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: RE: [External] Kahana Erosion

12572 Drake St NW, Coon Rapids MN 55448.

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 5:25 PM (GMT-06:00)
To: c21hettwer <c21hettwer@aol.com>
Subject: RE: [External] Kahana Erosion

Aloha Jan,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: c21hettwer <c21hettwer@aol.com>
Sent: Thursday, August 22, 2019 3:52 PM
To: Sam.j.lemmo@hawaii.gov
Cc: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Erosion

I am a timeshare owner at the Sands of Kahana and have watched our property continue to erode.

Please take action steps to remedy this situation ASAP before it gets any worse.

I look forward to hearing the resolution to this terrible problem.

Thank you.

Jan Hettwer-Dummer

Sent from my Verizon, Samsung Galaxy smartphone

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Jan Hettwer-Dummer
12572 Drake St. NW
Coon Rapids, MN 55448

Dear Jan Hettwer-Dummer,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "duskie gramm"
Subject: RE: [External] Sands of Kahana Beach nourishment
Date: Friday, August 23, 2019 12:26:00 PM

Aloha Mr. and Mrs. Gramm,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: duskie gramm <dgramm39@gmail.com>
Sent: Thursday, August 22, 2019 4:54 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Sands of Kahana Beach nourishment

Please accept this message as our support for your consideration for the much needed beach nourishment at Sands of Kahana. We've been owners since 2003 and have enjoyed much needed time with family and friends. It's sad to see what has happened in just the short time since we were there last. I've always looked forward to mornings sitting down in the area that is, for the most part, gone now. Please take action before anymore is lost. Thank you for your time and consideration.

Dale & Duskie Gramm
2329 Wyoming St
Missoula, MT 59801
306-370-6943

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Dale and Duskie Gramm
2329 Wyoming St.
Missoula MT 59801

Dear Dale and Duskie Gramm,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "Sandra Bates"
Subject: RE: [External] Sands of Kahana Erosion
Date: Friday, August 23, 2019 12:27:00 PM

Aloha Ms. Bates,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: Sandra Bates <sandrabates649@gmail.com>
Sent: Thursday, August 22, 2019 4:56 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Sands of Kahana Erosion

We have been owners at the Sands of Kahana since 2003 and have enjoyed 2 weeks there every year since then. We are deeply concerned about the erosion of the beach area at this property and all along the beaches of the Kahana area. Please more forward with the mitigation plan to address this problem.

Sincerely yours,

Sandra R. Bates
14898 Snafflebit
Sisters, OR 97759

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

Sandra R. Bates
14898 Snafflebit
Sisters, OR 97759

Dear Sandra R. Bates,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

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We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From: Kahana Bay Comments
To: "Ken Hughes"
Subject: RE: [External] Kahana Bay Erosion Mitigation Project
Date: Friday, August 23, 2019 12:28:00 PM

Aloha Mr. Hughes,

Mahalo for your insight on and support of the Kahana Bay Erosion Mitigation Project. We will be responding to your comments in a letter mailed to the address that you provided.

Thank you,
Taylor

From: Ken Hughes <hugos92128@gmail.com>
Sent: Thursday, August 22, 2019 4:57 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Bay Erosion Mitigation Project

I am a Sands of Kahana owner and I urge approval of the Maui County Planning Department and the Kahana Bay Steering Committee's plan to restore, rehabilitate and preserve the sandy beach along Kahana Bay.

Please approve this effort without further delay.

Thank you,

Kenneth Hughes
17816 Frondoso Dr
San Diego, CA 92128

619-992-9666

oceanit.
innovation through engineering & scientific excellence

February 13, 2020

Kenneth Hughes
17816 Frondoso Dr.
San Diego, CA 92128

Dear Kenneth Hughes,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the Kahana Bay Erosion Mitigation Project following the publication of the EISPN in the July 23, 2019 *Environmental Notice* Bulletin. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

From:	Kahana Bay Comments
To:	Marjorie Schultz
Subject:	RE: [External] Beach Erosion
Date:	Monday, August 26, 2019 9:59:00 AM

Aloha,

Received. Many thanks!

Best,
Taylor

From: Marjorie Schultz <mschultz6972@aol.com>
Sent: Sunday, August 25, 2019 6:39 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: Re: [External] Beach Erosion

Our address is:

Robert & Marjorie Schultz
570 Caber Ct
Santa Rosa, CA 95409-4428

Sent from my iPhone

On Aug 23, 2019, at 4:44 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. Schultz,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> **From:** mschultz6972@aol.com <mschultz6972@aol.com>
> **Sent:** Thursday, August 22, 2019 5:14 PM
> **To:** Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Beach Erosion
>
> To Whom It May Concern,
>
> My wife Margie and I have owned a condo at Sands of Kahana for over 20 years. We have seen a lot of changes. But when the storms and high tide came, it showed we were not prepared to maintain our beach and retaining walls. We always enjoy going to the beach when we are staying at the Sands of Kahana, but with the beach erosion there will be no place to enjoy
> having a beach on our property.
>
> It is important to make repairs on the beach and wall ASAP in order to save what is left of the beach and the grounds.
>
> Bob & Margie Schultz

From:	Kahana Bay Comments
To:	"Bright house"
Subject:	RE: [External] Beach erosion sands of katana
Date:	Friday, August 23, 2019 1:45:00 PM

Aloha Mr. and Mrs. Covey,

Mahalo for your feedback on and photos of Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

-----Original Message-----
From: Bright house <mccovey@bak.rr.com>
Sent: Thursday, August 22, 2019 5:17 PM
To: sam.j.lemmo@hawaii.gov
Cc: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach erosion sands of katana

I am an owner(timeshare) at Sands of Kahana. The erosion has gotten so bad that sand bags are being used to keep the sand from eroding. We come twice a year and I don't remember our board of directors telling us that there is a problem. I will send pictures following this e-mail. It is bad and getting worse. Please help
Thank you,
Martha and Bob Covey.

From:	Kahana Bay Comments
To:	"Carol Miller"
Subject:	RE: [External] Kahana Beach Nourishment Project
Date:	Friday, August 23, 2019 1:45:00 PM

Aloha Mr. and Mrs. Miller,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Carol Miller <carolwinthermiller@gmail.com>
Sent: Thursday, August 22, 2019 5:26 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach Nourishment Project

We are the owners of two Condo's in the Sands of Kahana. The beach erosion is very serious and needs to be dealt with as soon as possible.
Without this action, serious problems will continue. We hope that you take this into consideration and respect our need for the Kahana Beach Nourishment Project so we all can continue to enjoy Maui. It is beneficial to all the citizens of Maui that this project happen as soon as possible. Please keep us informed as to the progress on this important project.

Carol & Sam Miller

Sands of Kahana Owners of Unit #264 and #282

Contact: cell phone: 415-686-8123
Email: carolwinthermiller@gmail.com

From:	KENT CARDWELL
To:	Kahana Bay Comments
Subject:	RE: [External] Kahana Beach restoration
Date:	Monday, August 26, 2019 7:19:51 AM

My home address follows:
2316 East Hintze Dr.
Salt Lake City, UT. 84124

Sent from Mail for Windows 10

From: Kahana Bay Comments <kahana@oceanit.com>
Sent: Friday, August 23, 2019 5:45:51 PM
To: KENT CARDWELL <kentcardwell@msn.com>
Subject: RE: [External] Kahana Beach restoration

Aloha Mr. Cardwell,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: KENT CARDWELL <kentcardwell@msn.com>
Sent: Thursday, August 22, 2019 5:34 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Kahana Beach restoration

Kahana Beach in West Maui has been subject to severe coastal erosion due to sea level rise, frequent storm events and past construction of individual seawalls and shoreline armoring.

As a property owner on this beach I would strongly propose that the beach remediation proposal be completed. Failure to do so will have fatal impact on the properties along this beach. This in turn will strongly discourage owners and future guests from visiting these properties---say goodbye to millions of tourist dollars.

Thank you,

Kent Cardwell

385-261-1236

Sent from Mail for Windows 10

From:	Joel Mur
To:	Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Comments on Kahana Bay Erosion Mitigation EIS
Date:	Thursday, August 22, 2019 6:14:44 PM

Dear Sirs:

We are time-share owners at Sands of Kahana on 4299 Lower, Honoapiilani Hwy, Lahaina, HI 96761 and wish to express our support of the proposal to devise a regional approach to provide erosion mitigation at Kahana Bay. The Kahana Bay Steering Committee plan would restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards of sand transported from previously identified offshore sources.

The plan also proposes constructing structures that extend from the shoreline seaward to retain the nourished sand and stabilize the beach. This beach nourishment project would widen the existing beach by 35,150 feet (approximately 50 feet average width). The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

Based on what we observed when last at Sands of Kahana, this proposed project is necessary to restore and preserve the Kahana Bay coastline threatened by shoreline erosion. We whole heartedly support the proposal.

Thank you for the opportunity to comment.

We can be reached at joelmur@mac.com or at the following mailing address:

4511 Pomona Ave.
La Mesa, CA 91942

Sincerely,

Joel Mur & Joanne Nivison

From:	Barbara Stanley
To:	Kahana Bay Comments
Subject:	[External] Kahana Beach Project
Date:	Thursday, August 22, 2019 6:19:56 PM

I support the Kahana Beach nourishment project. It is needed.

Thank you,

Barbara Stanley

Sent from Yahoo Mail on Android

From:	Robert Miske
To:	Kahana Bay Comments
Subject:	Re: [External] Kahana Beach Erosion
Date:	Friday, August 23, 2019 5:35:44 PM

Thanks Taylor...

Robert Miske
13709 Sherman Blvd
Marina, CA 93933

On Fri, Aug 23, 2019, 4:47 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. Miske,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Robert Miske <rmiske@alumni.nd.edu>
> **Sent:** Thursday, August 22, 2019 6:30 PM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Kahana Beach Erosion
>
> To Whom it May Concern,
>
> I am an 18-year US Army Officer and have been a 2 Bedroom Timeshare Owner at Sands of Kahana Resort for more than ten years and have enjoyed the resort with family and friends for even longer. I have witnessed the considerable beach erosion over the years (especially in recent years) and strongly advocate for the beach nourishment project, to include individual seawalls and shoreline armoring, that is being considered.
>
> Thank you for your consideration.

Respectfully,

Robert C. Miske

Lieutenant Colonel

US Army

From:	Kahana Bay Comments
To:	"Betty Steinke"
Subject:	RE: [External] Beach Nourishment Project
Date:	Friday, August 23, 2019 1:47:00 PM

Aloha Mr. and Mrs. Steinke,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,
Taylor

From: Betty Steinke <lbsteinke@shaw.ca>
Sent: Thursday, August 22, 2019 6:53 PM
To: Sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Beach Nourishment Project

To whom it may concern:
We have been owners at Sands of Kahana since the early 1990's. We have seen erosion take place over time. We agree with the maintenance of the beach that should be looked after now. The State and County should be concerned also and should be interested in making sure the beaches are in tact.
Thank you in advance for keeping this resort an attraction for tourists.

Regards,
Lloyd & Betty Steinke
Vancouver, BC

From: Patrick LeDoux
To: Kahana Bay Comments
Subject: Re: [External] Kahana Beach restoration project.
Date: Sunday, August 25, 2019 3:23:59 AM

Good morning. Yes. Our permanent residence address is
126 194th ST SE
Bothell WA 98012

Thank you
Patrick and Jamie LeDoux
206-300-7775

On Fri, Aug 23, 2019, 4:47 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. LeDoux,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** Patrick LeDoux <patrickjledoux@gmail.com>
> **Sent:** Thursday, August 22, 2019 8:41 PM
> **To:** sam.j.lemmo@hawaii.gov
> **Cc:** Kahana Bay Comments <kahana@oceanit.com>; Jamie LeDoux <jbledoux@msn.com>
> **Subject:** [External] Kahana Beach restoration project.
>
> Please add me to the list of supporters for this much needed restoration project. We love the Kahana Beach areas and this project is a must for the viability of the beach and community.
>
> Respectfully
>
> Patrick and Jamie LeDoux
>
> 206-300-7775

From: Kahana Bay Comments
To: "john.newlin13"
Subject: RE: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard wou
Date: Monday, August 26, 2019 9:57:00 AM

Aloha,

Received. Many thanks!

Best,

Taylor

From: john.newlin13 <john.newlin13@gmail.com>
Sent: Friday, August 23, 2019 3:59 PM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: RE: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard wou

John newlin
2402 krikland dr
Grayling, mi 49738
Thanks

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: Kahana Bay Comments <kahana@oceanit.com>
Date: 8/23/19 7:47 PM (GMT-05:00)
To: "john.newlin13" <john.newlin13@gmail.com>
Subject: RE: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard wou

Aloha Mr. Newlin,

Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?

Thank you,

Taylor

From: john.newlin13 <john.newlin13@gmail.com>
Sent: Friday, August 23, 2019 3:40 AM
To: Kahana Bay Comments <kahana@oceanit.com>
Subject: [External] Good morning my name is John newlin my wife and I have a timeshare at the sands and the beach,for the last 20 years,we have seen the beach slowly recideto the point the sands has lost 15 beautiful palm trees,if this was your front yard woul...

Thanks John Newlin

Sent from my Verizon, Samsung Galaxy smartphone

From:	Thaddeus Bettner
To:	Sam.j.lemmo@hawaii.gov; Kahana Bay Comments
Subject:	[External] Fw: URGENT ACTION NEEDED TODAY
Date:	Friday, August 23, 2019 5:26:55 AM

Hello,

We own property at the Sands of Kahana and are urgently requesting this work be completed. Please provide any information or websites where the status of this project will updated.

Also, please add my email to any database you are keeping that will send updates of the project.

Thank you,

Thaddeus Bettner

----- Forwarded Message -----
From: SOK Email <76sokco@76sokco.com>
To: SOK Email <76sokco@76sokco.com>
Sent: Thursday, August 22, 2019, 02:55:02 PM PDT
Subject: URGENT ACTION NEEDED TODAY

Dear Sands of Kahana Vacation Club Owner:

The below is very self-explanatory, take the time today, if possible , to send an email supporting the Kahana Bay beach nourishment project. Thanks.

Marc

Marc,
I'm going to forward you an email from Sullivan. All SOK owners and timeshare owners need to send in their comments urging the the need for the resolution on beach erosion. Please help in getting as many as we can involved in sending a note to the 2 email addresses. THIS IS DUE TODAY.

Due Date: End of day today, Aug 22 2019
What: Dept of Land and Natural Resources is reviewing comments from residents on the Erosion CAse
SOK Owner Action Needed: Please mail Sam.j.lemmo@hawaii.gov and kahana@oceanit.com with your comments on the urgency for the Beach Nourishment Project. PLEASE FEEL FREE TO ADD PICTURES. WE MUST MAKE THIS HAPPEN.

READ THE NEWS ARTICLE:

http://www.lahainanews.com/page/content.detail/id/565963/New-comment-period-open-for-Kahana-Bay-Erosion-Mitigation-EIS.html?nav=19

New comment period open for Kahana Bay Erosion Mitigation EIS

August 8, 2019

Lahaina News

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KAHANA - The public has until Aug. 22 to comment on the second Environmental Impact Statement Preparation Notice for a project to devise a regional approach to provide erosion mitigation at Kahana Bay.

The EIS notice for the Kahana Bay Erosion Mitigation project is posted in the July 23 edition of the state Office of Environmental Quality Control's "The Environmental Notice" (available via health.hawaii.gov/oeqc/).

According to the document, Kahana Beach in West Maui has been subject to severe coastal erosion due to sea level rise, frequent storm events and past construction of individual seawalls and shoreline armoring.

In consultation with the Maui County Planning Department, the Kahana Bay Steering Committee (KBSC) plans to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards of sand transported from previously identified offshore sources.

The plan also envisages constructing structures that extend from the shoreline seaward to retain the nourished sand and stabilize the beach.

This beach nourishment project would widen the existing beach by 35150 feet (approximately 50 feet average width).

The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

KBSC represents nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline threatened by shoreline erosion.

The applicant is publishing a modified version of the EIS Preparation Notice originally published on March 8, 2019. Another 30-day public review and comment period starts.

The EIS will include comments and responses from all comment periods.

Comments should be sent to three parties:

The applicant: Kahana Bay Steering Committee, 10 Ho?ohui Road, Suite 201, Lahaina, HI 96761.

The approving agency/accepting authority: Department of Land and Natural Resources, State of Hawaii, Samuel Lemmo, Administrator, Office of Conservation and Coastal Lands, P.O. Box 621, Honolulu, HI 96809-0621, or Sam.j.lemmo@hawaii.gov.

And the consultant: Oceanit; 828 Fort Street Mall, Suite 600, Honolulu, HI, 96813, or kahana@oceanit.com.

From: Macewen, Malcolm
To: sam.j.Lemmo@hawaii.gov
Cc: Kahana Bay Comments
Subject: [External] Fwd: Kahana Bay beach erosion.
Date: Friday, August 23, 2019 5:39:09 AM

Subject: Kahana Bay beach erosion.

I've been a timeshare owner of multiple units at Sands of Kahana and Kahana Beach Resort for a 25 years, currently with 5 separate units. The erosion the past years has taken away nearly all of our useable beach. Also, the erosion. Is now removing old growth trees and our lawn area. The proposed beach nourishment project is an absolute necessity to save our developments value, beauty and pleasures. Thank you. Malcolm MacEwen. 11324 N 129th Way, Scottsdale, Arizona 85259. 1-480.276.3142.
https://images.app.goo.gl/pVLVZM1Gex4jUDk39

Malcolm MacEwen Sent from my iPhone

From: rbakervertipm@aol.com
To: Kahana Bay Comments
Subject: [External] Kahana Bay Beach Nourishment Project
Date: Thursday, August 22, 2019 1:41:10 PM

Sir,
As a long time owner at the Sands of Kahana I strongly support this badly needed project!
We have helplessly watched many beautiful palm trees and other landscape plants as well as the sandy beach disappear over the last few years due to the rising ocean and rough surf.
This was sad knowing that without government permits etc we could do nothing to protect our investment and the resort we have come to love and call our home away from home.
Completion of this project will not bring back the beautiful palm trees that Hawaii is so well known for but it would certainly restore the beach, prevent damage to the buildings, protect surviving landscape plants and stabilize the property value which is surely sliding as the damage continues to destroy the beautiful Island look!
Thank you for your service and consideration.
God Bless!
Rex O. Baker
909-938-7223

From:	Pat Scheibel
To:	Kahana Bay Comments
Subject:	Re: [External] Fwd: Beach erosion
Date:	Friday, August 23, 2019 3:04:42 PM

Thank you Taylor,
Our address
Bob & Pat Scheibel
13108 Overbrook Rd
Leawood, KS 66209

Sent from my iPad

On Aug 23, 2019, at 6:50 PM, Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. and Mrs. Scheibel,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
> Taylor
>
> ---
>
> **From:** Pat Scheibel <rscheibel@kc.rr.com>
> **Sent:** Friday, August 23, 2019 8:28 AM
> **To:** Kahana Bay Comments <kahana@oceanit.com>
> **Subject:** [External] Fwd: Beach erosion
>
> Sent from my iPad
>
> Begin forwarded message:
>
>> **From:** Pat Scheibel <rscheibel@kc.rr.com>
>> **Date:** August 23, 2019 at 1:22:02 PM CDT
>> **Subject: Beach erosion**
>>
>> To whom it may concern,
>> We have been owners at the Sands of Kahana for 25 years. We have enjoyed the beautiful beach and palm trees. The recent erosion is so sad and although they have placed special sand bags on the north side it is continuing to erode. Something needs to be done to protect the land, sand, trees, and buildings. Please help!
>> Sincerely,
>> Patricia B Scheibel
>> Robert C Scheibel
>>
>> Sent from my iPad

From:	John Kober
To:	Kahana Bay Comments
Subject:	Re: [External] Beach Nourishment Project at Kahan Bay
Date:	Monday, August 26, 2019 10:01:48 AM

My address is 3423 Fordham Ct., St. Anthony Village, MN 55420

On Mon, Aug 26, 2019 at 2:57 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

> Aloha Mr. Kober,
>
> Mahalo for your feedback and insight on Kahana Bay. May you please provide a physical address to which we can mail a hard copy response?
>
> Thank you,
>
> Taylor
>
> **From:** John Kober <jrkober@gmail.com>
> **Sent:** Friday, August 23, 2019 2:21 PM
> **To:** sam.j.lemmo@hawaii.gov; Kahana Bay Comments <kahana@oceanit.com>
> **Cc:** Marc Nelson <76sokco@gmail.com>
> **Subject:** [External] Beach Nourishment Project at Kahan Bay
>
> Greetings,
>
> I have been a timeshare owner at the Sands of Kahana for nearly 20 years. Over the years, my family and I have enjoyed the beach at the Sands and adjoining properties; however, over the last several years we have unfortunately witnessed a severe erosion of the beach and the adjoining property due to increased wave activity.
>
> I am writing to support your efforts to restore, rehabilitate, and preserve the sandy beach area. I believe that the proposed beach nourishment project will mitigate the severe erosion and once again provide a stable beach for visitors to Kahana Bay to enjoy, as well as prevent more erosion of the land abutting the beach area. I believe the beach erosion has reached a critical stage, and without the nourishment project, it will continue to increase and be disastrous to property owners in the very near future.
>
> Please move forward with the project and keep the many visitors returning to Maui and Kahana Bay year after year. You have what seems to be a solid plan, now let's move forward with it.
>
> Sincerely,
>
> John Kober
>
> Minneapolis, MN
>
> Sands of Kahana owner

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DLNR:OCCL:SH

Correspondence OA-20-42

AUG 2 3 2019

Michael Foley, Ph.D, P.E., Coastal Engineer
828 Fort Street Mall, Suite 600,
Honolulu, HI, 96813

SUBJECT: RE: (Second) Environmental Impact Statement Preparation Notice (EISPN) for the Kahana Bay Erosion Mitigation Project

Dear Dr. Foley,

The Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has received your (Second) Environmental Impact Statement Preparation Notice (EISPN), dated August 8, 2019.

We thank you for your submission and offer the following feedback and recommendations regarding preparation of the Draft Environmental Impact Statement (DEIS). Further, for your convenience we have provided our comments regarding the previously published EISPN dated February 5, 2019.

- As stated in our previous letter we recommend that you include a suite of alternative project designs that feature scaled-down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groin structures). More specifically, we recommend that you consider multiple design alternatives including those that do not employ groin structures, use only terminal groin structures, consider various numbers, sizes, and configurations of groins, consider integrating construction materials in the groins that promote native intertidal and aquatic ecosystems (e.g., artificial reef components), and alternatives that would limit nourishment to a historical extent of the beach.

- We recommend that additional shoreline accessways and public parking be made available to the public to facilitate increased beach use.

Given our experience with permitting and conducting beach restoration projects, please consider staff at the DLNR-OCCL as an additional resource for questions and guidance as you continue to develop the proposed project. Should you have any questions on the matter, please feel free to contact Shellie Habel, Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or via email at Shellie.L.Habel@Hawaii.gov.

Sincerely,

SAMUEL J. LEMMO, ADMINISTRATOR
OFFICE OF CONSERVATION AND COASTAL LANDS

Attachment

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DLNR:OCCL:SH

Correspondence OA-19-140
MAR 2 7 2019

Michael Foley, Ph.D, P.E., Coastal Engineer
828 Fort Street Mall, Suite 600,
Honolulu, HI, 96813

SUBJECT: RE: Environmental Impact Statement Preparation Notice (EISPN) for the Kahana Bay Erosion Mitigation Project

Dear Dr. Foley,

The Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has received your Environmental Impact Statement Preparation Notice (EISPN), dated February 5, 2019.

We thank you for your submission and offer the following feedback and recommendations regarding preparation of the Draft Environmental Impact Statement (DEIS):

- We appreciate that the project gives serious consideration to beach restoration. The DLNR generally favors projects designed to mitigate coastal erosion by restoring beach ecosystems rather than by hardening the shoreline with seawalls and revetments, which has led to widespread beach loss in Hawaii.
- When preparing the DEIS, we recommend that you discuss potential impacts, if any, to offshore ecosystems and surf breaks that may result from sand migration/equilibration that generally occurs following beach nourishment projects.
- We recommend that you include a more detailed discussion regarding the methods (i.e., modeling, calculations, data analyses) that informed the design and tuning of T-head groins. Please also discuss the expected lifetime of the nourished beach and groin structures, and discuss the expected response of each to magnitudes of sea-level rise expected within those timeframes. For reference, sea-level rise projections are reported in the State Sea Level Rise Report and associated mapping tools can be accessed by visiting the following website: hawaiisealevelriseviewer.org.
- From the project description it appears that the offshore sand borrow areas would need to be nearly entirely emptied to obtain intended sand volumes (50-100K cy, total). There is

concern that doing so may cause changes to the benthos and may increase the chance of encountering fines and course material when dredging through the entire sand column. We recommend that a discussion be included in the DEIS that describes the potential impacts of doing so, if this is what is intended. We also recommend that a discussion be included regarding the long-term sustainability of beach nourishment in this area, for at least the next few decades or expected lifespan of the groins based on sand availability and intended usage.

- We recommend that you provide more detail to the discussion regarding the potential for increased stream blockage at the Kahana Stream mouth. On page 82 you state that "the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean. In its current state, the channelized portion of the stream's outlet is often plugged with accreted sand and sediment, causing ponding in the channel." You go on to state that your method of reducing blockage would be to place coarse grained material in this area to limit migration of sand by waves. This section would benefit from a more thorough discussion regarding intended grain sizes, potential sources of the coarse-grained material, and alternatives to the described mitigation method.
- We recommend that you clarify which season the project would take place, reasoning behind the choice in timing, and any foreseeable challenges associated with conducting the project during the chosen season (i.e., coral spawning, seasonal wave regime).
- We recommend that you provide more detail to the discussion regarding the overall design and footprint of the beach restoration project. For instance, please explain why the the design footprint extends beyond any documented beach extent featured in aerial photography dating back to 1912[1]. We raise this question because widening the beach beyond the limits of its former footprint will raise questions regarding possibly undesirable effects to nearshore ecosystems and offshore coral colonies. Please describe the potential environmental impacts, if any, and establish the benefit of filling the beach beyond historical extents, if that is a goal of the project
- We recommend that you provide more detail to the discussion on page 23 regarding the synchronization between sand placement and groin construction. The present description makes it seem as though sand would be placed prior to groin construction. We are concerned that 1) sand may be lost from the project before groins are constructed, and 2) that placement of armor-stones atop placed sand may lead to destabilization of the structure following subsequent beach equilibration and natural sand migration.
- We recommend that you include a description detailing how groins will be designed such that they do not hinder/block lateral beach access.

1 University of Hawaii Coastal Geology Group. Hawaii Coastal Erosion Website. http://www.soest.hawaii.edu/coasts/erosion/index.php

- When applying for a CDUA, DLNR OCCL will request that you submit sand samples from multiple locations along the beach and from each offshore borrow site. From information included in the EISPN, it appears that sand recovered from deposit 19 consists of greater than 2% fines. While DLNR OCCL guidelines state that sand is required to contain less than 6% fines, we may ask that a lower percentage (< 2%) is considered owing to the large amount of sediment being placed and presence of coral ecosystems located directly offshore. We also recommend that you amend Figure 4-7 to include the grain size distributions for each sand sample taken at onshore and offshore sample sites. Also, it is unclear why the 20% grain size distribution envelope uses a Kahana beach sample to determine the concentration limit for coarse grained material and a Honokowai beach sample to determine the concentration limit for fine grained material.

- On page 23 of the EISPN it is stated that the dredging barge cannot withstand waves greater than one to two feet. The offshore location from which sand would be dredged features swell that regularly exceeds this height and may rise unexpectedly. Thus, you may want to reconsider use of this particular barge system, or seek out alternative sand fields.

- We recommend the following three amendments to section 4.2.5 *Sea Level Rise* on page 79 of the EISPN. 1) Amend the following statement to include the contribution of land-based ice melt to present rates of sea-level rise, "Tide gauges at Hawai'i's major harbors, including Kahului Harbor, show an upward trend in sea level (Figure 4-11). This trend is primarily caused by the thermal expansion of seawater as it increases in temperature." 2) Amend the following statement to recognize present acceleration in the rate of global mean sea level rise, "The average global SLR over the last century was approximately 1.88 mm (0.074 inches) per year, with studies indicating that this rate may accelerate in the coming decades." 3) Correct the inactive link cited in the following statement, "UH SOEST provides a SLR scenario for Honolulu projecting a one-foot increase in sea level by midcentury, and about three feet by the end of the century (SOEST, 2018)."

- We recommend that you include a suite of alternative project designs that feature scaled-down options for sand nourishment and groin design (i.e., smaller project footprints, reduced sand volumes, various lengths and placement of groin structures).

- Regarding the potential use of hydraulic slurry pumps for sand transport as stated on page 23 and 35, we are concerned that the method may cause sand to fracture; this in turn can lead to sand loss and elevated turbidity. This was the observed during the 2012 Waikiki Beach nourishment project, in which hydraulic pumping was identified as the likely culprit[2]. Beach quality sand is a valuable and diminishing resource among the Hawaiian Islands and it is important to realize that, owing to its composition, sand used for local nourishment projects is generally more fragile than sand used for the majority of large-scale efforts accomplished within the continental United States.

2 Habel, S., Fletcher, C. H., Barbee, M., & Anderson, T. R. (2016). The influence of seasonal patterns on a beach nourishment project in a complex reef environment. *Coastal Engineering, 116*, 67-76.

- Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups. As part of the section in the DEIS that describes potential cultural impacts, please provide information that satisfies the following:
    - Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.
    - Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.
    - What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai'i rights?

Given our experience with permitting and conducting beach restoration projects, please consider staff at the DLNR-OCCL as an additional resource for questions and guidance as you continue to develop the proposed project. Should you have any questions on the matter, please feel free to contact Shellie Habel, Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or via email at Shellie.L.Habel@Hawaii.gov.

Sincerely,

SAMUEL J. LEMMO, ADMINISTRATOR
OFFICE OF CONSERVATION AND COASTAL LANDS

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 3, 2019

Oceanit Laboratories Inc.
Attn: Mr. Michael Foley, Ph.D., P.E
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

via email: kahana@oceanit.com

Dear Mr. Foley:

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project** located at Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

Thank you for the opportunity to review and comment on the subject matter. In addition to our previous comments dated August 21, 2019, enclosed are comments from the (a) Division of Aquatic Resources and (b) Land Division – Maui District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
JUL 31 2019
Division of Aquatic Resources
DAR 5981

RECEIVED
LAND DIVISION
2019 AUG 29 AM 11:09
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

July 30, 2019

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**
LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various
APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

(x) We have no objections.
( ) We have no comments.
(x) Comments are attached.

Signed:

Print Name: Brian Neilson - DAR Administrator

Date: 8/28/19

Attachments
cc: Central Files

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: 08/23/2019
DAR # 5981

MEMORANDUM

TO: Brian J. Neilson
DAR Administrator

FROM: Russell Sparks, Aquatic Biologist

SUBJECT:

Request Submitted by: Russell Y. Tsuji, Land Administrator

Location of Project: Kahana Bay, Maui, TMK (2) 4-3-005 and (2) 4-3-010

Brief Description of Project:

Environmental Impact Statement Preparation Notice for beach Nourishment projects in the Kahana Bay Regional area.

Comments:

☐ No Comments ☒ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: _____________ Date: 8/28/19
Brian J. Neilson
DAR Administrator

DAR# 5981

Comments

We have consulted with the contractors on this project in the past and feel our concerns and input have been adequately considered at this point. Therefore, we have nothing to add during this preparation portion of the process. We do, however, look forward to reviewing and providing input into the draft EIS when appropriate.

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Brian J. Neilson, Administrator
ATTN: Russell Sparks, Aquatic Biologist
Division of Aquatic Resources
Department of Land and Natural Resources
1151 Punchbowl Street, Room 330
Honolulu, HI 96813

Dear Mr. Neilson,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009
DAR #: 5981

Thank you for participating in the scoping process for submitting written comments dated September 3, 2019 on the subject EISPN. We acknowledge your comments and concerns, and they are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that you have consulted with the contractors on the project in the past and feel that your concerns and input have been adequately addressed at this point.

We appreciate your input and guidance and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
[AU]G 30 AM 10:53
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2019 JUL 33 AM 8:24

July 30, 2019

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

2019 AUG -2 8:27

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**
LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various
APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed:
Print Name: Daniel Ornellas
Date: 8/19/19

Attachments
cc: Central Files

OFFICE OF PLANNING
STATE OF HAWAII

DAVID Y. IGE
GOVERNOR

MARY ALICE EVANS
DIRECTOR
OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

DTS201908191619LI

August 21, 2019

TO: Sam Lemmo, Administrator
Office of Conservation and Coastal Lands
Department of Land and Natural Resources

FROM: Mary Alice Evans, Director Mary Alice Evans

SUBJECT: Environmental Impact Statement Preparation Notice for the Proposed Kahana Bay Erosion Mitigation Project, Lahaina District, Maui, Fronting and Seaward of Tax Map Key: (2) 4-3-005: 008, 009, 019, 020, 021, 029 and 031; (2) 4-3-0010: 001, 002, 004, 007 and 009.

Thank you for the opportunity to provide comments on the subject Environmental Impact Statement Preparation Notice (EISPN), which was published in the Office of Environmental Quality Control *Environmental Notice*, on July 23, 2019.

The Kahana Bay Steering Committee, which represents nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline, proposes to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing the beach with 50,000-100,000 cubic yards of sand transported from previously identified offshore borrow areas. The proposal also envisages constructing structures such as groins that extend from the shoreline seaward to retain the nourished sand and stabilize the beach. The purpose of the proposed project is to devise a regional beach nourishment and restoration approach to provide erosion mitigation at Kahana Bay.

For use of state or county lands, use of state or county funds, use of state conservation district lands, and use of the shoreline area, an Environmental Impact Statement (EIS) will be prepared pursuant to Hawaii Revised Statutes (HRS) Chapter 343.

The construction cost for the proposed Kahana Bay erosion mitigation project is estimated between \$10,000,000 and \$20,000,000. The construction period is projected to occur in the late summer or fall of 2020.

The Office of Planning (OP) has reviewed the subject EISPN and has the following comments to offer:

1. The Hawaii Coastal Zone Management (CZM) Law, HRS Chapter 205A, requires all state and county agencies to enforce the CZM objectives and policies. The Draft EIS should examine the proposed project's activities and its alignment with the objectives and supporting policies of the Hawaii CZM Program as embodied in HRS § 205A-2, as amended.

2. The OP recommends that the Draft EIS consider low impact development design elements as a safeguard against sediment loss, stormwater runoff, and as an erosion control method. The OP suggests that the Draft EIS refer to OP's guidance, *Low Impact Development, A Practitioners Guide*. This document covers a range of structural best management practices for stormwater control management and layout that minimizes environmental impacts: http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf.

3. According to the EISPN, Kahana Bay has undergone chronic and episodic coastal erosion, and the shoreline recedes at an average rate of appropriately one foot per year. The OP supports the regional beach nourishment and restoration approach to provide erosion mitigation at Kahana Bay. The OP concurs that a series of beach stabilization structures such as T-head groins or stub groins would be necessary to retain the nourished sand in place, given the erosion trend at Kahana Bay. The Draft EIS should discuss alternative designs of groins and assess their potential environmental impacts with specific mitigation measures for the proposed Kahana Bay erosion mitigation project.

4. The OP recommends that the Draft EIS add site-specific assessments for the applications of the hydraulic suction dredging and mechanical dredging, and further assess which dredging alternative would be preferred to retrieve offshore sand for the proposed beach restoration project. If appropriate, the Draft EIS should discuss and refer to the applications of offshore dredging methods from other large-scale beach nourishment projects in Hawaii, such as at Iroquois Point on Oahu and Stable Road Beach on Maui.

5. Please note that the new rules, HAR Chapter 11-200.1, are in effect as of August 9, 2019. This EISPN will direct the preparation of a Draft EIS, rather than anticipate a finding of no significant impact (FONSI) as illustrated in **Figure 3-1**. Please consider whether it is appropriate to state that the Draft EIS would include an analysis of the proposed action in relation to each of the thirteen criteria provided on page 53.

6. Any exterior lighting and lamp posts associated with the proposed construction activities shall be cut-off luminaries to provide the necessary shielding to mitigate potential light pollution in the coastal areas, and lessen possible seabird strikes. No artificial light, except as provided in HRS §§ 205A-30.5(b) and 205A-71(b), shall be directed to travel across property boundaries toward the shoreline and ocean.

If you have any questions regarding this comment letter, please contact Shichao Li of our office at (808) 587-2841.

c: Mr. Michael Foley, Oceanit ✓

Kulakcwa

Kuleuir@hawaii.edu.

February 13, 2020

Daniel Ornellas
Land Division - Maui District
Department of Land and Natural Resources
54 High Street, Room 101
Wailuku, HI 96793

Dear Mr. Ornellas,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009
DAR #: 5981

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated August 19, 2019. We acknowledge your comments and concerns, which have been considered in the preparation of the Draft EIS in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the DLNR Land Division – Maui District has no comments at this time.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

February 13, 2020

Ms. Mary Alice Evans, Director
ATTN: Shichao Li
State of Hawaii Office of Planning
P.O. Box 2359
Honolulu, HI 96804

Dear Ms. Evans:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009
Number: DTS201908191619LI

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 21, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC). We have taken your comments into consideration in preparing the Draft EIS and offer the following responses to your comments relating to the content of the Draft EIS.

The following addresses your specific comments:

Comments #1, 2, and 5: Thank you for the provided resources for the HRS Chapter 205A Coastal Zone Management Law, low impact design, and HAR Chapter 11-200.1. These resources will be used in preparation of the DEIS. Conformance of the project to State Land Laws, land use plans, and regulations are discussed in detail in Section 4.2 of the DEIS.

Comment #3: We note your support of the proposed beach nourishment and sand stabilization structures to provide erosion mitigation at Kahana Bay. A thorough analyses of the project alternatives and design of the coastal structures will be discussed in Chapter 2 of the DEIS.

Comment #4: Thank you for the examples of offshore dredging projects in Hawaii. Site-specific assessments for dredging options to retrieve offshore sand sources will be discussed in Chapter 2 of the DEIS.

Comment #6: Proposed mitigation measures to reduce artificial lighting impacts will be included and discussed in Section 3.1.8 of the DEIS.

We appreciate your input and guidance to help develop prudent actions for Kahana Beach and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

COUNTY OF MAUI
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
2050 MAIN STREET, SUITE 2B
WAILUKU, MAUI, HAWAII 96793

August 23, 2019

Oceanit
c/o Michael Foley
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

SUBJECT: KAHANA BAY EROSION MITIGATION ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE TMK (2) 4-3-005:029, 020, 031, 019, 009, 008; (2) 4-3-010:009, 007, 004, 002, 001; LAHAINA, MAUI

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:
   a. None.
2. Wastewater Reclamation Division (WWRD) comments:
   a. We note that there are not any immediate impacts to the existing wastewater infrastructure within Lower Honoapiilani Road due to the potential construction from this project.
   b. We support these efforts to protect both private property and the County of Maui's infrastructure (e.g. roadway, water, sewer, storm drain assets.)

If you have any questions regarding this letter, please contact me at 270-8230.

Sincerely,

SHAYNE R. AGAWA
Deputy Director of Environmental Management

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February 13, 2020

Mr. Shayne R. Agawa, Deputy Director
Department of Environmental Management
County of Maui
2050 Main Street, Suite 2B
Wailuku, Maui, Hawaii 96793

Dear Mr. Agawa:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 23, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

1. Solid Waste Division – We note that the Solid Waste Division has no comments at this time and appreciate their review.
2. Wastewater Reclamation Division (WWRD) – We note that there are no immediate impacts to the existing wastewater infrastructure within Lower Honoapi'ilani Road due to the potential construction of the project.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

MICHAEL P. VICTORINO
Mayor

ROWENA M. DAGDAG-ANDAYA
Director

Deputy Director

GLEN A. UENO, P.E., L.S.
Development Services Administration

RODRIGO "CHICO" RABARA, P.E.
Engineering Division

JOHN R. SMITH, P.E.
Highways Division

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM 434
WAILUKU, MAUI, HAWAII 96793

September 9, 2019

Mr. Michael Foley
OCEANIT
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

Dear Mr. Foley:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR KAHANA BAY EROSION MITIGATION FRONTING AND SEAWARD OF TMKS: (2) 4-3-005:008,009,020,029,031; (2) 4-3-001:009; (2) 4-3-010:001, 002,004,007

We reviewed the subject application and have no comments at this time.

If you have any questions regarding this memorandum, please call Rowena M. Dagdag-Andaya at (808) 270-7845.

Sincerely,

ROWENA M. DAGDAG-ANDAYA
Director of Public Works

RMDA:da
xc: Engineering Division
S:\DSA\Engr\CZM\Draft Comments\43001009_43005008,009,020,029,031_43010001,002,004,007_kahana_bay_erosion_mitigation_eispn.rtf

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February 13, 2020

Rowena M. Dagdag-Andaya, Director
Department of Public Works
County of Maui
200 South High Street, Room 434
Wailuku, Maui HI 96793

Dear Ms. Dagdag-Andaya:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 23, 2019. We acknowledge your comments and concerns, and they are being incorporated in the preparation of the Draft EIS in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the Department of Public Works has no comments at this time.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

Appendix J:

Agency Consultation During the Preparation of the DEIS

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From: Kim, Duane SS
To: Kahana Bay Comments
Subject: [External] RE consultation draft EIS Kahana Bay
Date: Monday, July 20, 2020 6:38:05 PM
Attachments: consultation draft EIS Kahana Bay.pdf

Attn: Michael Foley, Ph.D., P.E.

Aloha Dr. Foley,

I received the attached and wanted to share with you that the State of Hawaii, Department of Transportation, Harbors Division, Maui District does not have any jurisdiction at Kahana Bay, namely the Kahana Beach Erosion Mitigation Project.

DOT Harbors only has responsibilities for Kahului Harbor on Maui and I recommend you reach out for the Department of Land and Natural Resources. Thank you.

Respectfully,

Duane Kim
Harbors District Manager
DOT Harbors Division
101 E. Kaahumanu Avenue, Suite 100
808-873-3350 Office
808-268-3173 Cell
Kahului, HI 96732

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November 19, 2020

Mr. Duane Kim, Harbors District Manager
Harbors Division
Department of Transportation
101 E. Ka'ahumanu Avenue
Kahului, HI 96732

Subject: **Consultation for the Draft Environmental Impact Statement**
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Mr. Kim,

Thank you for your letter dated July 20, 2020, responding to our consultation request on the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process.

We note that your comments included:

Comment #1 - *Department of Transportation, Harbors Division, Maui District does not have any jurisdiction at Kahana Bay, namely the Kahana Beach Erosion Mitigation Project.*

Response #1 – We note that the Department of Transportation, Harbors Division, Maui District does not have jurisdiction at the Kahana Beach Erosion Mitigation Project site.

Comment #2 - *DOT Harbors only has responsibilities for Kahului Harbors on Maui and I recommend you reach out for the Department of Land and Natural Resources (DLNR).*

Response #2 – We contacted the DLNR during the consultation process and have received responses. Correspondence with the DLNR will be included in the DEIS.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

From:	Nakamura, Darlene K
To:	Kahana Bay Comments
Subject:	[External] Request for Comments - Kahana Bay Erosion Mitigation Project, Lahaina, Maui
Date:	Tuesday, July 21, 2020 3:55:49 PM
Attachments:	Request for Comments - Kahana Bay Erosion Mitigation Project.msg FW Request for Comments - Kahana Bay Erosion Mitigation Project.msg Kahana Bay Erosion Mitigation Project 071420.pdf

Hi Michael,

In connection with your recent letter dated July 14, 2020 (copy attached for your convenience) requesting comments for an EISPN that was published last year on July 23, 2019 in OEQC's bulletin, we are re-sending you the two emails containing the previously submitted comments from the DLNR.

Please let me know if you have any questions.

Thanks,
Darlene

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 21, 2019

Oceanit Laboratories Inc.
Attn: Mr. Michael Foley, Ph.D., P.E
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

via email: kahana@oceanit.com

Dear Mr. Foley:

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project** located at Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division and (b) Division of Forestry & Wildlife on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION

2019 AUG -7 AM 10: 30

DEPT. OF NATURAL RESOURCES
STATE OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 30, 2019

MEMORANDUM

TO: FROM

DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: TO
Russell Y. Tsuji, Land Administrator

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**

LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: [signature]

Print Name: Carty S. Chang, Chief Engineer

Date: 8/5/19

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Environmental Impact Statement Preparation Notice for the Kahana Bay Erosion Mitigation Project
TMK(s): (2) 4-3-005: Various and (2) 4-3-010: Various
Location: Kahana Bay, Island of Maui
Applicant: Oceanit on behalf of The Kahana Bay Steering Committee

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed: [signature]
CARTY S. CHANG, CHIEF ENGINEER

Date: 8/5/19

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February 13, 2020

Carty S. Chang, P.E., Chief Engineer
ATTN: Darlene Nakamura
Engineering Division
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Chang,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject EISPN and your written comments dated August 5, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We acknowledge your comments regarding compliance with the rules and regulations of the National Flood Insurance Program (NFIP) and Title 44 of the Code of Federal Regulations (CFR) as the project area falls within a high-risk Special Flood Hazard Area. These regulations will be considered when preparing the DEIS, and discussion of flood hazard mitigation of the project will be included in Section 3.2.3 of the DEIS.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

DAVID Y. IGE
GOVERNOR OF HAWAII

2050

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2019 AUG -2 AM 11:06
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

July 30, 2019

MEMORANDUM

~~TO:~~ From:
DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

~~FROM:~~ TO: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**
LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various
APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Print Name: **DAVID G. SMITH, Administrator**
Date: 7/31/19

Attachments
cc: Central Files

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innovation through engineering & scientific excellence

February 13, 2020

David G. Smith, Administrator
ATTN: Darlene Nakamura
Division of Forestry and Wildlife
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Smith:

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated July 31, 2019. We acknowledge your comments and concerns, which are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the DLNR DFW did not have any comments on the above referenced EISPN.

We look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer, Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 3, 2019

Oceanit Laboratories Inc.
Attn: Mr. Michael Foley, Ph.D., P.E
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

via email: kahana@oceanit.com

Dear Mr. Foley:

SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project** located at Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various

Thank you for the opportunity to review and comment on the subject matter. In addition to our previous comments dated August 21, 2019, enclosed are comments from the (a) Division of Aquatic Resources and (b) Land Division – Maui District on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: darlene.k.nakamura@hawaii.gov. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
JUL 31 2019
Division of Aquatic Resources
DAR 5981

RECEIVED
LAND DIVISION
2019 AUG 29 AM 11:09
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

July 30, 2019

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**
LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various
APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

(x) We have no objections.
( ) We have no comments.
(x) Comments are attached.

Signed: [signature]

Print Name: Brian Neilson - DAR Administrator

Date: 8/28/19

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: 08/23/2019
DAR # 5981

MEMORANDUM

TO: Brian J. Neilson
DAR Administrator

FROM: Russell Sparks [signature], Aquatic Biologist

SUBJECT:

Request Submitted by: Russell Y. Tsuji, Land Administrator

Location of Project: Kahana Bay, Maui, TMK (2) 4-3-005 and (2) 4-3-010

Brief Description of Project:

Environmental Impact Statement Preparation Notice for beach Nourishment projects in the Kahana Bay Regional area.

Comments:
☐ No Comments ☒ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: [signature] Date: 8/28/19
Brian J. Neilson
DAR Administrator

DAR# 5981

Comments

We have consulted with the contractors on this project in the past and feel our concerns and input have been adequately considered at this point. Therefore, we have nothing to add during this preparation portion of the process. We do, however, look forward to reviewing and providing input into the draft EIS when appropriate.

oceanit

innovation through engineering & scientific excellence

February 13, 2020

Brian J. Neilson, Administrator
ATTN: Russell Sparks, Aquatic Biologist
Division of Aquatic Resources
Department of Land and Natural Resources
1151 Punchbowl Street, Room 330
Honolulu, HI 96813

Dear Mr. Neilson,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009
DAR #: 5981

Thank you for participating in the scoping process for submitting written comments dated September 3, 2019 on the subject EISPN. We acknowledge your comments and concerns, and they are being incorporated in the preparation of the Draft EIS (DEIS) in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the DEIS currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that you have consulted with the contractors on the project in the past and feel that your concerns and input have been adequately addressed at this point.

We appreciate your input and guidance and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2019 AUG 30 AM 10:53
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2019 JUL 31 AM 8:24
2019 AUG -2 8:27

July 30, 2019

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Maui District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice for the **Kahana Bay Erosion Mitigation Project**
LOCATION: Kahana Bay, Island of Maui; TMK: (2) 4-3-005: Various and (2) 4-3-010: Various
APPLICANT: Oceanit on behalf of The Kahana Bay Steering Committee

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **August 20, 2019.**

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on The Environmental Notice in the middle of the page.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417or by email at darlene.k.nakamura@hawaii.gov. Thank you.

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed:
Print Name: Daniel Ornellas
Date: 8/19/19

Attachments
cc: Central Files

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Daniel Ornellas
Land Division - Maui District
Department of Land and Natural Resources
54 High Street, Room 101
Wailuku, HI 96793

Dear Mr. Ornellas,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009
DAR #: 5981

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated August 19, 2019. We acknowledge your comments and concerns, which have been considered in the preparation of the Draft EIS in accordance with Hawai'i Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the DLNR Land Division – Maui District has no comments at this time.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

MICHAEL P. VICTORINO
Mayor

ROWENA M. DAGDAG-ANDAYA
Director

JORDAN MOLINA
Deputy Director

GLEN A. UENO, P.E., L.S.
Development Services Administration

RODRIGO "CHICO" R. RABARA, P.E.
Engineering Division

JOHN R. SMITH, P.E.
Highways Division

Telephone: (808) 270-7745
Fax: (808) 270-6267

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
200 SOUTH HIGH STREET, ROOM NO. 410
WAILUKU, MAUI, HAWAII 96793

July 17, 2020

Dr. Michael Foley, Ph.D., P.E.
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

SUBJECT: CONSULTATION FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT KAHANA BAY EROSION MITIGATION PROJECT TMK: (2) 4-3-005: 029, 020, 021, 031, 019, 009, 008; 4-3-010: 009, 007, 004, 002, 001, DISTRICT OF LAHAINA, MAUI.

Dear Mr. Foley:

The County of Maui, Department of Public Works (DPW) is in receipt of your July 14, 2020 letter seeking consultation on the subject project's Environmental Impact Statement Preparation Notice (EISPN) issued in the Office of Environmental Quality Control's "Environmental Notice" publication on July 23, 2019.

We offer the following comments on the proposed project:

1. The site is located adjacent to Pohaku "S-Turns" Beach Park. DPW maintains the Pohaku Park outlet. In anticipation of severe weather events, the sand plug is lowered at the outlet to ensure there is adequate relief for flooding. Historically, during high tide and north swell events, sand washes onto Lower Honoapiilani Road and DPW maintenance personnel are required to push the material off the road. Will this project impact the frequency of this occurrence or hinder the ability to maintain this outlet?

2. The retention basin adjacent to Pohaku Park is also maintained by DPW. The EISPN is unclear as to whether the basin will be utilized for dredging operations. Section 2.3.7 describes the potential use of the basin for dewatering. Please note that the basin is intended to serve as a flood control structure. If used during construction, appropriate mitigation should be proposed in the event of a major storm event.

3. Kahana Stream is located to the north of the project, and is also a DPW-maintained outlet. The EISPN correctly describes that the stream outlet is often plugged with sand and causes ponding in the stream channel. Similar to Pohaku Park, a sand plug must be lowered in anticipation of storm events.

Section 4.32 of the EISPN, page 81 states:

"All discharge associated with the project is expected to be along the shore, downstream from the mouth of the Kahana Stream; however, the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean."

Please address this impact to ensure there are no flanking effects to adjacent properties and drainage outlets along the shoreline.

4. Section 4.64 Drainage System, page 101 states:

   "The proposed action is not anticipated to increase stormwater discharge. No alterations to existing drainages are proposed. Where drainage pipes or culverts lead to the ocean, placed sand may act as a filter and stabilize stormwater flows or enhance their percolation into subsurface flows."

   Please confirm that any drainage culverts within the project limits will not be plugged by the placement of sand. Sand will not act as a filtration method – stormwater will back up into the drainage system and may flood upstream properties.

If you have any questions regarding the above comments, please contact Kristi Ono at 270-7745 or kristi.ono@co.maui.hi.us.

Sincerely,

RODRIGO "CHICO" RABARA, P.E.
Engineering Division Chief

RRR/KO (ED20-0833)
S:\ENG\DESIGN\DRAINAGE REVIEWS\DSA\2020\WEST MAUI\KAHANA BAY EROSION MITIGATION\2020-07-17 DPW RESPONSE.DOC

oceanit
innovation through engineering & scientific excellence

February 13, 2020

Daniel Ornellas
Land Division - Maui District
Department of Land and Natural Resources
54 High Street, Room 101
Wailuku, HI 96793

Dear Mr. Ornellas,

SUBJECT: Environmental Impact Statement Publication Notice (EISPN)
Kahana Bay Erosion Mitigation
Lahaina, HI 96761
Fronting and seaward of TMK (2) 4-3-005 Parcels 008, 009, 019, 020, 021, 029, and 031 and TMK (2) 4-3-010 Parcels 001, 002, 004, 007, and 009
DAR #: 5981

Thank you for participating in the scoping process for the subject Environmental Impact Statement (EIS) Preparation Notice and for your written comments dated August 19, 2019. We acknowledge your comments and concerns, which have been considered in the preparation of the Draft EIS in accordance with Hawaiʻi Administrative Rules, Title 11, Chapter 200, Section 17. Your comments are an important part of the environmental review process and will be included in an appendix of the Draft EIS, which is currently in preparation. The Draft and Final EIS documents will be made available for public review at the State, Lahaina, and Kahului libraries and online via *The Environmental Notice* published by the State Office of Environmental Quality Control (OEQC).

We note that the DLNR Land Division – Maui District has no comments at this time.

We appreciate your input and look forward to your continued involvement in the environmental review process.

Sincerely,

Michael Foley, Ph.D, P.E.
Coastal Engineer
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813
E-mail: kahana@oceanit.com

MICHAEL P. VICTORINO
Mayor

MICHELE CHOUTEAU MCLEAN, AICP
Director

JORDAN E. HART
Deputy Director

DEPARTMENT OF PLANNING
COUNTY OF MAUI
ONE MAIN PLAZA
2200 MAIN STREET, SUITE 315
WAILUKU, MAUI, HAWAII 96793

July 30, 2020

Mr. Michael Foley
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

Dear Mr. Foley:

SUBJECT: COMMENTS ON ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) FOR THE KAHANA BAY EROSION MITIGATION PROJECT

This letter is in response to your letter of July 14, 2020 on the above subject. The Planning Department (Department) provides the following comments, including those intended to assist you and the Kahana Bay Steering Committee (KBSC) in your joint endeavor of "refining the Proposed Project details based upon public comments" as stated in your July 14 letter.

1. The project was precipitated by a desire to develop a sustainable and environmentally sensitive solution to protect the valuable private properties along the Kahana Bay shoreline, and the County has supported this effort and intent. However, also please identify any benefits that the project will bring to the nearby and broader communities beyond the KBSC properties, particularly what these communities can expect in return for their possible acceptance or support for constructing offshore T-head groin structures or other potentially impactful project alternatives.

2. Clearly define the public and environmental benefits and costs of allowing T-head groin structures in the ocean, or other potentially impactful alternatives. If the costs could outweigh the benefits, define compensatory mitigation which could extend outside the KBSC project area but still clearly lead to overall net public and environmental benefits.

3. Discuss the impacts of long term (through at least 2100) sea level rise on the project and the KBSC properties with and without the various project alternatives.

4. Address project consistency with relevant provisions of the Draft West Maui Community Plan, Updated June 2020. This can be accessed at: https://wearemaui.konveio.com/draft-west-maui-community-plan-june-2020.

5. As part of the alternatives analysis, seek and include in the DEIS statements from each of the KBSC properties regarding their individual efforts towards longer term shoreline retreat, with projected cost ranges, and the returning of the shoreline to its natural state.

6. If the preferred alternative involves T-head groin structures, please describe any outstanding issues (e.g. ownership, financing) that may affect the feasibility of this approach.

7. For the preferred alternative, please discuss in detail any opportunity to include a vegetated coastal dune or berm as part of the project rather than as a stand-alone alternative.

8. Since the EISPN conceptually discusses construction methods that may involve either hydraulic or mechanical dredging, the DEIS should identify the anticipated construction approach to enable agency review and assessment of impacts from such construction.

9. Identify what additional public shoreline access will be achieved as part of the project to complement existing public access at only the north and south ends of the project area. Address the possibility of at least one new access, possibly between Valley Isle and Royal Kahana, or between Hololani and Royal Kahana. These can be among the types of broader community benefits as sought to be identified by Comment No. 1 above.

10. Related to Comment No. 9 above, identify how many parking stalls will be developed and dedicated to public beach access. Possible approaches should involve all condominium properties included in the KBSC designating public parking stalls, and all of these should be included in a public parking plan for the overall set of properties. Again, these can be among the types of broader community benefits as sought to be identified by Comment No. 1 above.

11. Describe how any surf spots and fishing areas in the project area might be affected or preserved.

12. Include with the DEIS all benthic and biologic studies, including the Essential Fish Habitat study, as important foundational information previously requested by NOAA during project pre-consultation so that agencies can review them when they comment on the DEIS.

13. Clearly identify any outstanding studies (e.g. archaeological inventory survey, cultural impact assessment, wave modeling, etc) that may not yet be fully completed and provide the status of such studies, steps to completion, and responsible parties. These studies should also be provided in draft form in the DEIS, if available and appropriate for release.

14. Discuss the cultural significance of Kahana Bay and the project area.

15. Identify the concerns, desires and perceived needs of parties within the KBSC project area relating to the project, and explain how those concerns will be addressed.

Thank you for your attention to this letter. Should you need clarification on the above comments, please contact Staff Planner James Buika or Current Planning Supervisor Jeffrey Dack at james.buika@mauicounty.gov, jeffrey.dack@mauicounty.gov, or at (808) 270-8205.

Sincerely,

Michele McLean

MICHELE MCLEAN, AICP
Planning Director

xc: Clayton I. Yoshida, AICP, Planning Program Administrator (PDF)
Jeffrey P. Dack, Current Planning Supervisor (PDF)
James A. Buika, Coastal Resources Planner (PDF)
Tara Miller Owens, U.H. Sea Grant Extension Program (PDF)
Project File

MCM:CIY:lak
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November 19, 2020

Michelle McLean, Planning Director
Planning Department
County of Maui
2200 Main Street, One Main Plaza
Wailuku, HI 96793

Subject: **Consultation for the Draft Environmental Impact Statement**
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Ms. McLean,

Thank you for your letter dated July 30, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process.

Please see Attachment A for responses to your comments.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

Attachment A: Responses to Comments sent on July 30, 2020

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

Attachment A: Response to Comments

Agency Comments from July 30, 2020	Oceanit Response
1. The project was precipitated by a desire to develop a sustainable and environmentally sensitive solution to protect the valuable private properties along the Kahana Bay shoreline, and the County has supported this effort and intent. However, also please identify any benefits that the project will bring to the nearby and broader communities beyond the KBSC properties, particularly what these communities can expect in return for their possible acceptance or support for constructing offshore T-head groin structures or other potentially impactful project alternatives.	DEIS Section 3.4.1, *Social Impacts*, will identify impacts on the surrounding and broader communities.
2. Clearly define the public and environmental benefits and costs of allowing T-head groin structures in the ocean, or other potentially impactful alternatives. If the costs could outweigh the benefits, define compensatory mitigation which could extend outside the KBSC project area but still clearly lead to overall net public and environmental benefits.	The Proposed Action is designed to achieve beach restoration through beach nourishment and stabilizing structures. Chapter DEIS Chapter 6, *Relationship Between Local Short Term Uses of Uses of Humanity's Environment and the Maintenance and Enhancement of Long-Term Productivity*, will clearly define public and environmental benefits and costs of the Proposed Action and Secondary Alternative. At this time, we anticipate that environmental, social and economic benefits of the stabilization structures will outweigh the costs.
3. Discuss the impacts of long term (through at least 2100) sea level rise on the project and the KBSC properties with and without the various project alternatives.	The DEIS will discuss the effects of sea level rise and climate change in Section 1.2, *Project Purpose and Need*, and Section 3.2, *Natural Hazards*. The Proposed Action is designed for a 50-year life, which falls short of the 2100 time frame discussed in - Hawaiʻi Climate

Agency Comments from July 30, 2020	Oceanit Response
	Change Mitigation and Adaptation Commission (2017), but we are considering the same sea level rise projections in the report.
4. Address project consistency with relevant provisions of the Draft West Maui Community Plan, Updated June 2020. This can be accessed at: https://wearemaui.konveio.com/draft-west-maui-communityplan june2020.	DEIS Chapter 4, *Relationship to Land Use Plans, Policies, and Controls*, will discuss the relationship of the Proposed Action and Secondary Alternative to the current and draft West Maui Community Plan.
5. As part of the alternatives analysis, seek and include in the DEIS statements from each of the KBSC properties regarding their individual efforts towards longer term shoreline retreat, with projected cost ranges, and the returning of the shoreline to its natural state.	The Proposed Action is based on a collective effort of ten properties that comprise the Kahana Bay Steering Committee. The purpose of the Proposed Action is to design and implement a regional sustainable and resilient approach to mitigate the regional erosion hazard along the Kahana Bay shoreline in Lahaina, Maui. Efforts of individual properties will be superseded by actions proposed by KBSC, the entity that will submit subsequent permit and funding applications, It is noted that this collaborative and regional approach nature is consistent with Objective 1 of the Beach Management Plan for Maui Objective 1, which is the "Development of individual management plans for each shoreline segment." Currently, nine out of ten properties have some form of armoring and the type of shoreline protection varies from property to property. They include a vegetated sand berm, rock revetment and rock, rock and concrete, three sand bag revetments, one of which has a seawall backstop, and three seawalls. For DEIS purposes, allowing current conditions to continue comprise the No Action Alternative, and will be discussed in Chapter 2.

Agency Comments from July 30, 2020	Oceanit Response
6. If the preferred alternative involves T-head groin structures, please describe any outstanding issues (e.g. ownership, financing) that may affect the feasibility of this approach.	DEIS Chapter 7, *Unresolved Issues*, will identify matters outstanding at the time of DEIS publication, including ownership and financing.
7. For the preferred alternative, please discuss in detail any opportunity to include a vegetated coastal dune or berm as part of the project rather than as a stand-alone alternative.	DEIS Chapter 2, *Proposed Action*, will discuss opportunities to include a vegetated coastal dune or berm in the Proposed Action and Secondary Alternative.
8. Since the EISPN conceptually discusses construction methods that may involve either hydraulic or mechanical dredging, the DEIS should identify the anticipated construction approach to enable agency review and assessment of impacts from such construction.	DEIS Section 2.2.5, *Construction*, will discuss both hydraulic and mechanical dredging options for the proposed action.
9. Identify what additional public shoreline access will be achieved as part of the project to complement existing public access at only the north and south ends of the project area. Address the possibility of at least one new access, possibly between Valley Isle and Royal Kahana, or between Hololani and Royal Kahana. These can be among the types of broader community benefits as sought to be identified by Comment No. 1 above.	In the County of Maui Code of Ordinances, public shoreline access requirements are outlined in Subdivision requirements identified in §18.16.210, Shoreline and other access rights-of-way, and Cluster Housing requirements set forth in §19.83.040, Application and Procedures. The Proposed Action and Secondary Alternatives are not covered under either the Subdivision or Cluster Housing requirements. We understand and support the County's effort in improving the public experience in accessing and enjoying the Kahana Bay shoreline and ocean experience. The Proposed Action and Secondary Alternative are designed to restore the beach to the 1975 benchmark based on the historical aerial photograph from this year, and the Proposed Action will help to sustain restoration over a 50-year time

Agency Comments from July 30, 2020	Oceanit Response
	frame. These improvements will greatly enhance public shoreline access. Two public shoreline accesses currently exist in properties adjacent to the project area, one of which provides nine public parking spaces. KBSC is currently exploring public easement and parking options and possible options will be discussed in the DEIS.
10. Related to Comment No. 9 above, identify how many parking stalls will be developed and dedicated to public beach access. Possible approaches should involve all condominium properties included in the KBSC designating public parking stalls, and all of these should be included in a public parking plan for the overall set of properties. Again, these can be among the types of broader community benefits as sought to be identified by Comment No. 1 above.	Pease see response to comment 9.
11. Describe how any surf spots and fishing areas in the project area might be affected or preserved.	DEIS Section 3.5.1, *Recreational Facilities and Resources*, will describe potential impacts on surf spots and fishing areas. Further, DEIS Sections 3.3.4, *Marine Biological Resources*, and 3.3.5, *Fish Habitat*, will discuss impacts of the Proposed Action and Secondary Impacts on fishing areas.
12. Include with the DEIS all benthic and biologic studies, including the Essential Fish Habitat study, as important foundational information previously requested by NOAA during project pre-consultation so that agencies can review them when they comment on the DEIS.	All benthic and biologic studies will be discussed in DEIS Chapter 3, *Existing Environmental Setting, Potential Impacts and Recommended Mitigation Measures*. Information required for an Essential Fish Habitat study will be incorporated in DEIS Section 3.3.5, *Fish Habitat*, and the marine resource assessment survey included as an appendix. This

Agency Comments from July 30, 2020	Oceanit Response
	information will be the basis for the Essential Fish Habitat Assessment that will be submitted in the future to fulfill the Magnusen Stevens Fishery and Conservation Management Act during the Federal review process. It is noted that early consultation with NMFS PIRO for the project began during the preparation of the EISPN. The marine benthic and water quality monitoring survey protocol was reviewed by NMFS, who provided written consultation dated April 30, 2019. In addition, NMFS PIRO provided comments on the EISPN on August 14, 2019 (Appendix I). The DEIS is being prepared based on NMFS PIRO consultation and comments.
13. Clearly identify any outstanding studies (e.g. archaeological inventory survey, cultural impact assessment, wave modeling, etc.) that may not yet be fully completed and provide the status of such studies, steps to completion, and responsible parties. These studies should also be provided in draft form in the DEIS, if available and appropriate for release.	An Archaeological Literature Review (ALR) Report is included in the DEIS and did not include any excavation work for subsurface resources. The necessity of an Archaeological Inventory Study will be determined during the Section 106 consultation and review during the Federal permitting process. The ALR and all other specialized studies performed for the DEIS (i.e., Key Informant Interviews, Cultural Impact Assessment, Marine Resource Assessment, Sand Study, Terrestrial Biological Resources Study) will be included in the DEIS as appendices.
14. Discuss the cultural significance of Kahana Bay and the project area.	DEIS Section 3.4.4, *Cultural Impact Assessment*, will summarize findings of the Cultural Impact Assessment and the full report will be included as an appendix.

Agency Comments from July 30, 2020	Oceanit Response
15. Identify the concerns, desires and perceived needs of parties within the KBSC project area relating to the project, and explain how those concerns will be addressed	DEIS Section 3.4.1, *Social Impacts*, will discuss community issues related to the project, as well has how these issues will be addressed.

DAVID Y. IGE

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: July 28,2020
DAR # 6141

MEMORANDUM

TO: Brian J. Neilson
DAR Administrator

FROM: Russell Sparks, Aquatic Biologist

SUBJECT: Consultation for the Draft Environmental Impact Statement, Kahana Bay Erosion Mitigation Project, Lahaina, Maui.

Request Submitted by: Michael Foley, Sr. Coastal Engineer

Location of Project: Kahana Bay, Lahaina, Maui

Brief Description of Project:

Advanced consultation in preparation for the development of a Draft Environmental Impact Statement (DEIS) for the proposed Kahana Bay Coastal Erosion Mitigation Project. The project objectives include designing and implementing a regional erosion control plan along the Kahana Beach shoreline in Lahaina, Maui. Current plans call for the installation of a vegetated sand berm and beach stabilizing coastal structures (T-head groins). Sand nourishment will involve dredging and placing 50,000 – 100,000 cubic yards of sand from previously identified offshore sand supplies.

Comments:

☒ No Comments ☐ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: ______________ Date: Jul 30, 2020

Brian J. Neilson
DAR Administrator

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innovation through engineering & scientific excellence

November 19, 2020

Brian Neilson
ATTN: Russell Sparks
Division of Aquatic Resources
Department of Land and Natural Resources
1151 Punchbowl Street, Room 330
Honolulu, HI 96813

Subject: **DAR #6141**
Consultation for the Draft Environmental Impact Statement
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Mr. Neilson,

Thank you for your letter dated July 30, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process.

We note that the Division of Aquatic Resources has no comments at this time but would like a chance to review the project as more information becomes available.

We appreciate your interest in the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

Cc: Kendall Tucker, Aquatic Biologist – Permits and Environmental Reviews, DLNR-DAR

MICHAEL P. VICTORINO
Mayor

KARLA H. PETERS
Director

JOHN L. BUCK III
Deputy Director

DEPARTMENT OF PARKS AND RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793
Main Line (808) 270-7230 / Facsimile (808) 270-7942

July 24, 2020

Oceanit Laboratories, Inc.
c/o Michael Foley
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

Dear Mr. Foley:

SUBJECT: CONSULTATION FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT, KAHANA BAY EROSION MITIGATION PROJECT, LAHAINA, MAUI SEAWARD OF TMK'S: (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; AND (2) 4-3-010:001

Thank you for providing the Department an opportunity to comment on the Draft Environmental Impact Statement for Kahana Bay Erosion Mitigation. We acknowledge the deterioration of our West Maui beaches and are concerned for their existence.

The Department would like to know how the beach nourishment project and the seven (7) T-head groins will affect the surrounding areas. In specific, has there been, or will there be an ocean current model produced to show the effect of adding the T-head groins and 50,000 – 100,000 cubic yards of sand to the subject properties, and what the resultant erosion/preservation will be to adjacent beaches, such as Pohaku Beach Park?

Should you have any questions or concerns, please feel free to call me or Sam Marvel, Acting Chief of Parks Planning and Development at (808) 270-6173.

Sincerely,

KARLA H. PETERS
Director of Parks and Recreation

c: Sam Marvel, Acting Chief of Parks Planning and Development

KHP:SM:kb

oceanit
innovation through engineering & scientific excellence

November 19, 2020

Karla H. Peters, Director
Department of Parks and Recreation
County of Maui
700 Hali'a Nako Street, Unit 2
Wailuku, HI 96793

**Subject: Consultation for the Draft Environmental Impact Statement
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001**

Dear Ms. Peters,

Thank you for your letter dated July 24, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process. We note that your comments include:

Comment #1:
"The Department would like to know how the beach nourishment project and the seven (7) T-head groins will affect the surrounding areas. In specific, has there been, or will there be an ocean current model produced to show the effect of adding the T-head groins and 50,000 – 100,000 cubic yards of sand to the subject properties and what the resultant erosion/preservation will be to adjacent beaches, such as Pohaku Beach Park?"

Response #1:
Section 3.2.1, *Coastal Processes,* of the DEIS, will discuss the nearshore wave assessment study that was conducted for the project using a Boussinesq Ocean and Surf Zone (BOSZ) model. Impacts to the subject properties and adjacent beaches from the proposed action will be evaluated and the nearshore wave assessment study will be appended to the DEIS.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

Cc: Sam Marvel, Acting Chief of Parks Planning and Development

OFFICE OF PLANNING
STATE OF HAWAII

DAVID Y. IGE
GOVERNOR

MARY ALICE EVANS
DIRECTOR
OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

DTS 202007280847LI

July 31, 2020

Mr. Michael Foley
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

Dear Mr. Foley

Subject: Consultation for the Draft Environmental Impact Statement
Kahana Bay Erosion Mitigation Project, Lahaina, Maui; Seaward of Tax Map Key: (2) 4-3-005: 008, 009, 019, 020, 021, 029 and 031; (2) 4-3-0010: 001, 002, 004, 007 and 009.

Thank you for the opportunity to provide comments on the preparation of a Draft Environmental Impact Statement (Draft EIS) for the proposed Kahana Bay Erosion Mitigation Project. The Environmental Impact Statement Preparation Notice (EISPN) was published in the Office of Environmental Quality Control *Environmental Notice*, July 23, 2019.

According to your consultation request dated July 14, 2020, and the EISPN, the purpose of the proposed project is to devise a regional beach nourishment and restoration approach to provide erosion mitigation at Kahana Bay. The proposed project includes sand nourishment, and installation of a vegetated sand berm and beach stablishing coastal structures. The nourishment will involve dredging, transporting, and placing between 50,000-100,000 cubic yards of sand from identified offshore borrow areas and restoring Kahana Bay beach.

Per your consultation request, besides the comments offered in the letter dated August 21, 2019, the Office of Planning (OP) has the following further comments to offer:

1. Given the scope and potential benefits of the proposed project, the project title may be changed from "Kahana Bay Erosion Mitigation Project" to "Kahana Bay Erosion Mitigation and Beach Restoration Project."

2. According to the EISPN, four of nine condominium complexes in the Kahana Bay beach cell have shoreline armoring. The OP suggests that the Draft EIS discuss the

alternatives how the proposed project will deal with the existing shoreline armoring structures and temporary erosion control measures such as sandbags to restore the beach to its historic beach width. The Draft EIS may further discuss the potential positive and/or negative impacts of the preferable alternative of the proposed project on the shoreline or beaches in front of the adjacent properties of the project area.

3. OP suggests that the Draft EIS discuss the details of the requirements of special management area (SMA) use and shoreline setbacks for the proposed project pursuant to Part II and Part III of HRS Chapter 205A, and County of Maui SMA and shoreline setback rules.

4. According to the consultation request, the proposed project is mostly seaward of the subject parcels across approximately 3,700 feet of shoreline. To retain the restored sand in place, the project proposes to construct seven beach stablishing T-head groins that will extend perpendicularly from the shoreline to about 200-250 feet offshore. Pursuant to Code of Federal Regulations (CFR), 15 CFR 930, if an Army Corps of Engineers Permit is required for the proposed project, please consult with the OP, Hawaii Coastal Zone Management Program, for the requirement of a federal consistency review.

5. To retain the restored sand and mitigate the regional erosion hazard along the Kahana beach shoreline, the design, life-span and function of the proposed T-head groins should consider the impacts of sea level rise by referring the findings of the Hawaii Sea Level Rise Vulnerability and Adaptation Report 2017, accepted by the Hawaii Climate Change Mitigation and Adaptation Commission.

If you have any questions regarding this comment letter, please contact Shichao Li of our office at (808) 587-2841.

Sincerely,

Mary Alice Evans

Mary Alice Evans
Director

oceanit
innovation through engineering & scientific excellence

November 19, 2020

Ms. Mary Alice Evans, Director
ATTN: Sichao Li
Office of Planning
State of Hawaii
P.O. Box 2359
Honolulu, HI 96804

**Subject: Consultation for the Draft Environmental Impact Statement
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001**

Dear Ms. Evans,

Thank you for your letter dated July 31, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process. We note that the State of Hawaiʻi Office of Planning had the following comments on the DEIS:

Comment #1: *Given the scope and potential benefits of the proposed project, the project title may be changed from "Kahana Bay Erosion Mitigation Project" to "Kahana Bay Erosion Mitigation and Beach Restoration Project."*

Response #1: Thank you for the suggestion for the project name change. We have considered this suggestion but would like to keep the title consistent with the Environmental Impact Statement Preparation Notice.

Comment #2: *According to the EISPN, four of nine condominium complexes in the Kahana Bay beach cell have shoreline armoring. The OP suggests that the Draft EIS discuss the alternatives how the proposed project will deal with the existing shoreline armoring structures and temporary erosion control measures such as sandbags to restore the beach to its historic beach width. The Draft EIS may further discuss the potential positive and/or negative impacts of the preferable alternative of the proposed project on the shoreline or beaches in front of the adjacent properties of the project area.*

Response #2: The Proposed Action is based on a collective effort of ten properties that comprise the Kahana Bay Steering Committee. The purpose of the Proposed Action is to design and implement a sustainable and resilient approach to mitigate the regional erosion hazard along the Kahana Bay shoreline in Lahaina, Maui. The collaborative nature of this effort is consistent with Objective 1 of the Beach Management Plan for Maui Objective 1, which is the "Development of individual management plans for each shoreline segment."

Currently, nine out of ten properties have some form of armoring, and the type of shoreline protection varies from property to property. They include a vegetated sand berm, rock revetment and rock, rock and concrete, three sand bag revetments, one of which has a seawall backstop, and three seawalls. For DEIS purposes, allowing current conditions to continue is the No Action Alternative and will be discussed in Chapter 2 of the DEIS.

Comment #3: *OP suggests that the Draft EIS discuss the details of the requirements of special management area (SMA) use and shoreline setbacks for the proposed project pursuant to Part II and Part III of HRS Chapter 205A, and County of Maui SMA and shoreline setback rules.*

Response #3: DEIS Chapter 4, *Relationship to Land Use Plans, Policies, and Controls*, will discuss the relationship of the Proposed Project and Secondary Alternative to State Coastal Zone Management objectives and policies, as well as its consistency with Maui County's SMA and shoreline setback rules. Relevant permits that will be sought will also be included in this chapter.

Comment #4: *According to the consultation request, the proposed project is mostly seaward of the subject parcels across approximately 3,700 feet of shoreline. To retain the restored sand in place, the project proposes to construct seven beach stablishing T-head groins that will extend perpendicularly from the shoreline to about 200-250 feet offshore. Pursuant to Code of Federal Regulations (CFR), 15 CFR 930, if an Army Corps of Engineers Permit is required for the proposed project, please consult with the OP, Hawaii Coastal Zone Management Program, for the requirement of a federal consistency review.*

Response #4: The Proposed Action and Secondary Alternative include dredging and deposition of sand fill, and the Proposed Action includes constructing structures within the Pacific Ocean. A Department of the Army Permit from the USACE will therefore be required for this project in accordance with Section 10 of the Rivers and Harbors Act. Consultation with the OP, Hawai'i Coastal Management Program, will occur at the time of permit applications.

Comment #5: *To retain the restored sand and mitigate the regional erosion hazard along the Kahana beach shoreline, the design, life-span and function of the proposed T-head groins should consider the impacts of sea level rise by referring the findings of the Hawaii Sea Level Rise Vulnerability and Adaptation Report 2017, accepted by the Hawaii Climate Change Mitigation and Adaptation Commission.*

Response #5: DEIS Section 1.2, Project Purpose and Need, will discuss the Hawai'i Sea Level Rise Vulnerability and Adaptation Report 2017, accepted by the Hawai'i Climate Change Mitigation and Adaptation Commission.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

From:	Anne Chung - NOAA Federal
To:	Kahana Bay Comments
Cc:	Stuart Goldberg - NOAA Federal; Gerry Davis - NOAA Federal; Malia Chow - NOAA Federal
Subject:	Re: [External] Request for extension - NMFS comments to Kahana draft EIS
Date:	Wednesday, August 12, 2020 2:31:49 PM

Aloha, thank you for the extension to provide comments to the Kahana Bay Erosion Mitigation Project. After reviewing the project materials and the letter request received July 17, 2020, NMFS would like to re-submit our comments from August 2019, which will also be relevant as the draft Environmental Impact Statement is prepared. Please see below. Thank you for the opportunity to provide comments for this proposed project and let us know if you have additional questions.

August 14, 2019 Comments:

The National Marine Fisheries Service, Pacific Islands Regional Office (PIRO) received your request for comments and technical assistance on the Environmental Impact Statement Preparation Notice (EISPN), Kahana Bay Erosion Mitigation (hereafter, EISPN) on July 23, 2019. Our technical assistance is provided below and is intended to help you comply with the essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; Section 305(b)(2) as described by 50 CFR 600.920), which will be required as part of the U.S. Army Corps of Engineers, Honolulu District, Regulatory Branch's (hereafter, USACE; CC'd here) permitting process. This technical assistance does not fulfill any federal responsibilities and does not constitute an EFH consultation. In addition to being the federal regulatory agency responsible for implementing the MSA, PIRO oversees consultations for compliance with the Endangered Species Act (ESA) and other statutory mandates. Compliance with the EFH provisions of the MSA can also be achieved through pursuance to the Fish and Wildlife Coordination Act (FWCA, 16 U.S.C. 661-666c). For all questions related to consultations with us in the future, please contact us through the email address EFHESAconsult@noaa.gov.

The Kahana Bay Steering Committee's EISPN proposes beach nourishment and installation of T-groins to mitigate erosion near private property along Kahana Bay, Island of Maui, Hawai'i. Kahana Beach is approximately 3,500-feet (ft) long and bounded by a submerged fringing reef and nine condominium complexes landward. Kahana Bay has undergone chronic and episodic coastal erosion leading to shoreline recession, beach narrowing, and a reduction in coastal access; coastal infrastructure, buildings, and amenities are at increased risk from sea level rise and natural hazards. The preferred alternative proposes nourishing the beach with 50,000-100,000 cubic yards of sand dredged and transported from offshore borrow areas, and retaining this sand T-head groin stabilization structures. The beach project would widen the beach by 35-150 ft and provide enhanced buffering against erosion. The project would require extensive in-water and land-based construction activities using heavy construction equipment (e.g., dredges, barges, dump trucks, excavators, underwater pumps, submerged polyvinylchloride piping, etc) and installing avoidance and minimization control measures (e.g., berms, turbidity curtains, dewatering stations, sand drainage basins, etc.). Beach sand for nourishing would be dredged (e.g., by mechanical or suction) from offshore borrow stations along Kahana Bay and either piped or transported back to shore by barge. Sand offloading by barge may require installing temporary trestles and secondary transfer to dump trucks for subsequent unloading.

PIRO Habitat Mandates

Magnuson Stevens Fishery Conservation and Management Act

A consultation with NMFS is required when a federal agency works in an area that will adversely affect EFH (i.e. the federal agency is directly conducting the work, funding work, or permitting work) (Section 305(b)(2) as described by 50 CFR 600.920). The EFH consultation process entails the federal action agency contacting NMFS and providing an EFH assessment (EFHA), which contains key information: a description of the proposed action, a determination from the federal agency as to how the action will affect EFH, an assessment of those adverse effects, and proposed ways to mitigate for the adverse effects, if applicable. An adverse effect to EFH is anything that reduces the quality and or quality of EFH. It may include direct, indirect, and site specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of an action. NMFS will then review the EFHA and may provide conservation recommendations to avoid, minimize, offset for or otherwise mitigate expected adverse effects.

EFH consultations are scalable and commensurate to the severity and type of adverse effects to EFH. The greater the adverse effect, the greater the scrutiny in making a determination. As the order of effect increases, qualitative, semi-quantitative, and quantitative EFH Assessments are appropriate, sequentially. Often, once EFH resources need to be quantified, PIRO is likely to request an "expanded" EFH consultation as opposed to "abbreviated" (50 CFR 600.920(h)(i)), unless sufficient quantification of unavoidable losses has been provided. Although we have provided you with our most recent EFH Draft Consultation Guidance document to assist with the EFH consultation process, below we provide detail specific to your proposal that should be included within the EFHA for this beach nourishment consultation.

In the main Hawaiian Islands, EFH has been designated in the marine water column from the surface to a depth of 1,000 meters (m), from the shoreline to the outer boundary of the Exclusive Economic Zone (5,150 kilometers/200 nautical miles/230 miles), and the seafloor from the shoreline out to a depth of 700 m. These waters and submerged lands are designated as EFH because they support various life stages for the management unit species (MUS) identified under the Western Pacific Regional Fishery Management Council's, Pelagic and Hawai'i Archipelago Fishery Ecosystem Plan (hereafter, Hawai'i FEP). The MUS and life stages found in these waters include: eggs, larvae, juveniles, and adults of Bottomfish MUS; eggs, larvae, juveniles, and adults of Crustacean MUS; and eggs, larvae, juveniles, and adults of Pelagic MUS. Specific types of habitat considered as EFH include coral reefs, patch reefs, hard substrate, seagrass beds, soft substrate, artificial or man-made structures, mangrove, lagoon, estuarine, surge zone, deep-slope terraces and pelagic/open ocean.

For clarity, federal agencies may incorporate the EFHA into documents prepared for other purposes, such as Endangered Species Act Biological Assessments, National Environmental Policy Act documents, or public notices. If an EFHA is contained in another document, it must still include all of the mandatory contents as per the EFH guidelines. It must also be clearly identified in the table of contents and text of the document as an EFHA. Alternatively, an EFHA may incorporate by reference other relevant environmental assessment documents that have already been completed. The referenced document must be provided to NMFS with the EFHA.

The EFHA process can also be combined with existing environmental consultation and review processes. The EFH guidelines at 50 CFR 600.920(f) enable Federal action agencies to use existing consultation or environmental review procedures to satisfy the MSA consultation requirements if the procedures meet the following criteria: 1) the existing process must provide NMFS with timely notification of actions that may adversely affect EFH; 2) notification must include an assessment of the proposed action's impacts on EFH that meet the requirements for EFHA discussed in section 600.920(e); and 3) NMFS must have made a finding pursuant to section 600.920(f)(3) that the existing process satisfies the requirements of section 305(b)(2) of the MSA. For the purposes of this beach nourishment proposed action, the EFHA should be integrated with the FWCA (see below) coordination process. In situations where a Federal action may adversely affect designated EFH for Federally managed fisheries, EFH Conservation Recommendations can be considered within the FWCA reporting recommendations.

Fish and Wildlife Coordination Act

The FWCA (16 U.S.C. 661-666c) mandates that wildlife, including fish, receive equal consideration and be coordinated with other aspects of water resource development. This is accomplished through consultation with NMFS, the U.S. Fish and Wildlife Service (USFWS), and appropriate state agencies whenever any body of water is proposed to be modified in any way and a Federal permit or license is required. These agencies determine the possible harm to fish and wildlife resources, the measures needed to both prevent the damage to and loss of these resources, and the measures needed to develop and improve the resources, in connection with water resource development. NMFS, the USFWS, and state agencies submit comments to Federal licensing and permitting agencies on the potential harm to living marine resources caused by the proposed water development project, and recommendations to prevent harm. In all, the FWCA compliance process includes the following four steps: consultation (notice of initiation); reporting (e.g., field surveys and summary reports) and recommendations to protect, mitigate, and restore natural resources; Action agency consideration of recommendations, and Action agency implementation of recommendations.

NMFS Concerns

NMFS appreciates the need to manage coastal erosion in using hybrid "soft" and "hard" approaches, including beach nourishment with T-groin stabilization. We are concerned that there are a variety of adverse effects from stressors on EFH that have not been fully considered in the EISPN. Short-term, long-term to permanent, and cumulative adverse effects to EFH are likely to occur from the preferred alternative due to physical damage, sedimentation and turbidity, and nutrients and chemical contamination.

Stressor Effects

<u>Physical Damage:</u> Direct contact to habitat forming EFH resources (e.g., corals and submerged aquatic vegetation) from construction equipment and materials, as well as from installation activities, can lead to permanent and lesser adverse effects. The level of these adverse effects (i.e., short-term, long-term to permanent, and cumulative) will depend on the density and extent of EFH resources present and the dredge and/or sediment retention designs that are chosen. For example, the 2012 Waikīkī Beach Nourishment and Dredging Project resulted in physical damage to the fossil limestone reef rock bordering sand borrow areas that were dredged. In addition, recent projects in Waikīkī have chosen to use a geotextile material to construct a sandbag groin. If such material is chosen for the T-groins in the preferred action, the long-term durability of this material is currently unknown and therefore carries a possibility of becoming compromised and potentially posing a risk to surrounding

EFH. Due to this stressor, a variety of measures to avoid and minimize physical damage to EFH may be needed to reduce unavoidable losses. Overall, steps should be taken during dredging and sand transport to avoid and minimize physical damage to corals and submerged aquatic vegetation. Sand pipes and pathways, dredging equipment, and turbidity control measures should consider wave energy and provide appreciable buffer space between construction equipment and nearby EFH resources.

Sedimentation and Turbidity: Enhanced sedimentation and turbidity may occur from: mechanical and suction dredging at borrow areas (e.g., pump heads causing re-distribution and settlement of fine sediment), land-based beach filling activities, after-the-fact leaching of micritic calcium carbonate from beach fill, and sediment resuspension from groins if they alter local hydrodynamics.

Nutrients and Chemical Contamination: Adverse effects may occur during dredging from borrow areas and after beach fill is placed due to release of sediment-bound nutrients and chemical contaminants. The latter may also occur from leaking construction equipment and introduction of treated materials into the marine environment, including lumber during multiple types of beach restoration projects.

EFH Assessment Content

An EFHA should be included for the upcoming EFH consultation, and specific content should be considered for inclusion to inform an EFH determination and the EFH effects analysis. Before you initiate the USACE permit application process, we recommend that you complete quantitative marine resource survey assessments (see our April 30, 2019 technical assistance email), new sediment modeling, and robust sediment testing; in addition, we recommend that your water quality monitoring plan include assessments before (e.g., baseline), during, and after construction activities (see below). The EFHA should consider the full suite of potential stressors to habitat forming EFH. Below we provide details related to these concerns and guidance on how these issues can be resolved through continued early coordination. In addition, we provide an Enclosure at the end of this letter with specific avoidance and minimization measures that would be applicable to the preferred alternative.

Quantitative Resource Survey Assessments

We provided technical assistance and guidance on conducting quantitative resource survey assessments on April 30, 2019; a brief summary follows. We recommend that you conduct preliminary, quantitative benthic marine survey assessments of the entire project footprint area within the littoral cell—hard and soft bottom, groin footprints, between groins, offshore of the groins, where sediment models predict deposition (see below), along or nearby sand pipeline pathways, and nearby the sand borrow areas—before an EFH consultation is initiated. The level of complexity of surveys will scale proportionally with the extent of habitat forming EFH resources (e.g., corals and submerged aquatic vegetation) that may suffer adverse effects (i.e., direct, indirect, and cumulative). Contingencies should be designed to accommodate analyses that require greater replication and higher statistical power to avoid the need to obtain higher resolution data. Hard-bottom and areas with habitat forming EFH should be prioritized over soft bottom substrate, though it will be important to characterize the latter. Post-action monitoring plans would reduce uncertainty during potential EFH offset determinations. Completing the survey work and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any potential offset determinations for unavoidable loss. NMFS is ready and willing to provide assistance to further refine and clarify the types and complexity of survey information that will be needed.

Sediment Modeling

Sediment modeling will be needed to predict how the preferred alternative may adversely affect EFH substrate (e.g., hard and soft bottom), habitat forming EFH (e.g., corals and submerged aquatic vegetation), and water column EFH. Modeling should consider how T-groins may alter sediment deposition. We are particularly concerned about redistribution and settling of fine sediment (e.g., 3000-6000 cubic yards), including limestone mud (i.e., microcrystalline calcium carbonate <4 microns in diameter) that may leach from beach fill and smother habitat forming EFH that may be nearby. The modelling effort should include and consider the following areas: the groin footprints, between the groins, offshore of the groins, along or nearby sand pipeline pathways, and nearby the sand borrow areas. If there is a high probability that sediment deposition will occur over sensitive and hard-to-replace hard-bottom habitat, corals, and submerged aquatic vegetation, these areas should be prioritized survey areas both before and after construction. Completing the modelling effort and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any offset determinations.

Sediment Testing

Sediment testing should be robust and specific. Information about sediment chemistry, nutrient content, and other chemical characterization should be considered for both bulk samples (i.e., all size fractions) and within each size fraction or sediment class (e.g., mud, silt, fine sand, sand, etc.). This would be helpful because smaller size fractions that include silt and mud classes typically retain higher organic carbon content and are more detrimental to habitat forming EFH than those sediment types with larger sizes. This information should also be considered for inclusion in the Draft EIS and EFHA to inform conservation recommendations and potential offset determinations. Completing the sediment testing effort and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any offset determinations.

Water Quality Monitoring

Robust water quality monitoring (e.g., turbidity, sedimentation rates, nutrients, dissolved oxygen, etc.) would be helpful to assess conditions before (i.e., baseline), during, and after beach restoration activities. These activities should be informed by the sediment modeling and daily tide and current velocity predictions (https://www.pacioos.hawaii.edu/voyager/) to select sampling locations. Special attention and consideration should be placed on collecting turbidity and sedimentation rate information at areas where there are habitat forming EFH resources, including corals and submerged aquatic vegetation. For other criteria needed for beach restoration projects, NMFS would defer to the requirements of the Environmental Protection Agency (EPA) delegated through the state of Hawai'i, Department of Health, Clean Water Branch's (DOH), 401 Water Quality Certification (WQC), Applicable Monitoring and Assessment Plans (AMAP). Completing the water quality monitoring planning effort and including it in the Draft EIS and EFHA would help reduce uncertainty and better inform EFH conservation recommendations and any offset determinations.

Summary

We greatly appreciate your early EFH coordination and the opportunity to provide comments on your EISPN. In summary, we expect that the proposed beach nourishment project may have short-term, long-term to permanent, and cumulative adverse effects to EFH. Depending on the results from the marine resource survey assessment, sediment modeling, sediment testing, and proposed water quality monitoring, the preferred alternative may result in unavoidable loss of EFH, which would require offset considerations. The prospective EFH consultation led by the USACE would be better informed with an increased level of information and monitoring data, careful evaluation of potential stressor effects to EFH, a post-project resource survey assessment monitoring plan, and quantification of the expected unavoidable loss of EFH resources; these have not yet been so far addressed in the EISPN. We have described the stressor impacts to EFH from the preferred alternative; and have previously provided guidance on the EFH consultation process and mandatory content needed to include in an EFHA. In the Enclosure at the end of this email, we also provide specific avoidance and minimization recommendations by stressor-type.

For all additional questions related to consultations with us (e.g., ESA, EFH, and FWCA) in the future, please contact us through the email address: EFHESAconsult@noaa.gov. For ESA-related topics please also contact Ann Garrett (ann.garrett@noaa.gov) and Ron Dean (ron.dean@noaa.gov); for FWCA contact Steve Kolinski (steve.kolinski@noaa.gov).

Enclosure

Recommended Avoidance and Minimization Measures
Below is a list of avoidance and minimization measures that you could anticipate to include in your Draft EIS potential EFHA during EFH consultation.

<u>Physical Damage</u>

1. Restrict all physical contact with the bottom to unconsolidated sediments devoid of coral and seagrass.
2. Work platforms should be selected based on the following preferential hierarchy:
  a. conduct all work from land;
  b. use a barge with auto-positioning systems where thrusters will not cause increased turbidity;
  c. anchor barges to (1) shoreline infrastructure; (2) nearby existing moorings; (3) anchors or spuds in/on sand only (as possible, have SCUBA divers lay anchors by hand in sand areas).
3. Prior to mobilizing, ensure all construction equipment, ballast, and vessel hulls do not pose a risk of introducing new invasive species and will not increase abundance of those invasive species present at the project location.
4. Minimize physical contact by divers and construction related tools, equipment, and materials with live benthic organisms, regardless of size, especially corals and seagrass.
5. Prevent trash and debris from entering the marine environment through the use of nets or barriers.
6. Relocate infrastructure materials (e.g., riprap, piles, boulders) that are colonized with benthic communities according to an approved relocation plan. Approved plans must ensure corals are moved to adjacent area(s) with similar habitat conditions, onto suitable substrates, using reliable attachment methods, in similar orientations. Monitoring is not required. If infrastructure materials (e.g. riprap, piles, boulders) that are colonized with benthic communities will be removed or destroyed as part of permitted activities, relocate these materials to an appropriate receiving site.
7. Have a qualified marine biologist identify and relocate hard corals that would be otherwise lost to project activities and which can be logistically moved according to an approved relocation plan. Approved plans must ensure corals are moved to adjacent area(s) with similar habitat conditions, onto suitable substrates, using reliable attachment methods, in similar orientations; and corals must be monitored for success (more frequently at the beginning, and for a duration of no less than 2 years). To provide accountability reference corals or a reference reef site should also be monitored concurrently to compare observed changes.
8. Ensure that new structures minimize shading impacts to marine habitats. Incorporate measures that increase the ambient light transmission under structures. Some of these measures include: maximizing the height of the structure and minimizing the width of the structure to decrease shade footprint; grated decking material; using the fewest number of pilings necessary to support the structures to allow light into under-pier areas and minimize impacts to the substrate; and aligning the boardwalk in a north-south orientation for the path of the sun to cross perpendicular to the length of the structure and reduce the duration of shading
9. Perform pre-deployment reconnaissance (e.g., divers, drop cameras) to ensure that all anchors are set on hard or sandy bottom devoid of corals and seagrass and that chosen anchor locations take into consideration damage that could occur from the anchor chain if the vessel swings due to currents or tides.
10. Require a long-term maintenance plan for gear, instrumentation, and equipment to prevent failures that lead to permanent adverse effects to EFH (e.g., vessel groundings).
11. Ensure structures are properly weighted to prevent movement from currents or waves and implement a maintenance plan to ensure integrity over time.
12. Lower utility lines or cables and maneuver the placement in a controlled manner using SCUBA in order to avoid all coral resources, when practicable.
13. Develop a Wave and Storm Contingency Plan for construction materials and equipment.
14. Develop a monitoring plan to consistently assess the condition of groin materials as well as a contingency plan if the condition is endangering EFH.

<u>Sedimentation and Turbidity</u>

1. Conduct intertidal work at low and or slack tide.
2. Conduct work during calm sea states; stop work during high surf, winds, and currents.
3. Perform work outside of the main coral spawning period in summer (May to August) to minimize sedimentation and turbidity effects to coral eggs and larvae in the area. Peak spawning periods vary by species and geography, and are based on best available science.
4. If appropriate, consider using cofferdams to dewater the project impact site.
5. Install sediment, turbidity, and/or pneumatic curtains, and use real-time monitoring (automated or manual) for barges and dredge vessels to detect failure and implement stop-work processes if pre-determined project thresholds are reached (use standards from Clean Water Act 401 water quality certification). In areas of soft sediment, consider partial length turbidity curtains in order to reduce resuspension of sediment during high winds and currents.
6. Use soft and/or natural engineering solutions to maintain/restore natural flow volumes and velocity.
7. Minimize disturbances to stream banks, and place abutments outside of the floodplain whenever possible. Seek to maintain baseline water flow volume and velocity within the system.
8. Utilize environmental clamshell buckets for mechanical dredging.

9. Design the nourishment activities to maintain or replicate natural stream channel and flow conditions to the greatest extent practicable.
10. Revegetate shoreline areas with appropriate native species and fully stabilize disturbed upland areas prior to removing silt fences and erosion prevention measures.

Chemical Contamination

1. Conduct work during the dry season when possible; stop work during storms or heavy rains. Neutralize or treat contaminated sediments and/or waters prior to release from the project site.
2. Inspect all equipment prior to beginning work each day to ensure the equipment is in good working condition, and there are no contaminant (oil, fuel, etc.) leaks.
3. All equipment found to be leaking contaminants must be removed from service until repaired.
4. All fueling or repairs to equipment must be done in a location with the appropriate controls that prevents the introduction of contaminants to marine environment.
5. Prevent discharges of chemicals and other fluids dissimilar from seawater into the water column.
6. Use materials that are nontoxic to aquatic organisms, such as untreated wood, concrete, or steel (avoid pressure treated lumber).
7. Use diffusers on the end of subtidal discharge pipes to minimize impacts from discharges.
8. Prevent bentonite drilling fluid from contacting live benthic organisms.

On Fri, Jul 24, 2020 at 2:38 PM Kahana Bay Comments <kahana@oceanit.com> wrote:

Aloha Dr. Chung,

Confirmed that NMFS's comments on the Kahana Bay DEIS may be extended to August 14, 2020. Thank you very much for your review!

Best,
Taylor

Taylor Chock | Resiliency and Sustainability Scientist

Email: **tchock@oceanit.com**

Office: 808.531.3017 x 117 | Direct: 808.954.4117

From: Anne Chung - NOAA Federal <anne.chung@noaa.gov>
Sent: Friday, July 24, 2020 10:30 AM
To: Kahana Bay Comments <kahana@oceanit.com>; Stuart Goldberg - NOAA Federal <stuart.goldberg@noaa.gov>
Subject: [External] Request for extension - NMFS comments to Kahana draft EIS

Aloha, NMFS has recently received your request (attached) for additional comments on the draft EIS for the Kahana Bay Erosion Mitigation project. We would like to request an extension to submit our comments no later than August 14, 2020.

Please respond to confirm the extension, we look forward to continued coordination on this project.

Thank you,

--

Anne Chung, Ph.D.
Marine Resource Specialist, Pacific Islands Regional Office
NOAA Fisheries | U.S. Department of Commerce
Office: 808-725-5096
Mobile: (732) 939-5253
www.fisheries.noaa.gov

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Anne Chung, Ph.D.
Marine Resource Specialist, Pacific Islands Regional Office
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www.fisheries.noaa.gov

From: McCarthy, Nadiera
To: Kahana Bay Comments
Cc: Polhemus, Dan
Subject: [External] Kahana Bay Erosion Mitigation Project
Date: Thursday, August 13, 2020 6:35:10 AM

Aloha Mr. Foley-

The letter of notification for the Kahana Bay Erosion Mitigation Project was sent to Washington, DC, and was not received here in the Honolulu Field Office until August 5, 2020. The request for comments was July 30, 2020. Is there a possible extension period to respond to this given your project timeline? If so, what date would that be.

-Nadiera Sukhraj

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Nadiera Sukhraj, Ph.D
Aquatic Ecosystems Conservation
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Rm 3-122
Honolulu, HI 96850
(808) 792-9410
Nadiera_McCarthy@fws.gov
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United States Department of the Interior

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

In Reply Refer To:
01EPIF00-2020-TA-0451

August 26, 2020

Dr. Michael Foley
Oceanit Laboratories, Inc.
282 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

Subject: Species List for the Proposed Kahana Bay Erosion Mitigation Project in Lahaina, Maui

Dear Dr. Foley,

The U.S. Fish and Wildlife Service (Service) received your letter on August 5, 2020 requesting comments for the proposed Kahana Bay erosion mitigation project in Lahaina, Maui. The proposed project includes sand nourishment and the installation of a vegetated sand berm and beach stabilizing coastal structures (e.g., groins and breakwaters). The nourishment will involve dredging, transporting, and placing between 50,000 – 100,000 cubic yards of sand from identified offshore borrow areas and restoring the beach to its historic beach width. A berm enhancement planted with native coastal flora along the backshore of the beach profile will help provide wave run-up protection and serve as a sand reservoir to the beach system. To help keep the restored sand in place, seven beach stabilizing T-head groins will extend perpendicularly from the shoreline to about 200-250 feet offshore. The project will be located within the following TMKs: (2) 4-3-005:029, (2) 4-3-005:020, (2) 4-3-005:021, (2) 4-3-005:031, (2) 4-3-005:019, (2) 4-3-005:009, (2) 4-3-005:008, (2) 4-3-010:009, (2) 4-3-010:007, (2) 4-3-010:004, (2) 4-3-010:002, and (2) 4-3-010:001.

The Service offers the following comments to assist you in your planning process so that impacts to trust resources can be avoided through site preparation and construction. This letter has been prepared under the authority of, and in accordance with, provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*) as amended (ESA).

We have reviewed the information you provided and pertinent information in our files, as it pertains to listed species in accordance with section 7 of the ESA. Our data indicate the following federally listed species may occur or transit through the vicinity of the proposed project area: the endangered hawksbill sea turtle (*Eretmochelys imbricata*), Hawaiian petrel (*Pterodroma sandwichensis*), band-rumped storm-petrel (*Oceanodroma castro*), wedge-tailed

shearwater (*Ardenna pacificus*) and the federally threatened Newell's shearwater (*Puffinus auricularis newlii*) and green sea turtles (*Chelonia mydas*). The Hawaiian petrel, band-rump storm-petrel, and Newell's shearwater will hereafter collectively be referred to as "Hawaiian seabirds". The hawksbill sea turtle and green sea turtle will hereafter collectively be referred to as "Sea Turtles".

Sea Turtles

The Service consults on sea turtles and their use of terrestrial habitats (beaches where nesting and/or basking is known to occur), whereas the National Marine Fisheries Service (NMFS) consults on sea turtles and their use of off-shore and open ocean habitats. We recommend that you consult with NMFS regarding the potential impacts from the proposed project to sea turtles in off-shore and open ocean habitats.

Green sea turtles may nest on any sandy beach area in the Pacific Islands. Hawksbill sea turtles exhibit a wide tolerance for nesting substrate (ranging from sandy beach to crushed coral) with nests typically placed under vegetation. Both species exhibit strong nesting site fidelity. Nesting occurs on beaches from May through September, peaking in June and July, with hatchlings emerging through November and December.

Construction on, or in the vicinity of, beaches can result in sand and sediment compaction, sea turtle nest destruction, beach erosion, contaminant and nutrient runoff, and an increase in direct and ambient light pollution which may disorient hatchlings or deter nesting females. Off-road vehicle traffic may result in direct impacts to sea turtles and nests, and also contributes to habitat degradation through erosion and compaction.

Projects that alter the natural beach profile, such as nourishment and hardening, including the placement of seawalls, jetties, sandbags, and other structures, are known to reduce the suitability of on-shore habitat for sea turtles. These types of projects often result in sand compaction, erosion, and additional sedimentation in nearshore habitats, resulting in adverse effects to the ecological community and future sea turtle nests. The hardening of a shoreline increases the potential for erosion in adjacent areas, resulting in subsequent requests to install stabilization structures or conduct beach nourishment in adjacent areas. Given projected sea level rise estimates, the likelihood of increase in storm surge intensity, and other factors associated with climate change, we anticipate that beach erosion will continue and likely increase.
Where possible, projects should consider alternatives that avoid the modification or hardening of coastlines. Beach nourishment or beach hardening projects should evaluate the long-term effect to sea turtle nesting habitat and consider the cumulative effects.

To avoid and minimize project impacts to sea turtles and their nests we recommend you incorporate the following applicable measures into your project plan:

- No vehicle use on or modification of the beach/dune environment during the sea turtle nesting or hatching season (May to December for Hawaii; throughout the year in the Marianas; October to March for American Samoa).

- Do not remove native dune vegetation.
- Incorporate applicable BMPs regarding Work in Aquatic Environments (see separate document) into the project design.
- Have a biologist familiar with sea turtles conduct a visual survey of the project site to ensure no basking sea turtles are present.
- If a basking sea turtle is found within the project area, cease all mechanical or construction activities within 100 feet until the animal voluntarily leaves the area.
- Cease all activities between the basking turtle and the ocean.
- Remove any project-related debris, trash, or equipment from the beach or dune if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, or stream channels.

Optimal sea turtle nesting habitat is a dark beach, free of barriers that restrict sea turtle movement. Nesting turtles may be deterred from approaching or laying successful nests on lighted or disturbed beaches. They may become disoriented by artificial lighting, leading to exhaustion and placement of a nest in an inappropriate location (such as at or below the high tide line). Hatchlings that emerge from nests may also be disoriented by artificial lighting. Inland areas visible from the beach should be sufficiently dark to allow for successful navigation to the ocean.

To avoid and minimize project impacts to sea turtles from lighting we recommend incorporating the following applicable measures into your project plan:

- Avoid nighttime work during the nesting and hatching season (May to December for Hawaii; throughout the year in the Marianas; October to March for American Samoa).
- Minimize the use of lighting and shield all project-related lights so the light is not visible from any beach.
- If lights can't be fully shielded or if headlights must be used, fully enclose the light source with light filtering tape or filters.

Incorporate design measures into the construction or operation of buildings adjacent to the beach to reduce ambient outdoor lighting such as tinting or using automatic window shades for exterior windows that face the beach; reducing the height of exterior lighting to below 3 feet and pointed downward or away from the beach; and minimize light intensity to the lowest level feasible and, when possible, include timers and motion sensors.

Hawaiian sea birds

Hawaiian sea birds may traverse the project area at night during the breeding, nesting, and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures, or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators.

Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable.

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

- Fully shield all outdoor lights so the bulb can only be seen from below bulb height and only use when necessary.
- Install automatic motion sensor switches and timer controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

Wedge-tailed shearwater

Unlike other Hawaiian seabird species, wedge-tailed shearwaters nest in littoral vegetation along coastlines. Nesting adults, eggs, and chicks are particularly susceptible to impacts from human disturbance and predators.

To avoid and minimize potential project impacts to wedge-tailed shearwaters we recommend you incorporate the following applicable measures into your project plan:

- Conduct surveys throughout the project area during the species' breeding season (March through November) to determine the presence and location of nesting areas.
- If wedge-tailed shearwaters nest within a proposed project area and construction would cause ground disturbance, time project construction to occur outside of the breeding season (March through November).
- If outdoor lighting is used, use light shields that are completely opaque, appropriately sized, and positioned so that the bulb is only visible from below and the light from the shielded source cannot be seen from the beach.
- Install automatic motion sensor switches and timer controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.

Measures to Avoid the Spread of Invasive Species

All activities, including site surveys, risk introduction of nonnative species into project areas. Specific attention needs to be made to ensure that all equipment, personnel, and supplies are properly checked and are free of contamination (weed seeds, organic matter, or other contaminants) before entering project areas. Quarantines and/or management activities occurring on specific priority invasive species proximal to project areas need to be considered or adequately addressed.

If this potential project should receive federal funding, federal permits (i.e. US Army Corps of Engineers permit), or any federal authorization, it will require a Section 7 consultation with the Service under the Fish and Wildlife Coordination Act (FWCA). The Service only conducts

Section 7 consultations with the federal action agency or their designated representative. If there is no federal action agency, but take of listed species cannot be avoided, further coordination with us pursuant to compliance with the ESA is necessary.

Thank you for participating with us in the protection of our endangered species. If you have any further questions or concerns regarding this consultation, please contact Christina Richards, Fish and Wildlife Biologist, 808-792-9450, email: christina_richards@fws.gov. When referring to this project, please include this reference number: 01EPIF00-2020-TA-0451.

Sincerely,

MICHELLE BOGARDUS
Digitally signed by MICHELLE BOGARDUS
Date: 2020.08.26 15:03:13 -10'00'

Michelle Bogardus
Island Team Manager
Maui Nui and Hawaii Island

Enclosure: Recommended Standard Best Management Practices for Work around Aquatic Environments

U.S. Fish and Wildlife Service

Recommended Standard Best Management Practices

The U.S. Fish and Wildlife Service (USFWS) recommends the following measures to be incorporated into project planning to avoid or minimize impacts to fish and wildlife resources. Best Management Practices (BMPs) include the incorporation of procedures or materials that may be used to reduce either direct or indirect negative impacts to aquatic habitats that result from project construction-related activities. These BMPs are recommended in addition to, and do not over-ride any terms, conditions, or other recommendations prepared by the USFWS, other federal, state or local agencies. If you have questions concerning these BMPs, please contact the USFWS Aquatic Ecosystems Conservation Program at 808-792-9400.

1. Authorized dredging and filling-related activities that may result in the temporary or permanent loss of aquatic habitats should be designed to avoid indirect, negative impacts to aquatic habitats beyond the planned project area.

2. Dredging/filling in the marine environment should be scheduled to avoid coral spawning and recruitment periods, and sea turtle nesting and hatching periods. Because these periods are variable throughout the Pacific islands, we recommend contacting the relevant local, state, or federal fish and wildlife resource agency for site specific guidance.

3. Turbidity and siltation from project-related work should be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. BMPs should be maintained for the life of the construction period until turbidity and siltation within the project area is stabilized. All project construction-related debris and sediment containment devices should be removed and disposed of at an approved site.

4. All project construction-related materials and equipment (dredges, vessels, backhoes, silt curtains, etc.) to be placed in an aquatic environment should be inspected for pollutants including, but not limited to; marine fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use. Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) can help to prevent attraction and introduction of non-native species.

5. Project construction-related materials (fill, revetment rock, pipe, etc.) should not be stockpiled in, or in close proximity to aquatic habitats and should be protected from erosion (*e.g.*, with filter fabric, etc.), to prevent materials from being carried into waters by wind, rain, or high surf.

6. Fueling of project-related vehicles and equipment should take place away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the project should be developed. The plan should be retained on site with the person responsible for compliance with the plan. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of accidental petroleum releases.

7. All deliberately exposed soil or under-layer materials used in the project near water should be protected from erosion and stabilized as soon as possible with geotextile, filter fabric or native or non-invasive vegetation matting, hydro-seeding, etc.

oceanit
innovation through engineering & scientific excellence

November 19, 2020

Michelle Bogardus
ATTN: Christina Richards
Pacific Islands Fish and Wildlife Office
U.S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122
Honolulu, HI 96850

Subject: **Reference No. 0EPIF00-2020-TA-0451**
Consultation for the Draft Environmental Impact Statement
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Ms. Bogardus,

Thank you for your letter dated August 27, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process.

We note that your comments include a list of species in accordance with Section 7 of the Endangered Species Act that may occur in or transit through the vicinity of proposed project area, as well as recommendations to avoid or minimize impacts to these species. The species of concern include:

- The endangered hawksbill sea turtle (*Eretmochelys imbricata*);
- The endangered Hawaiian petrel (*Pterodroma sandwichensis*);
- The endangered band-rumped storm-petrel (*Oceanodroma castro*);
- The endangered wedge-tailed shearwater (*Ardenna pacificus*);
- Federally threatened Newell's shearwater (*Puffinus auricularis newlii);* and
- Federally threatened green sea turtles (*Chelonia mydas*).

Discussion of these species of concern and actions to minimize impacts to these species will be included in Section 3.3.3, *Rare, Threatened, and Endangered Species,* of the DEIS.

We also note that the U.S. Fish and Wildlife Service lists measures to avoid the spread of invasive species. These measures will be discussed in Section 3.3.1 – *Terrestrial Biological Resources* of the DEIS.

It is anticipated that the final project will require a federal permit, at which time Section 7 consultation with the Service under the Fish and Wildlife Coordination Act (FWCA) will be sought.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

Cc: Christina Richards, Fish and Wildlife Biologist

United States Department of the Interior

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

In Reply Refer To:
01EPIF00-2020-CPA-0024

August 28, 2020

Michael Foley
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

Subject: Comments on the Environmental Impact Statement Preparation Notice (EISPN) for the proposed Kahana Bay Erosion Mitigation Project, Lahaina District, Island of Maui

Dear Mr. Foley:

The U.S. Fish and Wildlife Service (Service) has received Oceanit's July 2020 letter requesting review and comment on the Environmental Impact Statement Preparation Notice (EISPN) for the proposed Kahana Bay Erosion Mitigation Project, Lahaina District, Island of Maui. The applicant, Kahana Bay Steering Committee (KBSC), is proposing measures to address erosion along the Kahana Bay shoreline, including sand nourishment and new construction of groins and breakwaters. It is the intent that the project will be privately funded by KBSC. The actions proposed will require a Department of the Army Permit, which will then require consultations from our agency under the provisions of the Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.: 48 Stat. 401], as amended (FWCA); the Clean Water Act of 1977 [33 USC 1251 et seq.: 91 Stat. 1566], the Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.: 87 Stat. 884], as amended (ESA); the Rivers and Harbors Act of 1899 [33 U.S.C. 403 et seq.], as amended; and other authorities mandating the Service's review and recommendations to conserve trust resources.

At this time, the Service is providing preliminary comments for the development of the Draft Environmental Impact Statement (DEIS). The Service appreciates being included in early planning for this project as it may make the coordination for the future consultations more efficient, as the resource agencies will have had a chance to contribute and address any concerns before the project reaches the Department of Army permitting stage.

Purpose and Need

The purpose of the project is to devise a regional approach to provide erosion mitigation for Kahana Bay. The Kahana Bay Steering Committee (KBSC) represents nine oceanfront condominiums and one kuleana parcel along the Kahana Bay coastline threatened by shoreline erosion. In consultation with the Maui County Planning Department, the KBSC plans to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas (Offshore Sites 18, 19, and 22). The plan also proposes constructing structures that extend from the shoreline seaward (stub groins and T-head groins) to retain the nourished sand and stabilize the beach. The beach nourishment project would widen the existing beach by 35-150 feet (approximately 50 ft average width). The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors. In addition, berm creation or enhancement may also be needed to reduce the time between future nourishment events. According to Table 1-1 the shoreline has retreated 76 ft. since 1912. Although the stabilization structures will slow erosion at Kahana Bay, sand re-nourishment may still be needed in 30 years following the initial construction of the structures.

General comments and recommendations for the DEIS

The Service has reviewed the EISPN and provides the following as suggestions for inclusion in the DEIS as the information will be needed for multiple consultations and permits identified by Oceanit as necessary for construction approval.

1) Additional studies recommended for the DEIS. These include but are not limited to:
    - a) Additional sand study focusing on infauna,
    - b) Additional sand study identifying contaminants,
    - c) Intertidal survey,
    - d) Benthic survey and reef structure delineation,
    - e) Shoreline terrestrial flora and fauna survey,
    - f) Assessment of possible sea level rise and effects on structure design,
    - g) Evaluation of stormwater runoff from altered drainage infrastructure, and
    - h) Assessment of water quality and turbidity related to the proposed action.

2) It is encouraging that two sets of sand grain size analyses have already occurred. The first was completed in the 2016 Feasibility Study and the second in 2018, identifying potential areas compatible with the "native" sand along the KBSC proposed shoreline project. These included Offshore Sites 18, 19, and 22. Additional testing is needed for the presence of environmental contaminants, as well as the identification of any infauna that may be affected by sand movement. Because of the sensitive nature of marine life, it is also important that sand for beach replenishment is as close as possible in size and composition to existing beach sand and that it be as clean, or free from silt and clay, as possible.

3) Expansion and completion of Section 2: Alternatives to the Proposed Action. The DEIS should propose a range of scenarios to which impacts to natural resources can be evaluated. Each action alternative should also include or propose how the sand would be transported (hydraulically, mechanically, etc.) from the borrow site to the dewatering site or the receiving site. Each type of dredge method has a different impact to resources and water quality. The DEIS should list all of the potential action alternatives that will be considered. For example, in Section 2.3.4. Groin Design, present engineering drawings of all potential combinations of T-head groin placements. What is the groin length in each scenario? How many T-head groins and where are they placed? What material will they be made of? The combined "design" of each action alternative allows for the evaluation of impacts for that specific action and for it to be compared to any similar actions. Another example – if dewatering of the borrow sand occurs, where will it occur? How will potential nearshore water quality issues from the process be controlled? This approach to giving detailed descriptions would apply to each area of Section 2 including but not limited to stub groins, beach fill, dune restoration, rock revetments, seawalls, temporary protections, sand sources, dewatering methods, etc. There are a few initial scenarios presented in Figures 1-7, 1-12 and 1-13, but they do not provide any information for a proper evaluation of the action.

4) Expansion and completion of Section 4: Existing Environmental Setting, Potential Impacts, and Mitigation Measures. The last resource survey was conducted by the State of Hawaii, Department of Land and Natural Resources in 2010 for an Environmental Assessment related to the Hololani Resort, only a portion of the proposed project area. The proposed project takes a Programmatic approach, which will be completed in phases, instead of sub-dividing into nine separate actions. As suggested above, these studies should include an intertidal survey, benthic survey and reef structure delineation, identification of infauna in the areas to be filled, shoreline terrestrial flora and fauna, possible sea level rise and effects on structure design, stormwater runoff changes from altered drainage infrastructure, and changes to water quality and turbidity.

5) Section 4 briefly mentions an item that should be considered an action described in the appropriate action alternatives. The project proposes constructing a submerged pipeline from Offshore Sites 19 and 22 to the shoreline near Pohaku Park. An investigation of resources along those routes will be required for an impact analysis and to guide in placement and retrieval of the submerged pipeline. This section should be expanded in the DEIS with schematics of the pipeline as well as how it would be deployed, if it would be secured to the bottom, and how it would be retrieved, etc.

6) Section 4 would also benefit by producing a series of benthic habitat maps within the proposed project area and a buffer area around the perimeter on both the seaward and landward sides. Identifying the current habitat types and the organisms that live there will be needed for evaluating the impacts to resources and water quality, as well as the possibility that sand will be retained after placement.

7) The water of the project area is currently classified as Marine Class A Waters by the 2014 Department of Health Water Quality standards. The DEIS should identify what measures

will be taken to ensure that this rating remains after the sand placement and the increase in use of the shoreline.

8) Identification of direct, indirect, and cumulative impacts of each action and/or each alternative. In addition to the major actions such as dredging, fill, and groin construction, this would include other actions such as the increase in use of public facilities, parking lots, roadways, alteration of property and roadway drainage infrastructure, etc.

9) A discussion on unavoidable environmental impacts. Identification of the unavoidable losses will guide the compensatory mitigation conversation, if necessary.

The Service appreciates the opportunity provide comments on the development of the DEIS for the Kahana Bay Erosion Mitigation Project. If you have questions regarding these comments, please contact Marine Biologist Nadiera Sukhraj (Nadiera_McCarthy@fws.gov) at 808-792-9400. When referring to this correspondence, please include this reference number: 01EPIF00-2020-CPA-0024.

Sincerely,

GREGORY KOOB

Digitally signed by GREGORY KOOB
Date: 2020.08.28 09:25:43 -10'00'

For Katherine Mullett
Field Supervisor

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oceanit
innovation through engineering & scientific excellence

November 19, 2020

Katherine Mullett
ATTN: Gregory Koob
Pacific Islands Fish and Wildlife Office
U.S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122
Honolulu, HI 96850

Subject: Consultation for the Draft Environmental Impact Statement
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Ms. Mullett,

Thank you for your letter dated August 28, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process.

Comment #1: *Additional studies recommended for the DEIS. These include but are not limited to:*

a. Additional sand study focusing on infauna,
b. Additional sand study identifying contaminants,
c. Intertidal survey,
d. Benthic survey and reef structure delineation,
e. Shoreline terrestrial flora and fauna survey,
f. Assessment of possible sea level rise and effects on structure design,
g. Evaluation of stormwater runoff from altered drainage infrastructure, and
h. Assessment of water quality and turbidity related to the proposed action.

Response #1: The DEIS will include the following specialized studies related to water quality and marine and terrestrial biological resources: Marine Resource Assessment and Water Quality Survey, Wave Assessment Study, Sand Study, and Terrestrial Biological Resources Study. Sea level rise and its anticipated effects on structure design will be discussed in Sections 2.2.3, *Stabilizing Structures,* and 3.2.5, *Sea Level Rise,* of the DEIS. The drainage system and evaluation of stormwater runoff will be summarized in Section 3.6.4, *Drainage System.* The specialized studies will be included as appendices in the DEIS.

Comment #2: *It is encouraging that two sets of sand grain size analyses have already occurred. The first was completed in the 2016 Feasibility Study and the second in 2018, identifying potential areas compatible with the "native" sand along the KBSC proposed shoreline project. These included Offshore Sites 18, 19, and 22. Additional testing is needed for the presence of environmental contaminants, as well as the identification of any infauna that may be important that sand for beach replenishment is as close as possible in size and composition to existing beach sand and that it be as clean, or free from silt and clay, as possible.*

Response #2: The sand study conducted for the DEIS discusses environmental contaminants and sand grain size for the three proposed sand sources and will be summarized in Section 3.1.4, *Soils and Sand Quality,* of the DEIS. The sand study will be included as an appendix in the DEIS.

Comment #3: *Expansion and completion of Section 2: Alternatives to the Proposed Action. The DEIS should propose a range of scenarios to which impacts to natural resources can be evaluated. Each action alternative should also include or propose how the sand would be transported (hydraulically, mechanically, etc.) from the borrow site to the dewatering site or the receiving site. Each type of dredge method has a different impact to resources and water quality. The DEIS should list all of the potential action alternatives that will be considered. For example, in Section 2.3.4, Groin Design, present engineering drawings of all potential combinations of T-head groin placements. What is the groin length in each scenario> How many T-head groins and where are they placed> What material will they be made of> The combined "design" of each action alternative allows for the evaluation of impacts for that specific action and for it to be compared to any similar actions. Another example – if dewatering of the borrow sand occurs, where will it occur? How will potential nearshore water quality issues from the process be controlled? This approach to giving detailed descriptions would apply to each area of Section 2 including but not limited to stub groins, beach fill, dune restoration, rock revetments, seawalls, temporary protections, sand sources, dewatering methods, etc. There are a few initial scenarios presented in Figures 1-7, 1-12, and 1-13, but they do not provide any information for a proper evaluation of the action.*

Response #3: Discussion of dredging and construction methods and their respective impacts to resources and water quality will be included in Section 2.2.5, *Construction.* Groin design, composition, and placement will be discussed and detailed in Section 2.2.3, *Stabilizing Structures.* Dewatering options will be discussed in Section 2.2.5.2, *Sand Recovery and Transfer.*

Comment #4: *Expansion and completion of Section 4: Existing Environmental Setting, Potential Impacts, and Migration Measures. The last resource survey was conducted by the State of Hawaii, Department of land and Natural Resources in 2010 for an Environmental Assessment related to the Hololani Resort, only a portion of the proposed project area. The proposed project takes a Programmatic approach, which will be completed in phases, instead of subdividing into nine separate actions. As suggested above, these studies should include an intertidal survey, benthic survey and reef structure delineation, identification of infauna in the areas to be filled, shoreline terrestrial flora and fauna, possible sea level rise and effects on structure design, stormwater runoff from altered drainage infrastructure, and changes to water quality and turbidity.*

Response #4: Please see Response #1; the specialized studies described in Response #1 will be used to expand and complete those applicable sections in Chapter 3 of the DEIS: *Existing Environmental Setting, Potential Impacts, and Mitigation Measures.*

Comment #5: *Section 4 briefly mentions an item that should be considered an action described in the appropriate action alternatives. The project proposes constructing a submerged pipeline from Offshore Sites 19 and 22 to the shoreline near Pohaku Park. An investigation of resources long those routes will be required for an impact analysis and to guide in placement and retrieval of the submerged pipeline. This section should be expanded in the DEIS with schematics of the pipeline as well as how it would be deployed, if it would be secured to the bottom, and how it would be retrieved, etc.*

Response #5: Construction method options for sand dredging and transport will be discussed in Section 2.2.5, *Construction,* of the DEIS. A marine benthic survey was conducted for the DEIS and surveyed the benthic resources along the proposed pipeline route. The marine benthic survey is summarized in Section 3.3.4, *Marine Biological Resources.* of the DEIS and included in its entirety as an appendix to the DEIS.

Comment #6: *Section 4 would also benefit by producing a series of benthic habitat maps within the proposed project area and a buffer area around the perimeter on both the seaward and landward sides. Identifying the current*

habitat types and the organisms that live there will be needed for evaluating the impacts to resources and water quality, as well as the possibility that sand will be retained after placement.

Response #6: NOAA characterizes the proposed project area and buffer area marine bottom types as uncolonized, macroalgae, and turf. A marine benthic survey was done to inventory the current habitat types and organisms in the area. The study will be included as an appendix to the DEIS and summarized in Section 3.3.4, *Marine Biological Resources,* of the DEIS.

Comment #7: *The water of the project area is currently classified as Marine Class A Waters by the 2014 Department of Health Water Quality standards. The DEIS should identify what measures will be taken to ensure that this rating remains after the sand placement and the increase in use of the shoreline.*

Response #7: Section 3.1.6, *Water Quality,* in the DEIS will discuss mitigation measures that will be taken to ensure that the waters around the project area remain Marine Class A Waters during construction as well as in the longer term after the sand placement and increased use of the shoreline.

Comment #8: *Identification of direct, indirect, and cumulative impacts of each action and/or each alternative. In addition to the major actions such as dredging, fill, and groin construction, this would include other actions as the increase in use of public facilities, parking lots, roadways, alteration of property and roadway drainage infrastructure, etc.*

Response #8: Section 3.5, *Public Services,* and Section 3.6, *Public Infrastructure,* will discuss the increase in dredging, fill, and groin construction, as well as impacts to use of public beaches (Section 3.5.2, *Shoreline Access*), parking lots (Section 3.5.1, *Recreational Facilities and Resources*), roadways, alteration of property, and roadway drainage infrastructure.

Comment #9: *A discussion on unavoidable environmental impacts. Identification of the unavoidable losses will guide the compensatory mitigation conversation, if necessary.*

Response #9: Chapter 5 of the DEIS: *Irretrievable and Irreversible Commitment of Resources* will discuss unavoidable environmental impacts.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

Cc: Nadiera Sukhraj, Marine Biologist

MICHAEL P. VICTORINO
Mayor

ROWENA M. DAGDAG-ANDAYA
Director

JORDAN MOLINA
Deputy Director

GLEN A. UENO, P.E., L.S.
Development Services Administration

RODRIGO "CHICO" R. RABARA, P.E.
Engineering Division

JOHN R. SMITH, P.E.
Highways Division

Telephone: (808) 270-7845
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII, 96793

September 10, 2020

Dr. Michael Foley
OCEANIT LABORATORIES, INC.
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

transmitted electronically: kahana@oceanit.com

SUBJECT: CONSULTATION FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT KAHANA BAY EROSION MITIGATION PROJECT LAHAINA, MAUI
SEAWARD OF TMK: (2) 4-3-005:008,009,019,020,021,029,031
(2) 4-3-010:001,002,004,007,009

Dear Dr. Foley:

We reviewed the subject application and have the following comments:

Comments from the Development Services Administration Civil and Construction Section:

1. It is unclear to what extent grading ordinance provisions will apply since it is unclear exactly where work will be done. Typically, Public Works does not regulate work in the ocean. It appears some work will extend onto the shore. If Public Works does have jurisdiction under the grading ordinance, there is a provision that prohibits importation of "soil" in the "shoreline area" (land area between the shoreline and the shoreline setback line). If boulders are to be placed in the shoreline area, it is questionable as to whether or not the boulders are considered "soil".

Comments from the Highways Division:

1. As the report identifies there are 3 drainage outlets potentially impacted by the proposed improvements. Engineering has raised this concern:

   a. Kahana Stream outlet just north of the project limits;
   b. S-turn outlet just south of the project limits; and
   c. a drainage outlet between Hololani & Pololani condominiums.

   Highways Division regularly coordinates with the USACE the lowering of sandplugs in anticipation of storm events to reduce flooding to roadways and adjoining properties. How will the proposed improvements change the currents and the depositing of sand at these ocean outlets? There is also a private ocean outlet, photo 8 between Valley isle Resort & Sands of Kahana on page 34. How will this project impact the outlet?

2. Section 1.7.2 Sand Sources (pg. 50) mentions extensively the compatibility of the sand sources to the resident sand. What about the aquatic life? Sections 4.3.1 mentions terrestrial (land) assessment and 4.3.6 mentions benthic (ocean bottom) surveys will be included in the EIS. We look forward to reviewing those assessments. Local fishermen are aware of fishing spots which may be adversely impacted by such mining and improvements.

Comments from the Engineering Division:

1. Our comments are still the same from letter dated July 17, 2020. See attached.

Additional Comments:

1. P. 2 Location and Ownership – the EIS must address ownership of the project and improvements and applicable land rights that need to be secured. Financing the project through the County's CFD process forces the County to assume ownership of the improvements. This create an impact to the County's operations that may extend beyond just the properties benefitting from this project. Also, it's unclear what type of land rights must be secured given the improvements will be built in the ocean under the State's jurisdiction.

2. P. 21 Beach Monitoring Plan – the EIS must discuss the scope (land rights, personnel expertise, access ways, enforcement of illicit activity, etc.) and lifecycle costs of the monitoring plan and who is responsible for its implementation. The EIS must describe how these items would differ if the responsibilities are undertaken by the Steering Committee versus County staff. The EIS must not assume that County staff are guaranteed to take on this responsibility.

3. P. 21 Sand Re-nourishment – the EIS must discuss the scope (i.e. permitting requirements, land rights, access ways, personnel expertise, etc.) and lifecycle cost of re-nourishment and who is responsible for its implementation. The EIS must describe how these items would differ if the responsibilities are undertaken by the Steering Committee versus County staff. The EIS must not assume that County staff are guaranteed to take on this responsibility.

4. P. 21 Beach Stabilization Structures – the EIS must discuss the scope (i.e permitting requirements, land rights, access ways, equipment, personnel expertise, enforcement of illicit activity, pedestrian use of structures, etc.) and lifecycle costs of monitoring and maintenance of these structures and who is responsible for its implementation. The EIS must describe how these items would differ if the responsibilities are undertaken by the Steering Committee versus County staff. The EIS must not assume that County staff are guaranteed to take on this responsibility.

5. P. 27 Sand Sources – the EIS must discuss the reliability of the offshore sand sources. What is the total volume that is advisable to be remove from these sources? How many years of re-nourishments can be supported by these off-shore sand sources? What secondary sources are available once these offshore sources are depleted? Also, the EIS must discuss the short-term and long-term impacts of removing sand on aquatic ecology.

6. P. 81 Streams – There are 3 County maintained and 1 privately maintained drainage outlets that will be impacted by the project as noted by the Highways Division. The EIS must discuss how the project will impact the functionality of these drainage outlets. The proposed improvement must be designed to reduce and not exacerbate the maintenance obligations of these drainage outlets.

Dr. Michael Foley, Ph.D, P.E.
September 10, 2020
Page 3

Please contact Jordan Molina at 270-7845 with any questions regarding this correspondence.

Mahalo,

for: ROWENA M. DAGDAG-ANDAYA
Director of Public Works

RDA:JM:jm
xc: Highways Division
Engineering Division
Development Services Administration

MICHAEL P. VICTORINO
Mayor
ROWENA M. DAGDAG-ANDAYA
Director
JORDAN MOLINA
Deputy Director
GLEN A. UENO, P.E., L.S.
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
200 SOUTH HIGH STREET, ROOM NO. 410
WAILUKU, MAUI, HAWAII 96793

July 17, 2020

Dr. Michael Foley, Ph.D., P.E.
Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

SUBJECT: CONSULTATION FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT KAHANA BAY EROSION MITIGATION PROJECT TMK: (2) 4-3-005: 029, 020, 021, 031, 019, 009, 008; 4-3-010: 009, 007, 004, 002, 001, DISTRICT OF LAHAINA, MAUI.

Dear Mr. Foley:

The County of Maui, Department of Public Works (DPW) is in receipt of your July 14, 2020 letter seeking consultation on the subject project's Environmental Impact Statement Preparation Notice (EISPN) issued in the Office of Environmental Quality Control's "Environmental Notice" publication on July 23, 2019.

We offer the following comments on the proposed project:

1. The site is located adjacent to Pohaku "S-Turns" Beach Park. DPW maintains the Pohaku Park outlet. In anticipation of severe weather events, the sand plug is lowered at the outlet to ensure there is adequate relief for flooding. Historically, during high tide and north swell events, sand washes onto Lower Honoapiilani Road and DPW maintenance personnel are required to push the material off the road. Will this project impact the frequency of this occurrence or hinder the ability to maintain this outlet?

2. The retention basin adjacent to Pohaku Park is also maintained by DPW. The EISPN is unclear as to whether the basin will be utilized for dredging operations. Section 2.3.7 describes the potential use of the basin for dewatering. Please note that the basin is intended to serve as a flood control structure. If used during construction, appropriate mitigation should be proposed in the event of a major storm event.

3. Kahana Stream is located to the north of the project, and is also a DPW-maintained outlet. The EISPN correctly describes that the stream outlet is often plugged with sand and causes ponding in the stream channel. Similar to Pohaku Park, a sand plug must be lowered in anticipation of storm events.

Section 4.32 of the EISPN, page 81 states:

"All discharge associated with the project is expected to be along the shore, downstream from the mouth of the Kahana Stream; however, the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean."

Please address this impact to ensure there are no flanking effects to adjacent properties and drainage outlets along the shoreline.

4. Section 4.64 Drainage System, page 101 states:

"The proposed action is not anticipated to increase stormwater discharge. No alterations to existing drainages are proposed. Where drainage pipes or culverts lead to the ocean, placed sand may act as a filter and stabilize stormwater flows or enhance their percolation into subsurface flows."

Please confirm that any drainage culverts within the project limits will not be plugged by the placement of sand. Sand will not act as a filtration method – stormwater will back up into the drainage system and may flood upstream properties.

If you have any questions regarding the above comments, please contact Kristi Ono at 270-7745 or kristi.ono@co.maui.hi.us.

Sincerely,

RODRIGO "CHICO" RABARA, P.E.
Engineering Division Chief

RRR/KO (ED20-0833)
S:\ENG\DESIGN\DRAINAGE REVIEWS\DSA\2020\WEST MAUI\KAHANA BAY EROSION MITIGATION\2020-07-17 DPW RESPONSE.DOC

oceanit
innovation through engineering & scientific excellence

November 19, 2020

Jordan Molina
Department of Public Works
County of Maui
200 South High Street, Room No. 434
Wailuku, Maui, Hawai'i 96793

Subject: **Consultation for the Draft Environmental Impact Statement**
Kahana Bay Erosion Mitigation Project
Lahaina, Maui
Seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001

Dear Mr. Molina,

Thank you for your letter dated September 10, 2020 responding to our consultation request regarding the Draft Environmental Impact Statement (DEIS) for the Kahana Bay Erosion Mitigation Project. Your feedback is an important part of the environmental review process.

We note that the Department of Public Works included comments from the Development Services Administration Civil and Construction Section, the Highways Division, and the Engineering Division (comments from July 17, 2020). We offer the following responses to these comments.

Comments from the Development Services Administration Civil and Consulting Section:

1. *It is unclear to what extent grading ordinance provisions will apply since it is unclear exactly where work will be done. Typically, Public Works does not regulate work in the ocean. It appears some work will extend onto the shore. If Public Works does have jurisdiction under the grading ordinance, there is a provision that prohibits importation of "soil" in the "shoreline area" (land area between the shoreline and the shoreline setback line). If boulders are to be placed in the shoreline area, it is questionable as to whether or not the boulders are considered "soil".*

Response 1: Delineation of project activities within federal, state, and county jurisdiction will be defined by a certified shoreline survey during the permitting process. Anticipated regulatory permits are discussed in Section 4.4, *Required Approvals and Applicable Regulatory Requirements*, of the DEIS.

Comments from the Highways Division:

1. *As the report identifies there are 3 drainage outlets potentially impacted by the proposed improvements.*

Engineering has raised this concern:

a. *Kahana Stream outlet just north of the project limits;*
b. *S-turn outlet just south of the project limits; and*
c. *a drainage outlet between Hololani & Pohailani condominiums.*

Highways Division regularly coordinates with the USACE the lowering of sand plugs in anticipation of storm events to reduce flooding to roadways and adjoining properties. How will the proposed improvements change the currents and the depositing of sand at these ocean outlets? There is also a private ocean outlet, photo 8 between Valley isle Resort & Sands of Kahana on page 34. How will this project impact the outlet?

Response 1: The drainage system and any anticipated impacts to the drainage outlets will be discussed in Section 3.6.2 of the DEIS. In addition, sand plug accretion and movement following nourishment will also be discussed in the aforementioned section.

2. *Section 1.7.2 Sand Sources (pg. 50) mentions extensively the compatibility of the sand sources to the resident sand. What about the aquatic life? Sections 4.3.1 mentions terrestrial (land) assessment and 4.3.6 mentions benthic (ocean bottom) surveys will be included in the EIS. We look forward to reviewing those assessments. Local fishermen are aware of fishing spots which may be adversely impacted by such mining and improvements.*

Response 2: A detailed marine resource assessment and terrestrial biological survey will be included as appendices to the DEIS. The results from these reports will be summarized in Section 3.3, *Ecological Resources*, which discusses terrestrial biological resources, marine biological resources, and fish habitat.

<u>Comments from the Engineering Division:</u>

1. *Our comments are still the same from letter dated July 17, 2020. See attached.*

Response 1: Responses to the Engineering Division comments dated July 17, 2020 will be sent directly to the Engineering Division.

Additional Comments:

1. P. 2 Location and Ownership – the EIS must address ownership of the project and improvements and applicable land rights that need to be secured. Financing the project through the County's CFD process forces the County to assume ownership of the improvements. This create an impact to the County's operations that may extend beyond just the properties benefitting from this project. Also, it's unclear what type of land rights must be secured given the improvements will be built in the ocean under the State's jurisdiction.

Response 1: The DEIS will discuss project ownership and financing options in Chapter 2, *Proposed Project and Project Alternatives*.

2. P. 21 Beach Monitoring Plan – the EIS must discuss the scope (land rights, personnel expertise, access ways, enforcement of illicit activity, etc.) and lifecycle costs of the monitoring plan and who is responsible for its implementation. The EIS must describe how these items would differ if the responsibilities are undertaken by the Steering Committee versus County staff. The EIS must not assume that County staff are guaranteed to take on this responsibility.

Response 2:
The DEIS will not assume that County staff will take on this responsibility of beach monitoring. Funding, ownership and related land rights, access ways, and enforcement are not determined at this time. Options for funding and ownership will be presented in Chapter 2, Proposed Project and Project Alternatives, and in Chapter 7, *Unresolved Issues,* of the DEIS.

3. P. 21 Sand Re-nourishment – the EIS must discuss the scope (i.e. permitting requirements, land rights, access ways, personnel expertise, etc.) and lifecycle cost of re-nourishment and who is responsible for its implementation. The EIS must describe how these items would differ if the responsibilities are undertaken by the Steering Committee versus County staff. The EIS must not assume that County staff are guaranteed to take on this responsibility.

Response 3: The DEIS will thoroughly discuss sand nourishment in Chapter 2, *Proposed Project and Project Alternatives*. Permitting requirements will be addressed in Chapter 4, *Relationship to Land Use Plans, Policies and Controls*. The DEIS will not assume that County staff are to assume responsibility of sand re-nourishment.

4. P. 21 Beach Stabilization Structures – the EIS must discuss the scope (i.e permitting requirements, land rights, access ways, equipment, personnel expertise, enforcement of illicit activity, pedestrian use of structures, etc.) and lifecycle costs of monitoring and maintenance of these structures and who is responsible for its implementation. The EIS must describe how these items would differ if the responsibilities are undertaken by the Steering Committee versus County staff. The EIS must not assume that County staff are guaranteed to take on this responsibility.

Response 4: The DEIS will discuss the Proposed Action's beach stabilization structures in Chapter 2, *Proposed Project and Project Alternatives*. Permitting requirements will be addressed in Chapter 4, *Relationship to Land Use Plans, Policies and Controls.*

5. P. 27 Sand Sources – the EIS must discuss the reliability of the offshore sand sources. What is the total volume that is advisable to be remove from these sources? How many years of re-nourishments can be supported by these off-shore sand sources? What secondary sources are available once these offshore sources are depleted? Also, the EIS must discuss the short-term and long-term impacts of removing sand on aquatic ecology.

Response 5: The DEIS will discuss sand sources, sand recovery, and sand transfer in Chapter 2, *Proposed Action and Project Alternatives*, for both the Proposed Project (stabilization structures and beach nourishment) and Secondary Alternative (beach nourishment). We note that beach nourishment frequency requirements differ significantly between the Proposed Project and the Secondary Alternative. In the Proposed Project, beach re-nourishment would be far less frequent due to the stabilization structures that help retain sand on the beaches. A sand study to evaluate the reliability and volume of the offshore sand sources was performed in June 2019. A write up of this study will be included as an appendix to the DEIS. Secondary sources that could be evaluated for renourishment events could possibly those identified by the 2016 Moffat and Nichol Study. The DEIS will discuss short- and long-term impacts of removing sand in Section 3.3.4 *Marine Biological Resources* as well as Section 3.2.1 *Coastal Processes* of the DEIS.

6. P. 81 Streams – There are 3 County maintained and 1 privately maintained drainage outlets that will be impacted by the project as noted by the Highways Division. The EIS must discuss how the project will impact the functionality of these drainage outlets. The proposed improvement must be designed to reduce and not exacerbate the maintenance obligations of these drainage outlets.

Response 6: DEIS Section 3.6.4, *Drainage System*, will describe the existing drainage outlets maintained by Maui County and discuss any expected impacts of the Proposed Action and Secondary Alternatives. Recommended avoidance and/or mitigation or impacts will be included as appropriate.

We appreciate your comments on the project and look forward to hearing from you when the DEIS is published.

Sincerely,

Michael Foley, Ph.D., P.E.
Sr. Coastal Engineer

Cc: Ms. Rowena M. Dagdag-Andaya
County of Maui Highways Division
County of Maui Engineering Division
County of Maui Development Services Administration