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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

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HONOLULU, HAWAII 96809

DLNR: OCCL: SL

Correspondence MA-16-224

MAY 11 2016

MEMORANDUM

To: Mr. Scott Glenn, Director
Office of Environmental Quality Control

From: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

Subject: Draft Environmental Assessment (EA) for Temporary Shoreline Erosion Control at the Hyatt Regency Maui Resort Located at 200 Nohea Kai Drive, Lahaina, Maui, TMK: (2) 4-4-013:008.

The Department of Land and Natural Resources has reviewed the Draft Environmental Assessment (EA) for the proposed project and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the **May 23, 2016** issue of the Environmental Notice. We have enclosed the applicant's completed OEQC Bulletin Publication Form and one (1) copy of the document in pdf format on a CD; and one (1) hardcopy of the Draft EA.

Should you wish to provide comments regarding this project please respond by the 30th Comment Day Deadline: June 23, 2016. If no response is received by the comment deadline, we will assume there are no comments. Please contact Brad Romine in the Office of Conservation and Coastal Lands at (808) 587-0049 should you have any questions.

Enclosures: *OEQC Bulletin Publication Form (hard copy)*
One (1) CD with pdf of the Draft EA
One (1) hardcopy of the Draft EA

APPLICANT
PUBLICATION FORM

Project Name:	Hyatt Regency Maui Temporary Slope Stabilization project at Kaanapali, Maui
Project Short Name:	Hyatt Regency Temporary Slope Stabilization DEA-AFNSI
HRS §343-5 Trigger(s):	Use of Conservation District
Island(s):	Maui
Judicial District(s):	Maui Second Circuit
TMK(s):	(2) 4-4-013:008
Permit(s)/Approval(s):	Conservation District Use Permit, County of Maui Special Management Area Permit
Approving Agency:	Department of Land and Natural Resources
Contact Name, Email, Telephone, Address	Tiger Mills, DLNR-OCCL, Kimberly.Mills@hawaii.gov, 808.587.0377, DLNR-OCCL, 1151 Punchbowl Street, Room 131, Honolulu, Hawaii 96813
Applicant:	Host Hotels and Resorts, Inc.
Contact Name, Email, Telephone, Address	Bryan Thrush, bryan.thrush@hosthotels.com, 240.744.5288, Host Hotels and Resorts, Inc., 6903 Rockledge Drive, Suite 1500, Bethesda, MD 20817
Consultant:	Sea Engineering, Inc.
Contact Name, Email, Telephone, Address	Chris Conger, cconger@seaengineering.com, 808.259.7966, Sea Engineering Inc., Makai Research Pier, Waimanalo, Hawaii 96795

Status (select one)	**Submittal Requirements**
__X_ DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.
____ Supplemental EIS Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.

____ Withdrawal — Identify the specific document(s) to withdraw and explain in the project summary section.

____ Other — Contact the OEQC if your action is not one of the above items.

Project Summary

Provide a description of the proposed action and purpose and need in 200 words or less.

The shoreline fronting the Hyatt Regency Maui (Hyatt) has been chronically eroding for decades, with a significant acceleration in erosion during the past decade. Ongoing erosion pressure on the shoreline is threatening backshore infrastructure including the Kaanapali Beachwalk (Beachwalk), which is the public coastal access path extending continuously from Hanakaoo Beach Park to Kekaa Point.

Though the long-term plan for the region is focused on beach maintenance, intense erosion is currently threatening a significant length of the Beachwalk and backshore infrastructure today. As the Beachwalk is progressively undermined, a public health, welfare, and safety concern is rapidly evolving. In addition, significant backshore infrastructure will be imminently threatened if the Beachwalk fails in the project area.

The proposed action consists of a temporary geotextile sandbag slope stabilization along approximately 250 ft of shoreline where the Beachwalk is imminently-threatened. Analysis of possible alternatives actually results in selection of a rock revetment as the preferred solution for the shoreline; however, given the regulatory and social perception of these structures as temporary or mid-term solutions, the less imposing alternative of a synthetic sandbag structure is proposed. The primary intent of the preferred alternative is to mitigate the impacts of ongoing erosion to coastal lateral access and public health, welfare, and safety, while the long-term beach maintenance project is undergoing design, planning, and permitting.

DRAFT ENVIRONMENTAL ASSESSMENT
HYATT REGENCY MAUI
TEMPORARY SLOPE STABILIZATION

Kaanapali, Maui, HI

May 2016

Prepared for:
Hyatt Regency Maui
200 Nohea Kai Drive
Lahaina, HI 96761

Prepared by:
Sea Engineering, Inc.
Makai Research Pier
Waimanalo, HI 96795

Job No. 25496

ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT (AFONSI) HYATT REGENCY MAUI TEMPORARY SLOPE STABILIZATION, KAANAPALI, HAWAII

Accepting and Approving Agency: Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street, Room 131
Honolulu, Hawaii 96813

Proposed Action: The shoreline fronting the Hyatt Regency Maui (Hyatt) has been chronically eroding for decades, with a significant acceleration in erosion during the past decade. Ongoing erosion pressure on the shoreline is threatening backshore infrastructure including the Kaanapali Beachwalk (Beachwalk), which is the public coastal access path extending continuously from Hanakaoo Beach Park to Kekaa Point. Beach maintenance for the region has been proposed and is currently undergoing design, planning, and permitting in a joint effort between the State and resort operators to address long-term degradation of beach resources, mitigate vulnerability to coastal hazards and erosion along the coastline, and improve public health and safety. Though the long-term plan for the region is focused on beach maintenance, intense erosion is currently threatening a significant length of the Beachwalk and backshore infrastructure today. This Beachwalk will not survive, given the current erosion pressure, until the beach nourishment effort can be implemented. As the Beachwalk is progressively undermined, a public health, welfare, and safety concern is rapidly evolving. In addition, significant backshore infrastructure will be imminently threatened if the Beachwalk fails in the project area.

Cumulative impacts of erosion, particularly during the past decade, have required progressive removal of undermined portions of the Beachwalk, resulting in narrowing of the pathway which has increased health and safety risks for residents and visitors. Continued removal has created “pinch points” that have reduced lateral access along the shoreline. Moreover, relocation of the Beachwalk further mauka at these pinch points is infeasible due to the presence of existing structures and infrastructure. Costs associated with relocation or loss of the Beachwalk are significant, with many additional impacts to backshore improvements that affect the local economy, including tax revenue, the landowner, and available jobs.

The proposed action consists of a temporary geotextile sandbag slope stabilization along approximately 250 ft of shoreline where the Beachwalk is imminently-threatened. Analysis of possible alternatives actually results in selection of a rock revetment as the preferred solution for the shoreline; however, given the regulatory and social perception of these structures as temporary or mid-term solutions, the less imposing alternative of a synthetic sandbag structure is proposed. The primary intent of the preferred alternative is to mitigate the impacts of ongoing erosion to coastal lateral access and public health, welfare, and safety, while the long-term beach maintenance project is undergoing design, planning, and permitting. The long-term management plan for the entire Kaanapali coastline is focused on beach maintenance and nourishment. The proposed stabilization of this short (250 ft) length of shoreline will preserve lateral public access along the presently-threatened shoreline until the long-term beach maintenance plan can be developed and implemented. The preferred alternative is necessary to prevent a substantial threat to public health, safety, and welfare. In addition, erosion impacts to the backshore improvements and infrastructure will result in significant costs for relocation or removal of improvements and loss of revenue if the Beachwalk is abandoned or moved.

Determination: In accordance with the potential impacts outlined in Section 5 of the Draft Environmental Assessment (DEA), the provisions of Chapter 343 Hawaii Revised Statutes (HRS), and Hawaii Administrative Rules (HAR) §11-200 significance criteria, the Approving Agency, the Department of Land and Natural Resources, State of Hawaii, is anticipated to make a Finding Of No Significant Impact (FONSI).

Basis for Determination: The project will stabilize the bank and Beachwalk and will not adversely alter or affect presently ongoing sand transport and natural shoreline processes, wave-driven currents, circulation patterns, overall water quality, or offshore wave breaking. Construction activities will be designed so as to avoid and minimize impacts to nearshore water quality so far as practicable, and since the project is landward of the Mean Higher High Water (MHHW) line, no impacts to marine biota are anticipated. The sandbag slope stabilization will be placed within and beneath the existing beach face; thus, there will be no loss of marine habitat. Construction Best Management Practices (BMPs) will be used to mitigate potential impacts to endangered and protected species such as the Green and Hawksbill Sea Turtles and Hawaiian Monk Seals. Construction can be expected to result in some temporary disruption of beach use and recreational activities, as well as minor noise disturbance and short-term degradation of air quality from the operation of construction equipment.

Chapter 343 Hawaii Revised Statutes (HRS), and Hawaii Administrative rules (HAR) §11-200, establish certain categories of action that require the agency processing an applicant's request for approval to prepare an Environmental Assessment (EA). HAR §11-200-11.2 established procedures for determining if an EA is sufficient, or if an Environmental Impact Statement (EIS) should be prepared for actions that may have a significant effect on the environment. HAR §11-200-12 lists the following criteria to be used in making such a determination.

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The sandbag slope stabilization will mitigate ongoing erosion and protect the Beachwalk. The beach is experiencing both chronic and episodic erosion, and the Beachwalk is presently undermined. The proposed work will take place in an area that has been substantially altered over decades of development. The preferred alternative is unlikely to have any significant adverse effect on known cultural or traditional Hawaiian practices, as the placement location is within an active beach face that has eroded and accreted several times in the past decade. The preferred alternative will prevent the future loss or destruction of natural and cultural resources.

2. *Curtails the range of beneficial uses of the environment.*

The preferred alternative would protect the Kaanapali Beachwalk with sandbag slope stabilization. The heavily-used Beachwalk is the only ADA-compliant shoreline access through the region. No adverse long-term impacts to the environment are anticipated to result from this project. There may be temporary short-term impacts during construction; however, these are not anticipated to be significant, and will be mitigated to the maximum extent practicable by the use of BMPs and monitoring procedures. The preferred alternative will preserve and enhance the beneficial use of the shoreline area.

3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 343, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

The preferred alternative is consistent with Hawaii's State Environmental Policy as established in Chapter 343(4)(A), HRS, to establish, preserve, and maintain recreation areas, including the shoreline, for public recreational use. The preferred alternative is necessary to prevent a substantial threat to public health, safety, and welfare due to failure of the Beachwalk and inland infrastructure.

4. *Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.*

The Beachwalk is the primary lateral shoreline access to the Kaanapali region, extending continuously from Hanakaoo Beach Park to Kekaa Point. The Beachwalk is also critical infrastructure that supports regional commerce in Kaanapali. Users of the Beachwalk access neighboring commercial properties and businesses, which supports the exchange of economic resources that is vital to all properties and the region as a whole. The preferred alternative will help maintain this very valuable socio-economic resource. In addition, future erosion impacts to inland improvements will have a profound effect on the economic welfare of the development, including employment opportunities and generated tax revenue.

5. *Substantially affects public health.*

The preferred alternative will have some impact on air and noise quality during construction; however, these will be mitigated to the maximum extent practicable by BMPs and monitoring procedures. The project will not result in any post-construction or long-term effects on public health.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities.*

The project will not alter the existing land use pattern in and around the project site. The project will; however, allow continued backshore use of the Beachwalk. The number of users is not expected to change as the result of the project. The preferred alternative has little or no potential to affect public infrastructure and services. Once completed it will require no water, power, sanitary wastewater collection, or additional emergency services.

7. *Involves a substantial degradation of environmental quality.*

Other than temporary, short-term environmental impacts during construction, which are generally not considered significant, the preferred alternative would not result in impacts which can be expected to degrade the environmental quality in the project area. The preferred alternative will improve existing environmental conditions by mitigating ongoing erosion and decreasing the amount of sediment released into nearshore waters from the bank.

8. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.*

The preferred alternative involves stabilizing approximately 250 ft of eroding bank with sandbag slope stabilization. The project does not require or commit to future larger actions. The preferred alternative is temporary in nature and is designed as a medium-term solution to stabilize the bank and Beachwalk while the long-term solutions are developed as part of the future Kaanapali Beach Maintenance project.

9. *Substantially affects a rare, threatened, or endangered species, or its habitat.*

The nearshore area fronting the Hyatt is frequented by the threatened Green Sea Turtle, which feeds on the algae-covered hard fossil limestone bottom areas. Hawaiian Monk Seals have been infrequently seen in the area. Turtles are not known to nest in the project area. The project is located landward of the MHHW line; thus, there will be no loss of habitat. Endangered species protection procedures as recommended by the National Marine Fisheries Service will be in place during construction. There will be no long-term impact to rare, threatened, or endangered species.

10. *Detrimentally affects air or water quality or ambient noise levels.*

There will be some temporary, short-term impacts to air and water quality, and noise levels, during construction. However, these impacts will be limited to the construction period and will not be significant. BMPs will be in effect to help minimize the construction impacts. Once construction is complete and the sand is placed on the beach there would be no activity or mechanism for further air, water, or noise impacts.

11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

The preferred alternative will stabilize the eroding bank and undermined Beachwalk, thus providing a beneficial impact by maintaining the space between the water and the coastal lateral access path. This buffer will effectively dissipate wave energy, decrease wave runup and flooding of the backshore area, and thus reduce vulnerability to coastal hazards. The preferred alternative will not change the shoreline elevation, and will not change the existing tsunami or storm wave flood hazard.

12. *Substantially affects scenic vista and view planes identified in county or state plans or studies.*

The preferred alternative is relevant to the objectives of the Maui Island Plan, including protecting and improving the natural environment, restoring natural resources, retaining scenic resources, and enhancing scenic views. The sandbags will be partially buried in the beach, and that which is exposed will be no higher than the Beachwalk. The sandbags will be light brown colored and will therefore blend naturally with the existing landscape. The sandbag slope stabilization will not significantly alter the Kaanapali view plane.

13. Requires substantial energy consumption.

Other than energy expended during construction operations, the project would require no additional energy consumption.

Contacts:

Applicant:	Host Hotels and Resorts, Inc. Attn: K. Bryan Thrush 6903 Rockledge Drive, Suite 1500 Bethesda, MD 20817 Phone: (240) 744-5288 Email: bryan.thrush@hosthotels.com
Consultant:	Sea Engineering, Inc. Attn: Chris Conger Makai Research Pier 41-305 Kalanianaole Highway Waimanalo, HI 96795 Phone (808) 259-7966, Ext. 26 Email: cconger@seaengineering.com

PROJECT SUMMARY

Project:	Hyatt Regency Maui Temporary Slope Stabilization
Receiving Agency:	Department of Land and Natural Resources State of Hawaii 1151 Punchbowl Street, Room 131 Honolulu, HI 96813 Contact: Sam Lemmo Phone (808) 587-0377 Fax (808) 587-0322 sam.j.lemmo@hawaii.gov
Consultant:	Sea Engineering, Inc. Makai Research Pier 41-305 Kalanianaole Highway Waimanalo, HI 96795 Contact: Chris Conger Phone (808) 259-7966, Ext. 26 cconger@seaengineering.com
Location:	Kaanapali, Maui, Hawaii
Tax Map Keys:	(2) 4-4-013:008
State Land Use District:	Conservation
County Zoning:	H-2 (Hotel)
Proposed Action:	Construction of a temporary sandbag slope stabilization
Required Permits & Approvals:	Environmental Assessment and Finding of No Significant Impact (Chapter 343, HRS and §11-200, HAR) Conservation District Use Permit (HAR 13-5)
Actions Requiring Environmental Assessment:	Work within the State Conservation District
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Estimated Cost:	$650,000 to $1,300,000
Time Frame:	Construction will begin when the necessary permits and approvals are obtained and a construction contract is awarded, currently estimated for Fall 2016. The construction period is estimated to be 30 to 45 days.

Unresolved Issues: Permit requirements

Anticipated Consultations - Organizations/Individuals:

Federal

U.S. Army Corps of Engineers, Honolulu District, Regulatory Branch
U.S. Fish and Wildlife Service
National Oceanic and Atmospheric Administration, National Marine Fisheries Service

State

Office of Environmental Quality Control
Department of Land and Natural Resources
- Division of Aquatic Resources
- Historic Preservation Division
- Office of Conservation and Coastal Lands
- Engineering Division
- Division of Boating and Ocean Recreation

Department of Transportation, Harbors Division
Office of Hawaiian Affairs
Hawaii Tourism Authority

Maui County

Department of Planning

Other

Kaanapali Operations Association, Inc. (KOA)
Hyatt Regency Maui Hotel

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1. INTRODUCTION

1.1 Project Location and General Description

The Hyatt Regency Maui (Hyatt) is located south of Hanakaoo Point on Kaanapali Beach, on the northwest coast of the island of Maui, Hawaii. An overview of the project site and relevant features is shown on Figure 1-1 and Figure 1-2. The hotel is located along 1,900 feet of shoreline and consists of three main wings along with ancillary facilities such as swimming pools, a spa, event areas, and a portion of the Kaanapali Beachwalk (Beachwalk) that extends one mile northward to the Sheraton Maui. The Hyatt shoreline is part of the Hanakaoo littoral cell that starts with the sandy beach at Hanakaoo Beach Park, includes the neighboring Marriott Maui Ocean Club, and ends with the wide fringing reef at Hanakaoo Point.

The Kaanapali development is an important economic engine for Maui, with the clean sand beach and clear water being major attractions for visitors. The Hyatt has experienced chronic erosion along its entire shoreline, with extreme erosion on a nearly 500-foot long stretch in front of the pool ("Grotto") area. This erosion has advanced rapidly over the last few years, extending to and threatening the Beachwalk, which is the primary access to the beach and along the shoreline.

The Beachwalk is a public amenity that is privately owned and maintained. The Beachwalk extends continuously for 6,000 feet from the Hyatt Regency Maui to the Sheraton Maui, connecting eight properties. The Beachwalk is the only ADA-compliant thoroughfare along the beach and has been identified by hotel representatives as having great importance to the region. Those representatives view the Beachwalk as the main pedestrian artery that makes Kaanapali a community. Many travel organizations, including Frommer's, TripAdvisor, Fodor's Travel, and About.com, refer to the value of the Beachwalk as an amenity. Moreover, the Beachwalk is freely available to any member of the public visiting Kaanapali. Along this section of coastline, between Hanakaoo Beach Park and Hanakaoo Point, the beach is severely narrowed and steep due to both chronic and episodic erosion.

The Beachwalk is actively used from before dawn to well after sunset each day of the week. The 2016 pedestrian study (SSFM, 2016) documented pedestrian flow rates of 9 to 20 people per minute at peak usage periods, on the Beachwalk at the affected site. Approximately 70% of the Beachwalk travelers were from the continental US, while 12% were from international locations and 18% were from Hawaii. Of these travelers, 65% were staying at the Hyatt, while 10% were local Maui residents, and the remaining 25% were staying at other accomodations in Kaanapali.

Approximately 0.1% of these travelers were mobility disadvantaged. Though this number is low, relative to the full volume, it is significant in that this group can only access the coastline along the Beachwalk.

The 2016 pedestrian study (SSFM, 2016) documented nearly 6,000 travelers during approximately 13 hours of observations over a two day period. Of these travelers, 65% were staying at the Hyatt, while 10% were local Maui residents, and the remaining 25% were staying at other hotels in Kaanapali. All of these travelers were using the Beachwalk as a coastal lateral access path with connectivity along the full length of the path, including shops, restuarants, and recreational amenities.

The current Beachwalk width of six feet at the project site was considered too narrow by some travelers. During periods of high traffic, opposing flows of travelers had difficulty passing groups because of path width. Additional narrowing of the path, resulting from further losses, would have a significantly negative impact on users of the Beachwalk.

In the critical section fronting the Hyatt, there is very little or no vegetative buffer remaining between the deflated beach face and the scarp on the seaward side of the Beachwalk. Parts of the Beachwalk have been undermined by wave attack and were subsequently removed. These narrow sections create “pinch points” where the path is threatened but cannot be moved further mauka because of existing coastal infrastructure and buildings. Further loss of the Beachwalk at these pinch points, which are currently undermined, will effectively remove the only passable, lateral beach access in the region. Obstruction of or a break in the Beachwalk will have a major impact to the flow of pedestrian traffic. Continued undermining will result in a significant and long-term interruption of access between Hanakaoo Beach Park and the beaches to the northwest. Damage to the Beachwalk has created a potential risk to the health, safety, and welfare of both visitors and local residents. In addition, the backshore amenities and infrastructure are also threatened, with further erosion evolving into structural integrity concerns and potential failures. Loss of these amenities and infrastructure as a result of erosion would be a significant impact the backshore landowner, causing irreparable damage during the interim period while the beach nourishment effort is being permitted and then implemented.

In an effort to more proactively manage the beach resource in Kaanapali, the Department of Land and Natural Resources (DLNR) and the Kaanapali Operators Association (KOA) have recently funded the first phase of the Kaanapali Beach Maintenance project. One goal of this project is to replenish the sand beach fronting the Hyatt, Hanakaoo Beach Park, and the adjacent Marriott Maui Ocean Club. The maintained sand beach will once again act as a coastal hazard buffer between the ocean and the Beachwalk. Design, planning, and permitting work have recently begun, but actual beach maintenance activities are anticipated to be several years away. In the meantime, the shoreline fronting the Hyatt continues to erode and undermine the Beachwalk.

The Beachwalk is imminently threatened and there is a potential risk to public health and safety. If left untreated, the situation is likely to evolve into an emergency. The proposed solution to alleviating a potential emergency is to provide temporary slope stabilization targeting the most critical erosion areas. Topographic surveys have indicated that the most critical area is a 250-foot long stretch of shoreline directly fronting the Grotto area. Erosion at this location has already required the removal of multiple palm trees and an entire section of the Beachwalk. In August 2015, an Emergency Erosion Protection Skirt was installed along 200 feet of coastline in this area to protect the Beachwalk during high tides and south swell events.

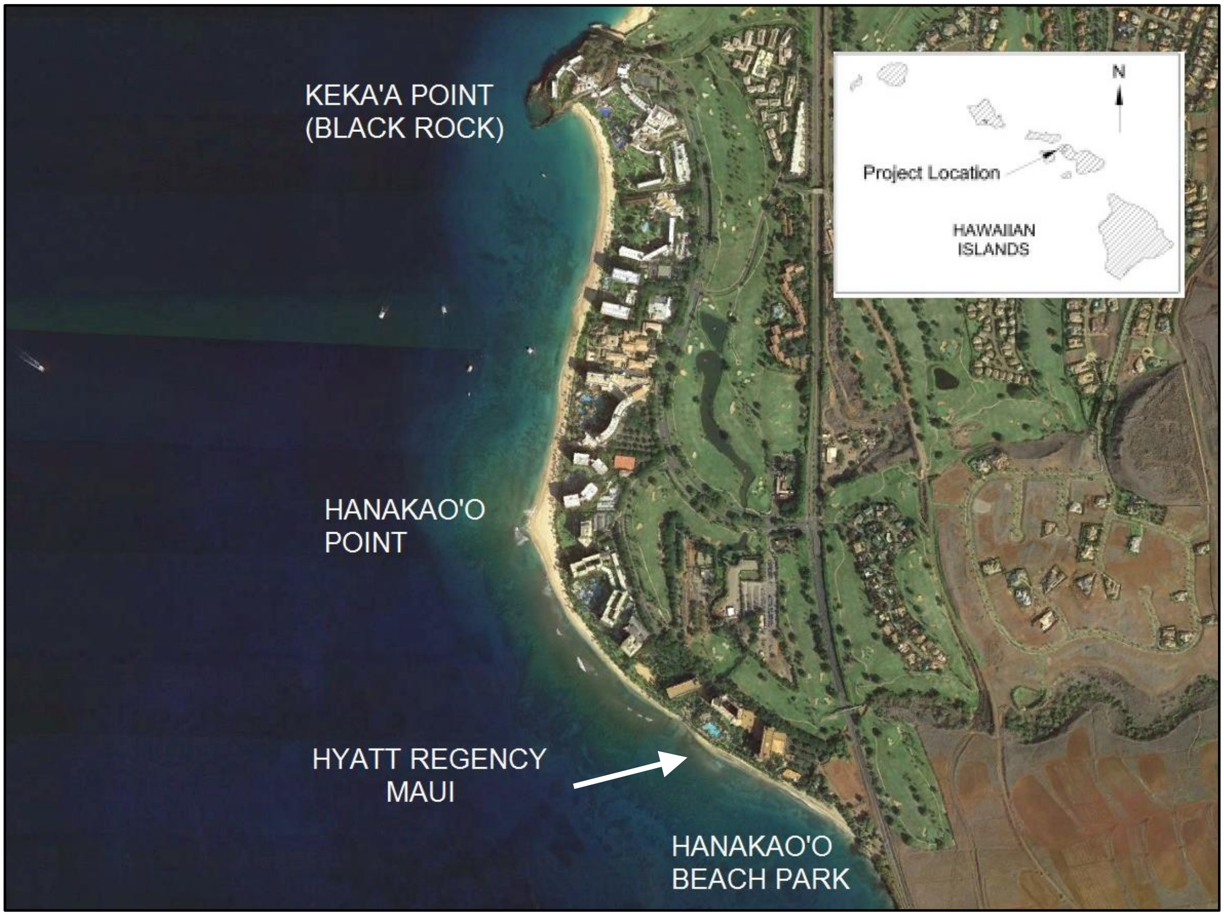

Figure 1-1 Map of Kaanapali Resort and project site

The Hyatt has attempted to remediate the ongoing erosion in accordance with the current environmental rules and recognized shoreline "best practices." They have commissioned multiple shoreline studies and topographic surveys to monitor the erosion. They also implemented a temporary coir solution that proved to be ineffective and ultimately failed. Despite these efforts, the shoreline has continued to erode away, at an accelerating rate in the last several years, resulting in the loss of more than 50 feet of fast land and a dozen fallen palm trees. To date, approximately 75 feet of the undermined Beachwalk has been removed. The situation continues to worsen and the threat to the Beachwalk is becoming more imminent. An effective medium-term solution is necessary to protect the shoreline and the Beachwalk until the proposed Kaanapali regional beach nourishment project is implemented.

1.2 Project Purpose and Objectives

Chronic erosion has caused the Beachwalk to become severely undermined in some locations fronting the Hyatt, including several pinch points. Failure of the Beachwalk at one of the pinch points will cut off lateral coastal access along Kaanapali Beach.

The purpose of the preferred alternative is to provide an effective medium-term solution to prevent further shoreline erosion until the proposed Kaanapali regional beach nourishment project is implemented.

The project involves three primary work tasks:

1. Obtain approved Environmental Assessment (EA) and necessary Federal, State and County permits for construction of a temporary sandbag slope stabilization;
2. Design and prepare construction documents for the preferred slope stabilization technique; and
3. Complete construction of the preferred slope stabilization design.

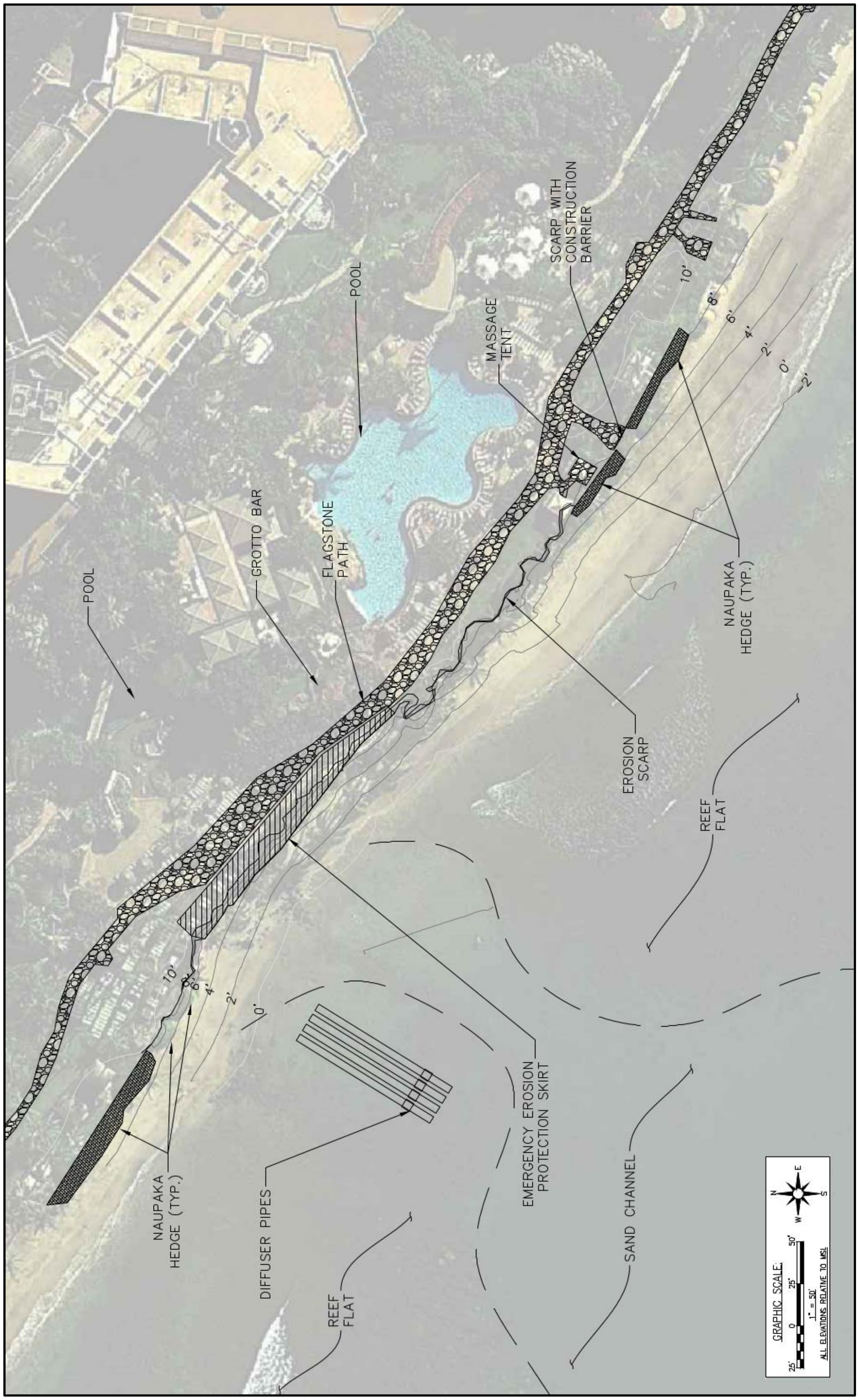

Figure 1-2 Relevant features in the project area

1.3 Required Permits and Approvals, and Applicable Regulatory Requirements

1.3.1 *Required Federal Approvals*

Department of the Army (DA) permits are issued by the U.S. Army Corps of Engineers (USACE) pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). All work or structures in or affecting the course, condition, location or capacity of navigable waters, including tidal wetlands, require DA authorization pursuant to Section 10. In addition, activities involving the discharge of dredged or fill material into waters of the United States requires a DA permit pursuant to Section 404. A jurisdictional determination will be requested from the USACE.

1.3.2 *Required State of Hawaii Approvals*

The preferred alternative will require preparation of a Draft and Final Environmental Assessment (DEA and FEA) pursuant to the State of Hawaii's environmental impact assessment process, Chapter 343, Hawaii Revised Statutes (HRS). Hawaii Administrative Rules (HAR) Title 11, Chapter 200, addresses the determination of significance and contents of an EA. If the FEA and Finding of No Significant Impact (FONSI) are approved by the Department of Land and Natural Resources (DLNR), the project can then proceed to implementation, once all other required permits and approvals are obtained.

The project will require a Conservation District Use Permit (CDUP) pursuant to Title 13, Chapter 5, Hawaii Administrative Rules (HAR), as well as a Right-of-Entry (ROE) permit from DLNR.

1.3.3 *Required County of Maui Approvals*

The proposed slope stabilization work will be in the State Conservation District; however, the staging area, laydown area, and ingress and egress routes will all be in Maui County's Special Management Area (SMA), thus requiring the following permits that are issued by the Maui County Department of Planning:

- *Special Management Area (SMA) Use Permit*
- *Shoreline Setback Variance (SSV)*

1.3.4 *Applicable Federal Laws, Regulations and Executive Orders*

The work will be carried out entirely landward of the MHHW, and thus is expected to be outside of USACE jurisdiction. Final placement of the preferred solution will be located predominantly in the State's jurisdiction and work will be carried out in both State and County jurisdictions. The project will be reviewed and assessed by both the State's and the County's regulatory and resource agencies.

1.4 Decision to be Made

The State of Hawaii Department of Land and Natural Resources and the County of Maui Department of Planning will review the analyses and conclusions presented in this DEA and decide whether to issue the necessary permits and approvals that the applicant has requested, to issue the permits and approvals with special conditions, or to deny the permits and approvals.

2. ENVIRONMENTAL SETTING

2.1 Physical Environment

The physical geography of the project site area is dominated by the ancient West Maui Volcano, which has collapsed and eroded into the West Maui Mountains. The nearly circular shape of the volcano has generated a similarly curved shoreline. The area is part of the Maui Nui complex that includes the islands of Maui, Lanai, Molokai, and Kahoolawe. The islands form a ring of protection that limits wave exposure. The channels between the islands shape the tide-generated currents, and the prominent land masses, especially Haleakala volcano, greatly affect the local wind conditions. Kaanapali borders the Pailolo channel, which runs between Maui and Molokai.

The shoreline along the Kaanapali coast is governed by the underlying volcanic rock formations. Kekaa Point, the most prominent geographic feature, is a remnant cinder cone. The coastal processes along the shoreline within the study area are complicated by the bay and headland morphology, the presence of offshore fringing reefs, and a seasonal wave climate with opposing wave approach directions.

Continuous sandy shoreline extends south from Kekaa Point to Hanakaoo Beach Park, a distance of approximately 8,000 feet, and fronts the master planned destination resort of Kaanapali. Extensive construction has taken place along the beach over the past 30 years and, except for Hanakaoo Beach Park, the backshore is fully developed with the resorts and condominiums that comprise Kaanapali Resort.

The Hyatt is located south of Hanakaoo Point, which is a seasonally-varying sand feature. The point is located at the confluence of two littoral cells, known as the Kaanapali cell to the north and the Hanakaoo cell to the southeast (Figure 2-1). While the island land-mass forms a broad rounded feature at the point, there is a prevailing sharp sand point that exists during seasonal periods of accretion. This feature is shown on the 1932 U.S. Coast and Geodetic Survey T-Sheet, indicating its longevity. During the winter season the sand point forms a broad beach that can be over 200 feet in width. The unusual beach plan-form is caused by complex wave patterns generated by the offshore bathymetry and by the two predominate and opposing swell directions that sometimes occur simultaneously.

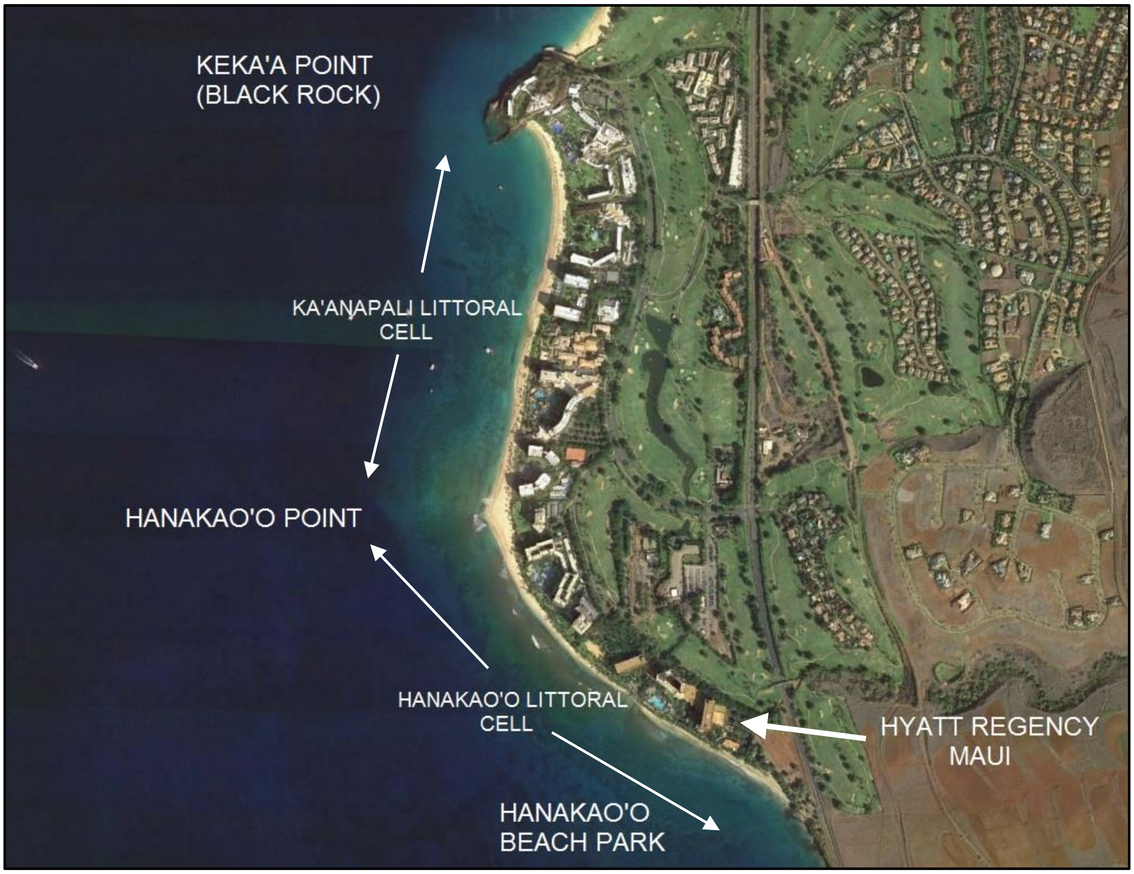

Figure 2-1 Two prominent littoral cells at Kaanapali

The beach within the Kaanapali Littoral Cell is dynamic and undergoes pronounced seasonal changes. During the winter, prevailing northerly swell tends to transport sand to the south, widening the beach at Hanakaoo Point. Conversely, during the summer months, southerly swell tends to transport sand to the north, with consequent narrowing of the beach. Eversole (2003) conducted extensive shoreline profiles throughout the Kaanapali region and found a seasonal volumetric sand transport of about 30,000 cubic yards to the north, and somewhat less to the south. Severe Kona storms can also cause rapid transport of beach sand to the north during winter months.

The beach within the Hanakaoo Littoral Cell, where the project is located, has less defined seasonal changes. The shoreline is southwest facing and is less susceptible to seasonal changes in swell direction. Therefore the beach changes are less seasonally dynamic than in the Kaanapali Littoral Cell. Long-term dynamics within this cell are erosional along the full length, with pronounced acceleration of the erosion signal within the past decade. High tide and inclement waves also have a pronounced short-term impact to the beach face in this cell, as more wave energy can cross the shallow reef and reach the shoreline.

2.2 Existing Conditions

The most recent site visits to the Hyatt shoreline were conducted on August 11, 2015 and September 9, 2015. The site visits included measuring shoreline profiles, documenting existing shoreline conditions, observing shoreline processes, and taking photographs. On August 11, 2015, nine representative beach profiles were surveyed along the portion of Kaanapali Beach fronting the areas of critical erosion.

The condition of the shoreline varies from south to north, and is divided into four segments for discussion as illustrated in Figure 2-2.

Figure 2-2 Shoreline segments (Photo Source: University of Hawaii Coastal Geology Group, Photo Date: N/A)

2.2.1 *Segment A*

Segment A is the southernmost section of critically-eroding shoreline and is approximately 110 feet in length. The segment is vegetated with Beach Naupaka (*scaevola taccada*) that shows significant saltwater damage, and a 2 foot high erosion scarp is present in the Naupaka hedges (Figure 2-3). A shower that is part of the Beachwalk and beach access is undermined and barricaded (Figure 2-4). Backshore resort infrastructure and hardscape located seaward of the Beachwalk is threatened to the point that some has been removed (Figure 2-5).

Figure 2-3 Erosion scarp in vegetation (SEI, 08/11/2015)

Figure 2-4 Undermined and barricaded beach access (SEI, 08/11/2015)

Figure 2-5 Erosion scarp threatening backshore amenities. Portions of the amenities have since been removed. (SEI, 08/11/2015)

2.2.2 *Segment B*

Segment B is approximately 150 feet in length and has noticeably less vegetation than Segment A. A photograph from June 2015 (Figure 2-6) show a healthy Naupaka hedge and Palm trees along this segment, but the vegetation has since been damaged and removed (Figure 2-7 and Figure 2-8). The erosion scarp in this segment is 4 feet high. The erosion scarp was as close as 10 feet from Beachwalk in this segment (Figure 2-8) in August 2015 and continues to move landward (Figure 2-9).

Figure 2-6 Vegetated backshore along Segment B (SEI, 06/08/2015)

Figure 2-7 Erosion scarp at Segment B (SEI, 06/27/2015)

Figure 2-8 Erosion scarp at Segment B with Coconut tree stumps and Naupaka hedge remnants on the mauka side (SEI, 08/11/2015)

Figure 2-9 Erosion scarp at Segment B (SEI, 01/14/2016)

2.2.3 *Segment C*

Segment C is approximately 180 feet in length. In early 2015, a combination of south swell and high tides caused critical undermining of the Beachwalk in several locations (Figure 2-10 and Figure 2-11). In response to that erosion and upcoming higher high tides, an Emergency Erosion Protection Skirt (EEPS) was deployed in July of 2015 over the 5 foot high erosion scarp to slow the retreat of the shoreline. The EEPS, discussed later in Section 2.2.7.1, provides a barrier between the erosion scarp and the erosive wave attack.

Like Segment B, this section of shoreline no longer has vegetation cover (Figure 2-12); Naupaka hedges and Palm trees were damaged or removed as the erosion scarp migrated landward. Removal of undermined sections of the Beachwalk in this segment have made a pinch point in shoreline access (Figure 2-13). The remaining width of Beachwalk at this pinch point is currently threatened, and removal would disrupt coastal access along the Beachwalk. This segment has experienced the highest erosion rates in the project area, with some spots eroding at rates over 2.0 feet per year.

Figure 2-10 Segment C before Emergency Erosion Protection Skirt installation (SEI, 07/27/2015)

Figure 2-11 Path undermined and electrical conduit exposed (SEI, 07/27/2015)

Figure 2-12 Segment C, pre-skirt installation (SEI, 07/27/2015)

Figure 2-13 Shoreline progression in Segment C with yellow arrow indicating reference coconut tree in each image. The Beachwalk originally split and had a segment mauka of the reference tree (SEI, 2010)

2.2.4 *Segment D*

Segment D is the northernmost section of critically-eroding shoreline and is approximately 60 feet in length. This segment has a 3 foot erosion scarp that is covered by patches of vegetation (Figure 2-14). The vegetation can be seen in Figure 2-15 to have been significantly damaged by saltwater intrusion and wave attack.

Figure 2-14 Erosion scarp in Segment D (SEI, 08/11/2015)

Figure 2-15 Erosion scarp and damaged vegetation in Segment D (SEI, 08/11/2015)

2.2.5 *Backshore Composition*

Stratigraphic trenching was performed as part of the 1997 EIS in support of the proposed Hyatt Residence Club, located at the northwest part of the Hyatt property adjacent to the Marriott. Two trenches were located on the grounds of the proposed new building, located approximately 500 to 600 feet from the present erosion site. The findings are shown in Table 2-1. Trench thickness is given in centimeters below the surface, and excavation was terminated when the water table was encountered. Trench ST-1 was found to contain a significant amount of cinder, which may represent fill material. ST-2 was more complex, containing layers of topsoil, sand, loam, and cinder, with the occurrence of rock increasing with depth below the surface.

Investigation of the shoreline erosion scarp generally confirms the findings of the trenching. An exposed clay bank can be seen fronting the Grotto where the Beachwalk has been undermined (Figure 2-16). This bank has been seen to erode during high water level events, when wave action allows water to impact the bank, releasing material into the nearshore waters. The release of this material may be slow and steady, or in areas containing palm tree root balls, the release may be sudden when the rootball collapses. This general condition is found along the shoreline fronting the main swimming pool and Grotto. To the west of the Grotto, the erosion scarp contains fill material that appears to be composed of loam and gravel (Figure 2-17), consistent with the findings of the trenching. This erosion scarp is also unstable and the material is released into the nearshore waters as erosion progresses landward.

Based on the findings in Section 2.2.7, more than 6,000 square feet of this material has been released over a 200-foot length of shoreline since 2002. Given the shoreline and oceanographic conditions, it is expected that this material will continue to be released into nearshore waters until the beach maintenance project can be implemented, unless the erosion scarp is stabilized.

Table 2-1 Stratigraphic trench results, Parcel 008

Trench	Findings
ST-1	
Layer I (0-25 cm)	Blacktop and base fill
Layer II (25-190 cm)	Dark reddish brown; cinder
ST-2	
Layer I (0-5 cm)	Imported topsoil and sod fill; very dark brown; very fine silty loam
Layer II (5-25 cm)	Yellowish brown; sand fill
Layer III (25-35 cm)	Dark reddish brown; sandy loam fill; 10-20% rock
Layer IV (35-70 cm)	Dark reddish brown; sandy loam; 20-25% rock
Layer V (70->80 cm)	Dark reddish brown; cinder

Figure 2-16 Exposed fill material in the erosion scarp below Beachwalk opposite the Grotto (SEI, 08/11/2015)

Figure 2-17 Exposed loam and gravel fill material in the erosion scarp to the west of the Grotto SEI, 08/11/2015)

2.2.6 *Coastal Processes*

Along most of the Kaanapali Resort shoreline, the concrete Beachwalk is located just mauka of the vegetation line and provides safe and convenient lateral access to and along the shoreline for both visitors and local beachgoers. Seaward of the Beachwalk is a narrow strip of vegetated coastal plane, a narrow beach strand, and shallow fringing reef. The shallow fringing reef spans much of the nearshore between Hanakaoo Beach Park and Hanakaoo Point, with typical widths ranging from 200 to 400 feet. The shallow fringing reef has numerous sand pockets and small channels.

The project area is located in the Hanakaoo littoral cell, situated between the rocky shoreline at the south end of the beach park and Hanakaoo Point. Littoral cells are defined as closed or semi-closed systems in terms of sand supply and circulation. Headlands or other barriers restrict transfers of onshore sediment to offshore or alongshore movements within individual littoral cells. Hanakaoo Point is the confluence of two 'littoral cells', the Kaanapali cell to the north and Hanakaoo cell to the southeast. Hanakaoo Point forms a 'leaky' boundary allowing some transport of sand between the Kaanapali and Hanakaoo littoral cells. Existence of a prevailing accretionary sand feature at Hanakaoo Point is attributed to the complex wave patterns induced by the shallow fringing reef.

Seasonal transport occurs in the Hanakaoo littoral cell, along the beach fronting the Hyatt and Marriot Resorts. The shallow, fringing reef limits both the wave energy reaching the beach and the sand volume of the beach. Grounds personnel at the Hyatt report that south swell and high tides are the primary cause of erosion, while seasonal variations are minimal.

Sand is occasionally transported into the project area from Hanakaoo Point, resulting in accretion of the beach. During the summer of 2009, erosion was active along the northern portion of the Hyatt's shoreline. The following winter was a vigorous north swell season, and resulted in accretion of the beach by April of 2010. Accretion events, similar to the winter of 2009/2010, tend to be the exception and not the rule.

An extreme erosion event occurred within the Hanakaoo littoral cell in 2003, affecting the Kaanapali Alii, Marriot and Hyatt resorts. Hyatt staff reported erosion of up to 20 feet during this single event. South swells during May and June of 2003 were both higher and more frequent than are normally observed, driving higher than normal sand transport rates to the north. Research has also shown that the highest sea level measurements recorded at the Honolulu Harbor tide gauge occurred during September of 2003 (Merrifield and Firing, 2004). Comparison and analysis of tide level, satellite altimetry, and hydrographic measurements around the Hawaiian Islands suggest that the 2003 extreme water levels were largely due to an "anti-cyclonic eddy" with an offshore water level rise of about ½ foot (15 cm) and a diameter of roughly 186 miles (300 km). This combination of high tides, frequent and large south swell, and eddy-induced additional sea level rise likely resulted in the extreme erosion experienced in this part of Hanakaoo Beach.

The project site can be identified geologically by a notable characteristic of the Hanakaoo cell that is found just south of the Hyatt's west wing - a marginal concavity and a narrowing of beach widths for a segment roughly 150 feet in length. This feature of the beach is present in aerial imagery dating back to 1949, and is also recognizable in the historic T-Sheet map of 1912. Field observations, analysis of current and historic aerial and satellite imagery and bathymetric data all indicate the presence of a cut or channel in the reef at this location. This depression in the reef is a relic stream channel which now lays submerged.

The wave patterns approaching the Hyatt shoreline are driven mainly by the nearshore bathymetry. The relic stream channel through the nearshore reef is present near the Grotto area. This channel is sand filled and is typically about 5 feet deeper than the adjacent reef. This bathymetry results in a larger wave passing through the channel toward shore, and is reportedly more energetic with increased wave heights and stronger currents relative to the rest of the beach.

Additionally, the portion of the wave over the channel travels faster than that over the reef, resulting in a wave crest orientation that is angled to the shoreline. The increased dynamics of this zone and refraction of the wave fronts by the deeper water produces an alongshore sediment transport gradient away from the channel in both directions, transporting nearby beach material to areas of lower energy on either side of the channel. Additionally, return currents flow out the channel, further removing sand from the nearshore.

Both the long-term erosion signal and episodic erosion events affect the project site. Moreover, the local bathymetry, deeper than the adjacent wide shallow reef allows for more wave energy to reach the shoreline, with waves approaching at a high angle, making the area susceptible to smaller erosion events.

Figure 2-18 Kaanapali Beach Site Map

2.2.7 *Erosion History*

The shoreline fronting the Hyatt is a chronically eroding shoreline. A 1991 study by Sea Engineering, Inc. (SEI) and Makai Ocean Engineering Inc. (MOE) used aerial photographic analysis of the area found that the vegetation line retreated approximately 25 feet from 1949 to 1961. After 1961, the shoreline experienced gradual accretion that allowed for the re-establishment of coastal vegetation to within 12 feet of the 1949 shoreline. However, the report stresses that the vegetation has been artificially cultivated and maintained and may not be an accurate indicator for beach face migration following the 1961 shoreline.

The oldest aerial photograph available, and used in both the SEI/MOE and University of Hawaii Coastal Geology Group (UHCGG) studies, is from 1949 (Figure 2-19). The UHCGG has conducted erosion analysis studies for beaches on Maui, Oahu, and Kauai. The UHCGG erosion rates, produced by these studies, are used by both Maui and Kauai counties for calculating shoreline setbacks. This photograph shows the Kaanapali shoreline heavily vegetated and with very few upland improvements. A relic stream channel or floodway is visible, crossing the shoreline at the current location of the erosion problem. The next available photograph, from 1961 (Figure 2-20) shows that extensive grubbing and grading had been conducted on the north side of the floodway/stream channel. Some infrastructure was installed at this time, including the main road servicing the area. The relic floodway/stream channel was reengineered as a water hazard and stilling pond for the area, which was also used as a functional part of the future golf course. The remainder of the historical aerial photographs (1975, 1987, 1993, and 1997) show that many of the current improvements were established by 1987, with only minor changes to the shoreline character.

Figure 2-19 1949 aerial mosaic showing a stream channel indicated by the white ellipse at the current location of the Hyatt Regency Maui

Figure 2-20 1961 aerial mosaic showing significant clearing/grubbing and expansion of the stream/floodway, indicated by the white ellipse

UHCGG conducted a more recent analysis of historical aerial photographs and concluded a regional erosion rate of -0.6 feet per year (UHCGG, 2003). The area fronting the Hyatt was reported to have erosion rates of -0.2 feet per year, well less than the average regional historical erosion rate. The 2003 UHCGG study, however, did not include the 1992 and 1997 shorelines, as they were considered outliers at the time.

SEI updated the 2003 UHCGG shoreline change analyses by incorporating more recent surveys from 2010 and 2015. Shoreline positions from 1961 through 2015 were utilized to produce a linear shoreline change trend. Updated surveys confirm that the 1992 and 1997 shorelines are not outliers, but rather are indicative of a chronic erosion trend that is accelerating in the area. Updating the analyses with the most recent 50 years of shoreline positions shows a shoreline recession trend of -0.7 to -1.4 feet per year (Figure 2-21). Erosion rates for Transects 27 to 35 were calculated for 1961 to 2015, while the rates for the remaining transects were for 1961 to 2010.

The shoreline position data, however, is highly variable and is not well-represented by standard trendlines, such as the linear trendline shown in Figure 2-22, which shows the shoreline position trend for Transect 32 located opposite the Grotto. Figure 2-22 also shows that the shoreline position from 2010 to 2015 changed more rapidly than the historical trend. The erosion rates for Transects 27 to 35 averaged -2.0 feet/year, with a maximum of -3.2 feet/year during this recent period from 2010 to 2015.

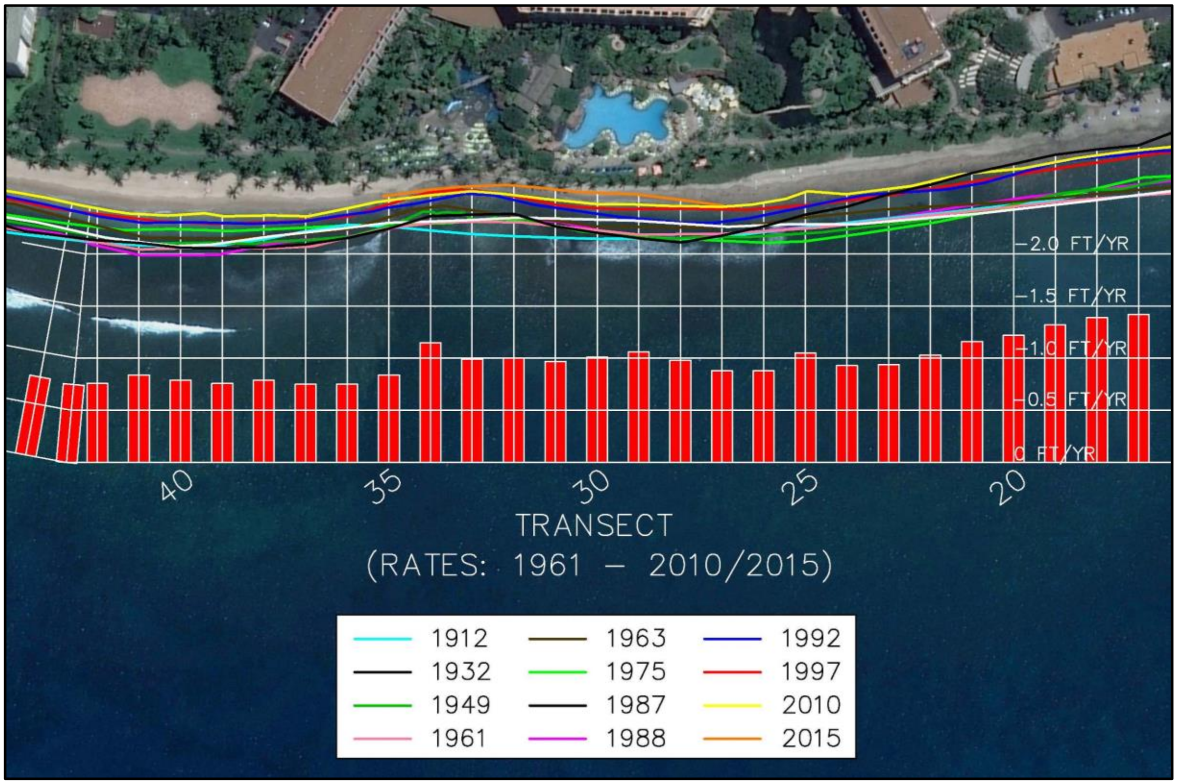

Figure 2-21 Historical shoreline positions and recession rates at the Hyatt Regency Maui

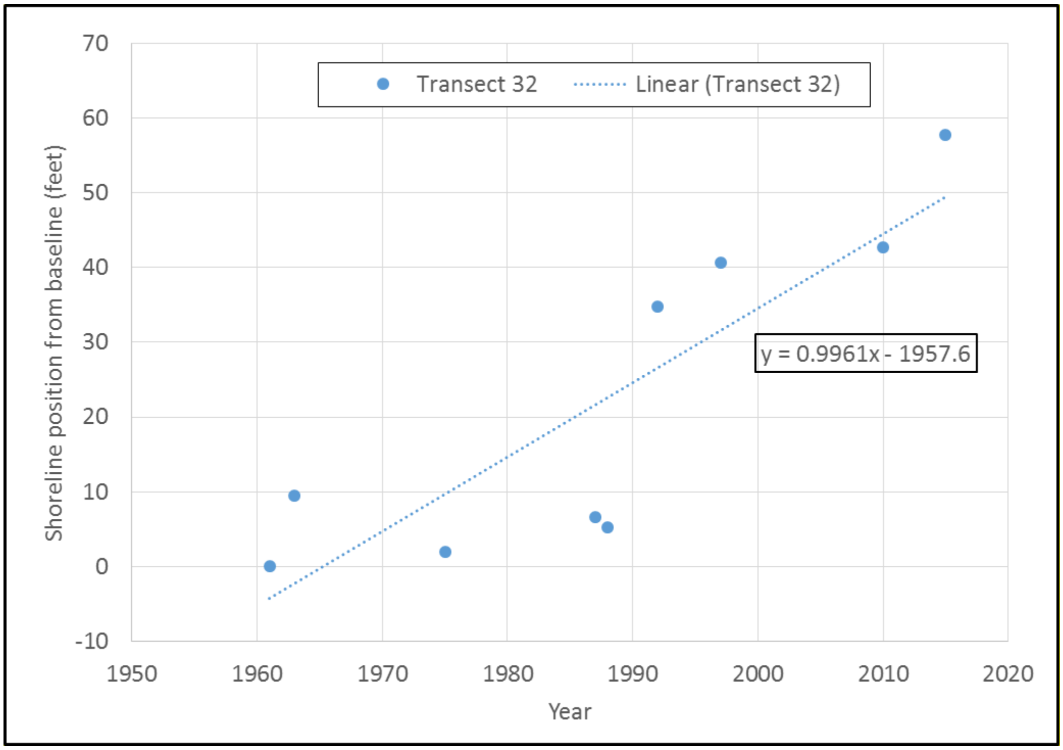

Figure 2-22 Historical shoreline positions for Transect 32, 1961-2015

The historical shoreline analysis presented above is based on the approximate location of the beach toe using aerial photographs. Certified shorelines, however, represent the highest extent of wave uprush, which along this shoreline is the erosion scarp. Comparing certified shorelines with scarp positions can show the amount of backshore erosion that has occurred. Based on the certified shorelines in 2002 and 2009, a 200-foot stretch of shoreline fronting the Grotto area eroded by 3,600 square feet in the 6.5 years between surveys, at an average rate of -2.8 feet per year. The average shoreline recession over this period was -18.0 feet. A similar analysis has been performed comparing the 2009 certified shoreline to present, assuming that the present day certified shoreline would be located approximately at the seaward edge of the Beachwalk. This equates to an additional eroded area of 2,470 square feet over 7 years, at an average rate of -1.8 feet per year. The average shoreline recession from 2009 to 2016 was -12.4 feet. The eroded areas between 2002 and present are shown in Figure 2-23. The average shoreline recession in this area from 2002 to 2016 was more than -30 feet. Based on the above methods, an erosion rate of -2.0 feet/year is assumed to be representative of this stretch of shoreline.

Figure 2-23 Shoreline erosion from 2002 to 2016 at the Hyatt Regency Maui based on certified shoreline positions

As shown by the historical and recent shorelines, this length of shoreline has been impacted by both chronic and episodic erosion for decades. The Beachwalk is imminently threatened by the ongoing erosion which has caused undermining and physical damage and led to the removal of portions of the Beachwalk. The shoreline exhibits a tendency to partially recover following episodic erosion events. However, recovery is never complete and the shoreline continues to migrate further landward each year. There are no indications that this pattern will stop, meaning that the next episodic event will erode mauka of the last erosion event, which has already undermined and threatened sections of the Beachwalk. If erosion continues beyond the extent of the last episodic event, the foundation of the Beachwalk will be severely undermined, leading to failure and removal of additional sections of the Beachwalk. The beach fronting the eroded area continues to deflate and become narrower, and lateral access along the beach is substantially diminished. Allowing erosion to progress "naturally" will likely result in long-term loss of lateral access along both the beach and the Beachwalk. It is imperative to protect the Beachwalk, while it is still stable and not undermined to the point it needs to be removed, in the mid-term until the beach maintenance project can be implemented.

2.2.7.1 Previous and Existing Erosion Management Efforts

In 2011, following a series of erosion events, an emergency request was submitted to DLNR authorize the construction of 140 feet of continuous geotextile sandbag protection in the area fronting the Grotto. The sandbags were designed to protect the Beachwalk, which had become severely undermined and damaged in three locations. On May 18, 2011, the DLNR issued an emergency permit (MA-11-01) but limited the placement of geotextile sandbags to the three undermined locations. The Hyatt chose not to implement this protection due to the potential for end effects that could accelerate erosion of the adjacent areas and make the emergency more severe. DLNR subsequently issued Site Plan Approvals (MA-13-1 and MA-14-5) authorizing the installation of coir bags at the same three undermined locations to help stabilize the existing bank (Figure 2-24). The coir bags were installed in October 2013 at those three locations. Erosion continued at the areas not protected and the bags settled and became dislodged, rendering the spot protection ineffective after only a short period of time. The Hyatt eventually removed the 75 foot section of Beachwalk that had been undermined, and the trees between the spot protection areas have since fallen onto the beach and been removed. The remnants of the coir sandbags were eventually removed in late 2014.

Coir/jute solutions have limited duration and have been shown to require frequent maintenance. While that type of solution might be effective in certain sites, it has proven to be ineffective in this location. Continued use of coir/jute protection will rapidly lead to failure of the Beachwalk during subsequent erosion events. The site requires a durable solution that can be effective and maintenance-free for a minimum of several years while the regional Kaanapali Beach Nourishment project is designed, permitted, and constructed.

In the summer of 2015, a combination of high tides, high waves, and elevated water levels resulted in a series of erosion events that severely impacted the shoreline fronting the Hyatt. In July of 2015 the DLNR and County of Maui authorized bank protection in the form of an Emergency Erosion Protection Skirt (EEPS), which was installed over a two-day effort (Figure 2-25).

The EEPS consists of a geotextile blanket that is laid across the erosion scarp and anchored in the backshore. The geotextile blanket protects the erosion scarp from wave attack, particularly during periods of high tides and high surf. The use of durable, geosynthetic materials facilitated rapid deployment and better protected the fragile and already undermined erosion scarp beneath and adjacent to the Beachwalk.. The EEPS design is intended for eventual recovery, ideally allowing for future re-use of the materials. The EEPS is performing adequately, requiring only minor adjustments since installation.

Figure 2-24 Photo of coir sandbag bank protection ((SEI, 10/15/2013)

Figure 2-25 Photo of existing Emergency Erosion Protection Skirt (SEI, 08/08/2015)

2.2.8 *Bathymetry and Nearshore Bottom Conditions*

Nearshore geomorphologies were documented in a biological reconnaissance by Marine Research Consultants, Inc. (MRCI) in 2010. The biological reconnaissance focused primarily on the shoreline fronting the Kaanapali Alii, which is located 2,000 feet to the northwest of the proposed slope stabilization, but is typical for the area. The hard reef bottom of Hanakaoo Point extends approximately 1,000 yards from the vegetation line to the 30 foot depth contour. MRCI divided the reef into three zones, based primarily on coral species cover and diversity, which accurately reflects the bottom morphology. The Fore-reef and Mid-reef Zones are morphologically similar, with outcrops and ridges of coralline limestone interspersed with sand channels and sand flats. The Fore-reef Zone is in water depths of 0 to 10 feet, with shallow areas being devoid of coral due to scour, and deeper areas containing coral on the higher projections of the reef. The Mid-reef Zone, starting at about 10 feet of water depth, is where sediment re-suspension due to wave forces was no longer observed, and showed increased opportunistic colonization. The Outer-reef Zone is characterized by the presence of large (and ancient) colonies of *porites lobata* as well as other species, more continuous hard substrate, and less sand channels and pockets.

At approximately 30 feet of water depth, the reef substrate transitions to sand. The sand field is extensive and is colonized by pastures of the calcareous green algae *Halimeda*. The extensive *Halimeda* sand fields were previously documented in a sand reconnaissance study by SEI (2007).

A fringing reef flat is located offshore of the coastline fronting the proposed slope stabilization. A typical profile of the reef flat is shown in Figure 2-26. In the profile, which was surveyed on August 11, 2015, through Segment B, the sand bottom extends 10 feet past the Mean Sea Level (MSL) waterline. The bottom transitions to rock, which is the beginning of the offshore fringing reef. The reef has an approximate elevation of -0.5 feet MSL. This profile is typical for Segments A, B, and D.

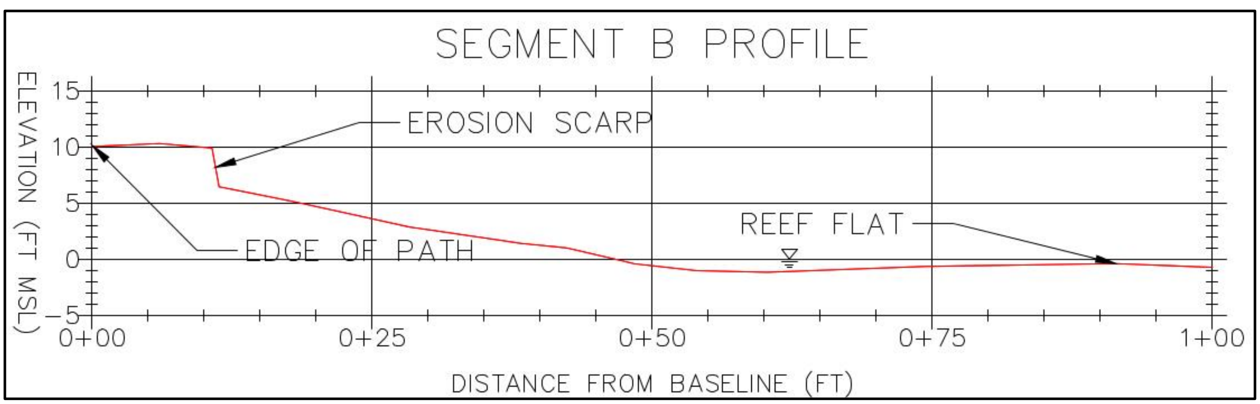

Figure 2-26 Segment B typical beach profile

There is a break in the offshore reef fronting Segment C that was formed by a relic floodway/stream channel that previously existed at the present day location of the Hyatt. The break, which is visible in the 5 and 10 foot depth contours in Figure 2-27, has water depths that are approximately 5 feet deeper than the adjacent reef flats. Figure 2-28 is a profile surveyed through Segment C and shows a gently-sloping sandy bottom as opposed to the reef flat seen fronting Segments A, B, and D. The deeper water fronting this segment has a significant effect on the waves as they approach the shore, and is further discussed in Section 2.2.13.

Figure 2-27 Project area bathymetry (elevation contours in feet MSL)

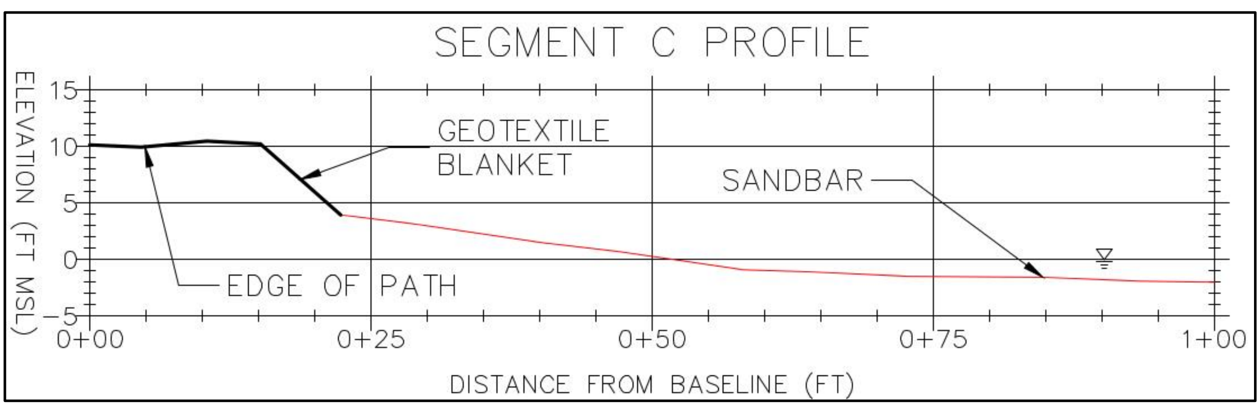

Figure 2-28 Segment C typical beach profile

2.2.9 *Climate*

The Hawaiian Island chain is situated south of the large eastern Pacific semi-permanent high-pressure cell, the dominant feature affecting air circulation in the region. Over the Hawaiian Islands, this high-pressure cell produces persistent northeasterly winds called tradewinds. During the winter months, cold fronts sweep across the north-central Pacific Ocean, bringing rain to the Hawaiian Islands and intermittently modifying the trade wind regime. Thunderstorms, which are rare but most frequent in the mountains, also contribute to annual precipitation.

2.2.9.1 Temperature and Rainfall

Due to the tempering influence of the Pacific Ocean and their low-latitude location, the Hawaiian Islands experience extremely small diurnal and seasonal variations in ambient temperature. Average temperatures in the coolest and warmest months in Lahaina are 73˚ Fahrenheit (F) (January) and 79.5˚F (August). These temperature variations are quite modest compared to those that occur at inland continental locations. Additional temperature data from Lahaina are summarized in Table 2-2.

Table 2-2 Average Monthly Temperature, Rainfall, and Humidity.

Month	Normal Ambient Temperature, ºFahrenheit		Average Monthly Rainfall (inches)	Average Relative Humidity (%)
	Daily Minimum	Daily Maximum		
January	64	82	2.99	75.5
February	64	82	2.20	74.0
March	65	83	1.50	73.0
April	66	84	0.83	72.5
May	67	84	0.43	71.5
June	69	86	0.08	70.0
July	70	87	0.08	70.0
August	71	88	0.16	70.0
September	71	88	0.31	71.0
October	70	87	0.98	72.5
November	68	85	1.46	74.0
December	66	83	2.52	75.0
Source: The Weather Channel				

Topography and the dominant northeast tradewinds are the two primary factors that influence the amount of rainfall on any given location on Maui. Near the top of the West Maui Mountains and the slope of Haleakala on the windward side of Maui that is fully exposed to the trade winds, rainfall averages nearly 250 inches per year. On the leeward side of the island, where the project is located, the rainfall is much lower with average annual rainfall in Kaanapali being less than 15 inches per year. Although the project area is on the leeward side of the island, the humidity is still moderately high, ranging from mid-60 to mid-70 percent.

2.2.9.2 Wind

The predominant winds in the Hawaiian Islands are the northeast tradewinds. During the summer months of April through October, the tradewinds occur 80-95 percent of the time with average speeds of 10-20 mph. The tradewind frequency decreases to 50-60 percent of the time during the winter months, when southerly or "Kona" winds may occur. Kona winds are generally associated with local low pressure systems. Kona conditions occur about 10 percent of the time during a typical year, with winds ranging from light and variable to gale strength. A severe, relatively long duration Kona storm which occurred in January 1980 produced sustained wind speeds of 30 mph, with gusts in excess of 50 mph, from the southwest. Winds of hurricane strength occur infrequently in Hawaii, but they are important for design purposes because of their intensity.

The West Maui Mountains have a blocking effect that decreases the influence of tradewinds in the Kaanapali area and causes the winds to come from a more northerly directions (following the land contours). A land-sea breeze condition caused by the diurnal heating and cooling of the land often predominates in coastal areas. However, wind speeds in the channels between Maui, Molokai, and Lanai can be significantly faster due to the funneling effect caused by the land masses.

2.2.10 *Tide*

Hawaii tides are semi-diurnal with pronounced diurnal inequalities (i.e., two high and low tides each 24-hour period with different elevations). Tidal predictions and historical extreme water levels are provided by the NOAA NOS Center for Operational Oceanographic Products and Services. The nearest official tide station to Kaanapali is located at Kahului Harbor, and the water level data for that station is shown in Table 2-3.

Table 2-3 Water level data for Kahului Harbor (relative to mean sea level)

Datum	Elevation (feet MLLW)	Elevation (feet MSL)
Highest Tide (estimated)	+3.1	+2.0
Mean Higher High Water	+2.2	+1.1
Mean High Water	+1.9	+0.8
Mean Tide Level	+1.1	0.0
Mean Low Water	+0.3	+-0.8
Mean Lower Low Water	0.0	-1.1

2.2.11 *Mesoscale Eddies*

Hawaii is also subject to periodic extreme tide levels due to large-scale oceanic eddies that have recently been recognized and that sometimes propagate through the islands. These events are referred to as *mesoscale eddies* and can produce tide levels that can be on the order of 0.5 to 1 foot higher than normal for periods up to several weeks (Firing and Merrifield, 2004).

There is consensus among Hawaii coastal scientists and engineers that the 2003 erosion event that damaged the shoreline at the Kaanapali Alii was caused by the vigorous and sustained occurrence of southern swell in combination with pronounced short-term increases in sea level due to the presence of mesoscale eddies (Sea Engineering, 2003; Vitousek et al., 2007). The highest sustained sea level measurements recorded at the Honolulu Harbor tide gauge occurred during September of 2003 (Firing and Merrifield, 2004). Comparative analysis of tide levels, satellite altimetry, and hydrographic measurements around the Hawaiian Islands suggest that the 2003 extreme water levels were largely due to an anti-cyclonic eddy with an offshore water level rise of about 0.5 feet and a diameter of roughly 186 miles. Figure 2-29 is a graph of predicted and verified tide levels at Honolulu Harbor during June 2003. The figure shows a sustained super-elevation of water level of at least 0.5 feet throughout the month.

Nearshore waves are typically depth-limited, meaning that the amount of wave energy that reaches the shoreline is directly tied to the water level at the shoreline. As wave energy increases exponentially with wave height, a water level increase of 0.5 feet can dramatically change the coastal processes at a particular shoreline. The previously-existing beach profile equilibrium can be suddenly modified and beach loss and coastal erosion can occur rapidly. This has been well documented at the Kaanapali Alii shoreline near the project site.

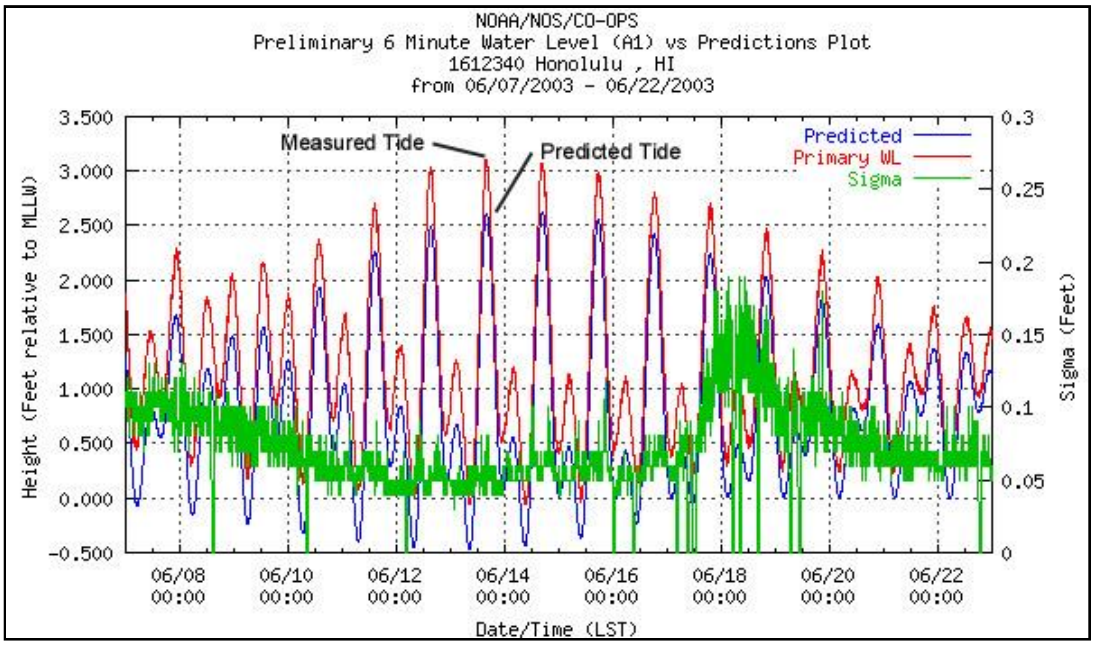

Figure 2-29 Honolulu Harbor tide record for June 2003 (NOAA NOS)

2.2.12 *Sea Level Rise*

The present rate of global mean sea level rise is +3.16 mm/yr (NASA, 2015), where a positive number represents a rising sea level. Sea level rise appears to be accelerating compared to the mean of the 20th century. Factors contributing to the rise in sea level include decreased global ice volume and warming of the ocean. Recent climate research by the Intergovernmental Panel on Climate Change (IPCC) predicts continued or accelerated global warming for the 21st Century and possibly beyond, which will cause a continued or accelerated rise in global MSL (USACE, 2011). It is estimated that global sea level rise may reach 1 meter (3.3 feet) by the end of the 21st century, and the USACE estimates possible sea level rise as high as 1.4 meters (4.6 feet).

Sea level, however, is highly variable. The sea level trend for Honolulu Harbor on Oahu for the period of 1905 to present is shown in Figure 2-30 (NOAA, 2015). The rate of sea level rise is shown in the figure as being +1.41 ± 0.22 mm/year based on monthly data for the period 1905-2013. Figure 2-30 shows interannual anomalies of up to about 0.5 feet (15 cm) in Honolulu Harbor.

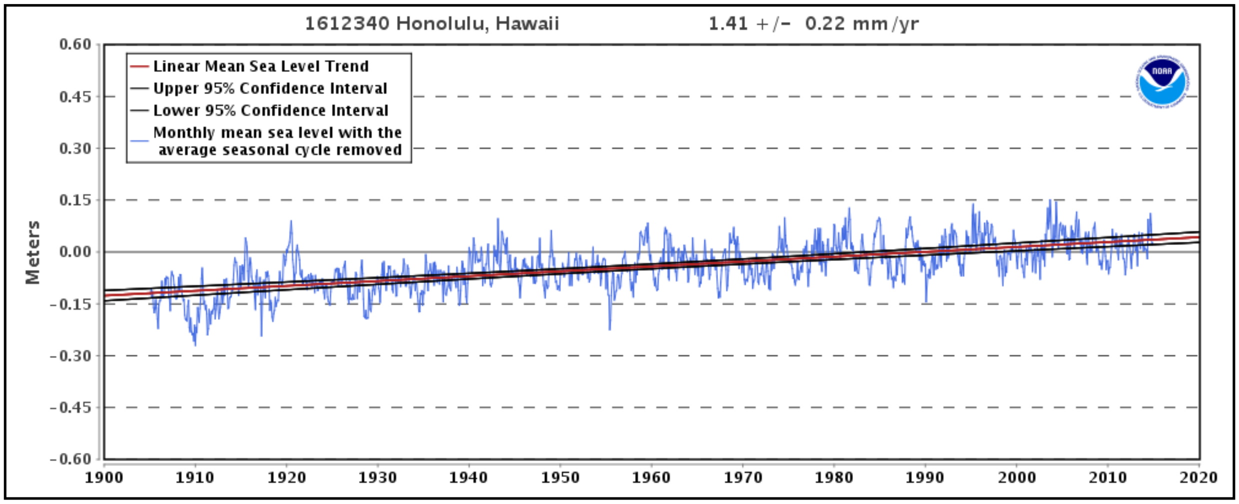

Figure 2-30 Mean sea level trend, Honolulu Harbor, 1905 to present (NOAA NOS, 2015)

The USACE provides guidance for calculating site-specific RSLR in their Engineering Circular EC 1165-2-212, Appendix C (USACE, 2011). Figure B-10 of the Engineering Circular presents a wide range of predictions for future SLR rates by various researchers, and the procedure produces low, intermediate, and high SLR curves following the National Research Council's (NRC) recommendation of using a multiple-scenario approach. To facilitate calculation of site-specific SLR, the USACE has also developed a climate change website that performs the calculations presented in EC 1165-2-212. The website contains a database of information for the tidal stations within the USACE's jurisdiction, allowing the user to select a project location and project start and end years, and the website quickly calculates the projected sea level rise for the project site. The USACE has developed criteria for three curves that correspond with the NOAA curves: which are the historic rate of sea level rise (USACE Low Rate), a modification of the NRC-I curve (USACE Intermediate Rate), and a modification of the NRC-III curve (USACE High Rate). NOAA SLR models have been added to the analyses presented on the website. The "NOAA Low Rate" corresponds to the "USACE Low Rate" while the "NOAA Intermediate-Low Rate" corresponds to the "USACE Intermediate Rate." The "NOAA Int High Rate" and the "NOAA High Rate" are also included, with the "NOAA High Rate" giving the highest predictions of all the models.

Sea level rise predictions for Kahului Harbor using the USACE and NOAA scenarios are shown in Table 2-4 and Figure 2-31. Positive numbers indicate a rise in sea level. The "NOAA Int High Rate" scenario is applicable for this project, as an intermediate rate is generally accepted as a reasonable prediction for future sea level at the project site. For a project design life of 5 years, the calculations predict an increase of 0.06 feet (0.72 in) by 2021 using the "NOAA Int Low / USACE Int" rates, and 0.11 feet (1.32 in) using the "NOAA Int High" rate.

The design life of the preferred alternative is expected to be 3 to 5 years. The projected sea level rise of 0.6 to 0.11 feet during this period is negligible and is therefore not incorporated into the design of the structure.

Table 2-4 Projected Sea Level Change, Kahului Harbor (USACE, 2016). Values are in feet.

Year	USACE Low NOAA Low	USACE Int NOAA Int Low	NOAA Int High	USACE High	NOAA High
2016	0.00	0.00	0.00	0.00	0.00
2017	0.01	0.01	0.02	0.03	0.03
2018	0.02	0.02	0.04	0.05	0.07
2019	0.02	0.04	0.07	0.08	0.10
2020	0.03	0.05	0.09	0.11	0.14
2021	0.04	0.06	0.11	0.14	0.17
2022	0.05	0.07	0.14	0.17	0.21
2023	0.05	0.09	0.16	0.20	0.25
2024	0.06	0.10	0.19	0.23	0.29
2025	0.07	0.11	0.22	0.26	0.33
2026	0.08	0.13	0.24	0.29	0.37

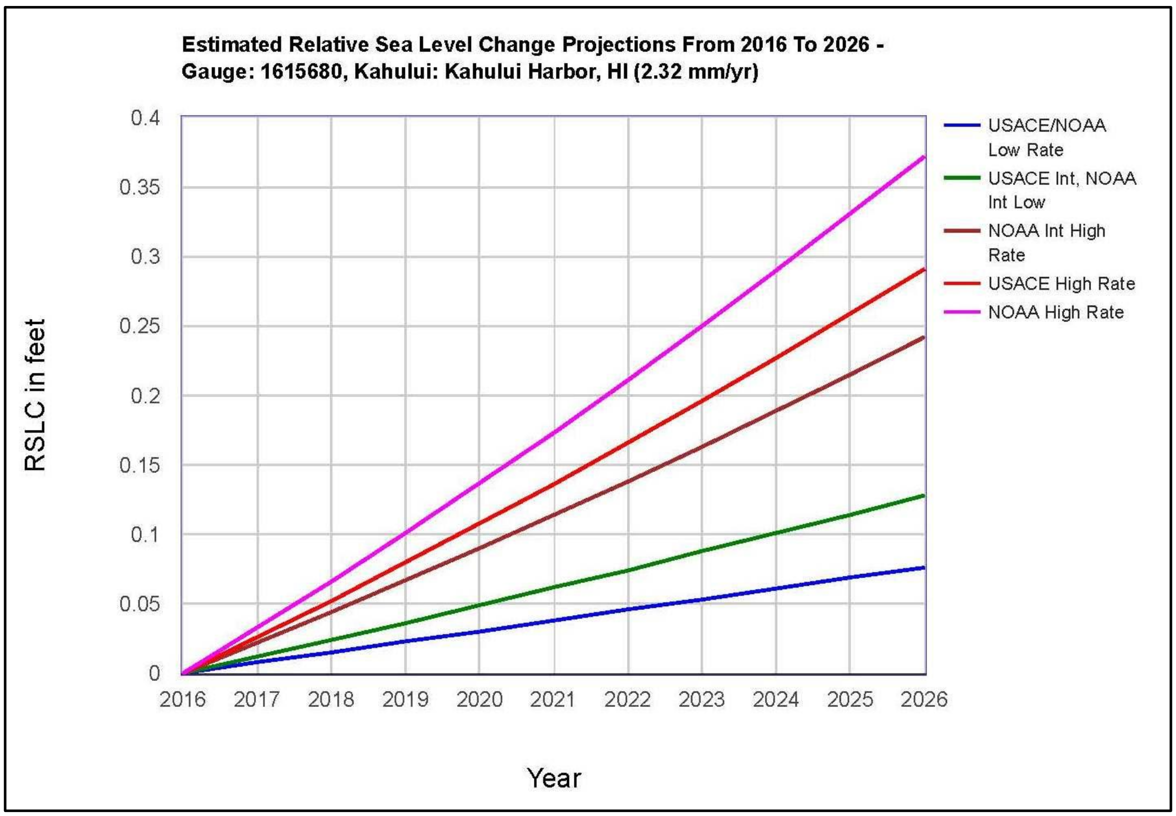

Figure 2-31 Projected Sea Level Change, Kahului Harbor (USACE, 2016)

2.2.13 *Waves*

2.2.13.1 General Wave Climate

The wave climate in Hawaii is characterized by four general wave types including northeast tradewind waves, southern swell, North Pacific swell, and Kona wind waves. Tropical storms and hurricanes also generate waves that can approach the islands from virtually any direction. Unlike winds, any and all of these wave conditions may occur at the same time.

Tradewind waves occur throughout the year and are most persistent April through September when they usually dominate the local wave climate. These waves result from the strong and steady tradewinds blowing from the northeast quadrant over long fetches of open ocean. Tradewind deepwater waves are typically between 3 to 8 feet high with periods of 5 to 10 seconds, depending upon the strength of the tradewinds and how far the fetch extends east of the Hawaiian Islands. The direction of approach, like the tradewinds themselves, varies between north-northeast and east-southeast and is centered on the east-northeast direction. The project site is well sheltered from the direct approach of tradewind waves by the island of Maui itself.

Southern swell is generated by storms in the southern hemisphere and is most prevalent during the summer months of April through September. Traveling distances of up to 5,000 miles, these waves arrive with relatively low deepwater wave heights of 1 to 4 feet and periods of 14 to 20 seconds. Depending on the positions and tracks of the southern hemisphere storms, southern swell approaches from the southeasterly to southwesterly directions. The project site is directly exposed to swell from the southerly direction and these waves represent the greatest source of wave energy reaching the project site.

During the winter months in the northern hemisphere, strong storms are frequent in the North Pacific in the mid latitudes and near the Aleutian Islands. These storms generate large North Pacific swells that range in direction from west-northwest to northeast and arrive at the northern Hawaiian shores with little attenuation of wave energy. These are the waves that have made surfing beaches on the north shores of Oahu and Maui famous. Deepwater wave heights often reach 15 feet and in extreme cases can reach 30 feet. Periods vary between 12 and 20 seconds, depending on the location of the storm. The project site is sheltered by the island itself and Molokai from swell approach from the north and northwest.

Kona storm waves also directly approach the project site; however, these waves are fairly infrequent, occurring only about 10 percent of the time during a typical year. Kona waves typically range in period from 6 to 10 seconds with heights of 5 to 10 feet, and approach from the southwest. Deepwater wave heights during the severe Kona storm of January 1980 were about 17 feet. These waves had a significant impact on the south and west shores of Oahu. Kaanapali is directly exposed to Kona storms waves that approach from the west between Lanai and Molokai or approach from the southwest between Lanai and Kahoolawe.

Severe tropical storms and hurricanes have the potential to generate extremely large waves, which in turn could potentially result in large waves at the project site. Recent hurricanes impacting the Hawaiian Islands include Hurricane Iwa in 1982 and Hurricane Iniki in 1992. Iniki directly hit the island of Kauai and resulted in large waves along the southern shores of all the Hawaiian Islands. Damage from these hurricanes was extensive.

2.2.13.2 Prevailing Deepwater Waves

Kaanapali is at the center of the Maui Nui complex, which consists of the islands of Maui, Lanai, Molokai, and Kahoolawe. These islands shelter the Kaanapali area from direct exposure to northeast trade wind generated waves and North Pacific swell from the northwest. However, the area is exposed to southern swell, North Pacific swell from the north, and occasional swell from the west. Figure 2-32 shows the wave exposure at Kaanapali.

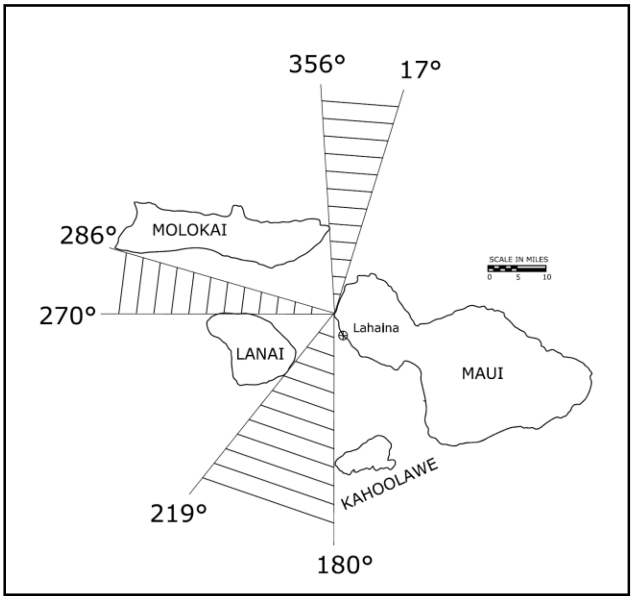

Figure 2-32 Wave exposure at Kaanapali

2.2.14 *Natural Hazards*

2.2.14.1 Flooding

Flood hazards for the portion of Kaanapali in which the project is located are depicted on Flood Insurance Rate Map (FIRM) Flood Sheet 15003C0370F. That map indicates that there are no threats of flooding from streams but that the shoreline is exposed to flooding caused by storm waves and tsunami. The area immediately inland of the shoreline is in Zone VE with a base flood elevation of 9 feet above MSL.

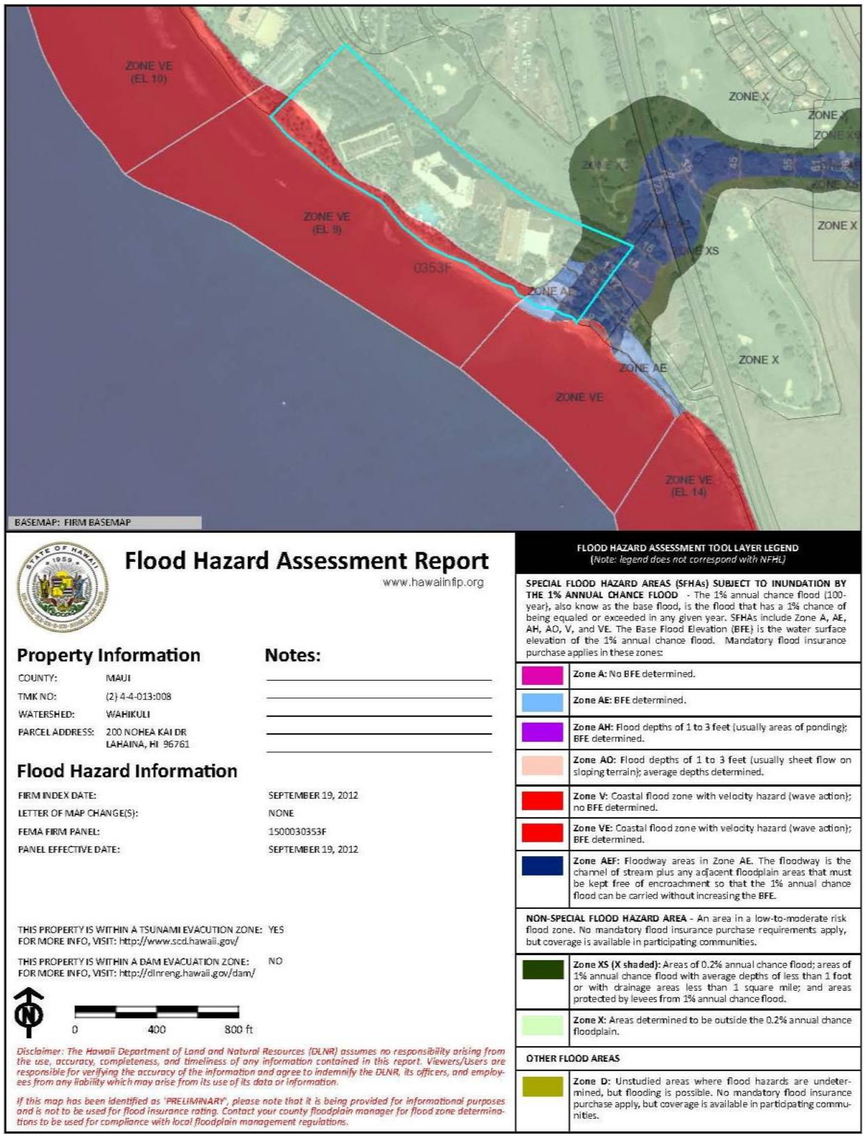

Figure 2-33 Flood Hazard Assessment Report, Hyatt Regency Maui (Retrieved 11/02/2015).

2.2.14.2 Tsunamis

Tsunamis are ocean waves that result from large-scale seafloor displacements. They are most commonly caused by an seismic events such as large earthquakes (magnitude 7.0 or greater) adjacent to or beneath the ocean. If an earthquake causes movement of a large segment of seafloor, waves will be generated by the displacement of a large volume of water above the seafloor. This displacement produces a series of waves, each of which extends from the ocean surface to the sea floor, and radiate outward from the epicenter of the earthquake. Tsunami waves are only a foot or so high at sea but are capable of producing massive waves as they approach coastlines. Tsunami waves have wavelengths of hundreds of miles and travel at speeds up to 500 miles per hour. When they approach shore, they begin to feel bottom and slow down, but not into a surf-shaped wave. Instead the water increases greatly in height and pushes inland at considerable speed. The water then recedes, also at considerable speed, and the recession often causes as much damage as the original wave front itself.

Most tsunamis in Hawaii originate from the tectonically-active areas located around the Pacific Rim (e.g., Alaska, Chile, and Japan). Waves originating from seismic events generally take from 4.5 to 15 hours to reach Hawaii. The Pacific Tsunami Warning System (PTWS), Deep Ocean Assessment of Tsunamis (DART) program utilizes a network of buoys to detect tsunami waves and provide Hawaii with several hours advance warning of tsunamis from these locations. Tsunamis can also originate from local seismic activity in the Hawaiian Islands, although these events are extremely rare. There is no advance warning for locally-generated tsunamis due to the lack of detection and warning systems. For example, the 1975 Halape earthquake (magnitude 7.2) produced a wave that reached Oahu in less than 30 minutes.

Fletcher, et al. (2002) report that the effects of tsunamis on Maui are greatly variable due to the island's topography. While runup elevation is greatest at rocky headlands, the potential for inundation is greatest in flatter low-lying areas. As an example, they report that runup heights for the 1946 tsunami varied by over 10 feet over only a few miles on the southeast side of Maui. The report gives the shoreline from Hanakaoo Beach Park to Hanakaoo Point a moderate Overall Hazard Assessment (OHA) of 4 out of 7.

3. OVERVIEW OF AFFECTED ENVIRONMENTS

This chapter summarizes the existing environment that may be affected by the project alternatives. The discussion is organized by type of potential resource impact (e.g., water quality, potential species, etc.). Potential effects and mitigation measures are addressed in Chapter 5 and Chapter 8.

3.1 Marine substrate (geomorphology)

3.1.1 *Existing Conditions*

The major factor shaping the composition of the marine communities off the project site is the dynamics of sand movement. Coral reef community structure is clearly in response to the degree of sediment re-suspension and transport from waves and currents. The documented structure of the coral communities in the vicinity of the project site indicate that, beyond the nearshore area where waves regularly break, the coral communities are in excellent condition with high abundance and diversity of species, and no evidence of stress. There have been no observations of any aggregations of species of nuisance algae reported to occur at other areas of West Maui.

The nearshore reef can be roughly divided into three zones, based primarily on coral species cover and diversity that also reflect the bottom morphology. The Fore-reef and Mid-reef Zones are morphologically similar, with outcrops and ridges of coralline limestone interspersed with sand channels and sand flats. The Fore-reef Zone is in water depths of 0 to 10 feet, with shallow areas being devoid of coral due to scour (Figure 3-1), and deeper parts of the zone containing coral opportunistically colonizing on the higher projections of the reef (Figure 3-2). The Mid-reef Zone, starting at about 10 feet of water depth, is where sediment re-suspension due to wave forces is no longer observed, and typically shows increased opportunistic colonization (Figure 3-3). The Outer-reef Zone is marked by the presence of large (and ancient) colonies of *porites lobata* as well as other species with almost 100 percent coral cover, more continuous hard substrate, and less sand channels and pockets (Figure 3-4). The preferred alternative is not anticipated to have significant negative impacts on marine substrate.

Figure 3-1 Fore-reef zone nearshore, with no coral growth due to sediment suspension and scour (Depth < 10 feet)

Figure 3-2 Fore-reef Zone showing opportunistic colonization of elevated outcrops (Depth < 10 feet)

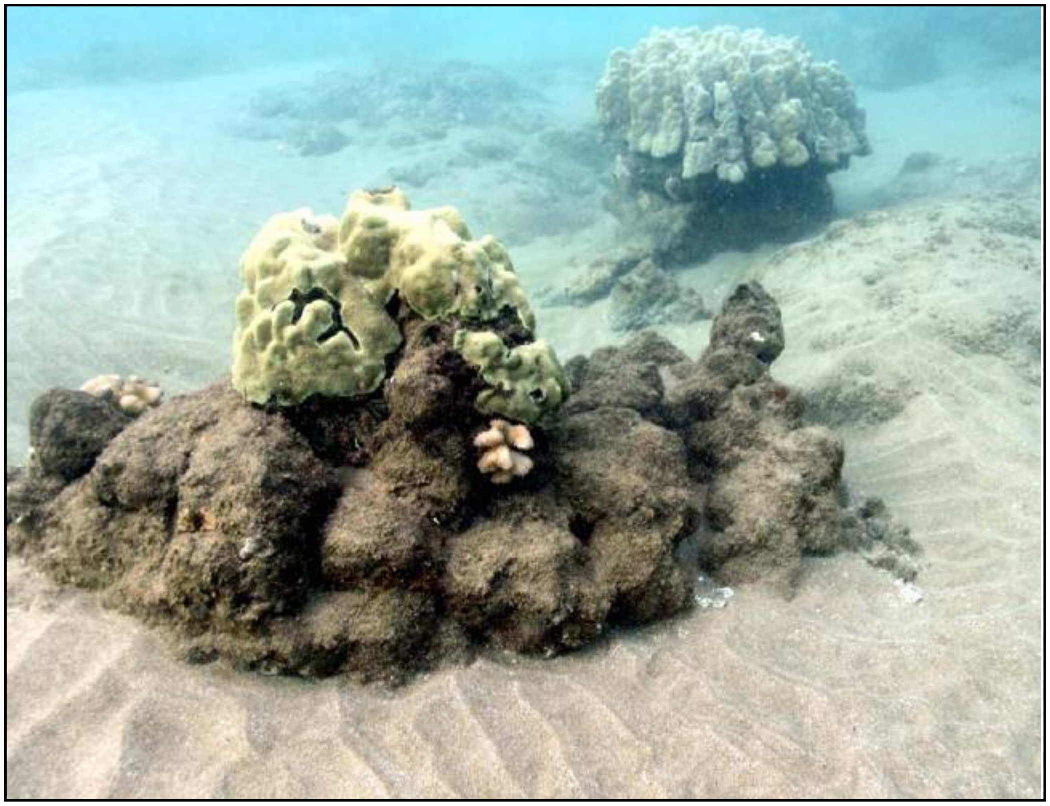

Figure 3-3 Mid-reef Zone (Depth approximately 15 feet)

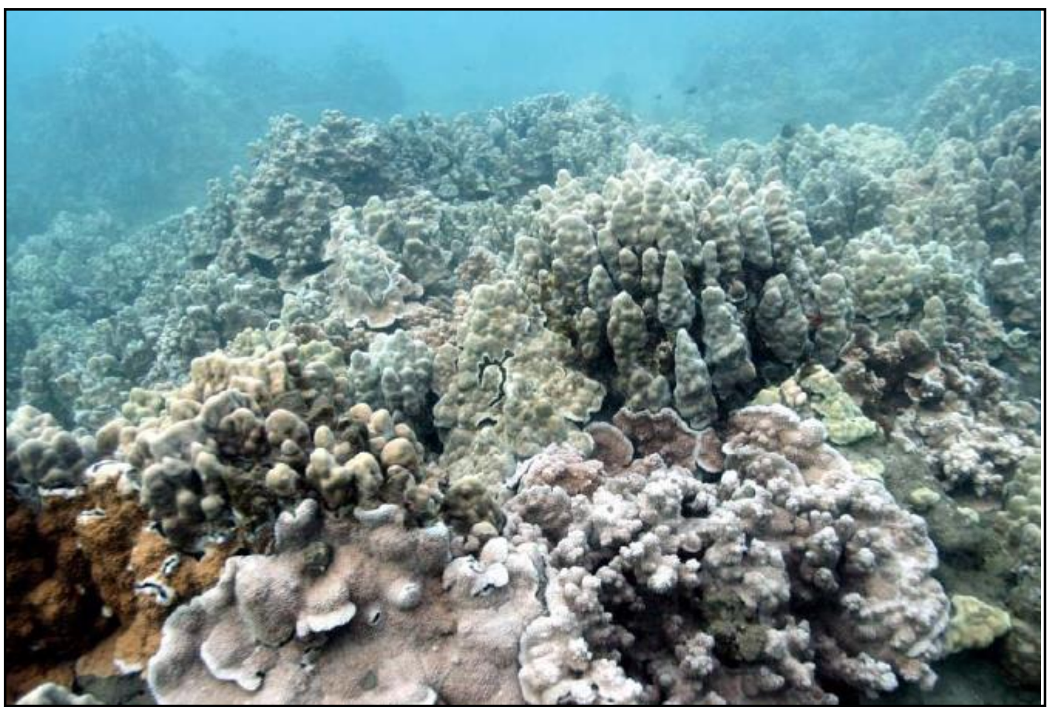

Figure 3-4 Outer-reef showing nearly 100 percent coral coverage, increased species diversity, and no evidence of stress (Depth approximately 30 feet)

3.2 Protected Species

3.2.1 *Existing Conditions*

Sea Turtles

Of the sea turtles found in the Hawaiian Islands, only the green sea turtle (*Chelonia mydas)* is common in the project vicinity. The hawksbill sea turtle (*Eretmochelys imbricata*) is rare in the Hawaiian Islands and only known to nest in the southern reaches of the state (NMFS-USFWS, 1998; NOAA-NMFS, 2007). In 1978, the green sea turtle was listed as a threatened species under the Endangered Species Act (ESA; USFWS, 1978, 2001). Since protection, the green sea turtle has become the most common sea turtle in Hawaiian waters with a steadily growing population (Chaloupka et al., 2008). Green sea turtle nesting mostly occurs on beaches of the Northwestern Hawaiian Islands, with 90% occurring at French Frigate Shoals (Balazs et al., 1992). None of the Hawaiian sea turtles is known to nest in the project vicinity.

The green sea turtle diet consists primarily of benthic macroalgae (Arthur and Balazs, 2008), which the shallow reefs of the main Hawaiian Islands provide in abundance. Red macroalgae generally make up 78% of their diet, whereas green macroalgae make up 12%. Turbidity (murky water) does not appear to deter green sea turtles from foraging and resting areas and construction projects in Hawaii have found sea turtles adaptable and tolerant of construction-related disturbances (Brock, 1998a,b). The preferred algal food species are found near the project site, and turtles are commonly observed foraging in the vicinity of the Hyatt. The preferred alternative is not anticipated to have significant negative impacts on sea turtles.

Hawaiian Monk Seals

The beaches and coastline of Maui are used by the endangered Hawaiian monk seal (*Monachus schauinslandi*) for hauling out and for pupping and nursing. These marine mammals are frequently observed in the waters of Kaanapali. The majority of monk seal sighting information collected in the main Hawaiian Islands is reported by the general public and is highly biased by location and reporting effort. Systematic monk seal count data come from aerial surveys conducted by the Pacific Islands Fisheries Science Center (PIFSC). Aerial surveys of all the main Hawaiian Islands were conducted in 2000-2001 and in 2008 (Baker and Johanos, 2004, PIFSC unpublished data).

Reports by the general public, which are non-systematic and not representative of overall seal use of main Hawaiian Islands shorelines, have been collected in the main Hawaiian Islands since the early 1980s. The NOAA Monk Seal Population Assessment Program keeps records of monk seal sitings throughout the populated Hawaiian Islands. A sighting is defined as a calendar day during which an individual seal was documented as present at a given location. It should be noted that the majority of monk seal sightings are reported when seals are sighted onshore. No births have been documented for the area.

As of 2015, both the Main Hawaiian Islands and the remote Northwestern Hawaiian Islands are considered critical habitat for this species (50 CFR 226), as was published in NOAA's Final Rule (80 FR 50925). The marine environment from 200 m below sea level to the shoreline, and the terrestrial environment to 5 m inland of the shoreline are considered Hawaiian monk seal critical habitat at the project site. The project area is located in the Terrestrial Critical Habitat segment between MA 61 and MA 62 on Maui's western coastline.

A NOAA report of monk seal sightings was produced for this project (Mercer, 2015). The report compiled sightings from Hanakaoo Beach Park to Kahekili Beach Park for the years 2005 through 2014. For that time period, 245 monk seals sightings were documented, with more than half occurring near Kekaa Point. By contrast, there were only 35 monk seal sightings during that time period from Hanakaoo Beach Park to Hanakaoo Point, with no specific reference to the Hyatt shoreline. The preferred alternative is not anticipated to have significant negative impacts on Hawaiian monk seals.

Humpback Whales
The humpback whale or *koholā* (*Megaptera novaeangliae*) was listed as endangered in 1970 under the ESA. In 1993 it was estimated that there were 6,000 humpback whales in the North Pacific Ocean, and that 4,000 of these regularly came to the Hawaiian Islands. The population is estimated to be growing at between 4 and 7% per year. Today, as many as 10,000 humpback whales may visit Hawaii each year (HIHWNMS, 2014). Humpback whales normally frequent Hawaiian waters annually from November to May with the peak between January and March (HIHWNMS, 2014). The preferred alternative will have no significant negative impacts on humpback whales.

Noise generated from construction activities are not anticipated to be substantial enough to cause an acoustic disturbance to protected species in nearshore waters. The effects thresholds currently used by NMFS are marine mammal specific and based on levels of harassment as defined by the Marine Mammal Protection Act (MMPA). For exposure to sounds in water, $\geq$180 dB and $\geq$190 dB are the thresholds for Level A harassment (i.e., injury and/or PTS) for cetaceans and pinnipeds, respectively. The thresholds for Level B harassment for all marine mammals in the form of TTS and other behavioral impacts are $\geq$160 dB for impulsive noises and $\geq$120 dB for continuous noises (NOAA, 2013). The preferred alternative will have no significant negative impacts on marine mammals or pinnipeds.

Corals
Coral species are protected under Hawaii State law, which prohibits "breaking or damaging, with any implement, any stony coral from the waters of Hawaii, including any reef or mushroom coral" (HAR §13-95-70, DLNR, 2010). It is also unlawful to take, break or damage with any implement, any rock or coral to which marine life of any type is visibly attached (HAR §13-95-71, DLNR, 2002). In 2014, the National Oceanic and Atmospheric Administration (NOAA) published a Final Rule to list 20 species of coral as threatened under the ESA. Fifteen of those species occur in the Pacific Islands Region but none of the listed corals occurs in Hawaii. The preferred alternative is not anticipated to have significant negative impacts on coral reefs or individual coral species.

3.3 Public Infrastructure and Services

3.3.1 *Existing Conditions*

Pedestrian access is available from Nohea Kai Drive through public right-of-ways that are oriented perpendicular to the shoreline, two of which are located at the northern and southern ends of the Hyatt property. Lateral shoreline access through the region is available via the Kaanapali Beachwalk that runs from Hanakaoo Beach Park to Kekaa Point.

The Beachwalk is the only ADA-compliant thoroughfare along the beach and has been identified by hotel representatives as having great importance to the region. Those representatives view the Beachwalk as the main pedestrian artery that makes Kaanapali a community. Obstruction of or a break in the Beachwalk would greatly affect the flow of pedestrian traffic and substantially diminish the beachgoer's, both visitor and resident alike, experience. The Beachwalk is a public amenity, available to any and all beachgoers visiting Kaanapali. Along this section of coastline, between Hanakaoo Beach Park and Hanakaoo Point, the beach is severely narrowed due to both chronic and episodic erosion. In the emergency section, there is very little or no vegetative buffer remaining between the deflated beach face and the scarp on the seaward side of the Beachwalk.

The Beachwalk is actively used from before dawn to well after sunset each day of the week. The 2016 pedestrian study (SSFM, 2016) documented pedestrian flow rates of 9 to 20 people per minute at peak usage periods on the Beachwalk at the affected site. Approximately 70% of the Beachwalk travelers were from the continental US, while 12% were from international locations and 18% were from Hawaii. Approximately 0.1% of these travelers were mobility disadvantaged. Though this number is low, relative to the full volume, it is significant in that this group can only access the coastline along the Beachwalk.

Loss of the Beachwalk will effectively eliminate the only safe and passable lateral shoreline and beach access in the region and cause significant and long-term interruption of public access between Hanakaoo Beach Park and the beach northwest of the imminently-threatened Beachwalk. The preferred alternative will have a positive impact on public infrastructure and services by mitigating the erosion hazard and protecting the Beachwalk.

3.4 Economic Setting

3.4.1 *Existing Conditions*

The Beachwalk itself does not directly generate income for the Kaanapali resort area. It does, however, provide a conduit for users to access properties through Kaanapali and enjoy the different amenities offered by the different properties. By connecting the Kaanapali community, the Beachwalk adds to the visitor's experience and provides an additional draw to potential visitors.

The 2016 pedestrian study (SSFM, 2016) documented nearly 6,000 travelers during approximately 13 hours of observations over a two day period. Of these travelers, 65% were staying at the Hyatt, while 10% were local Maui residents, and the remaining 25% were staying at other hotels in Kaanapali. All of these travelers were using the Beachwalk as a coastal lateral access path with connectivity along the full length of the path, including shops, restaurants, and recreational amenities.

Loss of lateral shoreline and beach access along the Beachwalk is expected to result in fewer users accessing the Hyatt from other properties and vice versa. This would result in a loss of revenue and potential economic hardship for both the Hyatt and the neighboring resorts and businesses. Because of its value to the regional economy and the community as a whole, the Beachwalk is considered critical infrastructure and should adequately protected. The preferred alternative is anticipated to have a positive impact on the local economy by mitigating the erosion hazard and protecting the Beachwalk.

3.5 Recreational Resources

3.5.1 *Existing Conditions*

The present recreation assessment is based on observations of activities and ocean conditions in the project area, as well as interviews with hotel management and staff, and evaluation of possible project effects and impacts on recreation activities. The project site, including the Beachwalk and waters offshore, is located toward the southern end of Kaanapali, and supports a wide variety of recreation activities including but not limited to jogging, walking, sunbathing, swimming, snorkeling, surfing, standup paddling, spearfishing, walking, and wading. The Hyatt's Beach Activities Center provides beach umbrellas; private oceanfront lounge chairs and cabanas; surfboard, boogie board, and standup paddleboard rentals and lessons; snorkel gear rentals; guided scuba tours; and kayak rentals.

Hanakaoo Beach Park is located east of the project site at the eastern end of the Hanakaoo littoral cell, and the termination of the sandy beach that extends southeast from Kekaa Point. The beach park offers opportunities for swimming and snorkeling during calm ocean conditions, as well as picnicking, and sunbathing. Boaters utilize the nearshore moorings and outrigger canoe clubs to access the ocean at Hanakaoo Beach Park and hold regattas in the nearshore waters.

Jogging

Joggers use the Beachwalk at all hours of the day to exercise while traveling along the Kaanapali shoreline. Joggers preferentially use the Beachwalk to the beach in Kaanapali.

Walking

Walker use the Beachwalk for exercise, recreation, and as a transit corridor along the shoreline to move between the properties, amenities, ocean activities, and beach locations. Walkers are actively using the Beachwalk from well before dawn until long after sunset each day.

Sunbathing

Sunbathing is prevalent throughout Kaanapali; however, sunbathing near the project site is limited to the backshore or pool area, due to the narrow beach.

Swimming

Swimming in the project vicinity is generally limited to the sand channel across from and adjacent to the Grotto Bar. Swimmers are attracted to the area which is located between two shallow patches of reef; however currents can make this area dangerous during moderate to high surf conditions.

Snorkeling

The reef in the project vicinity is known as a good site for snorkeling. The sand channel across from and adjacent to the Grotto Bar provides good access to the shallow reef.

Surfing

Kaanapali has few named surf breaks, and in general, there are few between Lahaina and Kekaa Point. According to Clark (1989), the surf break referred to as *Sandbox* is located offshore of the Hyatt.

Fishing and Gathering
Two types of fishing occur in the project vicinity, spear fishing and pole fishing, but both are infrequent. The intensive use of the beach and the ocean in the project site by all of the other ocean users is a major deterrent to activities involving spears and fish hooks.

Paddling
Hanakaoo Beach Park to the east of the Hyatt is home to the Lahaina Canoe Club. Founded in 1971, the canoe club practices from the beach park. The club was scheduled to participate in two dozen events in 2015.

The *Maui Paddle for a Cure* charity event takes place in the waters off Kaanapali, with the race route from Hanakaoo Beach Park to Kekaa Point and back. The event is co-sponsored by the Hyatt Regency Maui and benefits the Susan G. Komen Foundation, Hawaii Affiliate.

The preferred alternative is anticipated to have a positive impact on ocean recreation by mitigating the erosion hazard and maintaining lateral shoreline and beach access.

3.6 Scenic and Aesthetic Resources

3.6.1 *Existing Conditions*

The Kaanapali shoreline is a globally-recognized visitor destinations. The wide expanse of water with typically calm conditions, the deep blue colors of the ocean, and an unobstructed view of the island of Lanai make the seaward and alongshore views from the shoreline spectacular. At the same time, the tall buildings that have been developed relatively close to the ocean along portions of the shoreline in the project area block views of the mountains.

The appearance of the beach is of significant interest to the Hyatt, as their guests represent the most numerous and closest viewers. However, it is also of considerable interest to those who own and/or use adjacent areas and the Kaanapali Beachwalk. This beach, like all sandy shorelines in Hawaii, is available to any member of the public, and can be visited and enjoyed at any time. Thus, the project area is also of interest to members of the public who frequent the area. The ongoing erosion is having deleterious effects on the scenic and aesthetic value of the shoreline. The preferred alternative is anticipated to mitigate the erosion hazard until the shoreline can be restored as part of the proposed Kaanapali regional beach nourishment. The beach maintenance project is anticipated to have a positive impact on the scenic and aesthetic resources of the area.

3.7 Water Quality

3.7.1 *Existing Conditions*

The waters at the project site are classified as Class A Open Coastal Waters by the State of Hawaii Department of Health (DOH), Hawaii Administrative Rules (HAR) 11-54, Section 6 (b).

The marine bottom type is classified as Subtype (A) – sand beaches; the marine bottom ecosystem is Class II.

Water quality reconnaissance surveys for an adjacent property indicate a small component of groundwater entering the ocean near the shoreline. The groundwater input is rapidly mixed to background coastal oceanic values through wave action. Turbidity of the water column is peak at the shoreline and decreases steadily with distance from shore, as a result of wave-resuspension of naturally occurring bottom sediments. None of these factors are likely to be affected to a noticeable extent beyond the range of natural variability by the proposed bank stabilization. The preferred alternative is anticipated to have a positive impact on water quality by reducing the release of fill material and sediment from the bank that could potentially contaminate the nearshore waters.

3.8 Air Quality

3.8.1 *Existing Conditions*

The EPA has set national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, 2.5-micron and 10-micron particulate matter ($PM_{2.5}$ and PM_{10}), and airborne lead. The NAAQS establish the maximum concentrations of pollution considered acceptable, with an adequate margin of safety, to protect public health and welfare. The State of Hawaii has also adopted ambient air quality standards for certain pollutants, some of which are more stringent than the Federal standards. The State currently has set standards for 5 of the 6 criteria pollutants (excluding $PM_{2.5}$) in addition to hydrogen sulfide (DOH, 2003).

Generally, air quality in the area is excellent. The State of Hawaii DOH monitors ambient air quality on Maui using a system of 3 monitoring sites. The primary purpose of the monitoring network is to measure ambient air concentrations of the 6 criteria NAAQS pollutants. DOH monitoring data for 2008 shows that air quality in the area during this year never exceeded the short-term or long-term State or National standards for the 6 pollutants measured [particulate matter ($PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide, and hydrogen sulfide]. The State of Hawaii Department of Health's only ozone monitoring station is located at Sand Island on Oahu. Existing ozone concentrations at that location also meet State and Federal ambient air quality standards. The preferred alternative is anticipated to have no significant negative impacts on air quality.

3.9 Noise

3.9.1 *Existing Conditions*

Hawaii Administrative Rules (HAR) §11-46, "Community Noise Control" establishes maximum permissible sound levels (see Table 3-1) and provides for the prevention, control, and abatement of noise pollution in the State from stationary noise sources and from equipment related to agricultural, construction, and industrial activities. The standards are also intended to protect public health and welfare, and to prevent the significant degradation of the environment and quality of life. The limits are applicable at the property line rather than at some pre-determined distance from the sound source. Because of that, the Class B limits applicable to land zoned for resort use appears the most applicable. Hawaii Administrative Rules (HAR) §11-46-7 grants the Director of the State of Hawaii Department of Health the authority to issue permits to operate a noise source which emits sound in excess of the maximum permissible levels specified in Table 3-1 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 3-1 Maximum Permissible Sound Levels in dBA

Zoning Districts	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Class A	55	45
Class B	60	50
Class C	70	70

Table 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 sections 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.

Source: Hawaii Administrative Rules §11-46, "Community Noise Control"

Existing ambient noise levels vary considerably within the project area both spatially (i.e., from place to place) and temporally (i.e., from one time to another). In general, existing background sound levels are the result of vehicle traffic, aircraft, ongoing maintenance, construction equipment, surf, and wind. In the vicinity of significant construction activity noise levels can intermittently reach 80 dBA.

3.10 Historic, Cultural, and Archaeological Resources

3.10.1 *Existing Conditions*

A cultural impact assessment was performed by Scientific Consultant Services (2006) in support of the construction of the Hyatt Residence Club Resort located on the north side of the Hyatt property. The study highlighted the cultural uses of the Lahaina District. Like other parts of the Hawaiian Islands, west Maui was divided into districts and sub-districts, with the land belonging to the alii (ruling class). Pre-contact, the land was used primarily for agriculture, where such crops included taro, sugar cane, banana, breadfruit, coconut and sweet potato. The study reports that at least 8 heiau (temples) were reported around Lahaina.

The study also notes that the Kaanapali coastline was the site of numerous battles, and Kekaa Point (Black Rock) is culturally significant as both a birthplace and burial ground.

Following a decline in the whaling industry, the Hawaiian capitol moved from Lahaina to Honolulu, after which the Lahaina District economy transitioned to commercial sugar cane and pineapple agriculture. Kekaa Point was used as a shipping point. Some of the agriculture land was developed into the present-day Kaanapali resort region. The expansive agriculture, and the subsequent resort development, reportedly greatly altered the landscape and disturbed the archeological record.

An archeological assessment was also performed by Scientific Consultant Services (2006). The study reported that remains of up to 6 individuals were found during construction of the Kaanapali Alii, approximately 2,000 feet to the north of the present project site. Another site was found at the Marriott Resort. In 2003, trenching identified no cultural materials.

The study states that there are no known historic resources on the Hyatt property. Hanakaoo Cemetery is located mauka of the adjacent Hanakaoo Beach Park. The study reported that the area was highly disturbed due to the transition of the area first to agriculture and then to tourism development, and as a result, surface features were unlikely to be found.

As part of that study, 11 trenches were excavated throughout the Hyatt property. The study reports that the material found within the trenches was primarily imported fill material. No cultural remains were discovered in any of the trenches. One trench contained material where color and composition suggested cultural layers. The preferred alternative is anticipated to have no significant negative impacts on historical, cultural, and archeological resources.

4. ALTERNATIVES CONSIDERED

This chapter includes discussion and analysis of the eight (8) alternatives considered. The individual alternatives are developed to a conceptual level to allow sufficient investigation of each, and accurate comparisons between the alternatives. The alternative that most completely fulfills the goals of the project, while also minimizing potential impacts, is presented as the proposed action.

4.1 Sandbag Revetment

Temporary shore protection options have been developed and installed in Hawaii with the concept of eventual removal. Typically these options are less permanent in nature than rock revetments or seawalls, though revetments and seawalls may be constructed for temporary installations and removed when required. These other options have been used when the erosion threat is perceived as seasonal or temporary, or for emergency situations where more time is necessary for the design and permitting of a permanent structure. The most common type of temporary structure typically used in Hawaii is geotextile sandbags. Small, hand-filled sandbags are an long-standing flood control and shore protection remedy, and they are still frequently used. However, they tend to degrade quickly and loose bags in the water can be an environmental nuisance. Geotextile seabags are a more recent development, and large geotextile sandbags (e.g. ELCOROCK® and Bulk Lift S.E.A. Bags) have been used for emergency/temporary shore protection in Hawaii in recent years. Natural fiber sandbags, cloth, and tubes have seen more frequent use on Hawaii's coastline in the last ten years. Natural fiber tends to break down faster than other materials, and sometimes leads to structural instability of the sandbag revetments requiring extensive maintenance. An advantage to using sandbags is their ease of installation; filling and placing typically require only an excavator. A disadvantage is that small sandbags may not be stable under wave attack and the material may degrade over time.

Sandbag structures are not without drawbacks, however. Terrestrial sources of beach quality sand are difficult to find and costly. Filling and placement of the bags is a labor-intensive process, and the temporary shore protection tends to be almost as expensive as a permanent structure. Sandbags can promote algae growth that is slippery and potentially dangerous, depending on the bag material. In most cases, eventual removal of the bags has only been for construction of a long-term solutions.

Sandbag revetments, similar to other shoreline protection structures, may have end-scour or flanking effects at the ends of an installation. These flanking effects are highly localized, impacting the area immediately adjacent to the end of the structure. Flanking can destabilize the ends of structures and should be a design consideration for shoreline projects.

Sandbag revetments are typically installed in areas that are subject to regional erosion, where shoreline retreat has already created public health, welfare, and safety concerns. Regional erosion is typically a result of one or more of the following issues: changes in water level; changes in sediment supply; and/or changes in wave energy. These structures do not change local or regional water levels affecting the shoreline. The structures themselves have not been documented to accentuate regional erosion impacts due to sediment supply, except in areas where sandy coastal plains such as stranded beach ridge plains are impounded by the structures. Though there is some sand mixed in the substrate at the project site, the substrate is predominantly fill, terrestrial materials, and sand that is not suitable for beach placement. Shoreline structures may create changes in the wave environment at a localized level. End-scour is a result of localized affects to the wave environment, and is very different from regional erosion resulting from wave environment changes operating at a littoral cell scale.

Materials: Natural Fibers

Sandbags constructed from natural, biodegradable materials have been increasingly used for temporary emergency protection in Hawaii over the last ten years. A common sandbag configuration is a jute (burlap) sand bag with a coir weave on the outside. When filled, the bags weighed approximately 50 lbs and can be placed by hand. This configuration was used as bank protection in 2013 at the Hyatt Regency Maui. Similar installations include Maalaea (Maui), Anahola (Kauai), and Honolulu (Oahu). An example of a roadside installation of natural fiber sandbags is shown in Figure 4-1, using larger coir sand bags with a protective blanket. The 2013 installation of sandbags at the Hyatt Regency Maui as slope stabilization was described in Section 2.2.7.1.

Figure 4-1 Shore protection using natural fiber bags, Anahola, Kauai (SEI, 2014)

Natural fiber installations for shore protection have been noted to require frequent maintenance. Coir and jute are not particularly strong materials. They are known to break down from contact with seawater and sunlight, and the material is generally unable to withstand internal stresses related to shifting and settling. The bags have to be installed carefully to avoid damage during placement. They are easily damaged when walked on, and they are susceptible to vandalism. Moreover, energetic coastlines typical of erosion prone areas tend to accelerate material failure as loose sediment abrades the fabric during wave conditions. Installations need to be monitored regularly, and damaged or degraded bags must be removed and replaced. This is not easy at or below the water line, where damaged bags are integral to the stability of the structure.

These natural fiber sandbags are appealing from an environmental and regulatory perspective because they are biodegradable and will eventually degrade and become ineffective. This can be a desirable quality for emergency authorizations that typically have finite time spans, requiring eventual removal or replacement with fully permitted solutions. However, the degradation has been seen to occur rapidly (within several months) in energetic coastal locations. A recent example occurred on the North Shore of Oahu beginning in 2015. The homeowner had experienced significant erosion over the winter of 2014/2015. An emergency permit for temporary shore protection was approved by DLNR, but required the use of natural fiber sandbags made of double-layer jute and a synthetic wrapping. Installation was performed in October of 2015, shortly before the arrival of the winter surf. Highly energetic conditions during one of the strongest El Nino seasons on record resulted in failure of the structure within three months (January 2016). Four months after installation the structure had been completely destroyed. Large synthetic sandbags can be seen along the shoreline now. A photographic timeline is shown as Figure 4-2.

Though these materials are desirable for temporary emergency installations, they may not be appropriate for engineered, fully vetted solutions that seek to both comply with the environmental review and regulatory process, and also provide mid-term protection to critical assets.

Figure 4-2 Photo comparison of 2015/2016 jute bag protection

Natural Fiber (jute or coir) Sandbags

Advantages:

- Preserves lateral public access along the shoreline
- Reduces public safety risks along the threatened portion of the Beachwalk
- Protects the backshore until beach nourishment plan can be implemented
- Minimizes economic impact to Kaanapali area by preserving access throughout the region
- Biodegradable
- Future removal plan may not be necessary
- Bags can adjust to differential stresses
- Provides protection to reduce release of backshore fill material into nearshore waters
- Complies with requirements for emergency shore protection installations

Disadvantages:

- Project may not support a sand beach in front of the structure
- Installation time may be longer than some other options
- Installation requires beach-quality sand
- Installation requires excavation
- Has larger footprint than some options
- Must be installed carefully to avoid damage
- Material tears easily
- Material breaks down quickly
- Material breaks down under wave attack
- Limited lifetime (less than one year)
- Must be maintained regularly
- Bags must be small to limit bulging stress on the material
- Unstable unless placed on non-erodible substrate
- Differential stresses due to shifting or settling may damage bags
- Material breakdown may destabilize structure and reduce effectiveness
- May be difficult to completely remove
- Susceptible to vandalism

Cost Estimate:
Cost estimate for construction of a natural fiber sandbag structure is approximately $900,000 to $1,200,000. This cost estimate does not include maintenance or removal. Given the environmental conditions at the site, maintenance costs are expected to range from $200,000 to $400,000 each year. Significant damage events may result in catastrophic failure and maintenance costs in excess of $700,000 due to the large volume of material that will need replacement. Based on recent failures of natural fiber sandbag installations, these maintenance estimates may be too low.

Suitability for Purpose:
Natural fiber sandbags will not satisfy the purpose to protect public health, welfare, and safety and the project shoreline due to the cost and time of anticipated maintenance, the nearly

continuous degradation of the sandbags, and the anticipated failure of the structure. It is expected that the full sandbag structure would require partial or complete replacement on an annual basis. Exposed areas may require more frequent repair and/or replacement due to vandalism and exposure to the elements. Failure sections may present a hazardous situation until maintenance can be carried out.

Materials: Synthetics

ELCOROCK® sandbags are produced by an Australia-based geotextile manufacturer that offers a series of robust sandbags. ELCOROCK® sandbags are manufactured with a polyester stable fiber non-woven needle-punched geotextile material. This type of geotextile provides protection against the harsh marine environment, allows the sandbags to mold to uneven foundation conditions, and provides the necessary friction angle for stacking. These are heavy duty sandbags specifically designed for use in the marine environment. The filled bags are approximately 4 feet x 5 feet x 1 foot high, and weigh approximately 3,000 pounds each. They are reasonably easy to fill and place, have sufficient mass to be stable when stacked, and the material is durable in a sun and saltwater environment. These sandbags have been shown to withstand Hawaiian coastal conditions and vandalism (Figure 4-3) better than both the natural fiber bags and other commercially-available synthetic sandbags. In addition, they are relatively easy to remove. SEI recommends constructing the sandbag structure with ELCOROCK® sandbags, which would be durable, simple to construct (Figure 4-4), and would blend in well with the native beach environment (Figure 4-5).

Figure 4-3 ELCOROCK® sandbags deployed as shore protection on Oahu, Hawaii (SEI, 2015)

Figure 4-4 ELCOROCK® sandbags during placement (ELCOROCK® brochure, 2015)

Figure 4-5 ELCOROCK® sandbag structure following completion (ELCOROCK® brochure, 2015)

ELCOROCK® Sandbags

Advantages:

- Preserves lateral public access along the shoreline
- Reduces public safety risks along the threatened portion of the Beachwalk
- Protects the backshore until beach nourishment plan can be implemented
- Minimizes economic impact to Kaanapali area by preserving access throughout the region
- Durable (can last several years)
- Can be filled off-site to expedite installation
- Bags do not have to be filled with beach-quality sand
- Stable if placed on non-erodible substrate
- Durable toe bag design adds to stability in dynamic areas
- Adjusts to differential stresses
- Resistant to damage and vandalism
- Can be coupled with turf reinforcement to limit structure size and visual impact
- Reduces release of backshore fill material into nearshore waters

Disadvantages:

- Installation time may be longer than some other options
- Installation requires excavation
- Larger footprint than some options
- Not biodegradable
- Removal requires excavation
- Project may not support a sand beach in front of the structure
- Flanking may occur at the ends and should be a design consideration

Cost Estimate:
Cost estimate for construction of a geosynthetic sandbag structure is approximately $975,000. This cost estimate does not include maintenance or removal. Maintenance costs for this structure are expected to range from $25,000 to $75,000 per year. Catastrophic failure of this structure is unlikely.

Suitability for Purpose:
A structure consisting of ELCOROCK® sandbags <u>will satisfy the purpose</u> of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur.

Concept Sandbag Design

Based on the site conditions, the proposed mid-term shore protection consists of an array of ELCOROCK® sandbags. The purpose of the sandbags is to prevent further erosion and damage to the Beachwalk. In the present shoreline condition, most of the sandbags would be buried, with the uppermost layer being visible at an elevation of approximately +3 feet MSL. The lower layer would be exposed only with continued sand loss, at which time they would protect the lower portion of the profile. The bottom layer of sandbags would be founded on the existing hard substrate at approximate elevation -2 foot MSL. The elevation of the top layer of bags would be about +8.5 feet MSL. The sandbags will be stacked with a 1V:1.5H face slope for stability. The structure will be aligned along the seaward edge of the existing Beachwalk for much of the length.

A plan view of the proposed design is shown as Figure 4-6 and typical cross section views are shown as Figure 4-7. The proposed sandbag structure provides the smallest, least-obtrusive, and most effective design solution.

While the sandbags will serve as protection against further erosion, the upper portion of the profile will be stabilized and landscaped with beach-quality sand, turf reinforcement mats, and salt-tolerant vegetation such as akiaki grass and naupaka. The landscaping will help to mitigate the visual impact of the sandbags. Examples of Geoweb bank stabilization are presented in Figure 4-8 and Figure 4-9.

The sandbags will be filled with sand at an offsite location and transported to the site as required. The beach will be excavated to existing hard substrate (approximately -2 feet MSL) which serves as the foundation for the sandbags, and the excavated sand will be retained onsite. Following installation of the sandbags, the retained beach sand will be used to cover the bags. Re-use of the existing beach sand will help to mitigate the visual impact of the sandbags.

All work will be performed landward of the Mean Higher High Water (MHHW) line. Details of the actual filling and placing of the bags and landscaping will largely be left up to the contractor as their specific materials and methods. Approximate material quantities involved are as follows:

- Sandbags, filled and placed (5.6’ x 4.4’ x 1.2’): 940 units
- Sand for sandbags: 920 cy
- Sand for Landscaping: 70 cy
- Geoweb Turf Reinforcement Mat: 55 sy

The sandbags are durable enough that they can easily be removed once a long-term solution is implemented.

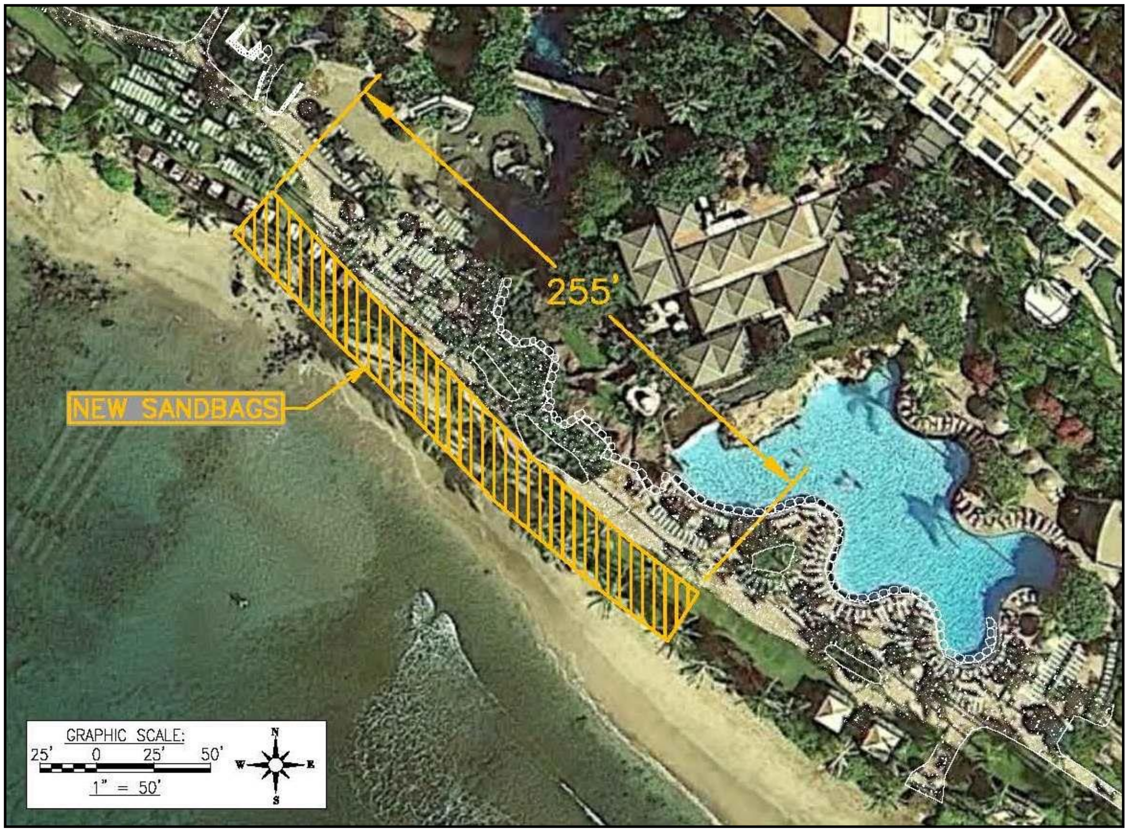

Figure 4-6 Footprint of proposed sandbag slope stabilization

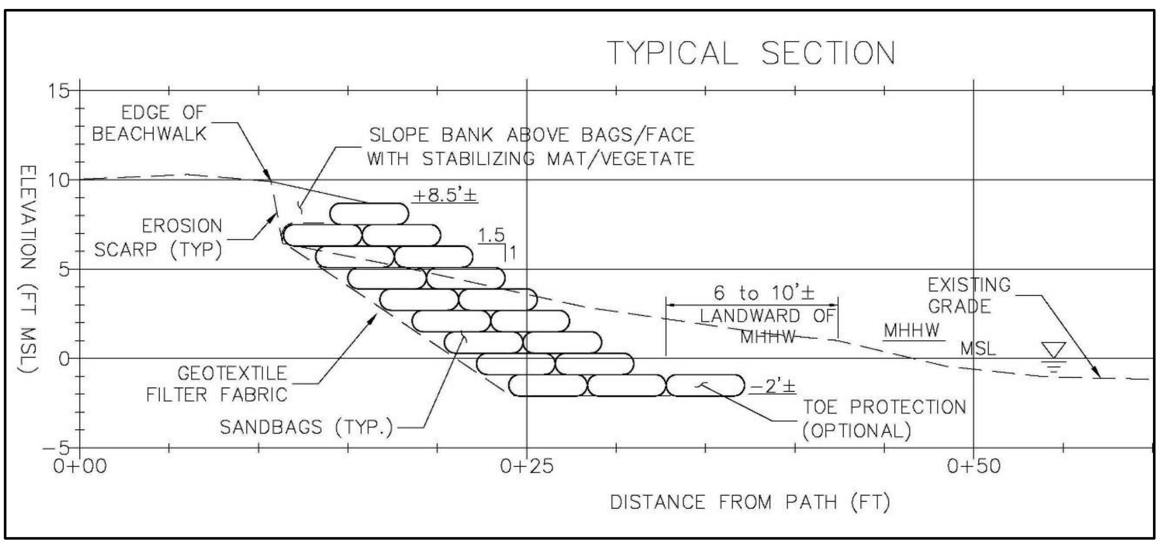

Figure 4-7 Typical cross section of proposed sandbag slope stabilization

Figure 4-8 Geoweb used as bank stabilization (Brochure)

Figure 4-9 Geoweb interconnections (Brochure)

4.1.1 *Construction Methodology*

While construction of the sandbag slope stabilization is a relatively straightforward marine construction effort, its location on Kaanapali Beach fronting a resort complex presents construction challenges. The biggest challenge is limited space for both construction access and staging area on the shoreline. This project requires a slope stabilization design and construction methodology that allows for relatively quick construction with minimal impact to the beach resource, lateral access, and hotel amenities.

A narrow pedestrian access path between the southernmost building of the Marriott complex and the northernmost building of the Hyatt complex provides access to the project site from Nohea Kai Drive; however, its width significantly limits the size of equipment that can use it. Large construction equipment and materials will have to come from the south through the pedestrian beach access between Hanakaoo Beach Park and the southernmost building of the Hyatt complex, and then move up the beach. A preliminary staging area for material would be located in the parking lot behind this beach access path, not to include the stalls identified for beach access parking. A second staging area would be located on the grassy area directly to the south of the project site for short-term equipment storage, a limited amount of construction material to be used each day, and BMP materials. Construction equipment would consist primarily of a small excavator and a telescopic handler (“telehandler”). Construction access and staging areas are shown on Figure 4-10.

The sandbag slope stabilization construction sequence would be approximately as follows.

- Remove existing Emergency Shore Protection Skirt
- Excavate a trench with small excavator starting from the southeast end of the project site
- Install geotextile filter fabric in the excavated trench
- Telehandler or small crane follows excavator placing sandbags starting with the toe bags and moving upwards.
- Slope bank and vegetate above the crest

Figure 4-10 Proposed construction access and staging areas

4.2 Rock Revetment

A revetment is a sloping, uncemented structure built of wave-resistant material. The most common method of revetment construction is to place an armor layer of stone, sized according to the design wave height, over a bed layer and filter designed to distribute the weight of the armor stone and to prevent loss of fine shoreline material through voids in the revetment. An example of a revetment used for shore protection along a road is shown as Figure 4-11.

Scour protection at the base of a revetment can be provided by excavating to place the revetment toe on solid substrate where possible, constructing the foundation as much as practical below the maximum depth of anticipated scour, or extending the toe to provide a scour apron of excess stone.

Properly designed and constructed rock revetments are durable, flexible, and highly resistant to wave damage. Should toe scour occur, the structure can settle and readjust without major failure. Damage from large waves is typically not catastrophic, and the revetment can still function effectively even if damage occurs.

In 1983, SEI designed a revetment for the Mahana condominiums at Honokowai Point on the north end of Kaanapali's North Beach. At that time, two years of excessive summer erosion had taken place and had forced the condominium association to install sandbags along their beachfront for a measure of temporary protection. The condominium association found that the sandbags were costly to maintain, and so they chose to invest in a permanent rock revetment. The revetment was effective in mitigating the erosion and is now typically covered by sand.

The rough and porous surface and flatter slope of revetments absorb and dissipate more wave energy than the smooth vertical walls of seawall structures, thus reducing wave reflection, runup and overtopping. The result is a greater likelihood of sand accumulation seaward of the structure. Sloping revetments do occupy more horizontal space and have a larger footprint than seawalls. Because of their durability, flexibility, and reduced wave reflection, rock revetments are often considered the best solution for erosion control and shore protection for sites where shoreline hardening is considered appropriate.

Figure 4-11 Example of a rock revetment in American Samoa (SEI, 2015)

Rock revetments, similar to other shoreline protection structures, may have end-scour or flanking effects at the ends of an installation. These flanking effects are highly localized, impacting the area immediately adjacent to the end of the structure. Flanking can destabilize the ends of structures and should be a design consideration for shoreline projects.

Rock revetments are typically installed in areas that are subject to regional erosion, where shoreline retreat has already created public health, welfare, and safety concerns. Regional erosion is typically a result of one or more of the following issues: changes in water level; changes in sediment supply; and/or changes in wave energy. These structures do not change local or regional water levels affecting the shoreline. The structures themselves have not been documented to accentuate regional erosion impacts due to sediment supply, except in areas where sandy coastal plains such as stranded beach ridge plains are impounded by the structures. Though there is some sand mixed in the substrate at the project site, the substrate is predominantly fill, terrestrial materials, and sand that is not suitable for beach placement. Shoreline structures may create changes in the wave environment at a localized level. End-scour is a result of localized affects to the wave environment, and is very different from regional erosion resulting from wave environment changes operating at a littoral cell scale.

Rock Revetment

Advantages:

- Preserves lateral public access along the shoreline
- Reduces public safety risks along the threatened portion of the Beachwalk
- Protects the backshore until beach nourishment plan can be implemented
- Minimizes economic impact to Kaanapali area by preserving access throughout the region
- Durable (designed to last for decades)
- Stable if placed on either erodible or non-erodible substrate
- Resistant to damage and vandalism
- Eliminates release of backshore fill material into the nearshore waters
- Can be coupled with a seawall to reduce footprint and visual impact

Disadvantages:

- Installation time may be longer than some other options
- Installation requires excavation
- Larger footprint than some options
- Material is not biodegradable
- Removal requires excavation
- Project may not support a sand beach in front of the structure
- Flanking may occur at the ends of the structure and should be a design consideration

Cost Estimate:
Cost estimate for construction of a rock revetment is approximately $765,000. This cost estimate does not include maintenance or removal. Maintenance costs for this structure are typically minimal, and catastrophic failure of this structure is unlikely.

Suitability for Purpose:
A rock revetment or a hybrid seawall / rock revetment will satisfy the purpose of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur. Revetments are generally considered long-term solutions for coastal hazard mitigation, but can be removed if required.

Concept Revetment Design

The rock rubblemound revetment would extend from the northwest end of the existing erosion skirt, 255 feet toward the southeast to the threatened portion of the Beachwalk as shown in Figure 4-12. The rock rubblemound revetment cross section is presented in Figure 4-13. The rock rubblemound revetment is designed with a side slope of 1V:1.5H, which is the steepest slope recommended by the Coastal Engineering Manual (2006). The stone size calculations are based on the 50-year return period wave, and includes consideration for sea level rise and high tide conditions. The required armor stone weight for stability under the design wave height is given by the Hudson Formula (Shore Protection Manual, 1984).

The rock rubblemound revetment crest and face consist of armorstone with a median stone size of 2,200 lbs or 2.4 ft based on the design wave calculations. Crest elevation is chosen to be +10.0 feet MSL, which is the approximate elevation of existing grade immediately landward of the revetment. The rock rubblemound revetment crest is two stones wide, or approximately 4.8 feet. The crest width is two stones for a non-overtopping structure. The large toe stone could be placed on hard substrate or trenched into hard substrate for additional stability.

A single layer armor stone revetment is recommended since the design wave height is less than 5 feet, and it is recommended that the armorstone be carefully placed (keyed-and-fitted) to maximize stability.

Alternate Design

A second rock rubblemound revetment section was developed to reduce the overall footprint of the structure. This section is shown in Figure 4-14 and is referred to as a hybrid structure, containing components of both a revetment and a seawall. The rock rubblemound portion of the design has the same general characteristics as above (e.g., stone size, face slope), with the exception of the revetment crest elevation being lower (+7 feet MSL), thereby reducing the seaward extent of the structure. The increased overtopping at higher wave conditions that would occur with this design would be limited by the seawall.

The seawall would consist of concrete or concrete rubble masonry (CRM). The top of the seawall is designed to have a typical elevation +10 feet MSL to be consistent with the backshore. While the elevation of the Beachwalk may vary along the project reach, the crest elevation of the revetment should remain constant. Any required variability in the structure elevation should be made to the seawall, rather than the rock rubblemound revetment. The base of the seawall should extend to the base of the underlayer.

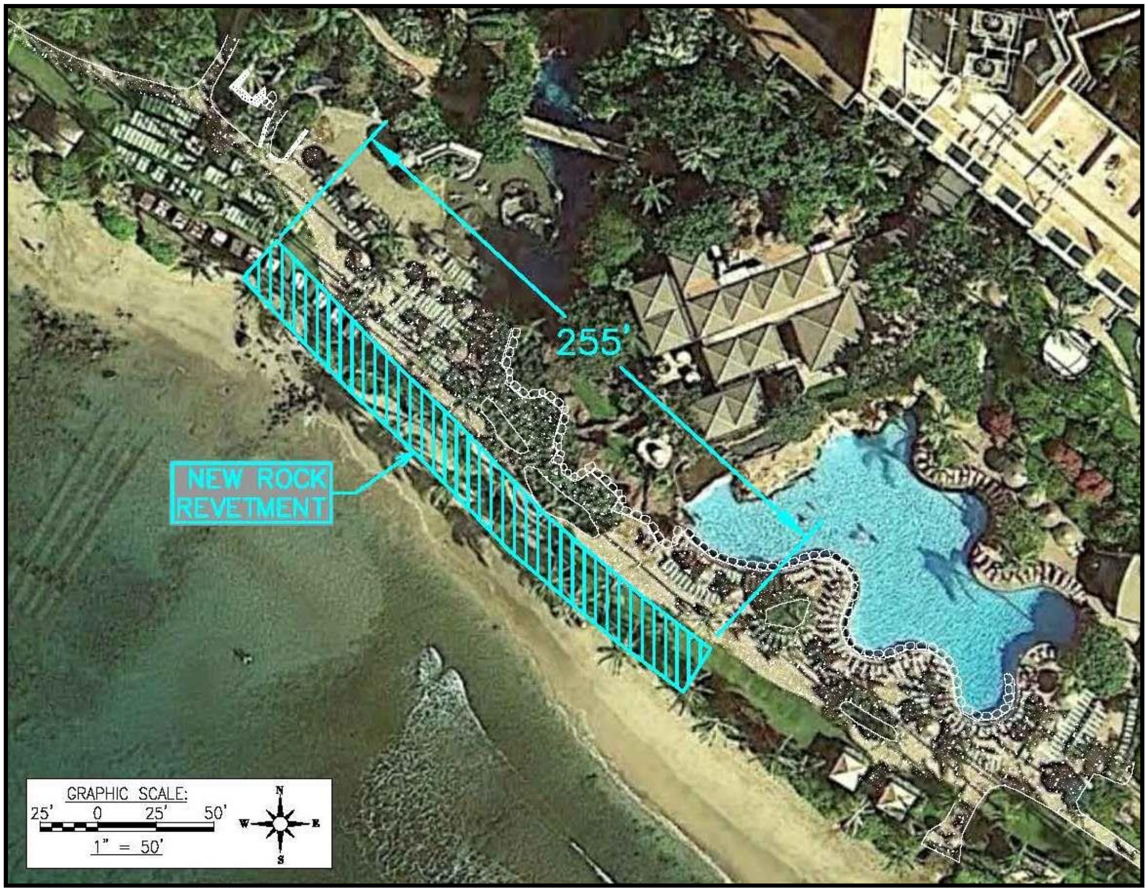

Figure 4-12 Rock rubblemound revetment footprint

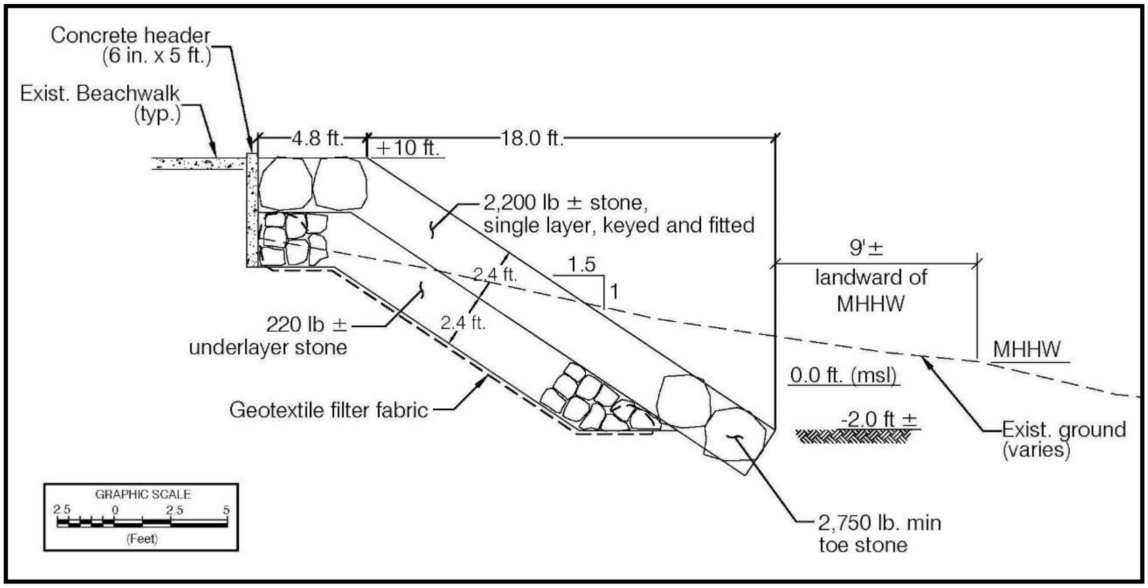

Figure 4-13 Rock rubblemound revetment cross section

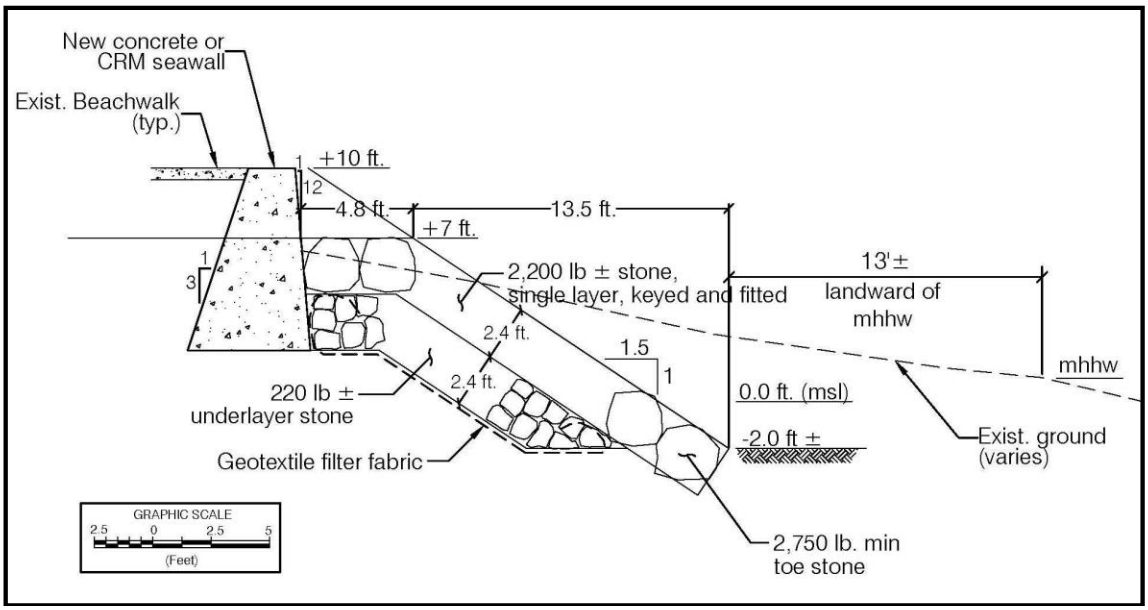

Figure 4-14 Hybrid seawall / rock rubblemound revetment cross section

4.3 Seawalls

Seawall are a vertical or sloping concrete or concrete rubble masonry (CRM) wall used to protect the land from wave damage and erosion. If properly designed and constructed, seawalls are a proven, durable shore protection method that requires relatively low maintenance. Seawalls also have the advantage of requiring limited horizontal space along the shore. The impervious and vertical face of a seawall, however, results in very little wave energy dissipation. Wave energy is deflected both upward and downward, and a large amount of incident wave energy is reflected seaward. The downward energy component can cause scour at the base of the wall, and thus the foundation of a seawall is critical for its stability, particularly on a sandy and eroding shoreline.

A seawall should be constructed on solid, non-erodible substrate. Seawalls are not flexible structures, and their structural stability is largely dependent on the stability of their foundations. Reflected wave energy can inhibit beach formation in front of the wall, and thus a seawall is not the best alternative if maintaining a beach seaward of the structure is desired. Figure 4-15 through Figure 4-17 show examples of concrete seawalls, each of which includes a wave/splash deflector.

Seawalls, similar to other shoreline protection structures, may have end-scour or flanking effects at the ends of an installation. These flanking effects are highly localized, impacting the area immediately adjacent to the end of the structure. Flanking can destabilize the ends of structures and should be a design consideration for shoreline projects. In addition, seawalls exposed to direct impact from inclement waves may result in wave energy reflection and scour at the base of the structure.

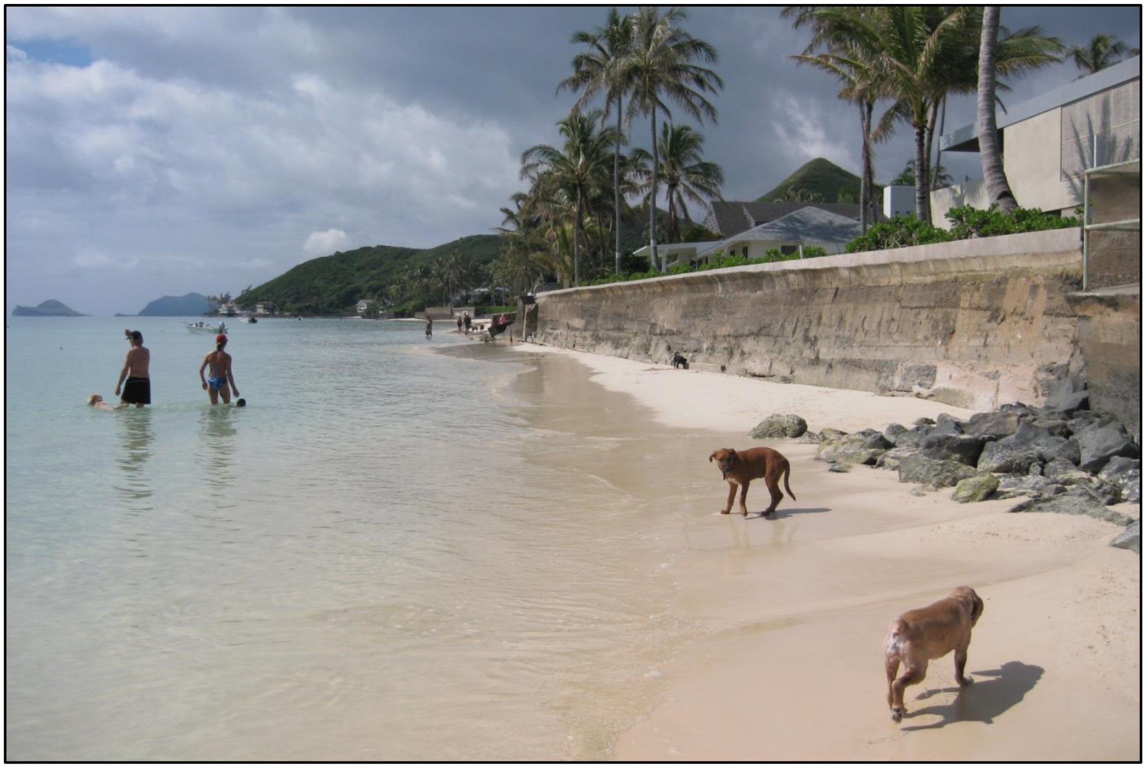

Figure 4-15 Concrete seawall fronting a private home in Lanikai (SEI, 2015)

Seawalls are typically installed in areas that are subject to regional erosion, where shoreline retreat has already created public health, welfare, and safety concerns. Regional erosion is typically a result of one or more of the following issues: changes in water level; changes in sediment supply; and/or changes in wave energy. These structures do not change local or regional water levels affecting the shoreline. The structures themselves have not been documented to accentuate regional erosion impacts due to sediment supply, except in areas where sandy coastal plains such as stranded beach ridge plains are impounded by the structures. Though there is some sand mixed in the substrate at the project site, the substrate is predominantly fill, terrestrial materials, and sand that is not suitable for beach placement. Shoreline structures may create changes in the wave environment at a localized level. End-scour, reflected waves, and scour at the base of the structure are a result of localized affects to the wave environment, and are very different from regional erosion resulting from wave environment changes operating at a littoral cell scale.

Figure 4-16 Concrete seawall fronting the Sheraton Waikiki (SEI, 2015)

Figure 4-17 Concrete seawall fronting the Sheraton Waikiki (SEI, 2015)

Vertical Seawall

Advantages:

- Preserves lateral public access along the shoreline
- Reduces public safety risks along the threatened portion of the Beachwalk
- Protects the backshore until beach nourishment plan can be implemented
- Minimizes economic impact to Kaanapali area by preserving access throughout the region
- Has the smallest footprint of any installation
- Durable (designed to last for decades)
- Stable if placed on non-erodible substrate
- Resistant to damage and vandalism
- Eliminates release of backshore fill material into the nearshore waters
- Can be coupled with a revetment to reduce wave reflection
- May not require Army and Department of Health permits

Disadvantages:

- Installation requires excavation and reconstruction of the Beachwalk
- Permanent, not biodegradable
- Removal requires excavation
- Flanking may occur at the ends of the structure and should be a design consideration
- Project may not support a sand beach in front of the structure

Cost Estimate:
Cost estimate for construction of a seawall is approximately $985,000. This cost estimate does not include maintenance or removal. Maintenance costs for this structure are typically minimal, and catastrophic failure of this structure is unlikely.

Suitability for Purpose:
A seawall will satisfy the purpose of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur. Seawalls are generally considered long-term solutions for coastal hazard mitigation. Seawalls have higher reflected wave energy and scour issues than other options. Inclusion of a wave absorber will significantly reduce reflected wave energy, and provide scour protection.

Concept Seawall Design

Figure 4-18 shows a concept seawall design for the nearshore conditions at the Hyatt Regency Maui shoreline. The seawall would be located along the existing Beachwalk. A portion of the Beachwalk would be removed for construction and then replaced.

Seawalls are most stable when constructed on a firm, non-erodible foundation. The existing hard bottom has been measured at an approximate elevation of -2 feet MSL and is shown in the concept design. As mentioned above, seawalls are susceptible to scour at the base of the wall which could result in undermining and instability. The toe of the seawall therefore includes a cutoff wall to limit the effects of scour and erosion. Figure 4-18 also includes a wave/splash deflector along the crest of the seawall to limit the potential for wave overtopping and splashing onto the Beachwalk. The crest of the concept structure is at +10 feet MSL to be consistent with the backshore elevation. A higher crest can further limit the potential for wave splashing and overtopping. The concept seawall shown in Figure 4-18 is consistent in size with the seawall shown previously on Figure 4-16 and Figure 4-17.

Vertical seawalls are highly reflective structures. The reflection of incoming waves can induce scour at the toe of the wall and inhibit the accretion of beach sand in front of the structure. Seawalls have contributed to much of the historical beach loss in the Hawaiian Islands. Figure 4-19 is a schematic section that shows the addition of a wave absorber at the foot of the seawall. This concept is a variation of the hybrid seawall/revetment presented in Section 4.2. The wave absorber is built similar to a rock rubblemound revetment with the crest being at about +5 feet MSL. The roughness and porosity of the sloping structure will help absorb both the incoming wave energy, and also reduce wave reflection off the wall. The wave absorber will help maintain a sand beach in front of the property, thereby helping to preserve lateral public access along the shoreline.

The seawall footprint shown on Figure 4-20 includes the full 24 foot width of the seawall with wave absorber option. Six feet of the footprint will be under the Beachwalk, while the wave absorber toe is expected to be buried in sand. The effective visible footprint is expected to be about 10 feet, or less than half of what is shown on Figure 4-20.

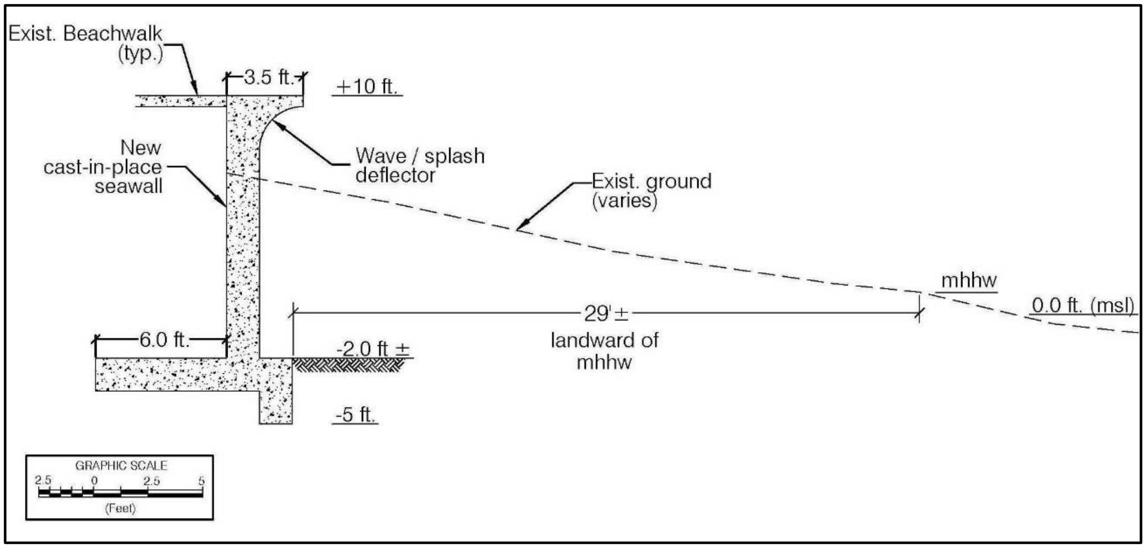

Figure 4-18 Concrete seawall concept design

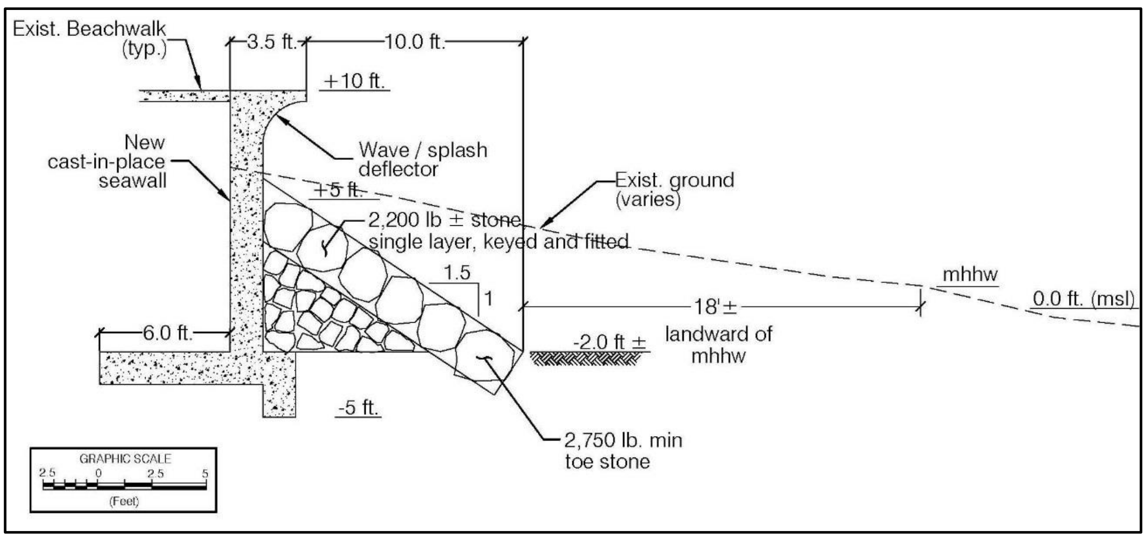

Figure 4-19 Concrete seawall concept design with wave absorber

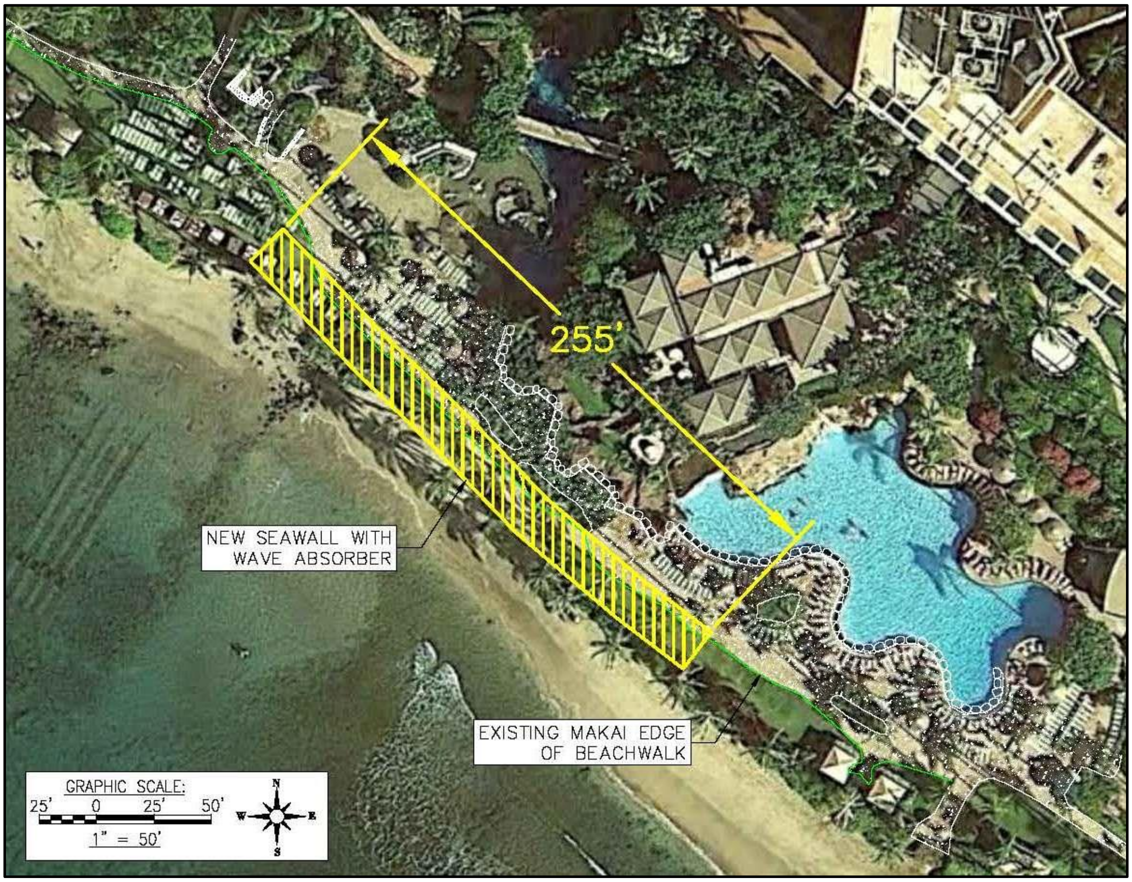

Figure 4-20 Concept seawall and wave absorber footprint (maximum width shown)

4.4 Erosion Protection Skirt with a Length Extension

An Emergency Erosion Protection Skirt was installed on a 200-foot length of the Beachwalk in August 2015 (Figure 4-21). This was in response to the highest predicted tides of the year and an extended period of large south swell. The skirt is made of a geotextile fabric that is draped over the erosion scarp and anchored in the backshore. The nearly impermeable fabric acts as a barrier against wave attack, protecting the Beachwalk from further undermining.

Though the skirt has done a sufficient job of protecting the erosion scarp over the short-term, its long-term performance is unknown. In addition, the skirt was designed as a temporary emergency measure with the concept of removal. If this measure is permitted for a longer period of time, to provide mid-term protection for the Beachwalk until the planned beach nourishment project can be implemented, it would require continued maintenance. The Emergency Erosion Protection Skirt, as originally installed, is unlikely to remain functional until the planned beach maintenance project, as it was never designed for use over a period of several years.

Figure 4-21 Photo of existing Emergency Erosion Protection Skirt (SEI, 11/08/2015)

The Emergency Erosion Protection Skirt, in contrast to other shoreline protection structures, has not created end-scour or flanking effects at the ends of an installation.

The Emergency Erosion Protection Skirt was installed at the project site as a result of regional erosion, where shoreline retreat had already created public health, welfare, and safety concerns. Regional erosion is typically a result of one or more of the following issues: changes in water level; changes in sediment supply; and/or changes in wave energy. This structure has not changed local or regional water levels affecting the shoreline. This structure has not accentuated regional erosion impacts due to sediment supply, since the mauka substrate has minimal beach quality sand. Though there is some sand mixed in the substrate at the project site, the substrate is predominantly fill, terrestrial materials, and sand that is not suitable for beach placement. This structure may have created minor perturbations in the wave environment at a localized level; however, these effects have not been observed during field investigations, and would be very different from regional erosion resulting from wave environment changes operating at a littoral cell scale.

Erosion Skirt Maintenance and Extension

Advantages:

- Preserves lateral public access along the shoreline
- Reduces public safety risks along the threatened portion of the Beachwalk
- Protects the backshore until beach nourishment plan can be implemented
- Minimizes economic impact to Kaanapali area by preserving access throughout the region

- Reduces release of backshore fill material into nearshore waters
- Relatively low impact to install
- Small footprint on the beach side
- Durable material
- Material can be stored locally for short lead-time installation
- Can quickly protect an extensive reach
- Relatively easy to remove

Disadvantages:

- Offers only bank protection
- Unstable if beach erodes
- Beach sand loss produces differential stresses
- Requires large footprint in the backshore
- Requires backshore anchoring
- Not biodegradable
- Not designed for mid- or long-term deployment

Cost Estimate:
Cost estimate for construction of an Emergency Erosion Protection Skirt is approximately $75,000. This cost estimate does not include maintenance or removal. Maintenance costs for this structure would include full replacement on an annual basis. This option is susceptible to catastrophic failure.

Suitability for Purpose:
The Emergency Erosion Protection Skirt will not satisfy the purpose of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur. The materials, though well suited for short-term installation, are not designed to be exposed or maintained for longer periods of time. The shallow burial of the toe is not sufficient to keep the material stable in the event of significant beach deflation.

Concept Emergency Erosion Protection Skirt Design

The Emergency Erosion Protection Skirt consists of a geotextile blanket that is laid out and anchored over an erosion scarp fronting the Grotto area of the resort. The geotextile blanket protects the existing erosion scarp from wave attack.

Project elements, shown in cross section view in Figure 4-22, include:

Geotextile Skirt
The geotextile skirt extends from the top of the erosion scarp (elevation +8 feet MLLW) to a toe trench excavated to an elevation of approximately +2 feet MLLW. The fabric, TenCate GT1000MB, is sand-color and was stitched into the custom design by the material manufacturer.

Small Sandbags

Small sandbags weighing approximately 45 pounds each were used to anchor the toe and the ends of the geotextile blanket. The geotextile blanket has anchor pockets that hold the sandbags in place. The sandbags were filled on site with the existing beach sand. When the temporary shore protection is removed, the sand will be placed back on the beach and the bags will be disposed of offsite.

Tiger Dam

Tiger Dams are 50-foot long, 24-inch diameter water-filled tubes that weigh roughly 10,000 pounds each when filled (Figure 4-23). The dams were placed on top of the erosion scarp and geotextile blanket as dead weight to assist with backshore anchoring.

Helical Anchors and Strongbacks

Helical anchors, 36" in length, are drilled into the backshore and cemented in place to provide anchor points for the skirt. Strongbacks are inserted through the anchor straps or into the anchor pockets to spread the anchoring load through the woven fabric.

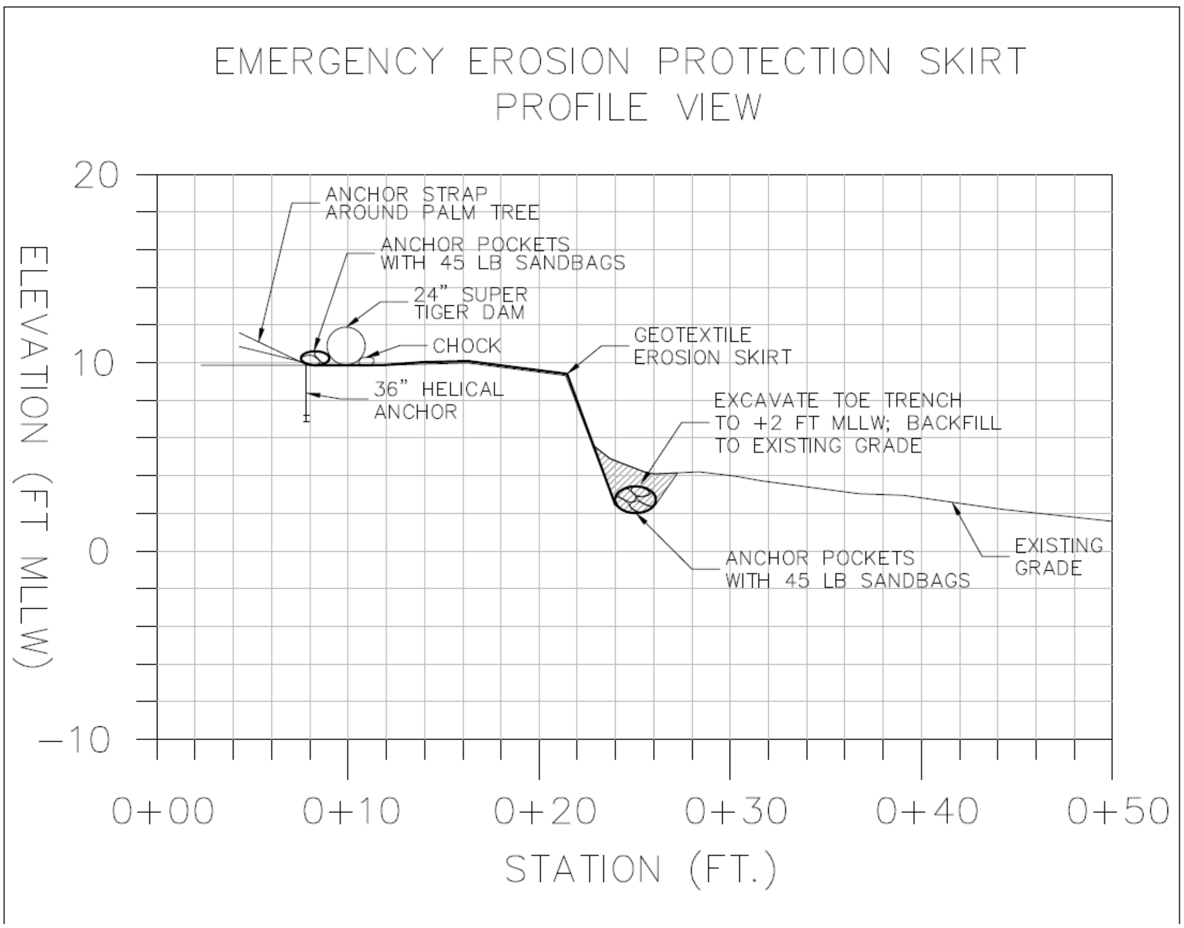

Figure 4-22 Section view of Emergency Erosion Protection Skirt deployment plan

Figure 4-23 Tiger Dam installation and anchoring (SEI, 2015)

Extending the existing erosion skirt by approximately 75 feet toward the southeast is recommended to address the immediate erosion threat. The extension would have the same type of construction and use the same type of materials as the existing erosion skirt. A plan view of the area of coverage for the existing erosion skirt and an extension are presented in Figure 4-24.

Figure 4-24 Emergency Erosion Protection Skirt deployment plan

4.5 Beach Nourishment

Constructing or nourishing a protective beach by placing suitable sand in an appropriately designed manner along a shoreline can be an effective and attractive means of mitigating beach loss, protecting against shoreline recession, protecting the backshore area, and providing for recreational and aesthetic enjoyment. The State Department of Land and Natural Resources (DLNR) and the Office of Planning, Coastal Zone Management Program (OP-CZM) actively encourage the development of beach nourishment projects, as illustrated by their funding of beach nourishment studies and support for a joint Federal/State General Permit for Small-scale Beach Nourishment (SSBN) to streamline the permitting and approval process for beach restoration projects. The SSBN program has a maximum volume of 10,000 cy of sand. Project using volumes larger than 10,000 cy will require the full suite of environmental documents and permits.

An example of a recent large scale Hawaii beach nourishment project is the Waikiki Beach Maintenance project completed by DLNR in 2012 (Figure 4-25). Approximately 28,000 cubic yards of sand was recovered from nearshore sand deposits off Waikiki Beach and used to nourish 1,700 linear feet of beach. This project widened the beach by about 40 feet. However, Waikiki

Beach is chronically eroding and receding about 1.5 feet per year, so this is only a temporary improvement, and will have to be repeated every 10 years or so in order to maintain the beach.

Figure 4-25. Waikiki Beach nourishment (24 hours post-construction) (Sheraton Beach Camera, 2012)

Beach nourishment requires a source of suitable beach quality sand and sufficient quantity to meet the needs of the project. Hawaii sand is calcareous (calcium carbonate, primarily from corals and the shells of marine life), and State rules require that only calcareous sand be introduced into the marine environment. There are currently no on-land sources of commercially available calcareous beach sand, and limited offshore deposits of suitable beach sand which can be recovered. Offshore sand deposits generally tend to have a particle size that is finer than that which is desirable for beach nourishment, with a significant fraction of less than sand size material, and are gray in color due to the presence of ferrous oxide produced by anaerobic conditions. In addition, environmental assessment and permitting of offshore sand recovery can be an expensive and lengthy process, and the sand recovery itself can be expensive. The Waikiki Beach project cost $100 per in-place cubic yard of sand on the beach. The recently constructed Iroquois Point beach nourishment project had the unique advantage of having the sand which was eroded from the shoreline transported eastward alongshore by the prevailing currents and then deposited in the more quiescent waters just inside the Pearl Harbor entrance channel. This deposit of perfectly suited beach sand could then be easily recovered and placed back on the oceanside shoreline. Without this sand source it is unlikely that the Iroquois Point beach nourishment project could have been accomplished. A total of 95,000 cy was used to nourish 4,200 feet of shoreline.

Nourishing a small portion of the beach fronting the Hyatt would likely provide little long term benefit. Sand placed in this fashion without any structural containment (such as jetties or groins) will likely be lost or dispersed to the rest of the littoral cell. To gain any substantial benefit from beach nourishment without the use of structures, a larger scale approach must be employed to nourish the entire beach as a system or littoral cell.

In 2006, SEI was contracted by the Kaanapali Operations Association (KOA) to begin evaluating the feasibility of nourishing Kaanapali Beach. Work included providing an overview of sand sources and costs, environmental and permitting requirements, and surveying to identify offshore sand deposits that could potentially be used for beach nourishment purposes. The surveys indicate the presence of sufficient quantities of suitable sand for potential use in nourishing Kaanapali Beach.

Small-scale Beach Nourishment (<10,000 cy of sand)

Advantages:

- Provides additional sand for the larger littoral cell
- Reduces public safety risks along the threatened portion of the Beachwalk for a short period of time
- Reduces release of backshore fill material into nearshore waters for a short period of time
- Produces a sandy beach for a short period of time

Disadvantages:

- Unstable as a spot deployment of sand without structures included in design
- Sand will spread over entire cell unless regional nourishment is undertaken
- Erosion will continue at historical rates
- Short project life span for placement of 10,000 cy or less
- Additional sand placement, after 10,000 cy will require the full suite of environmental documents and permits
- Will not preserves lateral public access along the shoreline until the regional plan can be implemented
- Will not protect the backshore until regional beach nourishment plan can be implemented
- Will not minimizes economic impact to Kaanapali area by preserving access throughout the region after the sand is moved from the project site and spread through the littoral cell
- No commercial sand source available
- Offshore sand sources are still being developed
- Requires transport of sand to shore, dewatering, and transport to the project site
- Expensive
- Could take several years to implement

Cost Estimate:
Small-scale beach nourishment efforts at the site would be ineffective to the level of needing constant reintroduction of sand at the erosion site. This option has no upper limit to costs.

Funding has been secured for regional beach nourishment and planning and permitting is already underway; however, this is a multi-year project that is still several years from completion.

Suitability for Purpose:
Small-scale beach nourishment is not suitable for the purpose of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur. Regional beach nourishment, conducted as part of a comprehensive long-term coastal management plan, will provide both backshore and resource protection; however, this is a multi-year project that is still several years from completion.

Concept Design for Regional Beach Nourishment (Underway)

SEI is under contract with the Department of Land and Natural Resources (DLNR) to design beach nourishment for the entire beach fronting the Hyatt and Marriot hotels, as well as berm enhancement extending north from Hanakaoo Point to Kekaa Point. Figure 4-26 shows the potential sand source locations and shoreline area identified for nourishment. The beach nourishment project would require dredging the offshore sand and transporting and delivering the sand to the beach. Building a 20-foot wide beach along 3,200 feet of shoreline is estimated to require dredging approximately 34,000 cubic yards of sand; a 25 foot width would require approximately 40,000 cubic yards; restoration of the beach to the 1988 shoreline may require as much as 70,000 cubic yards.

A possible dredging method would consist of two crane barges equipped with deepwater offshore mooring systems and two 1,500 cubic yard capacity deck barges. One crane barge would be moored at the sand deposit site and the other barge would be moored at the offload site directly offshore of the Hyatt's shoreline. Dredging and offloading operations to transport the sand would be performed simultaneously using the two deck barges.

The anticipated construction duration for placing 70,000 cubic yards of sand, including time for site mobilization and demobilization, would be approximately 85 calendar days. The estimated rate of dredging and delivery to the beach is 1,000 cubic yards per day.

Approximate costs for dredging and nourishment of the beach include a mobilization fee of $1 million and sand dredging and delivery costs of $65 per cubic yard. Design and permitting costs are estimated at $800,000. Total project costs, including design and permitting for a 70,000 cubic yard beach maintenance project and a combined 5,000 cubic yard berm enhancement project are estimated at $5.7 million.

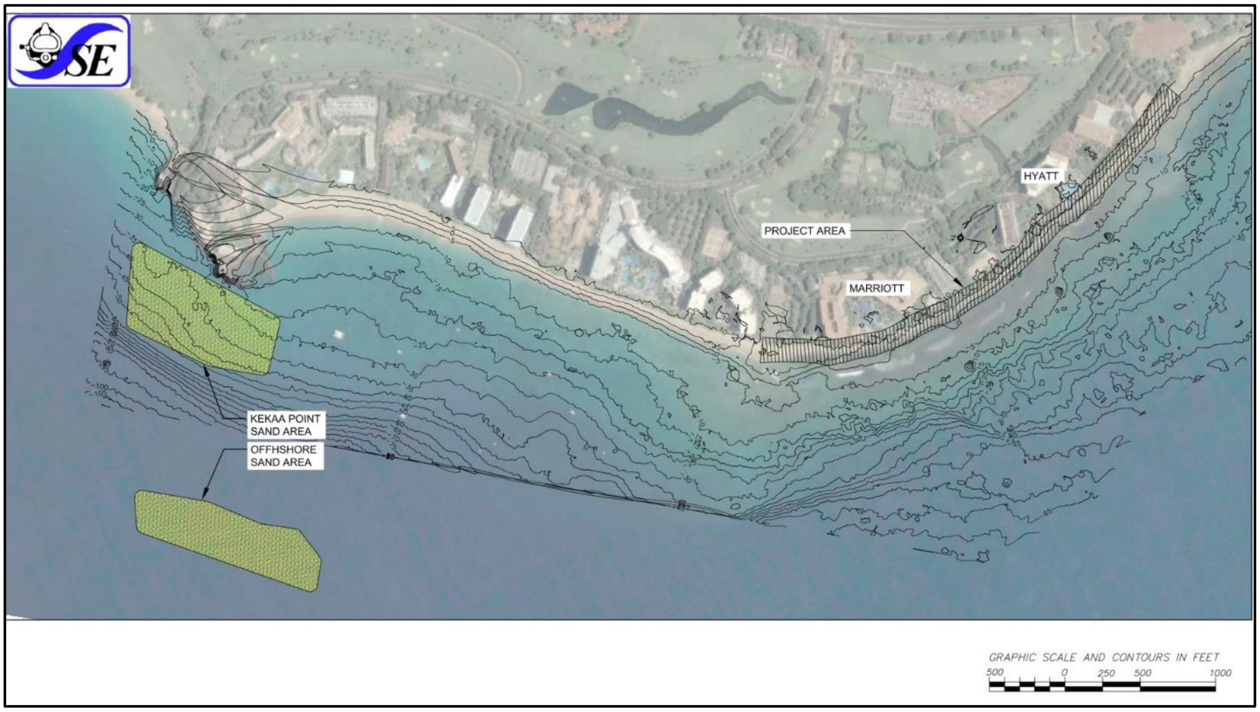

Figure 4-26 Sand source and project area for a nourishment project of the Hanakaoo beach cell.

4.6 Elevated Boardwalk

Replacing the Beachwalk with an elevated boardwalk constructed on piles has been assessed as an option. The openness of the pile system would allow the shoreline to naturally move under the boardwalk while not immediately threatening the coastal access path. Boardwalks are commonly constructed to allow users to traverse sensitive dune systems and are found worldwide. Figure 4-26 shows an elevated boardwalk along the shoreline at Wailea on the island of Maui. The boardwalk was initially supported by wooden piling; however, those pilings have been heavily reinforced with concrete (Figure 4-28).

Figure 4-27 Elevated shoreline boardwalk at Wailea, Maui (SEI, 2016)

Figure 4-28 Concrete supports under elevated boardwalk, Wailea, Maui (SEI, 2016)

Elevated boardwalks used as dune walkovers are primarily designed to focus pedestrian traffic to defined areas to prevent widespread impact to the dune and vegetation. Dune walkovers may not be exposed to the wave forces that an elevated shoreline boardwalk may experience. An elevated coastal boardwalk at the Hyatt will experience wave forces and is required to be designed to withstand those forces as well as the loads exerted by significant pedestrian use.

The SSFM Pedestrian Study, conducted in 2016, identified typical use patterns and makes recommendations for an elevated boardwalk's dimensions. The report suggests an elevated boardwalk that is 12 to 14 feet in width. The current beach walk is approximately 6 feet in width and is located as far inland as possible at the project site. A boardwalk designed to this standard would extend six to eight feet seaward of the current Beachwalk location.

In addition, the elevated boardwalk will quickly become disconnected to the backshore improvements as erosion continues to impact the coastline. Special on and off ramps will need to be created for beach access from the elevated structure, as well as bridges to connect to the backshore areas. The example from Wailea is not accessible, except from the ends where it meets the existing path.

Wave action around the piles will create a turbulent and potentially hazardous situation during high wave events. In addition, the exposed erosion scarp will be partially hidden from general view by the piles, and will present an attractive and dangerous nuisance for children.

Elevated Boardwalk

Option 1 - Conventional drilled and cast-in-place piles with a cast-in-place concrete deck

Advantages:

- Preserves lateral public access along the shoreline.
- Reduces public safety risks along the threatened portion of the Beachwalk .
- Minimizes some economic impact to Kaanapali area by preserving access from either end.
- Durable (can last several years)
- Resistant to damage and vandalism
- This option will minimize the size of the equipment required and the noise generated during the pile drilling and installation operations.
- If suitable, the drilling spoils can be used for buildup of the existing beach conditions
- The cast-in-place deck will minimize the need for large equipment and machinery for installation.
- The piles will have an increased resistance to scouring of the support soils from sand, water, and wave action from anticipated long term erosion below.
- The integral cast-in-place deck will eliminate exposed connections subject to damage and/or degradation due to scouring of the support soils on the underside of the deck from sand, water, and wave action from anticipated long term erosion below.

Disadvantages:

- Negative economic impacts the backshore area because the boardwalk will be disconnected from the backshore amenities.

- The drilling spoils may not be suitable for onsite use and may need to be exported from the site.
- The beach will end up beneath the boardwalk when natural erosion moves the shoreline inland, rendering the beach unusable and limiting alongshore access on the beach
- Ingress and egress points from the boardwalk will be limited
- Does not protect the backshore until beach nourishment plan can be implemented.
- Does not reduce release of backshore fill material into nearshore waters.
- Wave action will become turbulent around the piles, accelerating erosion around them.
- The failing erosion scarp may present a hazardous condition for children when hidden from general view.

Option 2 – Driven precast concrete piles with a cast-in-place concrete deck

Advantages:

- Preserves lateral public access along the shoreline.
- Reduces public safety risks along the threatened portion of the Beachwalk.
- Minimizes some economic impact to Kaanapali area by preserving access from either end.
- Durable (can last several years)
- Resistant to damage and vandalism
- There will be no drilling spoils to export from the site
- The cast-in-place deck will minimize the need for large equipment and machinery for installation.
- The piles will have an increased resistance to scouring of the support soils from sand, water, and wave action from anticipated long term erosion below.
- The integral cast-in-place deck will eliminate exposed connections subject to damage and/or degradation due to scouring of the support soils on the underside of the deck from sand, water, and wave action from anticipated long term erosion below.

Disadvantages:

- Negative economic impacts the backshore area because the boardwalk will be disconnected from the backshore amenities.
- The pile installation will require larger equipment and generate a significant amount of ambient noise during pile installation.
- Vibrations may damage nearby facilities such as the swimming pool.
- The beach will end up beneath the boardwalk when natural erosion moves the shoreline inland, rendering the beach unusable and limiting alongshore access on the beach
- Ingress and egress points from the boardwalk will be limited
- Does not protect the backshore until beach nourishment plan can be implemented.
- Does not reduce release of backshore fill material into nearshore waters.

- Wave action will become turbulent around the piles, accelerating erosion around them.
- Wave action around piles may present a hazardous situation during high surf events.
- The failing erosion scarp may present a hazardous condition for children when hidden from general view.

Other options considered at a concept level include:

Treated wood piles with a treated wood deck

- This option is considered as not feasible long term.
- The upper portions of the piles will be embedded in soil initially and gradually exposed due to long term erosion of the beach. This increases the likelihood of damage as the result of changed exposure condition and increased chance of rotting of the wood to occur.
- Damage to the piles due to scouring action of the sand, water and wave action below the deck.
- Exposed connections will be subject to damage and/or degradation due to scouring of the support soils on the underside of the deck from sand, water and wave action from anticipated long term erosion below

Precast concrete deck

- Exposed connections will be subject to damage and/or degradation due to scouring of the support soils on the underside of the deck from sand, water and wave action from anticipated long term erosion below
- The installation of the precast units will require larger pieces of equipment for installation and likely to generate more ambient noise.

Cost Estimate:
Cost estimate for construction of an elevated boardwalk is approximately $1,650,000. This cost estimate does not include removal of other affected infrastructure. Modifications required will cost approximately $1,400,000 for the Grotto area and $650,000 for the pool. This cost estimate does not include maintenance or removal. Maintenance costs for this structure are typically minimal, and catastrophic failure of this structure is unlikely.

Suitability for Purpose:
An elevated boardwalk <u>will not</u> provide protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur; however, it does provide a coastal lateral access. Erosion rates of around 2.0 feet per year would result in the boardwalk being separated from the backshore in numerous locations and suspended above the active beach face. This would limit ingress and egress points from the structure. The close spacing of large piles would also limit beach use and processes beneath the structure.

Concept Design for Boardwalk

Figure 4-29 shows a plan view of an elevated boardwalk that could replace the Beachwalk. The alongshore limits were selected based on the historical erosion rates such that the ends of the boardwalk would not become flanked by erosion over the next 10 years. Such an event would render the boardwalk impassible. The boardwalk is shown to replace the existing Beachwalk in the same location. Wave forces on the piles were calculated for a wave with a 10-year recurrence interval. This design wave is a moderate-sized south swell having a deepwater wave height H_o = 4.3 feet and period T_p = 15 seconds. Assuming an 18-inch diameter piling, the structural analysis results in 8-foot pile spacing alongshore as shown in Figure 4-29. A cross-section of the boardwalk, presented in Figure 4-30 and Figure 4-31, also shows the necessity of extending piles to about 20 feet below MSL for structural stability. The cross-sections show both cast-in-place and pre-cast pile designs. This design is based on existing Beachwalk width, and is not designed to the recommended standard presented in the SSFM pedestrian study conducted in 2016. SSFM recommends a boardwalk width of 12 to 14 feet.

It is unknown if a pile-supported walkway would be approved by the State and County. It is our understanding that the Kaanapali walkway guidelines state that boardwalks should be modular and relocatable. This boardwalk design would meet neither of those requirements based on location; however, there are currently no alternate locations to place the boardwalk.

Figure 4-29 Overview of Hyatt boardwalk plan

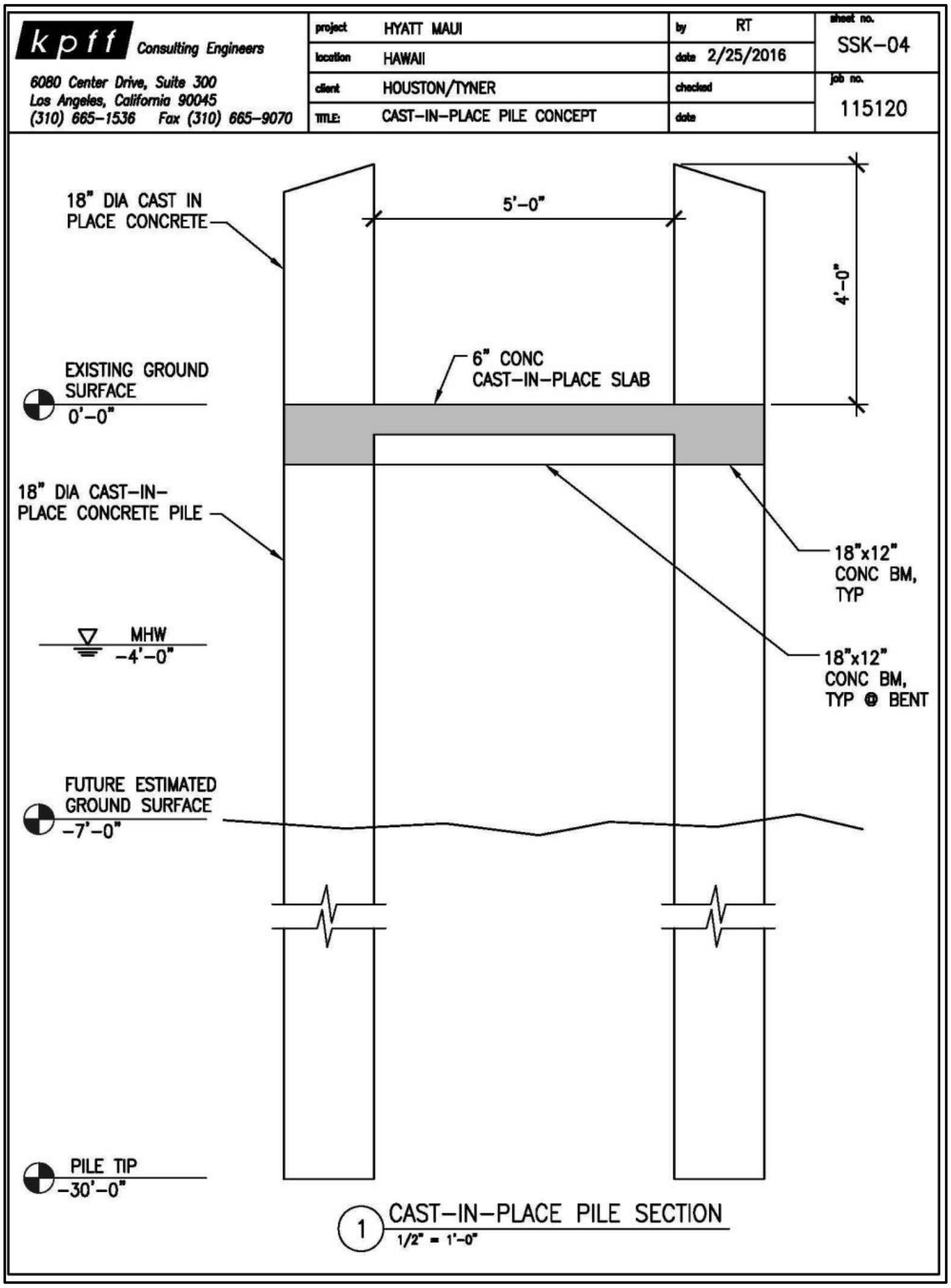

Figure 4-30 Hyatt boardwalk cross section—cast-in-place concrete pile

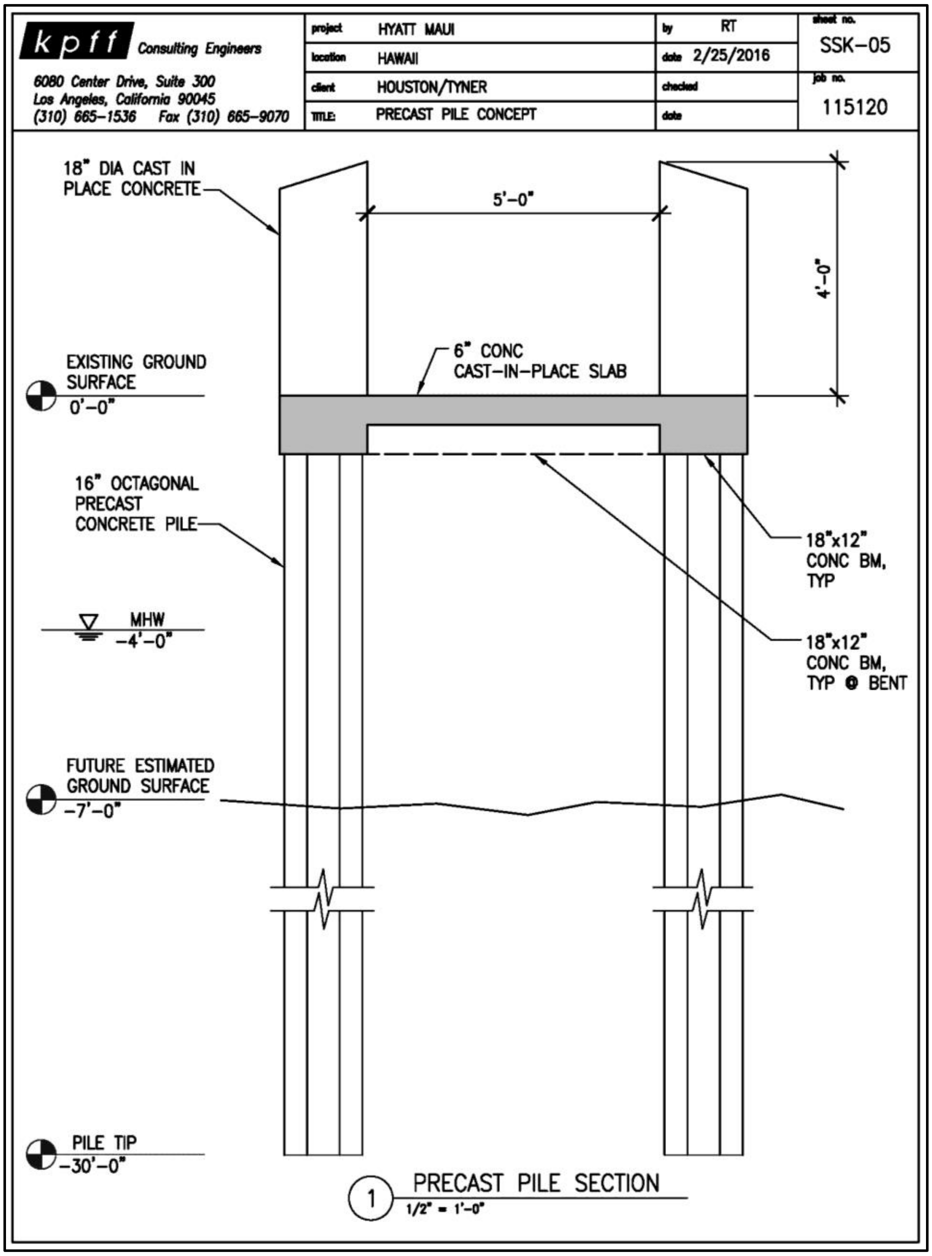

Figure 4-31 Hyatt boardwalk cross section—precast concrete pile

4.7 Realignment of Kaanapali Beachwalk

The Kaanapali Beachwalk is a coastal access path, approximately 1.33 miles in length extending continuously from Hanakaoo Beach Park to Kekaa Point (Figure 4-32). The Beachwalk is laid out in a curvilinear configuration running parallel to the shoreline. The Beachwalk connects nine shoreline properties allowing continuous pedestrian travel to the general public, hotel and resort guests.

The Kaanapali Beachwalk is the only contiguous ADA-compliant shoreline access path in the region. The existing route is level, consisting of concrete grouted stone. The Beachwalk maintains varying widths throughout, with areas ranging from approximately 5 feet wide in typical segments to 14 feet wide at intersection and congregating points. The proximity of the existing Beachwalk to the shoreline facilitates relationship between the ocean and the pedestrian which is critical to the Beachwalk's identity as a coastal access path.

Chris Hart & Partners, Inc., (CHP) evaluated options for rerouting pedestrian traffic in the event that the Kaanapali Beachwalk were no longer passible. The report analyzed the four potential routes that are shown in Figure 4-33.

Figure 4-32 Kaanapali Beachwalk location map

<u>*Route A*</u>

Alternative *Route A* is the proposed Beach Pathway Plan that would be implemented in the event that the Kaanapali Beachwalk became impassible due to shoreline erosion damage. As indicated by a green dashed line in Figure 4-33, the south end of *Route A* diverts from the existing Beachwalk between the Hyatt's luau facility and the Lahaina Tower. The path enters the ballroom pre-function area where the option of stairs or elevator access up to the lobby floor is currently provided. Ocean views exist while ascending the stairs and on the lobby floor; however, those views end as *Route A* enters an enclosed retail shop area. The ocean views reemerge in the Atrium Tower, then are lost again as *Route A* enters the existing commercial building between the Atrium Tower and the Napili Tower. *Route A* leaves the interior of the hotel and weaves seaward through a park-like setting via an ADA-accessible ramp before rejoining the existing Beachwalk alignment just off the southwest corner of the Hotel's Napili Tower.

Additional signage throughout alternative *Route A* will be necessary to enhance way-finding. All necessary infrastructure for pedestrian and ADA accessibility is currently in place.

Route A has emerged as the preferred option because of its proximity to the existing Kaanapali Beachwalk alignment and the shortest detour from the existing Beachwalk. *Route A* results in an increase in walking distance of approximately 950 feet (0.18 miles) when compared to the existing Beachwalk. Of the four alternatives, *Route A* best preserves the visual relationship of the pedestrian to the ocean with the most frequent opportunities for views to the ocean and shoreline.

Route B
As indicated by a blue dashed line in Figure 4-33, alternative *Route B* uses a portion of the same path as *Route A*. Pedestrians passing through to the Atrium Tower would exit the hotel via the main lobby entrance and proceed down the sidewalk of the entrance driveway and past the Napili Tower, before turning seaward down the beach access between the Napili Tower and the Hyatt Kaanapali Beach Residence Club.

Route B strays further from the shoreline and increases the travel distance by approximately 1,150 feet (0.22 miles) when compared to the existing Beachwalk. *Route B* is less favorable because of its increased walking distance, decreased opportunities for ocean views, and increased exposure to automobile traffic as the path follows the edge of the Hyatt's main entrance driveway. *Route B* also forces pedestrians through Hyatt's main entrance, check-in area, and valet parking area, which are congested throughout the day.

The loss of visual relationship with the ocean experienced via *Route B* is significant. Ocean views ascending the stairway between the ballroom pre-function area, to and along the lanai of the Lahaina Tower are experienced, as well as pocket views passing through the Atrium Tower, but do not reemerge before nearing the reconnection with the existing Beachwalk route north of the Napili Tower.

Existing pedestrian pathways on the Hyatt Kaanapali Residence Club (Timeshare) property, seaward from the Hotel entry driveway, are narrow at points and are unsuited for the existing volume of pedestrian traffic occurring on the Beachwalk. It is anticipated that Hyatt Kaanapali Residence Club owners will not support *Route B* due to general public traffic intrusion into the existing private pool, pool deck area, and pool bar service area.

Route C
A third mauka route, *Route C*, is shown by the black dashed line on Figure 4-33. *Route C* departs from the existing Beachwalk alignment at the south end of the Hyatt property and proceeds mauka through the beach access, behind the spa facility, through the parking lot, and northwest along the Hyatt's service driveway. The existing vehicle access route along this segment provides inadequate space for pedestrian traffic. Back of the house services and utility functions are a primary purpose of this area, and as such are aesthetically unsuited for guest

pedestrian traffic. As the route approaches the Hyatt's main driveway, it becomes mandatory for the pedestrians to cross vehicle traffic in order to pass through the beach access between the Napili Tower and the Hyatt Kaanapali Beach Residence Club.

Route C increases pedestrian walking distance by approximately 1,550 feet (0.29 miles) when compared to the existing Beachwalk.

Rerouting of Beachwalk

Advantages:

- Pedestrian access between Hanakaoo Beach Park and the Kaanapali Resort would be maintained; however, it would be moved inland from the beach.
- Reduces public safety risks along the threatened portion of the Beachwalk .
- Minimizes some economic impact to Kaanapali area by preserving access from either end.
- Durable (can last several years)
- Resistant to damage and vandalism
- The shoreline would be allowed to change naturally
- Implementation would not impact the shoreline
- Only signage would be necessary—no other construction

Disadvantages:

- Erosion will continue at historical rates
- Each alternative route increases distance by 950 to 1,550 feet vs. the existing Beachwalk
- Implementation would not reduce shoreline erosion
- Scenic ocean views would be diminished
- Nearshore amenities would need to be removed/relocated as erosion progressed
- Fill material will continue to erode into the nearshore waters
- Pedestrian traffic may be funneled through already congested areas, such as the hotel entrance, valet parking area, the Residence Club pool area, and the County's beach accessways
- Pedestrian traffic may be forced through areas not that do not have marked pedestrian walkways or sidewalks, such as the back parking lot
- Pedestrian traffic may encounter vehicular traffic
- This option is very expensive to implement

Cost Estimate:
Cost estimate for relocation of the Beachwalk is approximately $1,500,000, including removal of the existing walk and creation of a new path. This cost estimate does not include removal of other affected infrastructure. Modifications required will cost approximately $1,400,000 for the Grotto area and $650,000 for the pool.

Suitability for purpose:
Rerouting of Beachwalk traffic is not suitable for the purpose of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and

Beachwalk protection until the Kaanapali Beach Nourishment can occur. Moreover, re-routing will not maintain coastal access along the shoreline.

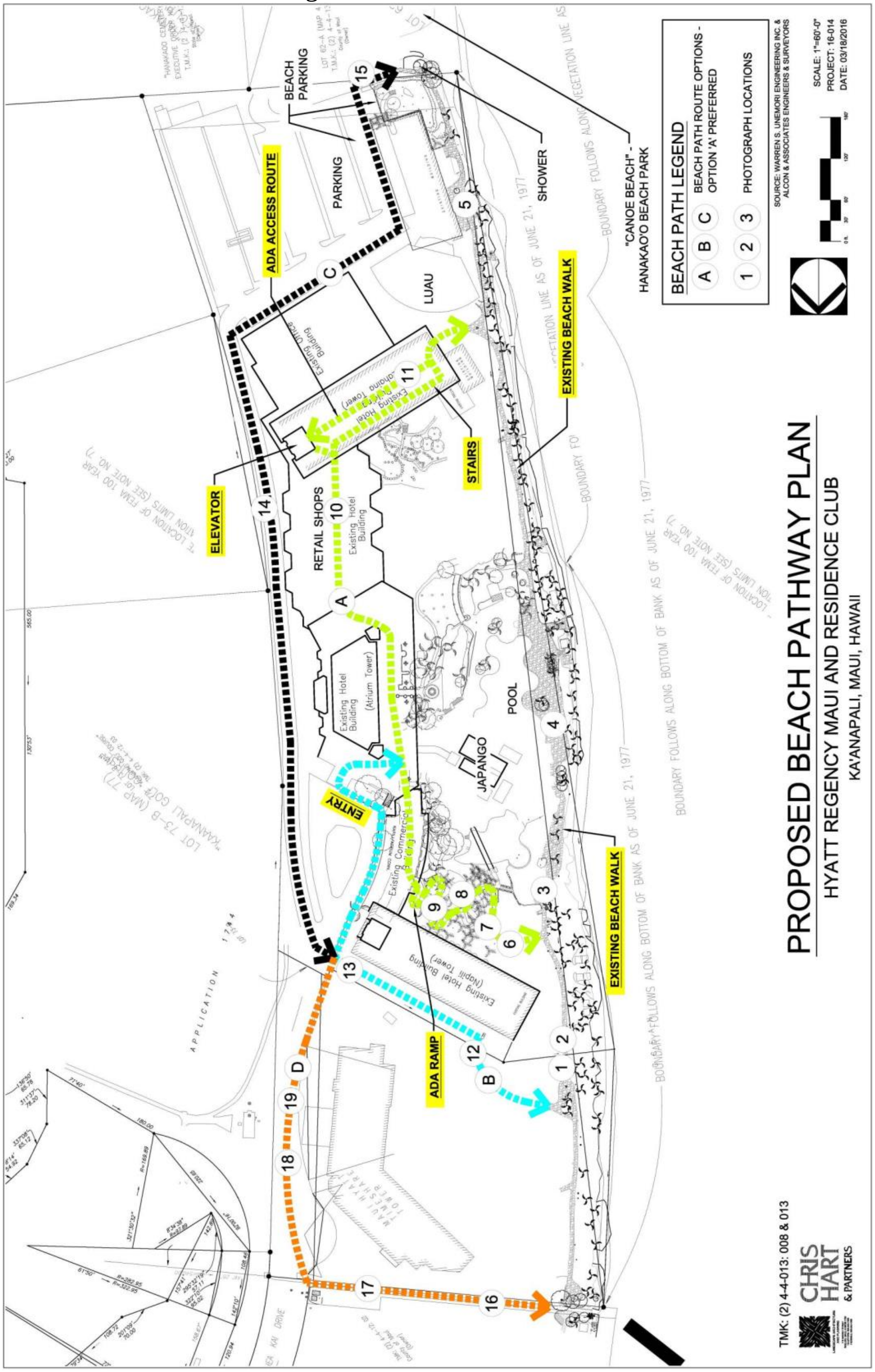

Figure 4-33 Proposed beach pathway plan – Hyatt Regency Maui

4.8 Removal of Kaanapali Beachwalk, Retreat, or No Action

The analysis of the alternatives for "Removal of Kaanapali Beachwalk," "Retreat", and "No Action" have similar areas of coverage and similar impacts to the backshore. Those three alternatives are therefore addressed together.

"Removal of Kaanapali Beachwalk" and "Retreat" are effectively the same, and would consist of the Hyatt removing the flagstone walkway, utilities, and other amenities, while allowing erosion to continue unabated. The Hyatt would have the choice of eliminating amenities or moving them as they see fit. "No Action" differs in that the Kaanapali Beachwalk would only be removed as it became unsafe and amenities would be relocated or removed when threatened.

Shoreline positions 5 and 10 years from the present are shown on Figure 4-34, based on the 2 feet/year historical erosion rate found in Section 2.2.7. The starting point in the analysis is the existing seaward edge of the Kaanapali Beachwalk as it now stands (green line). The projected positions assume that there is no shore protection in place and the shoreline naturally erodes at the projected/historical rate. Episodic events could result in impacts sooner—there is no precise way to predict these.

Short-term Erosion Projections

The analysis indicates that in 5 years, the erosion scarp (yellow line) will be landward of the planter on the east side of the Grotto entrance and will be less than 7 feet from the Grotto wall. The erosion scarp will also be up against the west planter.

Mid-term Erosion Projections

In 10 years, the erosion scarp (red line) will be landward of the western planter and it will have met the Grotto wall. This area will be impassible on the west side of the Grotto entrance, and greatly limited on the east side. The erosion scarp will also be less than 10 feet from the main pool.

The spatial loss is estimated to be about 7,000 square feet in 10 years.

The erosion analyses assume that there is no shore protection in place and that the erosion rate is steady at the recent historical rate.

Long-term Erosion Projections

Figure 4-34 Projected future shoreline positions – Hyatt Regency Maui

Impact to Hyatt Infrastructure

KPFF performed impact analyses for the existing Grotto structure and the existing main pool based on projected shoreline erosion over the next 5 and 10 years. Based upon their review, KPFF had the following comments regarding impact to the Grotto structure:

1. The projected limits for the shoreline erosion will encroach within approximately 5-10 feet of the current edge of the Grotto structure.
2. This encroachment will cause potential undermining of the existing foundations affecting 7 columns, bar, hardscape areas, and the current edge of pool within the limits of the Grotto.
3. To maintain the Grotto and accommodate the shoreline encroachment, it will be necessary to modify the existing structures as indicated on the existing foundation plan:
   a. Reconstruction and relocation of the existing structures noted is anticipated within 18-20 feet of the expected limits of erosion.
   b. This 18-20 feet buffer zone will accommodate access around the pool, sufficient lateral support of the foundation system and provided for natural sloping of the beach to occur without the introduction of a protection/retaining wall structure.
   c. The existing 7 support columns of the Grotto Structure will need to be removed and reconstructed beyond the safe limits of the expected erosion.

d. The depth of the new footing excavations will need to be approximately 6-7 feet deeper than the current footing elevations to prevent future undermining by continued or more rapid erosion than expected.
e. The existing bridge structure will need to be modified and/or reconstructed.
f. The existing roof structure will need to be modified to accommodate the shift of the 7 support columns below. The existing bar and/or other hardscape items including the Grotto rock formations will need to rebuilt and reconstructed to replicate the current site features.
g. The edge of pool in the area of the Grotto will need to be reconstructed beyond the limits of the expected erosion.

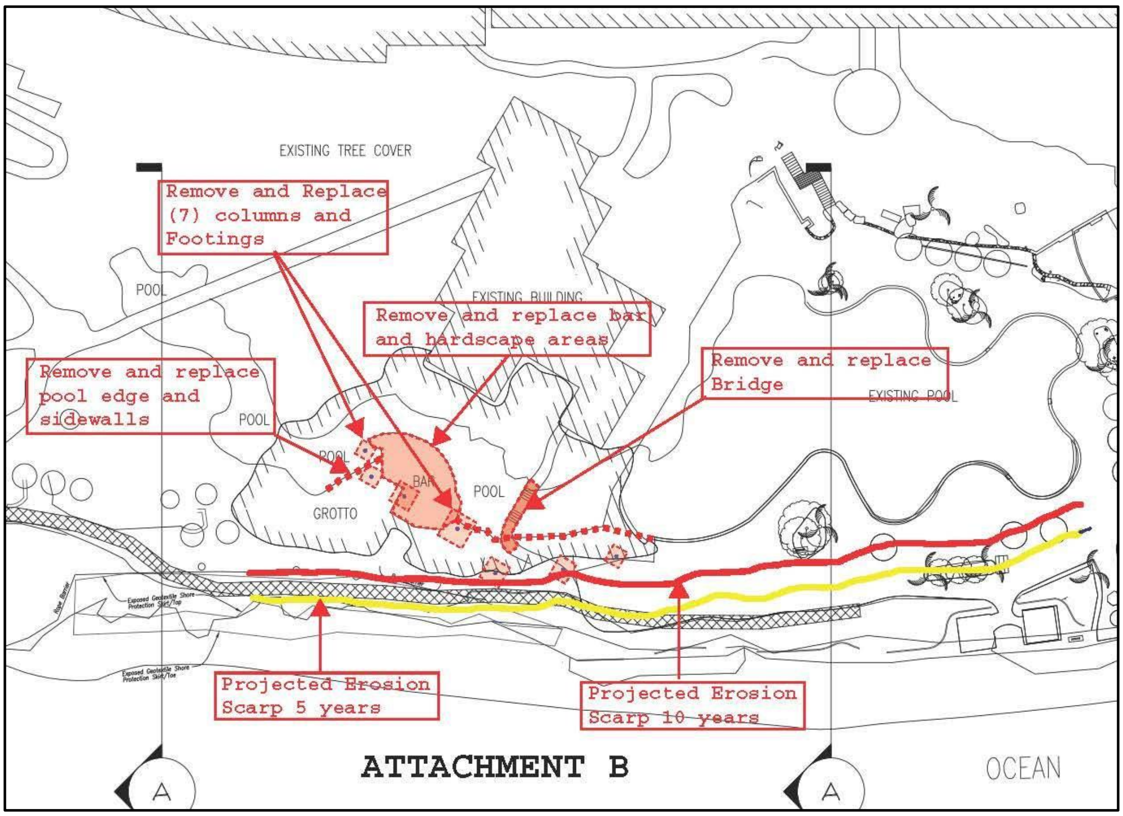

Figure 4-35 Projected impact to Grotto and modifications – Hyatt Regency Maui

Additionally, KPFF had the following comments regarding impact to the main pool structure:

1. The projected limits for the shoreline erosion will encroach within approximately 10-15 feet of the current edge of the pool.
2. This encroachment will cause potential undermining of the existing pool edge and side wall.
3. To maintain the pool and accommodate the shoreline encroachment it will be necessary to modify the existing pool edge and side wall where indicated on the attached plan. (Figure 4-36)

a. Reconstruction and relocation of the pool edge and side wall is anticipated to occur within 18-20 feet of the expected limits of erosion.
b. This 18-20 feet buffer zone will accommodate access around the pool, sufficient lateral support of the side wall and provided for natural sloping of the beach to occur without the introduction of a protection/retaining wall structure.
c. Reconstruction of the pool edge and side wall will consist of a gunite soil support system similar to the original construction as shown in Figure 4-37.
d. Affected hardscape items will need to rebuilt and reconstructed to replicate the current site features.

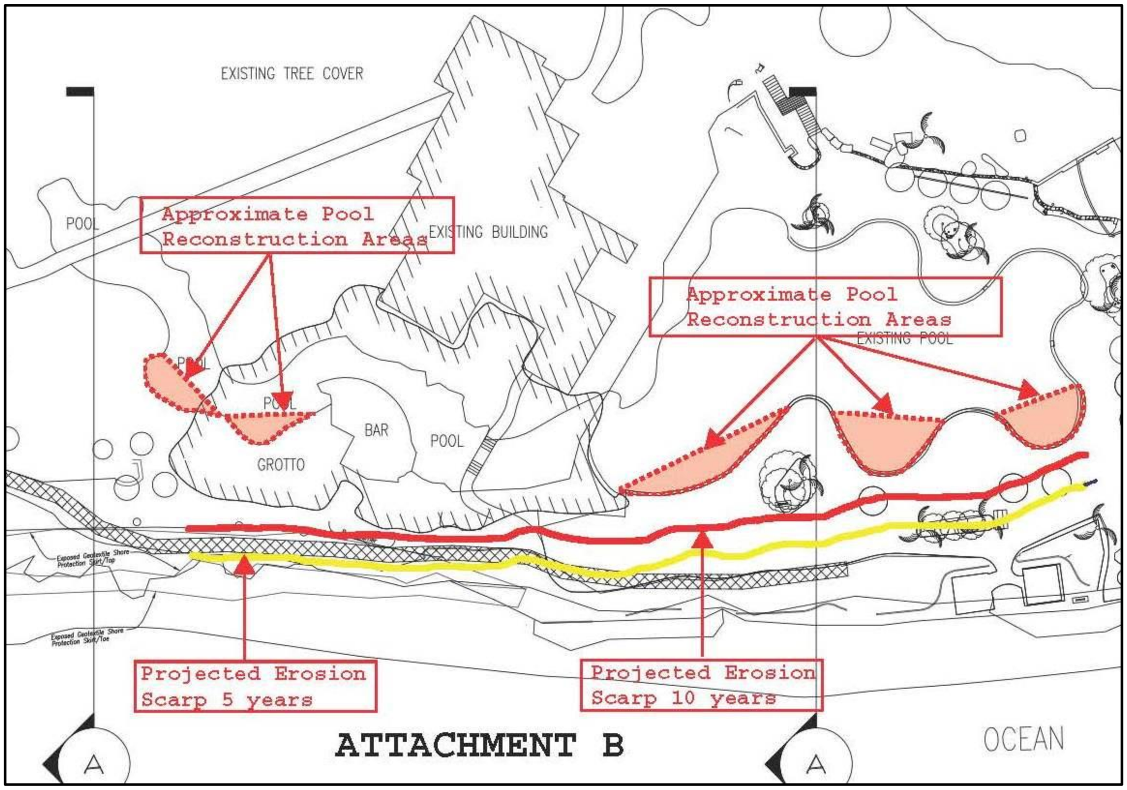

Figure 4-36 Projected impact to main pool and modifications – Hyatt Regency Maui

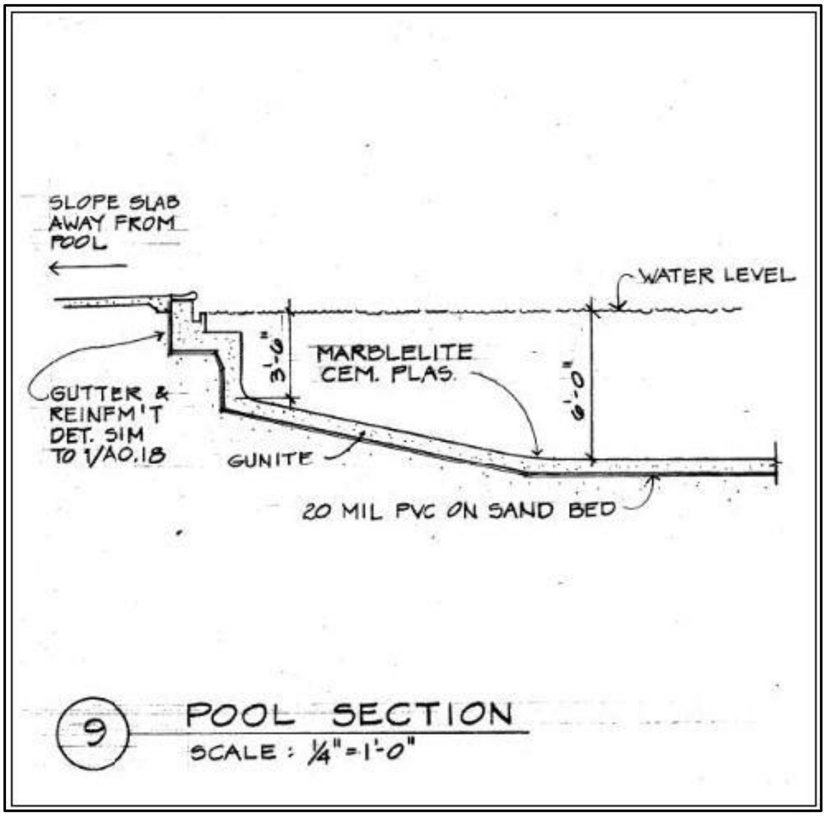

Figure 4-37 Original main pool construction – Hyatt Regency Maui

The Kaanapali Beachwalk is a public amenity that is privately owned and maintained on private land. The Kaanapali Beachwalk extends continuously for 6,000 feet from the Hyatt Regency Maui to the Sheraton Maui, connecting eight properties. The Beachwalk is the only ADA-compliant thoroughfare along the beach and has been identified by hotel representatives as having great importance to the region. Those representatives view the Beachwalk as the main pedestrian artery that makes Kaanapali a community, and they feel strongly that any obstruction would greatly affect the flow of pedestrian traffic and substantially diminish the beachgoer's experience. Many travel organizations, including Frommer's, TripAdvisor, Fodor's Travel, and About.com, refer to the Beachwalk as a valuable amenity. Moreover, the Beachwalk is a public amenity, available to any and all beachgoers visiting Kaanapali. Along this section of coastline, between Hanakaoo Beach Park and Hanakaoo Point, the beach is severely narrowed due to both chronic and episodic erosion. There is very little or no vegetative buffer remaining between the deflated beach face and the scarp on the seaward side of the Beachwalk, as described in the emergency section.

Loss of the Beachwalk will eliminate the only passable, lateral beach access in the region and cause significant and long-term interruption of access between Hanakaoo Beach Park and the beach northwest of the threatened Beachwalk. Without the preferred alternative, continued erosion, undermining, and failure of the Beachwalk is imminent. Erosion is presently releasing fill material, including cinders and topsoil, into the nearshore waters. The "No Action" alternative could lead to increased turbidity and nearshore biological impacts as a result of continued bank erosion.

Loss of the Beachwalk may prevent visitors to other properties from visiting the Hyatt, and it may result in fewer return visitors, as they may choose other properties.

"No Action" is not expected to affect historic, cultural, and archaeological resources.

Removal of the Kaanapali Beachwalk, Retreat, or No Action

Advantages:

- The shoreline will be allowed to erode naturally
- There will be no design or permitting expenses

Disadvantages:

- Loss of lateral public access along the shoreline between Hanakaoo Beach Park and the Kaanapali
- Increased public safety risks along the threatened portion of the Beachwalk
- Loss of alongshore ingress and egress for emergency services
- Continued release of backshore fill material into coastal waters
- Erosion will destabilize the Grotto structure, requiring fortification
- Erosion will threaten the swimming pools, resulting in loss of decking and requiring stabilization
- Increased structural damage to the Beachwalk and Hyatt resort infrastructure
- Utilities may require removal or relocation
- Expenses related to removal and fortification of infrastructure
- Increasing economic impact to Kaanapali area from loss of from either end, isolating beach and ocean areas, amenities, restaurants, shopping, and accommodations.

Cost Estimate:
Cost estimate for removal of the Beachwalk is approximately $310,000. This cost estimate does not include removal of other affected infrastructure. Modifications required will cost approximately $1,400,000 for the Grotto area and $650,000 for the pool.

Suitability for Purpose:
Removal of the Beachwalk, Retreat, and No Action will not satisfy the purpose of protecting public health, welfare, and safety and the project shoreline by providing adequate mid-term shore and Beachwalk protection until the Kaanapali Beach Nourishment can occur. None of these options will maintain lateral coastal access to and along the shoreline. All of these options have a negative economic impact to the region.

4.9 Preferred Alternative

Based on the concept designs developed and evaluated, the Rock Revetment option is the top choice. The Rock Revetment preserves lateral public access along the shoreline; reduces public health, welfare, and safety risks; minimizes economic impacts; eliminated release of backshore fill material into the nearshore waters; and provides the best protection to the nearshore waters. The structure itself is durable, stable, requires little maintenance, and is resistant to damage and vandalism. The mid-term disadvantages associated with this option will be repaired during implementation of the regional beach nourishment project, negating long-term impacts.

However, since there is are sometimes negative connotations associated with placement of a rock revetment adjacent to a sandy shoreline, even for a mid-term duration, the ElcoRock sandbag revetment is chosen at the Preferred Alternative. The advantages of the ElcoRock alternative are similar in scope to the Rock Revetment, though maintenance costs will be higher for the mid-term duration. Similarly, the mid-term impacts will be negated by implementation of the regional beach nourishment project.

Preferred Alternative: ElcoRock Sandbags

5. POTENTIAL IMPACTS AND MITIGATION

This chapter summarizes the potential adverse impacts and beneficial effects that may result from the preferred alternative. The discussion is organized by type of potential resource impact (e.g., water quality, potential species, etc.). Good project design and implementation integrates features and practices intended to avoid or mitigate potential environmental effects into the overall design of the project. Because of this, in most cases the discussion of "mitigation measures" is integrated into the overall discussion rather than limited to a separate section of the report. Each resource section in this chapter includes a discussion of criteria used to determine the significance effects on the resource.

5.1.1 *Marine Substrate (Geomorphology)*

5.1.1.1 Potential Impacts and Mitigation Measures

Excavation of the beach could result in the release of sand into the nearshore waters. During construction, excavation will be limited to the beach area landward of the MHHW line. Measures will be taken to keep water out of the excavation area, such as building a berm along the seaward side of the excavation. Additionally, silt curtains will be deployed as an additional measure to protect against the release of sediment.

The beach, however, is composed of beach sand that moves with every wave. Any additional sand released to the nearshore waters is anticipated to be minimal, and that sand should quickly disperse along the beach. It is not anticipated that there would be any impact on the coral reef.

5.1.1.2 Long-term Impacts

No long-term impacts to nearshore biota due to construction activities are anticipated. Following construction, the sandbag slope stabilization will help to retain fill material, including cinders and soil, which is alien to the nearshore environment. No long-term negative impacts are expected; however, preventing the release of soil into the nearshore waters will be a long-term positive impact.

5.1.2 *Protected Species*

5.1.2.1 Potential Impacts and Mitigation Measures

Turtles would be expected to naturally avoid the construction activities, and as the impact area is relatively small and on shore, construction would not affect turtle foraging area. Construction of the sandbag slope stabilization will not involve in-water work, and is therefore not expected to result in significant underwater sound that would adversely affect marine creatures.

The following Best Management Practices (BMPs) as typically recommended by the National Marine Fisheries Service (NMFS) will be adhered to during construction of the project to avoid impacts to the turtles:

1. Conduct a survey for marine protected species before any work in the water starts, and if a marine protected species is in the area, a 150-foot buffer must be observed between the protected species and the work zone.

2. Establish a safety zone around the project area whereby observers will visually monitor this zone for marine protected species 30 minutes prior to, during, and 30 minutes post project in-water activity. Record information on the species, numbers, behavior, time of observation, location, start and end times of project activity, sex or age class (when possible) and any other disturbances (visual or acoustic).
3. Conduct activities only if the safety zone is clear of turtles.
4. Upon sighting of a turtle within the safety zone during project activity, immediately halt the activity until the animal has left the zone. In the event a marine protected species enters the safety zone and the project activity cannot be halted, conduct observations and immediately contact NMFS staff in Honolulu to facilitate agency assessment of collected data.
5. For on-site project personnel that may interact with a protected species potentially present in the project area, provide education on the status of any listed species and the protections afforded to those species under Federal laws.

A summary of anticipated effects on endangered species is as follows:

- By using the above BMPs noise/physical disturbance is expected to be insignificant and not result in adverse behavioral changes.
- Based on the in-water work being conducted landward of the MHHW with turbidity containment barriers surrounding the work area, any exposure of marine protected species to turbidity and sedimentation would be temporary and not significant.

No habitat or foraging grounds will be impacted by the project. The work will be performed landward of the MHHW line.

5.1.3 *Water Quality*

5.1.3.1 Potential Impacts and Mitigation Measures

Excavation of the beach has the potential to release sediment into the nearshore waters which can temporarily increase turbidity. During construction, excavation will be limited to the beach area landward of the MHHW mark. Measures will be taken to keep water out of the excavation area, such as building a berm along the seaward side of the excavation. Additionally, silt curtains will be deployed as an additional measure to protect against the release of sediment. The project includes a geotextile filter fabric behind the sandbags to inhibit the transport of fine material through or between the sandbag.

While construction activities will be above MHHW, the construction contractor shall be required to employ certain BMPs for construction in coastal waters, such as daily inspection of equipment for conditions that could cause spills or leaks; cleaning of equipment prior to operation near the water; proper location of storage, refueling, and servicing sites away from the water; implementation of adequate on site spill response procedures; and stormy weather preparation plans.

All construction activities shall be confined to the immediate area of construction, and no construction material shall be stockpiled in the water. Turbidity containment barriers shall be installed and maintained to completely surround the work area so as to control and contain construction-generated turbidity. The water area around the construction site shall be visually monitored, and if monitoring suggests that the turbidity standards are being exceeded, construction shall be suspended until the condition is corrected.

The beach, however, is composed of beach sand that moves with every wave. Any additional sand released to the nearshore waters is anticipated to be minimal, and that sand should quickly disperse along the beach. It is not anticipated that there would be any impact on water quality.

5.1.3.2 Long-term Impacts

No long-term impacts to water quality due to construction activities are anticipated. Following construction, the sandbags will help to retain fill material, including cinders and soil, which is alien to the nearshore environment. There is expected to be no long-term negative impact; however, preventing the release of soil into the nearshore waters will be a long-term positive impact.

5.1.4 *Air Quality*

5.1.4.1 Potential Impacts and Mitigation Measures

Because most of the work that will take place on the sandy shoreline, the preferred alternative differs from many construction projects in that it involves little or no on-site soil disturbance that could result in particulate emissions (i.e., dust or dirt). Potential sources of air pollution as a result of the project are related to the construction phase.

During the actual construction process, construction activities will create temporary degradation in air quality in the immediate vicinity of the project area. This negative impact to air quality will be limited to typical work hours, and will end once the sandbags are in place. The emissions from these internal combustion engines are far too small to have a significant or lasting effect on air quality. As part of the construction process, the contractor will observe all BMPs to keep construction related emissions to the lowest practicable levels.

Short-term degradation of air quality may occur due to emissions from construction equipment and would include carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. Sulfur dioxide (SO_2) is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting Federal standards can contain up to 5,000 parts per million (ppm) of sulfur, whereas on-road diesel is restricted to less than 15 ppm of sulfur.

These minor effects on air quality are short-term in duration and, therefore, will not result in adverse or long-term impacts. Implementation of the following measures will reduce any air quality impacts resulting from construction activities:

- Apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions.
- Properly tune and maintain construction equipment and vehicles.
- Locate equipment and materials storage sites as far away from hotels and commercial uses as practical. Keep construction areas clean and orderly.

5.1.4.2 Long-term Air Quality Impacts

Once construction is completed, the project will have no long-term air emissions or impact on air quality.

5.1.5 Noise

5.1.5.1 Potential Impacts and Mitigation Measures

It is not feasible to mitigate construction noise to the extent that it does not at times exceed existing background noise levels or is inaudible to beach users, hotel guests, etc. Some reduction is practical, however, and the following measures would be implemented.

- Equipment operation on the shoreline will be limited to the hours between 7:00 a.m. and 5:00 p.m.
- Broadband noise backup alarms in lieu of higher frequency beepers will be required for construction vehicles and equipment. Broadband noise alarms tend to be less audible and intrusive with distance as they blend in with other background noise sources.
- The project will specify use of the quietest locally available equipment, e.g., high insertion loss mufflers, fully enclosed engines, and rubber tired equipment when possible.
- The use of horns for signaling will be prohibited.
- Worker training on ways to minimize impact noise and banging will be required.
- A noise complaint hotline will be provided at the job site to allow for feedback from the hotel operators, which can be used to help develop modifications to construction operations whenever feasible.

5.1.5.2 Long-term noise impacts

Once construction is completed, the project will have no long-term noise emissions.

5.1.6 Historic, Cultural, and Archaeological Resources

5.1.6.1 Potential impacts and mitigation measures

As discussed above, the Kaanapali area has a rich historical and cultural legacy. However, there do not appear to be any known traditional Hawaiian cultural practices that would be adversely affected by the preferred alternative. Neither does it seem like the activities associated with the project will conflict with traditional cultural practices as expressed in legend. The preferred alternative would be accomplished in an area which has been substantially altered over more than a century, and the existing substrate is primarily fill material. Based on the above, the preferred alternative is unlikely to have an adverse effect on rights customarily and traditionally exercised for subsistence, cultural and religious purposes. Should any items of cultural significance be found during the project, the construction will stop and the State Historical Preservation Division (SHPD) will be notified.

5.1.6.2 Long-term cultural impacts

Since there are no known traditional cultural practices in the area, The project is not expected to have any long-term impacts historic, cultural, or archaeological resources.

5.1.7 *Recreation*

5.1.7.1 Potential impacts and mitigation measures

The work will be performed on an area of actively eroding shoreline, thus the availability of sunbathing opportunities is already reduced due to erosion.

While the work will be landward of the MHHW line, a turbidity containment barrier will surround the construction activity to prevent any unanticipated impacts to nearshore water quality. Lateral access along the shoreline will be effectively cut off during the work. Users attempting to access the shoreline and ocean will be directed to the ocean adjacent to the construction site. Hyatt personnel will erect signs and will be available to direct users to accessways to the beach and ocean.

5.1.7.2 Long-term Recreational Impacts

Long-term recreational impacts are related to beach access. Shoreline access across the sandbags will be restricted through the use of ropes and signage. Shoreline users will be directed toward shoreline access routes at the ends of the project area. The beach is eroding and is becoming more narrow and deflated. The existing signage and ropes, along with the high erosion scarp, reduce the shoreline access through this area already. The preferred alternative is not anticipated to result in any additional impacts to shoreline access or beach and ocean recreation.

5.1.8 *Scenic and Aesthetic Resources*

5.1.8.1 Potential impacts and mitigation measures

The southwest facing shoreline offers great opportunities for scenic views, particularly of the island of Lanai and the sunset. Users will be able to experience the same views by positioning themselves at other nearby vantage points along the shoreline.

5.1.8.2 Long-term impacts

Once construction is completed, the sandbags will be visible; however, they will not block typical scenic views.

5.1.9 *Economic Setting*

5.1.9.1 Potential impacts and mitigation measures

The project is not expected to have any negative economic impacts. The project will stabilize the bank and Beachwalk, thereby preserving it as vital infrastructure. Implementation of the project will maintain the economic value to the Hyatt, the adjacent resort properties, and the Kaanapali community in general.

5.1.9.2 Long-term impacts

The project is not expected to have any long-term negative economic impacts. The project will have the positive long-term impact of stabilizing the bank and Beachwalk and maintaining the Beachwalk as a corridor along the shoreline. The project also has the potential to mitigate potential economic losses associated with future erosion (e.g. repair, maintenance, and replacement costs for damaged infrastructure).

5.1.10 *Public Infrastructure and Services*

5.1.10.1 Potential impacts and mitigation measures

The project is not expected to have any negative impacts to public infrastructure and services. The proposed sandbag slope stabilization will protect the Kaanapali Beachwalk from undermining and collapsing. Otherwise, the project has little potential to affect public infrastructure and services. Once in operation it will not require water or electrical power. In and of itself, it does not generate a need for additional sanitary wastewater collection and treatment facilities and it would not affect stormwater runoff that might impact the County's stormwater system. People visiting that stretch of shoreline would come by foot rather than in vehicles, and the improvements are not expected to increase the resident or visitor population of the island.

Construction of the project will involve a relatively small construction crew of approximately 6 to 12 workers. During most of the construction these workers can park either in a construction staging area or existing public parking facilities. Mobilization and demobilization of the on-shore equipment and materials will involve some heavy truck traffic through the resort; however, this would be of limited duration. Equipment and materials would be transported along the Beachwalk to the project site. The equipment would be escorted to assure public safety, and the delivery of materials and equipment would be timed such that impact to beach users would be minimized.

Because of the small number of vehicle-trips involved, construction worker and equipment/material delivery trips do not have the potential to substantially affect traffic volumes and/or the level of service on area roadways and do not require substantial mitigation efforts.

5.1.10.2 Long-term infrastructure impacts

The project is not expected to have any long-term infrastructure impacts. Construction equipment, material stockpiles, and construction activities will be present within the project area for several weeks during the construction of the project. These impacts are temporary and will not be present once the construction phase of the project is completed.

The project has the long-term positive impact of keeping the Beachwalk intact for continued use. Keeping the Beachwalk intact will allow visitors to access the Hyatt property, and will allow Hyatt guests to visit other properties.

6. POTENTIAL IMPACTS OF NO ACTION

"No Action" consists of any agency denying the necessary permits and approvals for the sandbag slope stabilization project. Without the project, the erosion scarp will continue to erode and undermine the Beachwalk until it ultimately fails. Approximately 55 feet of the Beachwalk is currently undermined and imminently threatened by erosion. No Action will continue to worsen the situation, exacerbating the public health, welfare, and safety concerns already identified for the project area.

The Kaanapali Beachwalk is a public amenity that is privately owned and maintained on private land. The Beachwalk extends continuously for 6,000 feet from the Hyatt Regency Maui to the Sheraton Maui, connecting eight properties. The Beachwalk is the only ADA-compliant thoroughfare along Kaanapali Beach and has been identified by hotel representatives as having great importance to the region. Those representatives view the Beachwalk as the main pedestrian artery that makes Kaanapali a community, and they feel strongly that any obstruction would greatly affect the flow of pedestrian traffic and substantially diminish the beachgoer's experience. Many travel organizations, including Frommer's, TripAdvisor, Fodor's Travel, and About.com, refer to the Beachwalk as a valuable amenity. Moreover, the Beachwalk is a public amenity, available to any and all beachgoers visiting Kaanapali. Along this section of coastline, between Hanakaoo Beach Park and Hanakaoo Point, the beach is severely narrowed due to both chronic and episodic erosion. In the emergency section, there is very little or no vegetative buffer remaining between the deflated beach face and the scarp on the seaward side of the Beachwalk.

Loss of the Beachwalk will effectively remove the only passable, lateral beach access in the region and cause significant and long-term interruption of access between Hanakaoo Beach Park and the beach northwest of the threatened Beachwalk. Without the project, continued erosion, undermining, and failure of the Beachwalk is imminent. Erosion is presently releasing fill material, including cinders and topsoil, into the nearshore waters. The "No Action" alternative could lead to increased turbidity and nearshore biological impacts as a result of continued bank erosion.

Loss of the Beachwalk may prevent visitors to other properties from visiting the Hyatt, and it may result in fewer return visitors, as they may choose other properties.

"No Action" is not expected to affect historic, cultural, and archaeological resources.

Advantages:

- The shoreline will be allowed to erode naturally
- There will be no design or permitting expenses

Disadvantages:

- Loss of lateral public access along the shoreline between Hanakaoo Beach Park and the Kaanapali
- Increased public safety risks along the threatened portion of the Beachwalk
- Loss of alongshore ingress and egress for emergency services
- Continued release of backshore fill material into coastal waters
- Erosion will destabilize the Grotto structure, requiring fortification

- Erosion will threaten the swimming pools, resulting in loss of decking and requiring stabilization
- Increased structural damage to the Beachwalk and Hyatt resort infrastructure
- Utilities may require removal or relocation
- Expenses related to removal and fortification of infrastructure
- Increasing economic impact to Kaanapali area from loss of from either end, isolating beach and ocean areas, amenities, restaurants, shopping, and accomodations.

Cost Estimate:
Cost estimate for removal of the Beachwalk is approximately $310,000. This cost estimate does not include removal of other affected infrastructure. Modifications required will cost approximately $1,400,000 for the Grotto area and $650,000 for the pool.

7. RELATIONSHIP TO RELEVANT PLANS, POLICIES, AND CONTROLS

This chapter discusses the compliance and compatibility of the proposed temporary sandbag slope stabilization with pertinent plans, policies, and regulations at county, state, and federal levels.

Relationship of the preferred alternative to the *Hawaii State Planning Act*

The Hawaii State Planning Act (Chapter 226, Hawaii Revised Statutes, as amended) outlines themes, goals, guidelines, and policies for statewide planning. The preferred alternative relates to the following objectives stated in §226-13, *Objectives and policies for the physical environment-land, air, and water quality*:

- Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters
- Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters

Discussion:
The preferred alternative will help to maintain the water quality in nearshore waters that become degraded by coastal erosion of the fill material, as well as protecting the Beachwalk from on-going erosion that threatens to undermine it. Stabilizing a chronically eroding shoreline when it approaches vital infrastructure is a significant and necessary step in coastal erosion mitigation.

Relationship of the preferred alternative to the *Maui County General Plan*

The Maui County General Plan (1990 update) sets broad objectives and policies to guide the long-range development of the County. Under the subject of Public Safety, it is the policy of the General Plan to:

- Maintain a state of preparedness for man-made or natural disasters
- Encourage industries to provide for themselves protection services to meet their special needs

Relationship of the preferred alternative to the *Countywide Policy Plan of 2010 (Maui County General Plan 2030)*

The Countywide Policy Plan took effect on March 24, 2010, and provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the future of Maui County. The core themes and key strategies of the Plan are to:

- Protect the Natural Environment
- Preserve Local Cultures and Traditions
- Improve Education
- Strengthen Social and Healthcare Services
- Expand Housing Opportunities for Residents
- Strengthen the Local Economy
- Improve Parks and Public Facilities

- Diversify Transportation Options
- Improve Physical Infrastructure
- Promote Sustainable Land Use and Growth Management
- Strive for Good Governance

Objectives, and policies related to the coastal environment and that pertain to the project include:

Objective: Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island

Policy: Protect and restore nearshore reef environments and water quality
Policy: Protect marine resources and valued wildlife
Policy: Mitigate the negative effects of upland uses on coastal wetlands, marine life, and coral reefs

Implementing Actions: Develop regulations to minimize runoff of pollutants into nearshore waters and reduce nonpoint and point source pollution

Discussion:
The preferred alternative will protect the nearshore reef environments and water quality from excess turbidity that is caused by erosion of the backshore fill material.

Objective: Improve the stewardship of the natural environment

Policy: Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.

Discussion:
The preferred alternative will protect the Kaanapali Beachwalk, thereby preserving lateral public access to and along the shoreline along Kaanapali Beach.

Relationship of the preferred alternative to the *Maui Island Plan*

The Maui Island Plan was adopted in December of 2012 and provides recommendations for community development looking forward through 2030. The Plan is founded on core values that break down into goals, objectives, policies, and actions.

Goals, objectives, and policies of the Plan related to the coastal environment and that pertain to the project include:

Goal:
- An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.

Objective:
- Improved reef health, coastal water quality, and marine life.

Policies:

- Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with an intent to protect the coastal and marine ecosystem.

Discussion:
The preferred alternative will armor the shoreline, however, it has gone through a rigorous environmental and permitting review process in accordance with the stated policy and State and County statutes and rules.

Objective:

- Water quality that meets or exceeds State Clean Water Act standards.

Policies:

- Ensure that the County upholds its affirmative duty under the Clean Water Act by monitoring and reducing point and NPS pollution to help safeguard coastal waters.

Discussion:
The preferred alternative will protect the nearshore reef environments and water quality from excess turbidity that is caused by erosion of the fill material in the erosion scarp. The project includes installation of a filter fabric to prevent fine material from passing through or between the sandbags.

Objective:

- Acquire additional shoreline lands and shoreline access rights.

Policies:

- Require the dedication of public beach and rocky shoreline access ways to and along the shoreline where it serves a practical public interest as a condition of development or subdivision approval…

Discussion:
The preferred alternative will protect the Kaanapali Beachwalk that provides lateral shoreline access through the region. Shoreline access points will be established at either end of the project.

Goal:

- Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents' quality of life, attract visitors, provide a connection to the past, and promote a sense of place.

Objective:

- A greater level of protection for scenic resources.

Policies:

- Protect views to include, but not be limited to, Haleakala, Iao Valley, the Mauna Kahalawai (West Maui Mountains), Puu Olai, Kahoolawe, Molokini, Molokai,

and Lanai, Mauna Kea, Mauna Loa, sea stacks, the Pacific Ocean, and significant water features, ridgelines, and landforms.
- Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.

Discussion:
The Kaanapali Beachwalk is located continuously along more than 3,000 feet of the shoreline, offer scenic views of Lanai, Molokai, the Pacific Ocean, and the sunset. The preferred alternative will protect the Beachwalk from further undermining and eventual loss. The preferred alternative will not obstruct existing viewplanes.

Relationship of the preferred alternative to the *West Maui Community Plan*

The West Maui Community Plan is one of nine community plans for Maui County. The community plans detail desired land use patterns and goals, objectives, policies and implementing actions for various functional areas. The Hyatt Regency is located on lands designated “Hotel”, with the drainage easement area designated “Public or Quasi-Public”. The “Hotel” designation is for primarily transient accommodations. The “Public or Quasi-Public” designation for the drainage easement is for public utilities.

No specific implementing actions are listed for the environs of the Hyatt Property. Following are sections of the plan that are applicable to the preferred alternative:

“B. Goals, Objectives, Polices and Implementing Actions”

Environment – Objectives and Policies
(11) Prohibit the construction of vertical seawalls and revetment except as may be permitted by rules adopted by the Maui Planning Commission governing the issuance of Shoreline Management Area (SMA) emergency permits, and encourage beach nourishment by building dunes and adding sand as a sustainable alternative.

The proposed project is a temporary measure to protect the Beachwalk while long-term alternatives are developed. The Kaanapali Beach Maintenance project is underway, and beach nourishment is a component of the plan. Implementation of beach nourishment, however, may be several years away. The sandbag slope stabilization will provide temporary protection for the Beachwalk until the long-term Kaanapali Beach Maintenance project can be developed and implemented.

Social Infrastructure – Recreation and Open Space – Objectives and Policies

(7) Ensure adequate public access to shoreline areas, including lateral access to establish the continuity of public shorelines.

The preferred alternative will maintain lateral shoreline access by protecting the Beachwalk. Should the Beachwalk fail due to further undermining, there may not be sufficient backshore space for lateral access and continuity of access that now extends between Hanakaoo Beach Park and Kekaa Point.

"C. Planning Standards"

(6) Environmental Aspects
c. *Prohibit the construction of vertical seawalls, except as approved by the planning commissions of the County of Maui*

The preferred alternative consists of a sloping array of sandbags built to an elevation of +8 feet MSL.

Relationship of the preferred alternative to the *Hawaii Coastal Erosion Management Plan*

The Hawaii Coastal Erosion Management Plan (COEMAP) is a technical document prepared by the University of Hawaii Sea Grant program that provides guidance for state and county agencies in the implementation of shoreline policy. COEMAP discourages shoreline hardening in favor of "soft" solutions such as beach nourishment. Figure 2-5 shows the COEMAP model of beach loss in the presence of shoreline hardening, which relies on the following assumptions:

1. The eroding upland is composed of beach quality sand;
2. Release of this sand due to shoreline retreat provides a significant contribution to the sand budget of the beach.

In addition, the model is active in only one horizontal dimension (i.e. cross-shore).

COEMAP recommends several treatments for interim erosion control:

1. "Two technical approaches have potential to fulfill emergency needs: large, protective sand bags, and small-scale sand nourishment (see Recommendation 11, above). Large 1 ton sand-filled "sea bags" are being used successfully to protect property on Oahu, Maui, Molokai, and Kauai. These projects utilize sandbag revetments constructed at a low slope, ideally attended by small scale sand nourishment."
2. "In certain settings a small groin or the use of detached breakwaters may be desirable to stabilize the fill. Landowners should be prepared to renourish the fronting beach as long as the sea bags remain. Maintaining public access, and the ecological characteristics of the beach, should be given high priority."

The purpose of the preferred alternative is to provide temporary slope stabilization as an interim erosion control measure while the long-term Kaanapali Beach Maintenance project is being developed.

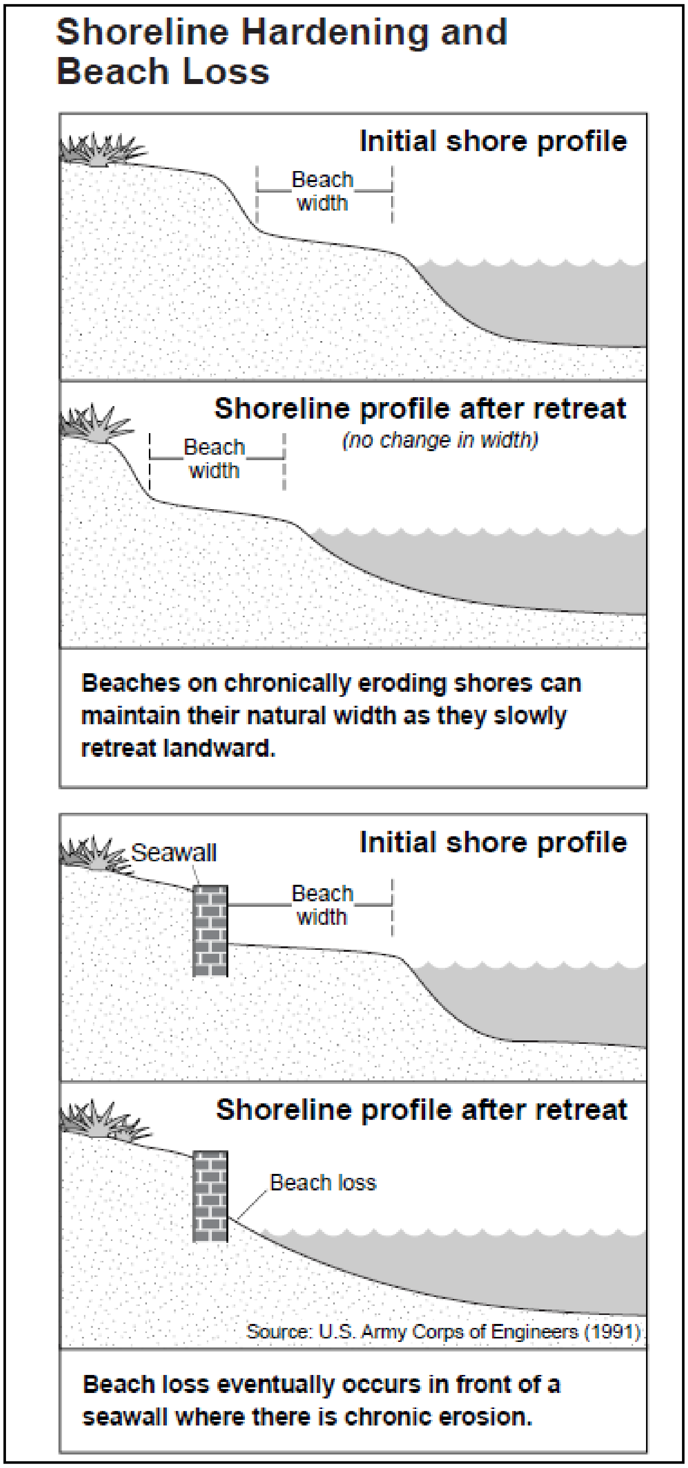

Figure 7-1 COEMAP model for beach loss relies on an extensive and homogenous sand continuum between the beach and upland areas.

7.1 State of Hawaii Laws and Regulations

7.1.1 *Hawaii State Planning Act*

The Hawaii State Planning Act (Chapter 226, Hawaii Revised Statutes, as amended) outlines themes, goals, guidelines, and policies for statewide planning. The proposed temporary sandbag slope stabilization project relates to the following objectives stated in §226-11: "*Objectives and policies for the physical environment--land-based, shoreline, and marine resources*":

1. Exercise an overall conservation ethic in the use of Hawaii's natural resources.
2. Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
3. Take into account the physical attributes of areas when planning and designing activities and facilities.
4. Manage natural resources and environs to encourage their beneficial and multiple uses without generating costly or irreparable environmental damage.
5. Pursue compatible relationships among activities, facilities, and natural resources.
6. Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes. [L 1978, c 100, pt of §2; am L 1986, c 276, §10]

Discussion:
Coastal erosion is degrading the beach resource and is undermining and damaging the Kaanapali Beachwalk. The preferred alternative would install sandbags to protect the Beachwalk from further undermining and ultimate collapse. Failure of the Beachwalk would result in a restriction of the heavily-used lateral shoreline access. Implementation of the project would maintain the access, while limiting the release of fill material, including soil, into the coastal waters. The project would maintain backshore activities and would not restrict coastal activities, as beach access points will be maintained at the ends of the project. Thus, the preferred alternative is consistent with the above objectives.

7.1.2 *State Land Use Laws*

The Board of Land and Natural Resources (BLNR) regulates uses of the State Conservation District by issuing Conservation District Use Permits (CDUP) for approved activities. The criteria that the Office of Conservation and Coastal Lands (OCCL) will use in evaluating the project are outlined in Hawaii Administrative Rules §13-5-30. Each criterion is listed below, followed by a discussion of how the preferred alternative complies with it.

3. The proposed land use is consistent with the purpose of the Conservation District;

Discussion:
The purpose of the Conservation District is to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public's health, safety, and welfare (HAR §13-5-1). As discussed throughout this DEA, the preferred alternative will protect the Beachwalk from undermining and ultimate collapse, thereby maintaining the variety of and access to water-oriented recreational activities. Without the project, continued erosion and the ultimate collapse of the Beachwalk would limit lateral shoreline access and restrict both backshore and shoreline activities. Most

important, though, is the preferred alternative's positive impact by removing a significant public health, welfare, and safety risk that continues to develop on the shoreline. This risk needs to be mitigated until the regional beach nourishment project is implemented. Thus, it is in keeping with the purpose of the Conservation District.

4. The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;

Discussion: The preferred alternative is in the Resource Subzone of the Conservation District, and consists of land use activities consistent with use R-6 Marine Construction (HAR §13-5-24). The resource subzone, as defined by HAR §13-5-13 is intended to "ensure sustained use of the natural resources" of that subzone. The proposed temporary slope stabilization project will provide interim erosion mitigation, as recommended by the DLNR-approved COEMAP, to provide necessary protection to the coastal lateral access resource while minimizing short-term impacts to the beach resource.

As specified in HAR §13-5-24(c)(4), the proposed land use is permitted in the Resource Subzone with the acquisition of a Conservation District Use Permit approved by the Board of Land and Natural Resources. The applicant is seeking this permit coverage for the project.

5. The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community, or region;

Discussion:
The preferred alternative involves constructing sandbag slope stabilization to temporarily protect the shoreline from continued erosion and prevent the Beachwalk from being further undermined and collapsing. The work will be performed landward of the MHHW line, and thus outside of the marine environment. A turbidity containment device will be deployed around the immediate work area to contain any temporary turbidity that might be caused by the project. Containment of turbidity will prevent impact to the nearshore reef. The project will also reduce the release of fill material, including soil, into the nearshore waters, which would adversely impact habitat.

6. The proposed land use, including buildings, structures, and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

Discussion:
The proposed project will be no higher than the Beachwalk; thus, the project will not obstruct the existing viewplane. The sandbags will be sand colored to limit the visual impact along the shoreline.

7. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;

Discussion:
The proposed project will be no higher than the Beachwalk; thus, the project will not obstruct the existing viewplane. The sandbags will be sand colored to limit the visual impact along the

shoreline. This project will have no negative impact on the continuity of Kaanapali's beachfront appearance.

8. Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district;

Discussion:
No property subdivision is needed for the preferred alternative.

9. The proposed land use will not be materially detrimental to the public health, safety and welfare.

Discussion:
Once the proposed sandbag slope stabilization has been constructed, there will be no regular sources of emissions or waste that could prove detrimental to public health. All offshore uses have inherent safety risks to users (e.g., inclement weather, rough seas, potentially dangerous marine life). However, the project will not create a significant hazard to public safety and welfare.

8. MITIGATION

8.1 Mitigation During Construction

8.1.1 *Protection of Endangered Species*

The following endangered species Best Management Practices (BMPs), as recommended by the National Marine Fisheries Service (NMFS), shall be adhered to during construction of the project.

1. Establish a safety zone around the project area whereby observers shall visually monitor this zone for marine protected species 30 minutes prior to, during, and 30 minutes post daily project activity. Record information on the species, numbers, behavior, time of observation, location, start and end times of project activity, sex or age class (when possible), and any other disturbances (visual or acoustic).
2. If a marine protected species is in the area, either hauled out onshore or in the nearshore waters, a 150-foot buffer must be observed with no humans approaching it. If a monk seal/pup pair is seen, a minimum 300-foot buffer must be observed.
3. In the event a marine protected species enters the safety zone and the project activity cannot be halted, conduct observations and immediately contact NMFS staff in Honolulu to facilitate agency assessment of collected data. For monk seals contact the Marine Mammal Response Coordinator, David Schofield, at (808) 944-2269, as well as the monk seal hotline at (808) 220-7802. For turtles, contact the turtle hotline at (808) 983-5730.
4. For on-site project personnel that may interact with a listed species potentially present in the action area, provide education on the status of any listed species and the protections afforded to those species under Federal laws. NMFS may be contacted for scheduling educational briefings to convey information on marine mammal behavior, and explain why and when to call NMFS and other resource agencies.

8.1.2 *Best Management Practices During Construction*

Best Management Practices (BMPs) for construction operations will be developed to help minimize adverse impacts to coastal water quality and the marine ecosystem. The project specifications will require the Construction Contractor to adhere to environmental protection measures, including, but not limited to, the following:

- The Contractor shall perform the work in a manner that minimizes environmental pollution and damage as a result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of the construction period.
- Any construction related debris that may pose an entanglement hazard to marine protected species must be removed from the project site if not actively being used and/or at the conclusion of the construction work.
- The Contractor shall submit a Best Management/Environmental Protection Plan for approval prior to initiation of construction. The plan shall include, but not be limited to:
    1. Protection of Land Resources
    2. Protection of Water Resources
    3. Disposal of Solid Waste
    4. Disposal of Sanitary Waste

5. Disposal of Hazardous Waste
6. Dust Control
7. Noise Control

- The construction contractor shall be required to employ standard BMPs for construction in coastal waters, such as daily inspection of equipment for conditions that could cause spills or leaks; cleaning of equipment prior to operation near the water; proper location of storage, refueling, and servicing sites; and implementation of adequate spill response procedures, and stormy weather preparation plans.
- Designated project personnel will be responsible for daily inspections and maintenance of all project BMPs. Inspections and observations will be noted upon Daily Production Reports and, combined with Water Quality Monitoring Reports, will be submitted to the contracting officer daily.
- No contamination (trash or debris disposal, alien species introductions, etc.) of marine (reef flats, lagoons, open oceans, etc.) environments adjacent to the project site shall result from project related activities.
- The Contractor shall confine all construction activities to areas defined by the drawings and specifications. No construction materials shall be stockpiled in the marine environment outside of the immediate area of construction.
- The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface or marine waters.
- Waste materials and waste waters directly derived from construction activities shall not be allowed to leak, leach or otherwise enter marine waters.
- The presence of heavy equipment on the shoreline creates a potential for pollutants, such as fuel and petroleum products, to enter the water. To prevent such discharges from occurring, heavy equipment will be visually inspected at the beginning and end of each work day to ensure early detection of potential leaks or line breaks. Equipment will be kept clean to ensure that grease or dirt does not enter the water. Fuel will be delivered to the site at sufficiently frequent intervals such that the volume of fuel stored on site is minimal. Spill kits will be kept at the site and workers will be trained on spill response.
- Fueling of project related vehicles and equipment should take place away from the water. A contingency plan to control the accidental spills of petroleum products at the construction site should be developed. Absorbent pads, containment booms and skimmers will be stored on site to facilitate the cleanup of petroleum spills.
- In the event of a spill, the following actions shall be taken:
    1. STOP FUELING / OILING IMMEDIATELY!
    2. Reduce the amount of the spill by shutting down the equipment, shutting off the valve, shutting off the pump, uprighting the container, etc. Place a pan or bucket under the leak to catch as much of the spill as possible.
    3. Confine fuel to containment areas as much as possible.
    4. Notify the Company Spill Response Safety Officer by radio or telephone. He will take over coordination of operations and further notifications. Whether assistance is required or not, all supervisors and personnel shall follow these notification steps.
    5. If the spill is too large to handle with on-site resources, then an emergency spill clean-up contractor will be notified and mobilized.
    6. Notify the Contracting Officer immediately.

7. The spill clean-up contractor will take over containment, clean-up, and disposal of the spill and any contaminated material in accordance with their established procedures. The contractor will provide whatever aid the spill clean-up contractor requires.

- Any spills or other contaminations shall be immediately reported to the DOH Clean Water Branch (808-586-4309).
- The project shall be completed in accordance with all applicable State and County health and safety regulations.
- All construction material shall be free of contaminants of any kind including: excessive silt, sludge, anoxic or decaying organic matter, turbidity, temperature or abnormal water chemistry, clay, dirt, organic material, oil, floating debris, grease or foam or any other pollutant that would produce an undesirable condition to the beach or water quality.
- Best management practices shall be utilized to minimize adverse effects to air quality and noise levels, including the use of emission control devices and noise attenuating devices.
- The contractor, at his own expense, shall keep the project area and surrounding area free from dust nuisance. A dust control program shall be implemented, and wind-blown sand and dust shall be prevented from blowing offsite by watering when necessary. The work shall be in conformance with applicable federal and local laws and regulations regarding air pollution control.
- Public safety best practices shall be implemented, possibly including posted signs, areas cordoned off, and on-site safety personnel.
- Areas of operation upon the shoreline will be clearly marked with fencing, barricades, or other approved devices, to protect the public from the hazards of construction. All work areas will have posted signs advising the public of current construction activities and related hazard warnings.
- Public access along the shoreline during construction shall be maintained so far as practicable and within the limitations necessary to ensure safety.
- Work will not be performed until a preconstruction survey is conducted, where necessary, to identify structures, significant environmental features, etc. This survey will determine baseline conditions to which the area will be returned, following the completion of construction. Resources landward of construction areas will be protected from construction activities as necessary.
- The Project Staging Area will be used as the primary point of collection of all waste derived from project construction. Rubbish and construction debris will be collected and confined to waste bins. The containers will be serviced as needed to prevent build-up of large amounts of waste stored on-site.
- Portable chemical toilets will be located on-site and will be serviced weekly, at a minimum.
- All storage containers will be free of leaks to prevent solid/sanitary waste from entering the environment. If leaks are detected at any time, repairs will be made immediately or the deficient container will be replaced.
- No wash down of project equipment, or runoff from such activities, will be permitted on this project.
- Hazardous waste will not be generated during the performance of the contract. Typical petroleum products used during the normal course of construction activities may

potentially be sources of hazardous waste. Only the minimum amounts required to perform the work activities will be stored on-site.

- The contractor shall coordinate his haul route, staging area, and all associated requirements, such as land use permit, with the contracting officer and the affected landowners.
- The contractor shall be responsible for the clearing and removal of all silt and debris generated by his construction work and deposited and accumulated on roadways and other areas.
- All existing utilities, concrete walkways, steps and walls shall be protected from damage at all times during construction and grading work. Any damages to them shall be repaired by the contractor at his expense.
- The contractor shall verify dimensions, locations, elevations, etc., that are indicated for verification and inform the contracting officer in writing of any differences prior to installation of new facilities.
- Work shall be done between 7:00 AM and 5:00 PM HST. No work shall be done on Saturdays, Sundays, holidays, or after normal work hours at any time, without special arrangement and prior approval by the contracting officer. Project work shall be in conformance with applicable federal and local laws and regulations regarding community noise control.
- No blasting will be allowed on this project.
- Waste material will be disposed of at an approved off-site disposal area. The contractor shall be responsible for locating the disposal area.
- If the contractor uncovers any cultural remains, such as artifacts or burials, during excavation work, the contractor shall stop work in the area of the find and notify the contracting officer.
- No contractor shall perform any demolition, grubbing, stockpiling, and grading operation so as to cause falling rocks, soil, or debris in any form to fall, slide, or flow onto adjoining properties, streets, or natural watercourses. Should such violation occur, the contractor may be cited and the contractor shall immediately make all remedial actions necessary.
- The contractor shall provide for access to and from all existing driveways and walkways at all times.

9. DETERMINATION

9.1 Determination Criteria

Basis for Determination: The project will stabilize the bank and Beachwalk and will not adversely alter or affect presently ongoing sand transport and natural shoreline processes, wave-driven currents, circulation patterns, overall water quality, or offshore wave breaking. Construction activities will be designed so as to avoid and minimize impacts to nearshore water quality so far as practicable, and since the project is landward of the Mean Higher High Water (MHHW) line, no impacts to marine biota are anticipated. The sandbag slope stabilization will be placed within and beneath the existing beach face; thus, there will be no loss of marine habitat. Construction Best Management Practices (BMPs) will be used to mitigate potential impacts to endangered and protected species such as the Green and Hawksbill Sea Turtles and Hawaiian Monk Seals. Construction can be expected to result in some temporary disruption of beach use and recreational activities, as well as minor noise disturbance and short-term degradation of air quality from the operation of construction equipment.

Chapter 343 Hawaii Revised Statutes (HRS), and Hawaii Administrative rules (HAR) §11-200, establish certain categories of action that require the agency processing an applicant's request for approval to prepare an Environmental Assessment (EA). HAR §11-200-11.2 established procedures for determining if an EA is sufficient, or if an Environmental Impact Statement (EIS) should be prepared for actions that may have a significant effect on the environment. HAR §11-200-12 lists the following criteria to be used in making such a determination.

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The sandbag slope stabilization will mitigate ongoing erosion and protect the Beachwalk. The beach is experiencing both chronic and episodic erosion, and the Beachwalk is presently undermined. The proposed work will take place in an area that has been substantially altered over decades of development. The preferred alternative is unlikely to have any significant adverse effect on known cultural or traditional Hawaiian practices, as the placement location is within an active beach face that has eroded and accreted several times in the past decade. The preferred alternative will prevent the future loss or destruction of natural and cultural resources.

2. *Curtails the range of beneficial uses of the environment.*

The preferred alternative would protect the Kaanapali Beachwalk with sandbag slope stabilization. The heavily-used Beachwalk is the only ADA-compliant shoreline access through the region. No adverse long-term impacts to the environment are anticipated to result from this project. There may be temporary short-term impacts during construction; however, these are not anticipated to be significant, and will be mitigated to the maximum extent practicable by the use of BMPs and monitoring procedures. The preferred alternative will preserve and enhance the beneficial use of the shoreline area.

3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 343, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

The preferred alternative is consistent with Hawaii's State Environmental Policy as established in Chapter 343(4)(A), HRS, to establish, preserve, and maintain recreation areas, including the shoreline, for public recreational use. The preferred alternative is necessary to prevent a substantial threat to public health, safety, and welfare due to failure of the Beachwalk and inland infrastructure.

4. *Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.*

The Beachwalk is the primary lateral shoreline access to the Kaanapali region, extending continuously from Hanakaoo Beach Park to Kekaa Point. The Beachwalk is also critical infrastructure that supports regional commerce in Kaanapali. Users of the Beachwalk access neighboring commercial properties and businesses, which supports the exchange of economic resources that is vital to all properties and the region as a whole. The preferred alternative will help maintain this very valuable socio-economic resource. In addition, future erosion impacts to inland improvements will have a profound effect on the economic welfare of the development, including employment opportunities and generated tax revenue.

5. *Substantially affects public health.*

The preferred alternative will have some impact on air and noise quality during construction; however, these will be mitigated to the maximum extent practicable by BMPs and monitoring procedures. The project will not result in any post-construction or long-term effects on public health.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities.*

The project will not alter the existing land use pattern in and around the project site. The project will; however, allow continued backshore use of the Beachwalk. The number of users is not expected to change as the result of the project. The preferred alternative has little or no potential to affect public infrastructure and services. Once completed it will require no water, power, sanitary wastewater collection, or additional emergency services.

7. *Involves a substantial degradation of environmental quality.*

Other than temporary, short-term environmental impacts during construction, which are generally not considered significant, the preferred alternative would not result in impacts which can be expected to degrade the environmental quality in the project area. The preferred alternative will improve existing environmental conditions by mitigating ongoing erosion and decreasing the amount of sediment released into nearshore waters from the bank.

8. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.*

The preferred alternative involves stabilizing approximately 250 ft of eroding bank with a temporary sandbag structure. The project does not require or commit to future larger actions. The preferred alternative is temporary in nature and is designed as a medium-term solution to stabilize the bank and Beachwalk while the long-term solutions are developed as part of the future Kaanapali Beach Maintenance project.

9. *Substantially affects a rare, threatened, or endangered species, or its habitat.*

The nearshore area fronting the Hyatt is frequented by the endangered Green Sea Turtle, which feeds on the algae-covered hard fossil limestone bottom areas. Hawaiian Monk Seals have been infrequently seen in the area. Turtles are not known to nest in the project area. Hawaiian monk seals have been infrequently seen in the area. The project is located landward of the MHHW line; thus, there will be no loss of habitat. Endangered species protection procedures as recommended by the National Marine Fisheries Service will be in place during construction. There will be no long-term impact to rare, threatened, or endangered species.

10. *Detrimentally affects air or water quality or ambient noise levels.*

There will be some temporary, short-term impacts to air and water quality, and noise levels, during construction. However, these impacts will be limited to the construction period and will not be significant. BMPs will be in effect to help minimize the construction impacts. Once construction is complete and the sand is placed on the beach there would be no activity or mechanism for further air, water, or noise impacts.

11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

The preferred alternative will stabilize the eroding bank and undermined Beachwalk, thus providing a beneficial impact by maintaining the space between the water and the coastal lateral access path. This buffer will effectively dissipate wave energy, decrease wave runup and flooding of the backshore area, and thus reduce vulnerability to coastal hazards. The preferred alternative will not change the shoreline elevation, and will not change the existing tsunami or storm wave flood hazard.

12. *Substantially affects scenic vista and view planes identified in county or state plans or studies.*

The preferred alternative is relevant to the objectives of the Maui Island Plan, including protecting and improving the natural environment, restoring natural resources, retaining scenic resources, and enhancing scenic views. The sandbags will be partially buried in the beach, and that which is exposed will be no higher than the Beachwalk. The sandbags will be light brown colored and will therefore blend naturally with the existing landscape. The sandbag slope stabilization will not significantly alter the Kaanapali view plane.

13. Requires substantial energy consumption.

Other than energy expended during construction operations, the project would require no additional energy consumption.

9.2 Determination

In accordance with the potential impacts outlined in Section 5 of the Draft Environmental Assessment (DEA), the provisions of Chapter 343 Hawaii Revised Statutes (HRS), and Hawaii Administrative Rules (HAR) §11-200 significance criteria, the Approving Agency, the Department of Land and Natural Resources, State of Hawaii, is anticipated to make a Finding Of No Significant Impact (FONSI).

10. CONSULTATION

10.1 Parties Consulted

EA Scoping Meeting to be held following review of public comments.

10.2 EA Preparers

The Hyatt Regency Maui Temporary Sandbag Slope Stabilization DEA was prepared by Sea Engineering, Inc. The respective contributions of individuals are as follows:

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