

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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SEP 23 2019

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DEPUTY DIRECTOR

September 12, 2019

2019/ED-3(LY)

Mr. Scott Glenn, Director
State of Hawaii
Department of Health
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Mr. Glenn:

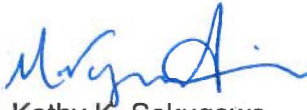
SUBJECT: Chapter 343, Hawaii Revised Statutes
Chapter 25, Revised Ordinances of Honolulu
Draft Environmental Assessment (DEA)
Project: Sea Life Park Improvements
Applicant: Sea Life Park Hawaii
Agent: G70 (Jeff Overton)
Location: 41-202 Kalaniana'ole Highway - Waimanalo
Tax Map Key: 4-1-014: 004 (por.)

With this letter, the Department of Planning and Permitting hereby transmits the DEA and anticipated finding of no significant impact (DEA-AFNSI) for the Sea Life Park Improvements project at 41-202 Kalaniana'ole Highway 7 in Waimanalo (Tax Map Key 4-1-014: 004 por.), on the island of Oahu, for publication in the next edition of "The Environmental Notice" on **September 23, 2019**.

Enclosed, please find a completed publication form, a hard copy of the DEA, and a disc with a digital copy of the DEA. We have also emailed an electronic copy of the publication form.

Should you have any questions, please contact Lila Youn, of our staff, at (808) 768-8016 or lila.youn@honolulu.gov.

Very truly yours,


Kathy K. Sokugawa
Acting Director

Enclosures

20-071

APPLICANT PUBLICATION FORM

Project Name:	Sea Life Park Improvements
Project Short Name:	Sea Life Park Improvements
HRS §343-5 Trigger(s):	Use of State Lands, Use Within a Conservation District
Island(s):	Oahu
Judicial District(s):	Koolaupoko District
TMK(s):	4-1-014: 004 (por.)
Permit(s)/Approval(s):	Special Management Area Use Permit
Approving Agency:	City and County of Honolulu Department of Planning and Permitting
<i>Contact Name, Email, Telephone, Address</i>	Lila Youn, lila.youn@honolulu.gov (808) 768-8016, 650 S. King St., 7th Flr., Honolulu, HI 96813
Applicant:	Sea Life Park Hawaii
<i>Contact Name, Email, Telephone, Address</i>	Valerie King, valerie.king@sealifeparkhawaii.com (808) 259-2502, 41-202 Kalanianaʻole Hwy. #7, Waimanalo, HI 96795
Consultant:	G70
<i>Contact Name, Email, Telephone, Address</i>	Jeff Overton, jeff@g70.design (808) 523-5866, 111 S. King Street, Ste. 170, Honolulu, HI 96813

Status (select one)	Submittal Requirements
<input checked="" type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.

Sea Life Park provides a unique setting for kamaaina and visitors to experience marine wildlife and the culture of the islands. The Park is planning to renovate, expand and relocate 14 exhibits and related facilities to improve the park and visitor experience. New exhibits and renovations will help to accommodate up to 1,300 visitors per day by 2025. The improvements will include a new Entry Concierge & Gift Shop and new Indoor Aquarium. Renovation and expansion will occur for the Honu Conservation and Education Center, Hawaii Ocean Theatre, Shark Cave, Restaurant, Luau area, and Conservation Center. The Penguin Exhibit, Seabird Sanctuary, and Hale Manu Aviary will be relocated and upgraded. Parking, vehicle access and circulation will be upgraded, along with the seawater delivery system. The total cost for these improvements is estimated at \$30 million.

SEA LIFE PARK IMPROVEMENTS

DRAFT ENVIRONMENTAL ASSESSMENT

WAIMĀNALO, ISLAND OF O'AHU, HAWAII



APPLICANT:



PREPARED BY:



111 S. KING STREET, SUITE 170
HONOLULU, HI 96813

SEPTEMBER 2019

SEA LIFE PARK IMPROVEMENTS

DRAFT ENVIRONMENTAL ASSESSMENT

WAIMĀNALO, ISLAND OF O'AHU, HAWAI'I

TMK: (1) 4-1-014:004

APPLICANT:



41-202 KALANIANA'OLE HIGHWAY #7
WAIMĀNALO, HI 96795 USA

PREPARED BY:



111 S. KING STREET, SUITE 170
HONOLULU, HI 96813

APPROVING AGENCY:

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF PLANNING AND PERMITTING
650 SOUTH KING STREET, 7TH FLOOR
HONOLULU, HAWAI'I 96813

SEPTEMBER 2019

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- B. Archaeological Assessment for Improvements to Sea Life Park, Ko‘olauloa District, Island of O‘ahu, Hawai‘i, Keala Pono Archaeological Consulting, LLC., Month 2019.
- C. Preliminary Engineering Report. G70, March 2019.
- D. Transportation Assessment Report for the Proposed Sea Life Park Improvements, Waimanalo, HI. Fehr & Peers, December 2018.

Section 1

Introduction

Chapter 1

Introduction

This Environmental Assessment (EA) has been prepared in accordance with the requirements of Chapter 343, Hawai'i Revised Statutes (HRS) and Hawai'i Administrative Rules (HAR), Title 11, Chapter 200.1, Department of Health, which set requirements for the preparation of environmental assessments. This EA is also prepared pursuant to and in compliance with Chapter 25, Special Management Area (SMA), Revised Ordinances of Honolulu (ROH), which provides for the regulation of land uses in the SMA. Sea Life Park and the proposed area of improvements are located within the SMA and will require the approval of an SMA Use-Major Permit application, which will review this EA as part of the application.

1.1 Project Information Summary

Type of Document:	Environmental Assessment (EA)
Project Name:	Sea Life Park Improvements
Recorded Fee Owner:	State of Hawai'i, Department of Land and Natural Resources Land Division 1151 Punchbowl St #220, Honolulu, HI 96813 Contact: Barry Cheung, District Land Agent Telephone: (808) 587-0433
Applicant:	Sea Life Park Hawai'i 41-202 Kalaniana'ole Hwy. #7, Waimānalo, HI 96795 Contact: Valerie King, General Manager Telephone: (808) 259-2502
Agent:	G70 111 S. King Street, Suite 170, Honolulu, Hawai'i 96813 Contact: Jeff Overton, Principal Telephone: (808) 523-5866
Approving Agency:	Department of Planning and Permitting 650 South King Street, 7th Floor Honolulu, HI 96813 Telephone: (808) 768-8049
Ch. 343, HRS Triggers:	Use of State Lands, Use Within a Conservation District
Project Location:	41-202 Kalaniana'ole Highway #7 Waimānalo, HI 96795 (<i>Figure 1.1</i>)

Tax Map Keys (TMK) and Landowners:	TMK: (1) 4-1-014:004 (por.) <i>(Figure 1.2)</i>
Project Area:	Total Lot Area: Approx. 106 acres; Total Leased Area: Approx. 62 acres; Project Area: Approx. 18 acres <i>(Figure 1.3)</i>
State Land Use District:	Conservation <i>(Figure 1.4)</i>
State Conservation District Special Subzone:	Sea Life Park Special Subzone designation for Recreational, Educational, Commercial purposes
Special Management Area:	Within SMA <i>(Figure 1.5)</i>
City & County of Honolulu Zoning:	P-1 Preservation District <i>(Figure 1.6)</i>
City Development Plan:	Ko'olau Poko Sustainable Communities Plan <i>(Figure 5.1)</i>
Flood Zone:	Zone D (Undetermined) <i>(Figure 1.7)</i>
Anticipated Determination:	Finding of No Significant Impact (FONSI)

1.2 Overview and Background

Sea Life Park (SLP) was originally incorporated in 1962 as a for-profit corporation doing business as an Oceanarium. The property has changed owners several times over the past five decades. Parques Reunidos acquired the property in 2008 and has a general partnership with the operator, Attractions Hawai'i.

The site is located within property leased from the State of Hawai'i, Department of Land and Natural Resources under General Lease S-6057 for Tax Map Key (TMK) properties (1) 4-1-014:004 and (1) 4-1-014:011, renewed in 2018. The lease allows for scientific research and public exhibit facilities of marine life.

Hawai'i Pacific University (HPU) holds the master lease on approximately 106 acres, and subleases 61.662 acres to SLP of which 21.5 acres are usable. The remainder of the lease area is steep land which extends up to the mountain ridge behind Makapu'u Point Beach Park. Sea Life Park and Oceanic Institute, an affiliate of HPU, share some facilities, such as a saltwater line, roads, parking, etc. Easements also exist within the lease area in favor of Hawaiian Electric Company, Inc. (for electric transmission line purposes) and in favor of the City and County of Honolulu (for tunnel and water pipeline purposes and slope purposes).

Sea Life Park is located within the State Land Use Conservation District and zoned P-1 Preservation by the City and County of Honolulu, which permits outdoor recreation uses. Lands within the P-1 District and under State Conservation District jurisdiction are governed by the requirements and procedures of HRS Section 205-5, Department of Land and Natural Resources (HRS Section 183C-3). According to HAR 13-5, the Sea Life Park Special Subzone, established in 1981, permits recreational, educational and commercial uses.

The SLP purpose is set forth clearly in the lease agreement with the State of Hawai'i. Originally signed in 1962, the agreement states that "The Lessee must provide a wholesome recreational and educational attraction in a healthy, park-like atmosphere commensurate with the best features of first-class public or private attractions of a similar nature in the United States." The Park is further obligated to design, construct and operate the facility to consist principally of marine life displays and presentations and for associated attractions or exhibits which shall incorporate and effect appreciable interpretation of the exhibit for public interest, enlightenment and education. However, the lease agreement does afford SLP flexibility to "select the type and variety of suitable exhibits and to develop or refine popular and appealing methods of animal display".

The Park was established in 1962 and a Master Plan for the existing facilities was prepared in 1963. In 1964, the Department of Land and Natural Resources (DLNR) adopted Regulation No. 4 which governs the land uses of Conservation Lands, pursuant to HRS Section 183-41 as amended. Regulation No. 4 states that no Conservation District Use Application (CDUA) is required for the use providing that the proposed use(s) are consistent with that provided for and/or required in the original lease. Since this regulation was adopted after the General Lease and Master Plan were prepared, a Conservation District Use Permit (CDUP) was not issued for any construction at SLP.

Sea Life Park opened in February 1964 with six exhibits and attracted 221,600 visitors in its first year of operation. These major exhibits included the Hawaiian Reef Tank (now known as Shark Cave), the Ocean Science Theater (Hawai'i Ocean Theater), Whaler's Cove (Dolphin Lagoon), Sea Lion Feeding Pool and Nursery, Turtle Lagoon, and bird sanctuary. Eating facilities, including the Galley Snack Bar (Beach Boy Lanai), a shopping arcade, and restrooms were also provided. A parking area was included to serve up to 200 cars and 17 buses. The original concept was realized only in a limited fashion due to economic constraints. Few facilities of this type had ever been built before and there was little track record to evaluate prospects for success. It was an attempt to provide marine-related recreational and educational programs and exhibits in an ideal setting.

In 1976 SLP applied for a CDUP to expand an existing commercial kiosk. Permitted as ancillary to the existing Sea Life complex, CDUA OA-831 was approved on November 12, 1976.

On October 5, 1977 revisions to the Master Plan were submitted to the Board of Land and Natural Resources (BLNR). Construction plans for the proposed new facilities are subject to prior approval of the Chairman of the BLNR as to aesthetics, but not to utility. The BLNR found these expansion plans to be consistent with the provisions of the General Lease of 1962 and did not issue a CDUP. On November 28, 1977 Sea Life Park was notified that the Master Plan was approved to permit construction of the following:

- Shark Tank with corresponding saltwater system
- Sea Lion Theater
- Parking expansion incorporating road re-alignment of entry
- Remodeling of the existing ticketing entrance to facilitate accessibility to the Park
- Supporting facilities including the expansion of the dining area to include a theme restaurant above the existing dining lanai
- New commercial complex as well as new marine facilities including a Hawaiian Fish Pond, Penguin Pond and Porpoise Tank
- Redesigned walkways and picnic areas.

Because these facilities were consistent with the original lease and were previously approved in the 1977 Master Plan for SLP, they did not require a CDUP. Subsequent changes to the approved Revised

Master Plan included the construction of a sewage treatment plant and an additional 16-inch saltwater intake line. These changes were reviewed by the BLNR to determine whether they were consistent with the provisions of the General Lease, or if a CDUP would be necessary.

In a letter from BLNR to the City and County of Honolulu Department of Land Utilization (DLU; now known as the Department of Planning and Permitting, DPP) dated March 6, 1981 regarding this subject, it was stated that, “Inasmuch as this lease was issued prior to the 1964 effective date of Department Regulation No. 4, no Conservation District Use Application is now required for the use providing that the proposed use(s) are consistent with that provided for and/or required in the original lease.”

On November 6, 1978, SLP, through its consultant, filed a Request for Assessment to obtain a Special Management Area Use Permit (SMP). The SMP is a prerequisite for other permits, in that denial of an SMP obviates the need for other permits; therefore, application for other permits is not expected until the SMP is granted. On March 12, 1979, the DLU determined that an Environmental Impact Statement (EIS) would be required for the proposed building expansion, since the SLP site is State-owned land in the Conservation District.

A Revised EIS was accepted by the DLU on April 23, 1981. A shoreline variance was applied for in order to install two additional saltwater lines and pumps in the shoreline setback area and included as an addendum to the application for an SMP. On May 1, 1981, DLU accepted the application of Sea Life, Inc., for an SMP and a Shoreline Variance (SV) to expand facilities at SLP under 79/SMA-18 and 81/SV-20. On August 12, 1981, the SMP and shoreline variance were approved by the City Council.

79/SMA-18 approved the following facilities:

- Bar Renovation/Restrooms
- Sea Lion Stadium
- Porpoise Pool with Northwest Hawai'i Island Exhibit and Bird Sanctuary
- Touch Tank/Keiki Play Area
- Penguin Exhibit
- Whalers Village Complex
- Ticket Entrance Upgrading
- Parking Expansion
- Hawaiian Fishpond/Aquaculture Exhibit
- Restaurant
- Pathways Relocation
- Shark Tank
- Saltwater Handling Facility
- Sewage Treatment Facilities

A Minor Modification to 79/SMA-18 was approved by DLU on April 20, 1989, in which the DLU had accepted the revised SLP Master Plan dated December 1, 1988 as the current Master Plan for the Park (*Figure 1.8*). The site of the current wedding chapel and dining facility had long been planned for a restaurant, as indicated in the SLP Master Plan, which was included in the 1976 CDUA OA-831. In 1985, this same site received an amendment to the previously approved CDUA OA-831 to allow the construction of a lū'au facility in place of the restaurant. The approval for this lū'au facility lapsed when work on the project was not initiated within one year of the approval. On December 3, 1999, the DLU approved a minor modification to the SMA Permit to allow substituting a wedding/reception facility for

the previously approved lū'au facility. The original CDUA for the wedding chapel project was submitted in March 2000 and withdrawn in May 2000 to allow staff to process a violation against the subject parcel for unauthorized grading. After the violation was resolved through the Hearing Officer Administrative Penalty System (HOAPS), the application was re-submitted in June 2000. CDUA OA-2994 for Construction of Wedding Chapel and Dining Facility was approved July 14, 2000.

Another Minor Modification to 79/SMA-18 occurred in 2009 (2009/ELOG-109(AA)) to install fabric shade canopies adjacent to the existing ticket building and at the Dolphin Cove exhibition. Permission to construct a new changing area building was confirmed in 2011 by DLNR, Office of Conservation and Coastal Lands under COR: OA-1285a and 2011/ELOG-2625(AA), as previously approved by DLNR as part of the 1988 Master Plan for SLP. In 2015, an SMA Minor (2015/SMA-58) was approved for a new cabana and improvements for the stage and pavilion in the Makapu'u Meadows area of SLP.

The Park seeks to expand the number of exhibits provided to the visiting public, to improve other facilities such as entrances, walkways, parking and to expand the dining area to include a viewing deck with tables above the existing dining lanai. These improvements are necessary for the Park to continue to attract repeat visitors from the resident population in Hawai'i, and to provide more viewing opportunities for the expanding number of visitors to the Park.

Timely upgrading and renewal of the existing facilities are critical to the continued operation of the Park. The major exhibits are now over 50 years old. Although some have been adjusted to fit changing public interest, some new major facilities are needed to continue to attract a public that has become accustomed to refined entertainment and educational programming. Without sacrificing the environmental character of this unique site, SLP will continue its program to educate, entertain and stretch the imagination of the visitor.

1.3 Purpose of the Environmental Assessment

This EA will comply with Hawai'i's Environmental Review process, HRS Chapter 343. This Environmental Assessment is also prepared pursuant to and in compliance with Chapter 25, Special Management Area (SMA), Revised Ordinances of Honolulu (ROH), which provides for the regulation of land uses in the SMA. The area of use is located within the SMA and certain improvements will require the approval of an SMA Use Permit Major application. The property is leased from DLNR, which constitutes utilization of State land, and is also located within the State Conservation zone, both of which provide the basis for the preparation of this document.

The City and County of Honolulu Department of Planning and Permitting (DPP) is the approving agency. The EA examines the potential environmental impacts of the planned improvements at SLP and seeks agency and public comment on subject areas that should be addressed.

1.4 Agencies, Organizations and Individuals Contacted in Early Consultation

Agencies, legislators and members of the community were consulted in the preparation of this Draft EA. As the recorded fee owner, the DLNR Office of Conservation and Coastal Lands was consulted. The Department of Planning and Permitting was also consulted as approving agency for this proposed action. Other state and county agencies were contacted for previous permitting information.

Conversations with various legislators included positive feedback for the conservation and education direction that Sea Life Park maintains and is continually improving upon, as well as providing exhibits with animals who are “in need”. Individuals were interviewed about their knowledge of the area and whether or not the Park improvements would have an effect on any culturally significant sites in the area. Additional information is located in *Chapter 3.9, Historical and Cultural Resources*.

Parties contacted in early consultation are listed below. Further information is detailed in Chapter 7.

State

- DOH Wastewater Branch
- DLNR Office of Conservation and Coastal Lands
- Senator Laura Thielen
- Representative Chris Lee

City and County

- Councilmember Ikaika Anderson
- Department of Planning and Permitting
- Honolulu Board of Water Supply

Organizations and Individuals

- Bunny Ahuna
- Haywood Kalima
- Wilson Kekoa Ho, Chair, Waimānalo Neighborhood Board #32



Figure 1.1

Project Location

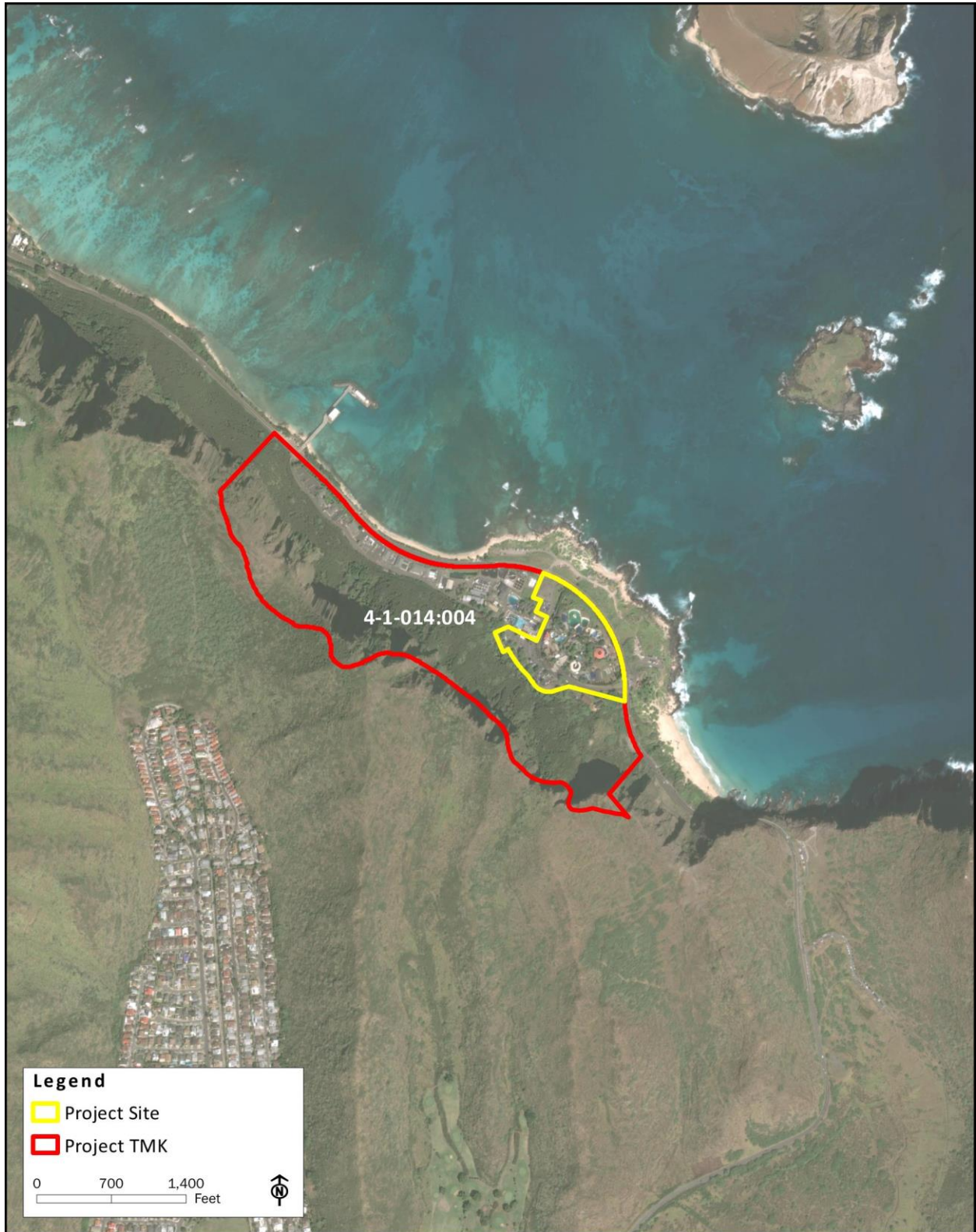


Figure 1.2

Tax Map Key



Figure 1.3

Project Area



Figure 1.4

State Land Use Classification



Figure 1.5

Special Management Area

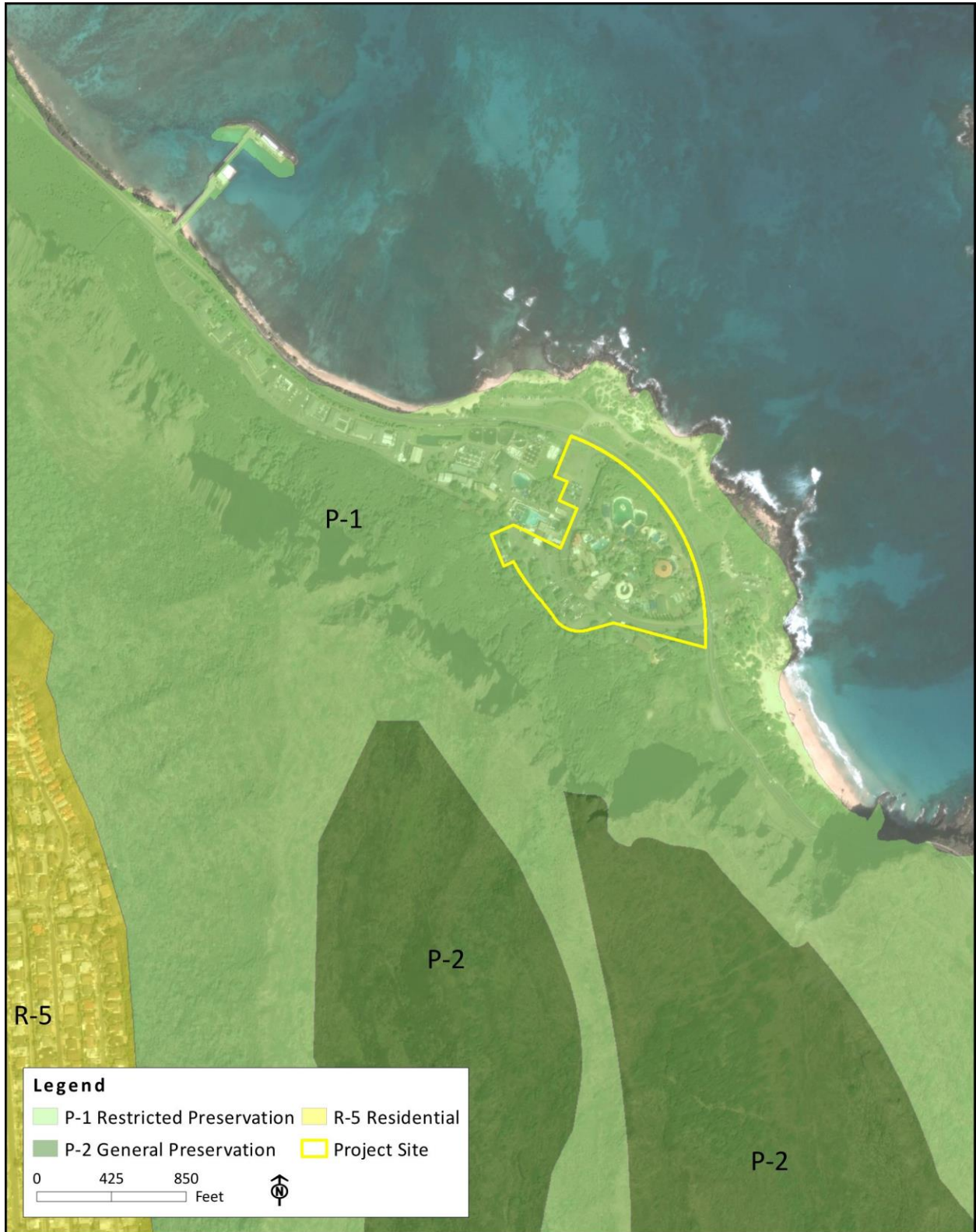


Figure 1.6

City and County of Honolulu Zoning Districts

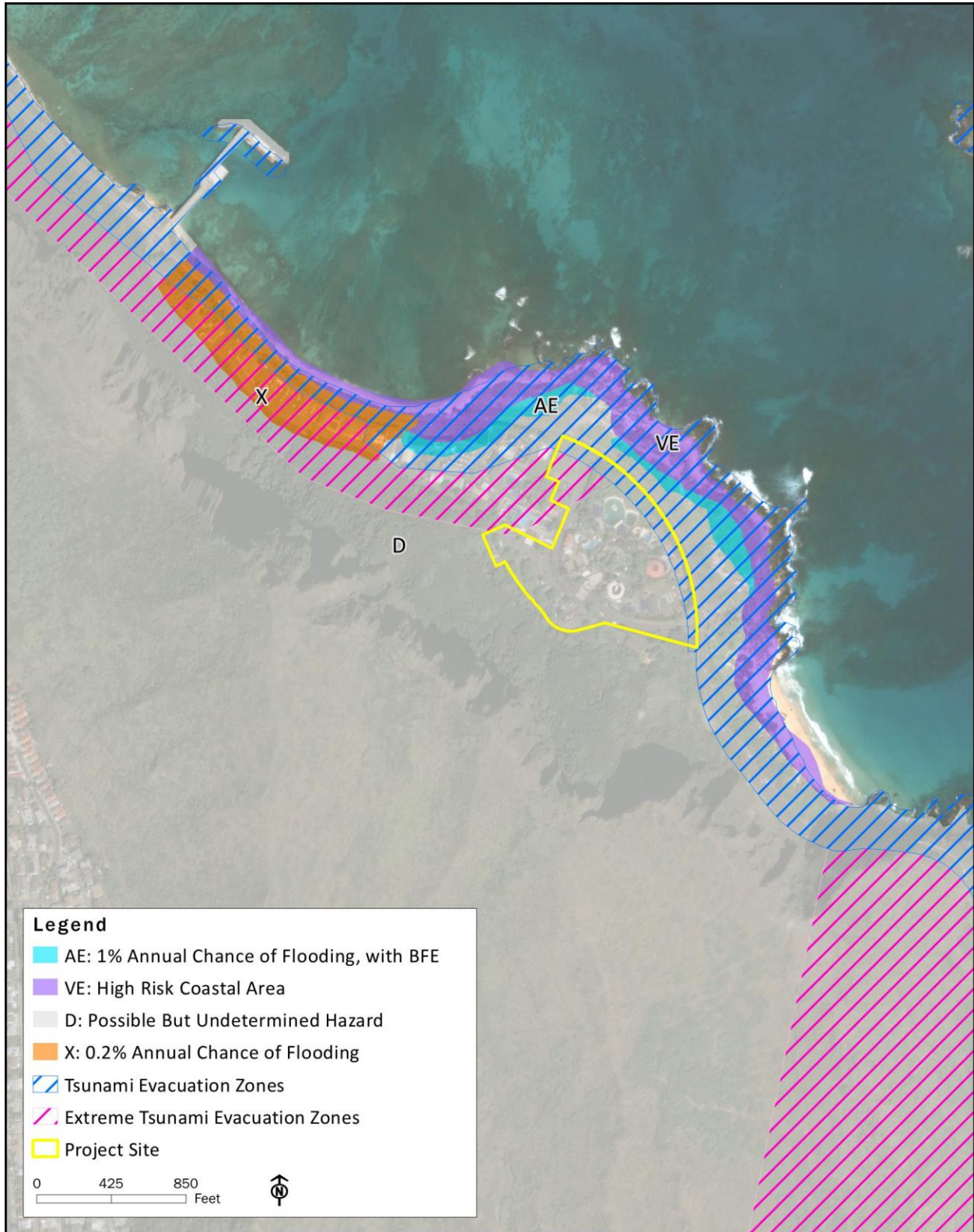


Figure 1.7

Flood and Tsunami Evacuation Zones

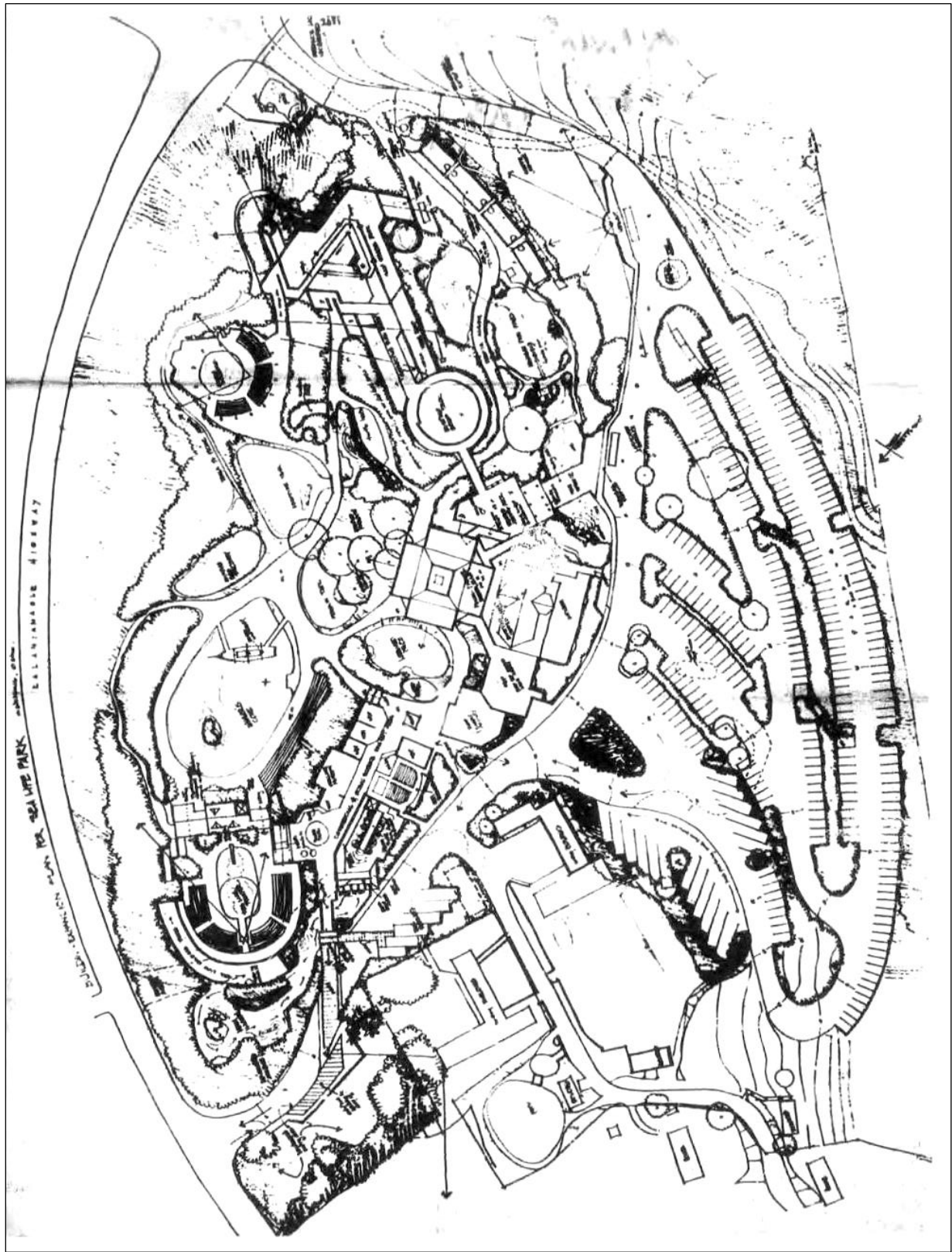


Figure 1.8

1988 Sea Life Park Master Plan

Section 2

Project Description

Chapter 2

Project Description

This chapter provides the history and existing uses of the property and surrounding areas. An overview of the planned improvements is provided.

Sea Life Park (SLP) encompasses approximately 18 acres on a 62-acre leased parcel on the mauka side of Kalaniana'ole Highway, almost directly across the street from Makapu'u Beach Park. The site offers views of Makapu'u Bay, Makapu'u Point and the waters surrounding Kāohikaipu and Mānana Islands. The property is situated at the easternmost point of the Ko'olau Mountains at the foot of a steep pali which rises to 1,000 feet. Driving distance along Kalaniana'ole to SLP is approximately two miles from Waimānalo and approximately four miles from Hawai'i Kai. The property is entirely within the Special Management Area (SMA) as defined in Chapter 205A, Hawai'i Revised Statutes (HRS) and Chapter 25 of the Revised Ordinances of Honolulu (ROH). SLP first opened in 1964 and was acquired by its current owner Parques Reunidos in 2008.

2.1 History of the Area

The point of land where SLP now stands was formed by lava which flowed to the sea from a vent approximately 250 feet on the pali above. The most recent of the secondary eruptions on O'ahu is believed to have occurred here and at other locations along the Ko'olau Mountain Range. This volcanic flow is known as the Kaupō flow, named for the Hawaiian village that was located adjacent to and partially within the present-day SLP.

Kaupō (Ko'onāpou) Village was comprised of a few fishing huts, a fishing shrine, a small heiau, lava tubes, and many habitation sites. The King's Highway ran through the village. The name Kaupō is translated as landing [of canoes] at night. Ko'onāpou literally means staff posts which supported the thatched roofs of the stone houses in this village. The village may have been built circa 1853, during the smallpox epidemic "when the Hawaiians attempted to escape the quarantine" (SCS, 2016).

A legend of the area tells of a gifted fisherman named Kapoi who came from Honolulu and was compelled to set up his home in this area. He was knowledgeable in chanting and known as a healer. People would come from all over the islands to be healed by him. Some would return to their home after and some chose to stay nearby, thereby creating the village known as Kaupō.

Later in his life, Kapoi's almost supernatural gifts faded, and he was left with but a dream. The dream was that a woman would come from the shore with burning skin, he would be afflicted with an eruption near his piko (belly button), and he would die by noon. Sometime later a woman was said to have arrived with a burning skin. The smallpox epidemic spread throughout the village. Many died including Kapoi, who supposedly had just one sore near his piko. The village was abandoned. Until the mid-1900s many stone structures of the village were visible from the roadside (*Figure 2.1*) which became an attraction for travelers. Although this village was not quite as ancient as most other inhabited places on the island, it preceded what we now know as modern Hawai'i.



Figure 2.1 **Kaupō Village, 1926 (Photo courtesy of Hawai‘i State Archives)**

A feature of the area at Kaupō Beach is a rock called Pōhaku Pa‘akikī. It can easily be overlooked as it is typically submerged at high tide. This rock, according to an ancient legend, is a monument of the agreement between Hawaiians who lived in this area and a guardian shark that there would be no shark attacks here. In old Hawai‘i this rock was sacred to ‘uala (sweet potato) farmers in this area. Every day they brought ‘awa to the stone and chanted for Kamohoali‘i, their shark god. Kamohoali‘i came and drank the ‘awa. A fisherman antagonized Kamohoali‘i and the ‘uala farmers and threw shark tails into the ocean near this rock, angering the shark god. One day, Kamohoali‘i caught the man as he was fishing and began to devour him from the feet up. He chewed all the way up to his buttocks but stopped because of the appalling smell. The shark god pledged to never eat human flesh again. He also didn’t allow any other sharks to attack humans between Makapu‘u and Kalaeoka‘ō‘ioi (Kualoa).

The history of the area, including the volcanic flow, fishing village and shark connection will be reflected in the new exhibits and theming related to the Sea Life Park improvements.

2.2 Project Area Characteristics

There is a heavy concentration of recreational uses on the coastal approach to SLP, which includes Koko Head District Park, with Koko Head and Koko Crater on either side of Hanauma Bay; Halona Blow Hole Lookout; Koko Head Rifle Range; Koko Crater Equestrian Center; Koko Crater Botanical Garden; Hawai'i Kai Golf Course; Kaiwi Trail; Makapu'u Point Lighthouse Trail; and several excellent beaches and fishing areas (*Figure 2.2*). Makapu'u and the numerous beaches in the Waimānalo direction combine to make this area a prime recreational area for residents as well as a unique tourist attraction.

There are no residential areas in the immediate vicinity of SLP. A residential neighborhood is located one mile from the Park entrance. Homes cluster on either side of Kalaniana'ole Highway until the valley widens and expands to include Waimānalo Beach Park, a few small stores and restaurants, gasoline station and agricultural uses in the valley. Commercial services are limited in the vicinity of the Park. Between Kailua and the Koko Marina Shopping Center there are very few sit-down restaurants and retail shops.

Offshore from the beach are two small islands, Mānana (Rabbit) and Kāohikaipu (Black Rock or Turtle) Islands. Both islands are very significant sea bird sanctuaries, where as many as 130,000 birds nested per year in the 1980s. Overall, SLP's setting is ideal for its purposes. The scenery is exceptional and is the perfect backdrop for an educational and recreational facility to attract repeat visitors from Hawai'i's residents as well as tourists.

2.3 Existing Conditions

Sea Life Park has several activities which provide visitors educational interactions with animals such as dolphins, sea lions, sharks, turtles and Hawaiian rays. Some of the most popular activities are the Dolphin Interaction Programs (including Royal Swim, Swim Adventure, Dolphin Encounter & Dolphin Aloha programs). The visitors pay an additional ticket to participate in these interactive activities.

Main exhibits and facilities (*Figure 2.3*) include:

- Dolphin Lagoon Show, an open-air theater from which visitors can watch dolphins
- Shark Cave, a 330,000-gallon tank that is home to several hundred reef animals, including sharks, stingrays, and schools of tropical fish;
- Hawaii Ocean Theatre (currently closed for renovations); and
- Kolohe Kai Sea Lion Show, an open-air theater to view the talents of Sea Lions.

Main programs that allow visitors to interact directly with animals are:

- Dolphin Royal Swim Program, where visitors interact directly with dolphins in the water;
- Shark Trek, an underwater stroll in the Shark Cave, surrounded by up to three different species of native Hawaiian mid-sized reef sharks;
- Sea Lion Encounter, which lets visitors swim and play with sea lions in the water;
- Sea Lion Feeding Pool, where visitors can feed herring to sea lions; and
- Hale Manu Bird Aviary, where visitors can step inside the aviary and feed the birds.

Additionally, SLP offers a lū'au show (including a meal) that has become one of the most popular lū'au shows offered on O'ahu.



Figure 2.2

Area Recreation Map

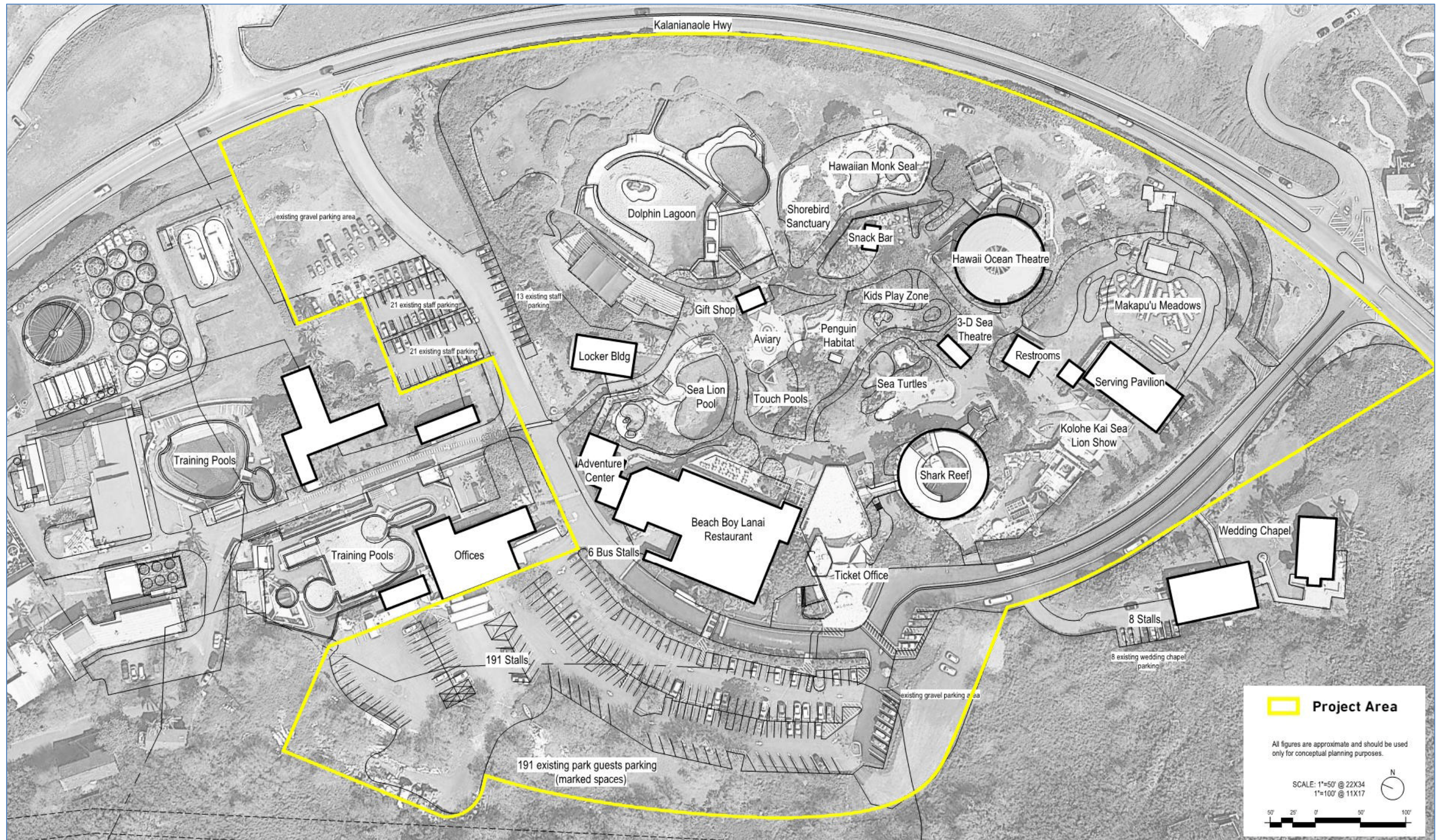


Figure 2.3

Sea Life Park Existing Conditions

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2.4 Description of the Proposed Action

Sea Life Park is creating a new identity that embraces its Hawaiian culture and provides visitors to O'ahu the Hawaiian experience they expect. SLP seeks to create a compelling visitor experience that exceed expectations, with the objective of regaining its place as one of O'ahu's top visitor destinations. Sea Life Park separates itself from local zoos and aquariums by embracing entertainment and culture into its message of conservation and education. Many of the existing exhibits and facilities at SLP have reached the end of their useful life, and now need to be replaced or remodeled. The objective is to operate a recreational and educational attraction in a healthy, park-like atmosphere commensurate with the best features of first-class public or private attractions of a similar nature in the continental U.S. This objective is also a condition of the State of Hawai'i lease.

Sea Life Park is planning to renovate, expand and relocate 14 exhibits and related facilities for better flow of the park and visitor experience (*Table 2.1*). New exhibits and renovations to the Entry Concierge and Gift Shop will help to accommodate up to 1,300 visitors per day by completion in 2025. It is expected that the timeframe for the overall improvements will be between 5 to 10 years at a cost of \$30 million, with funding provided by the owners Parques Reunidos. The facilities upgrades will be located within the SLP grounds, maintaining a landscaped buffer of 65 to 130 feet between Park activities and Kalaniana'ole Highway. The new and/or improved exhibits and related facilities are described in *Table 2.1*. The total additional facilities floor area is approximately 47,856 square feet (sf).

The locations of the planned facilities are shown in *Figure 2.4*. Descriptions of each individual use are provided in the following sections.

2.5 Entry Feature

The primary entry to SLP on the eastern or Makapu'u Side is somewhat understated and warrants updates and improvements. An updated entry area will communicate an authentic Hawaiian marine park experience by:

1. Alerting visitors to the location and arrival at Sea Life Park
2. Attracting the visitor who is "exploring" the Island (drive-by)
3. Extending a formality and "class" feeling to all visitors as they enter the Park, thus creating a positive first impression.

Entrance signage with 8-foot high natural rock work, lighting and related landscaping will accomplish these objectives in addition to enhancing and beautifying the entry area (*Figure 2.5*). The signage and graphics of SLP will reinforce area thematic stylings and the park storyline, while clearly and directly conveying critical information.

Table 2.1 Proposed Improvements					
Facility	Status	Improvements	Existing Size (sf)	Proposed Size (sf)	Net Change (sf)
Entry Feature	Existing	New signage and landscaping	N/A	N/A	N/A
Entry Concierge and Gift Shop	Existing / Proposed	Demolish and build new ticket lobby, entry deck, view deck, retail area, offices, and restrooms. A new bridge will connect to the Shark Cave and new roof top lanai at Beach Boy Lanai.	4,350	8,885	+4,535
Shark Cave	Existing	Structural and design renovations. New exhibit theming.	8,000	8,000	-
Honu Conservation and Education Center	Existing / Proposed	Demolish and add two new pools with both above and under water viewing areas. Renovate classroom. New shaded gathering space with stage and seating area.	1,700	4,730	+3,030
Ocean Oddities Indoor Aquarium	Proposed	This will be a new climate-controlled facility which will be themed to provide an underwater experience with video and aquariums.	-	15,400	+15,400
Kaupō Fishing Village and Support Facilities	Proposed	New entry sign from park. Demolish two old facilities and build new facility with restrooms and new access road. New open hale structures for demonstrations.	Facilities: 1,210 Pavilion: 5,000	Facilities: -680, +3,300 Hale: 5 @ 2,400ea	+14,620
Hawai'i Ocean Theatre	Proposed	New upper level seating and roof structure for shade. New underwater viewing area under performance area.	11,000	12,100	+1,100
Penguin Cove	Existing	Demolish and relocate new pool near Hawai'i Ocean Theatre.	1,000	1,500	+500
Snack Bar	Existing	Re-theme with local style grab-and-go food concept.	460	460	-
Seabird Sanctuary and Rehabilitation Facility	Existing	Relocate enclosure and pool. New office/rehab building to provide medical services. New covered pavilion and walking path.	Rehab: 500 Sanct: 3,879	Rehab: 600 Sanct: 4,000 Pav: 2,000	+2,221
Hale Manu Aviary	Existing	New screened enclosure and covered pavilion.	2,000	2,300	+300
Menehune Island Splash Play Area	Proposed	Open water play area with play structure, toddler pool, carousel, covered pavilion, seating and renovated retail building.	-	3,350	+3,350
Beach Boy Lanai	Existing	Replace roof and add roof top lanai.	14,900	17,700	+2,800
Conservation Center and Museum	Existing	Renovate interior of existing building for museum spaces and meeting rooms.	2,500	2,500	-
Existing Facilities			56,499		
Total Facilities After Improvements				104,355	
Increase in Facilities After Improvements					47,856

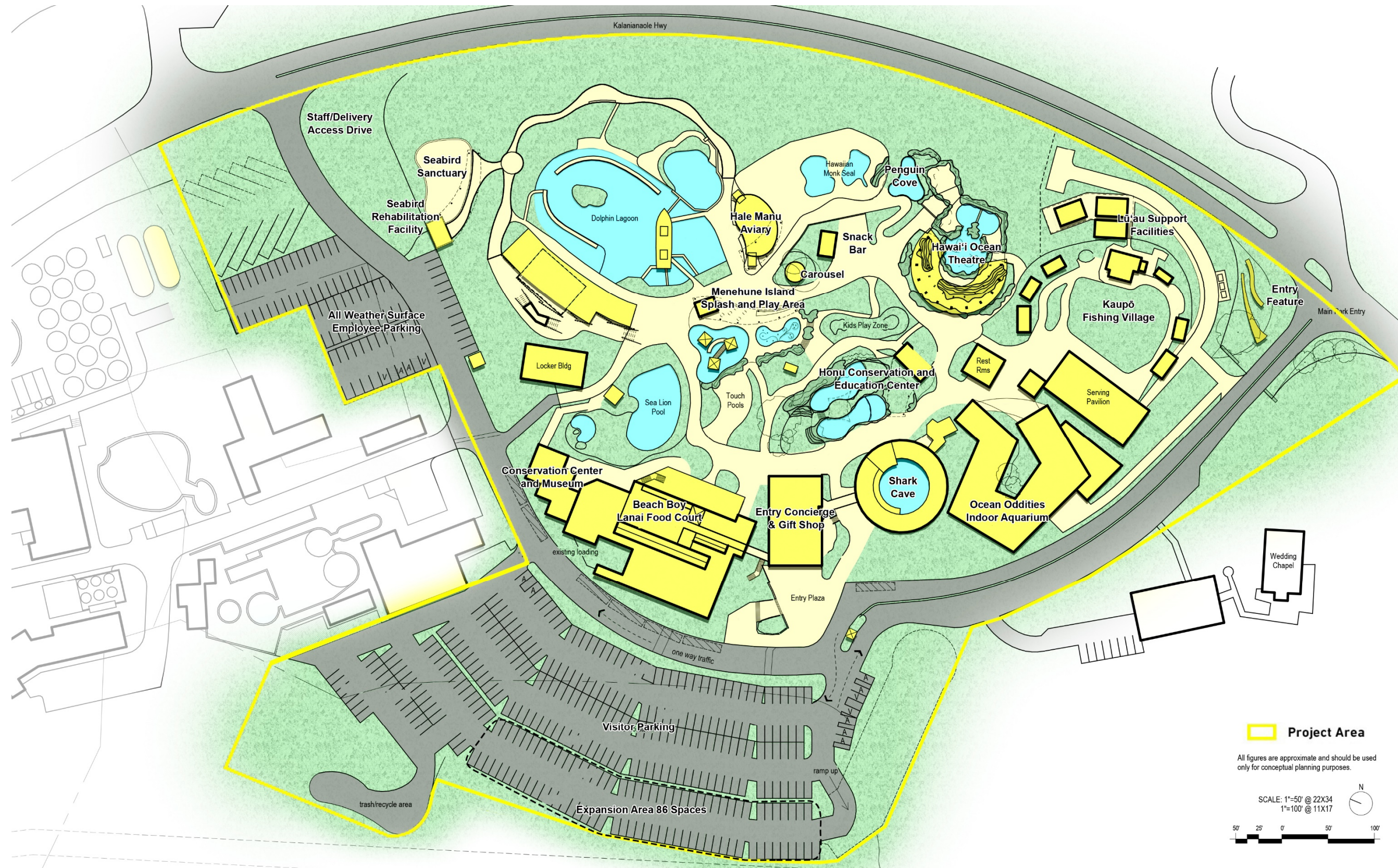


Figure 2.4

Proposed Sea Life Park Improvements

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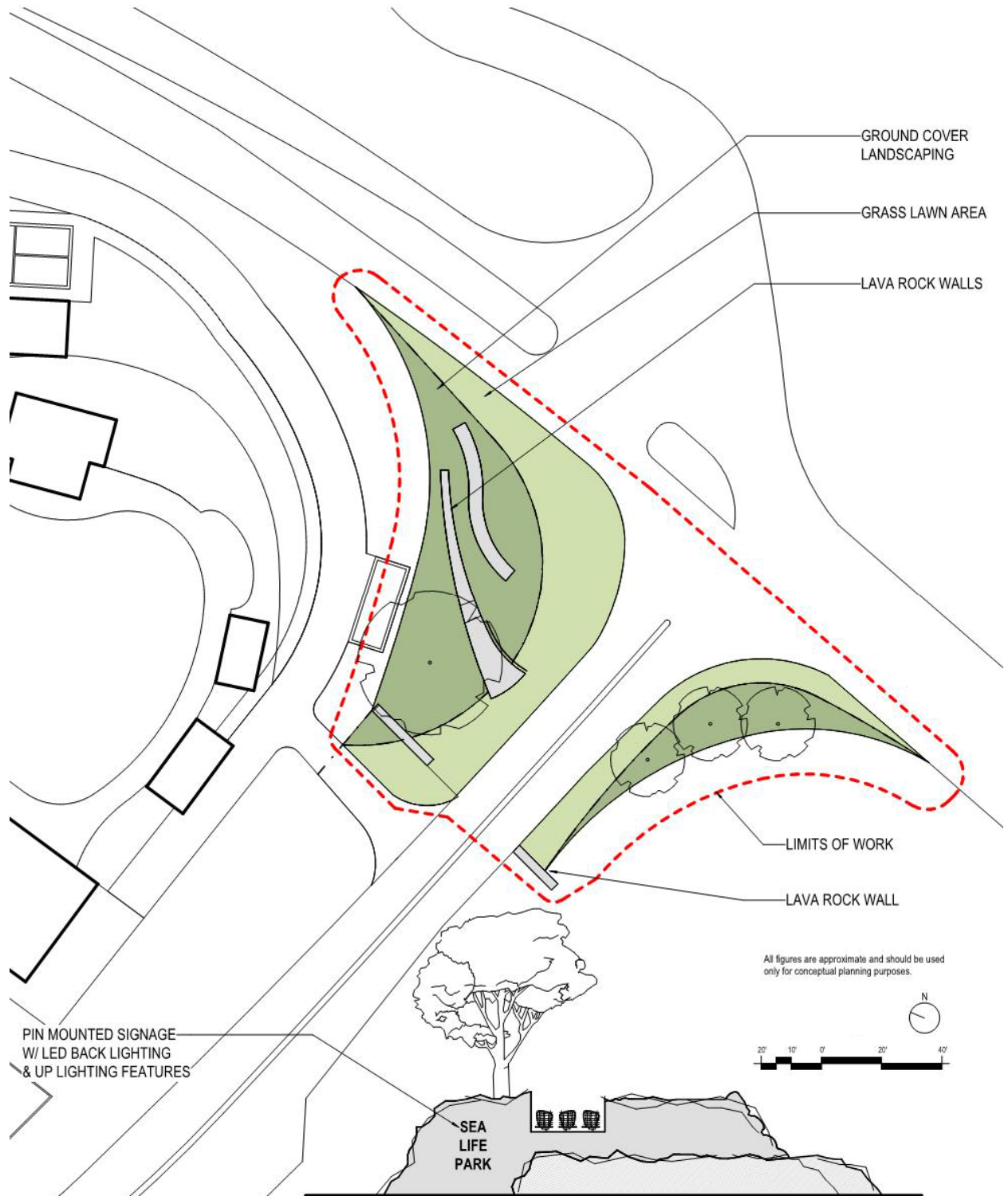


Figure 2.5

Updated Entry Feature Concept

2.6 Entry Concierge and Gift Shop

A new entry concierge and retail/gift shop are planned to replace the existing 4,350 sf arrival and ticketing building. *Figures 2.6 and 2.7* show a rendering and site plan. Visitors enter the ticketing lobby through two double doors and are served at six ticketing podiums that receive visitors who then proceed into the facility. The 31-foot high arrival deck leads the visitor through an open-air corridor overlooking the Gift Shop below, culminating in a glassed-in observation deck to provide an overview of the Park and ocean. From this point the visitor can either enter the Shark Cave exhibit or descend via elevator or stairs to the Gift Shop. The Gift Shop will offer unique gift articles and souvenir items with a marine and sea life theme. Restroom facilities are provided in this building.



Figure 2.6

Entry Concierge Rendering

2.7 Shark Cave

The Shark Cave is an existing 8,000 sf building which houses a cylindrical 330,000-gallon fish tank, which is viewed from a spiral walkway around the perimeter. This educational exhibit is home to native Hawaiian sharks, including Whitetip Reef sharks, Sandbar Sharks, and a Blacktip Reef shark, as well as a Brown Hawaiian Sting Ray, Blue Trevally, Surgeon fish, and Yellow Tangs. The Shark Cave is designed for shark viewing and underwater shark experiences, features life-size shark imagery and cave rockwork on the walls with underwater mood lighting. Several times each day a diver enters the tank and a narrator provides interesting data on the creatures and their habits. In the Shark Tank Scuba and Shark Trak programs, participants join the dive for an up-close encounter with these animals.

Renovations to the Shark Cave will include upgrades to the concrete structure (tunnel ceiling, building walls & beams). Upgraded exhibit theming will illustrate unique elements of Hawai'i's origin by replacing the existing fishing boat set with an erupting volcano and underwater rock work and natural features (*Figures 2.8, 2.9*). The underwater volcano exhibit will communicate a story of Hawai'i's formation, with an educational narration and interpretive theming of geology and the natural landscape. Additional in-wall aquariums will be placed within the outer wall along the ramp. The life support system of the Shark Cave will also be upgraded. The main seawater delivery system will be rerouted in this renovation project.



Figure 2.8

Shark Cave Renovation Rendering

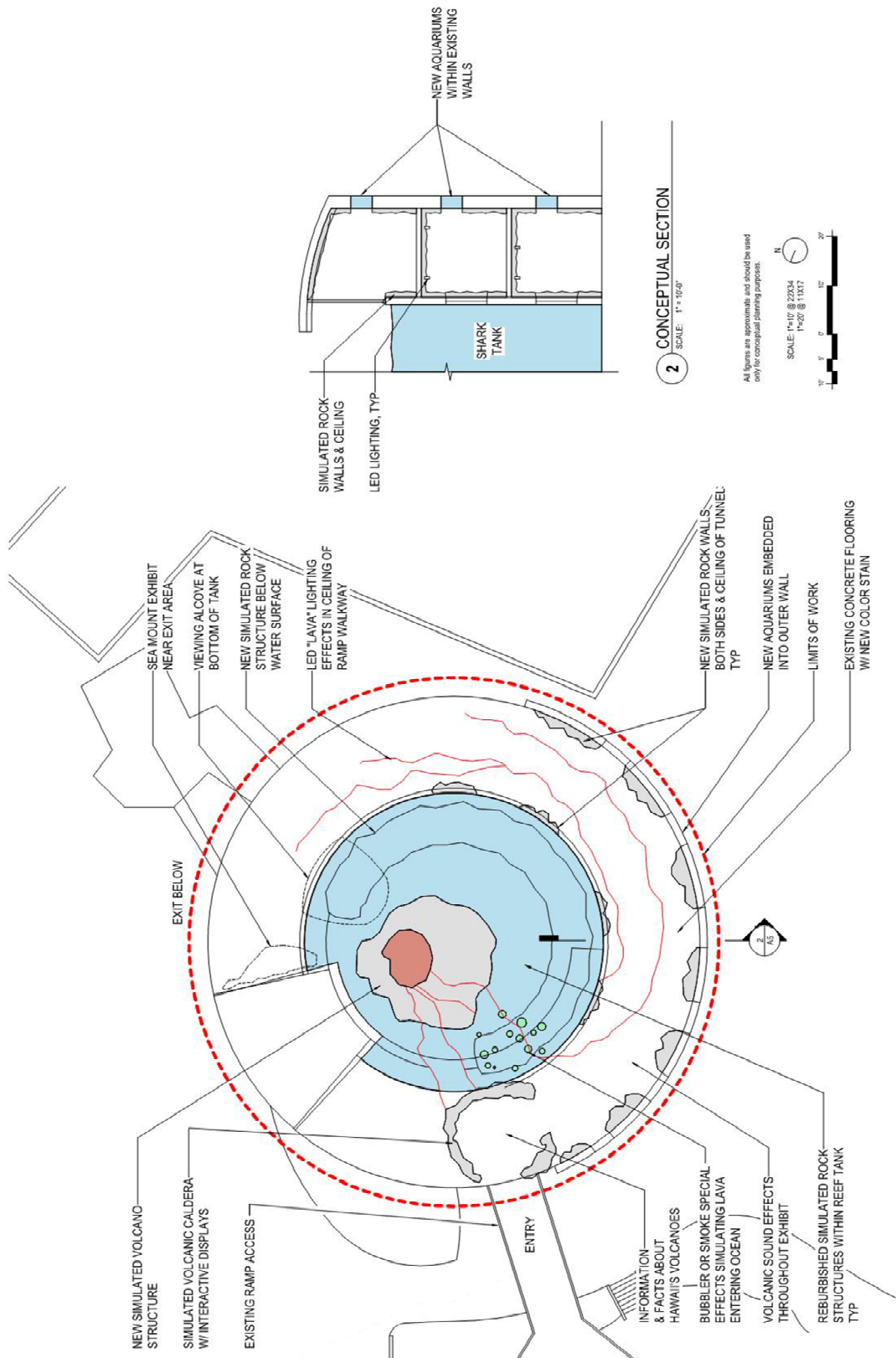


Figure 2.9

Shark Cave and Tunnel Renovation Concept

2.8 Honu Conservation and Education Center

The existing Hawaiian Green Sea Turtle Lagoon is a very unique and interesting exhibit, which is also a breeding sanctuary for the endangered Hawaiian Green Sea Turtles (honu). Sea Life Park is the only sanctioned institution in the United States that maintains an active breeding colony of Green Sea Turtles. To date, approximately 700 to 1,000 honu hatchlings are produced here each year, and more than 17,000 honu have been released to the ocean since 2005. Although most hatchlings are released, some remain at SLP, and others travel to Maui Ocean Center, Hilton Waikoloa, Kāhala Hotel and other facilities through SLP's Hawaiian Green Sea Turtle Educational Loan Program. The Educational Loan Program is an education, conservation, and awareness program. The Turtle Lagoon allows viewing of the adult turtles basking on the beach or eating leafy greens. Visitors can join the trainers at feeding time to learn more about these creatures and participate in the feeding activities.

To build upon the success of the breeding program, the Turtle Lagoon will be expanded from one pool and breeding beach to two interactive experience pools (*Figure 2.10*). The pools will be sized according to U.S. Fish and Wildlife Service federal guidelines, each with a deep end graduating up to a shallow end with a sand beach. Pools will have naturalized simulated rock walls and pool interior. A new simulated rock wall will define the back of the Center to reinforce the natural feel of the pools, as well as screen the Conservation Center from the children's area beyond. Landscaping will also be incorporated to screen the play structures from the Center.

The existing 1,700 sf building that currently houses the 3-D SEA Interactive Marine Life Experience will be renovated as a Honu Conservation Center. This facility will be repurposed to educate visitors about the beauty, majesty and plight of sea turtles around the world, and how they can make a difference in the protection of these species. The interior space will be split into two rooms. There will be a work area with glass walls to allow visitors to view the activity inside. The larger interior room will be an indoor interactive display space with exhibits and glass walls opening out to the rest of the center. This interactive exhibit will entertain, educate and instill appreciation for the splendor of the sea turtle. Baby sea turtles will be on display in protected areas as they are nursed back to health before their release back into the wild. Resident turtles which are too injured be released are given a home in an innovative habitat. A covered pavilion or trellis element will provide shade to the education building and interactive plaza area.

New concrete walkways will surround the pools and create a circulation opportunity to observe the pools from all sides from ground level. Additionally, a new walkway will bisect the two pools and will incorporate an Americans with Disabilities Act (ADA)-compliant ramp down to an underwater viewing area with full-height, curved glass walls into both pools at their deepest sides (*Figure 2.11*). A tensile shade structure will be provided over the glass viewing area. From this area, steps lead up to an outdoor gathering space with tiered seating along the pool edges.

Special admissions allow for an up-close and behind-the-scenes experience with the sea turtle rehabilitation team. The Park has been in discussion with the National Oceanic and Atmospheric Association (NOAA) to include an endangered Hawksbill Turtle Habitat, and possibly house other threatened and endangered species in the future.

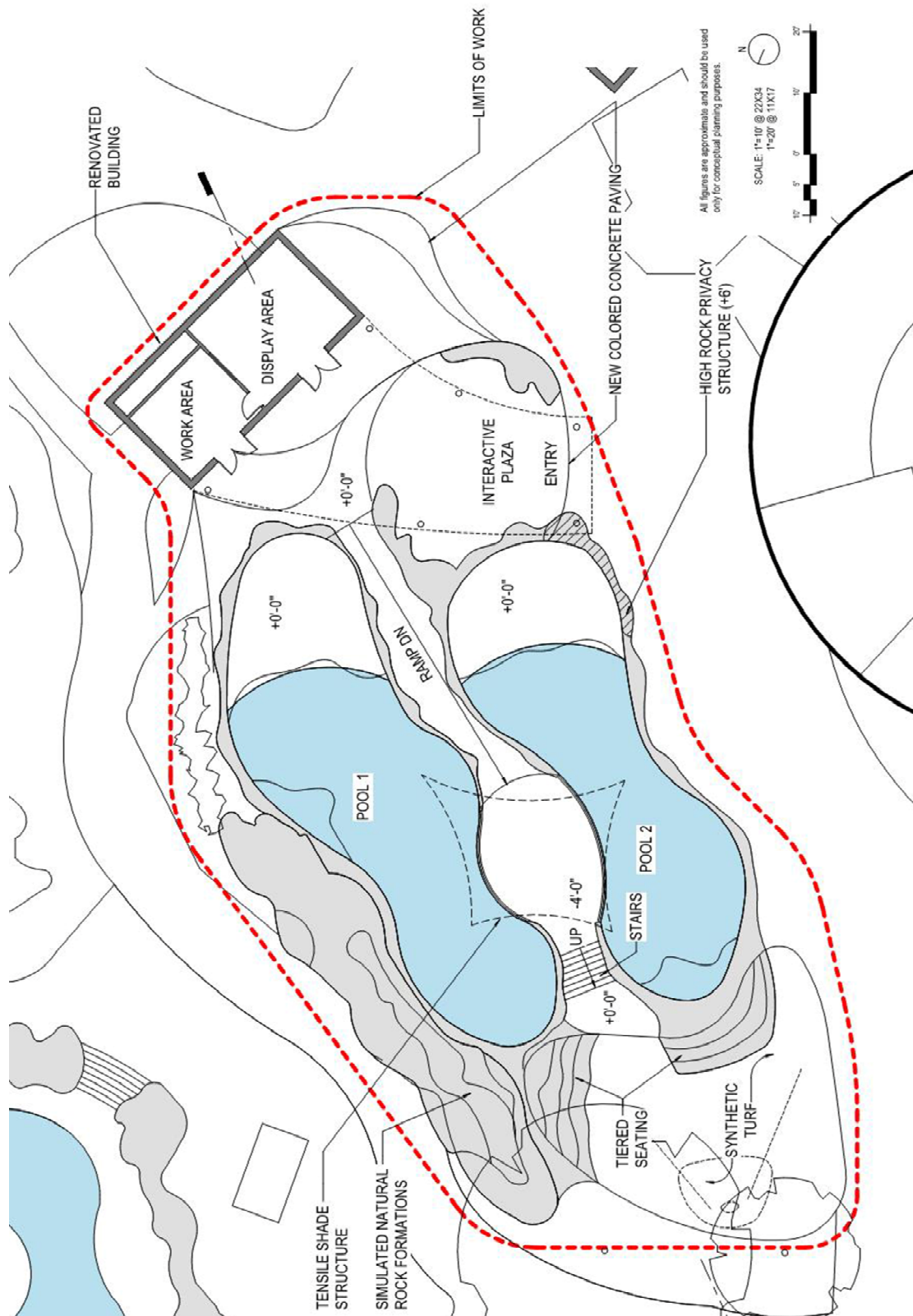


Figure 2.10

Honu Conservation Center Concept

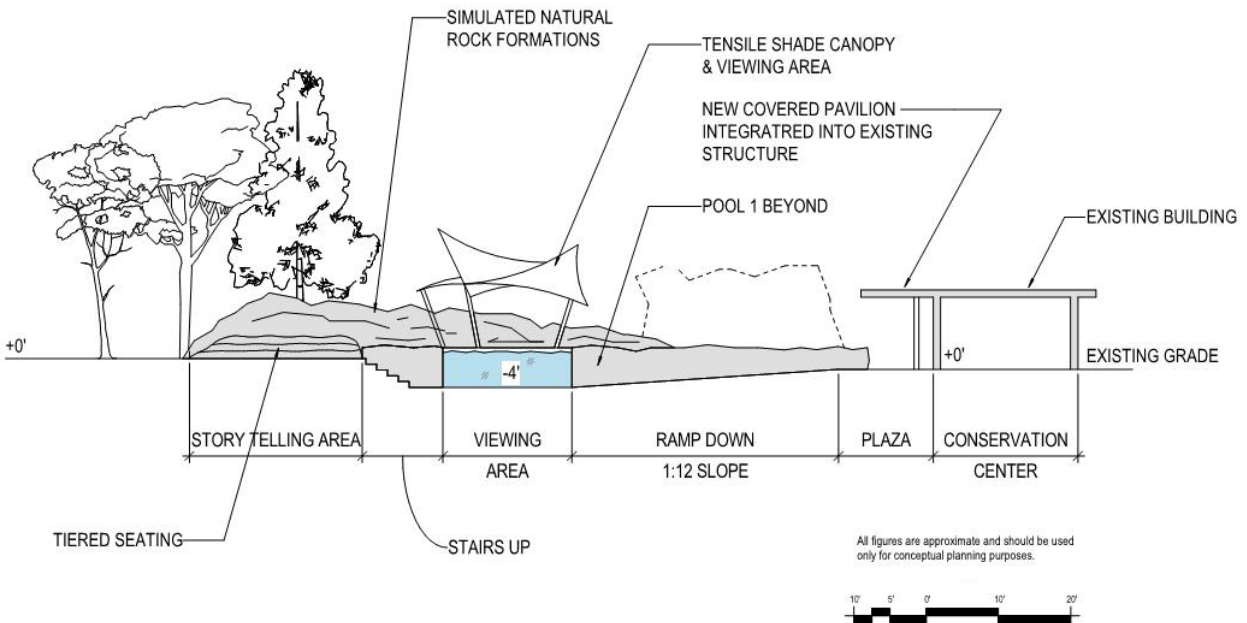


Figure 2.11

Honu Conservation Center

2.9 Ocean Oddities Indoor Aquarium

A new indoor aquarium facility will be constructed adjacent to the existing Shark Cave, incorporating unusual Hawaiian Islands native fish and invertebrates. This will be a highly themed experience, transporting the visitor into a deep-sea submarine voyage storyline. This aquarium will offer an additional climate-controlled facility, increasing the overall length of stay for visitors. The building is envisioned to be cool and darkened to create a sense of submarine voyage and a deep-sea ambiance. The floor will ramp down as the visitor travels through the aquarium to further reinforce the feeling of descending down into the depths of the ocean.

The one-story building will be approximately 15,400 sf and 15 to 20 feet high to allow for ample ceiling heights and a catwalk structure to service tanks from above. The aquarium will be a simple windowless building with glazing at the front wall, an iconic entry feature and a covered front lanai. The building will be CMU construction with a flat roof and parapet, with lava rock veneer cladding to blend into the surrounding landscape. A new entry plaza will be constructed to create a sense of arrival and excitement as visitors navigate to this new attraction.

An entry lobby with stage and reception desk area will lead visitors to three separate zones within the building (Sunlight Zone, Twilight Zone, and Midnight Zone) before connecting to the exit/gift shop area (Figure 2.12). A rotating exhibit area will be located adjacent to the entry lobby and exit area where temporary exhibits will be located for educational talks.

This exhibit will replace the existing Kolohe Kai Sea Lion Show facility. The sea lions will be located at either the renovated HOT facility or the Sea Lion Feeding Pool.

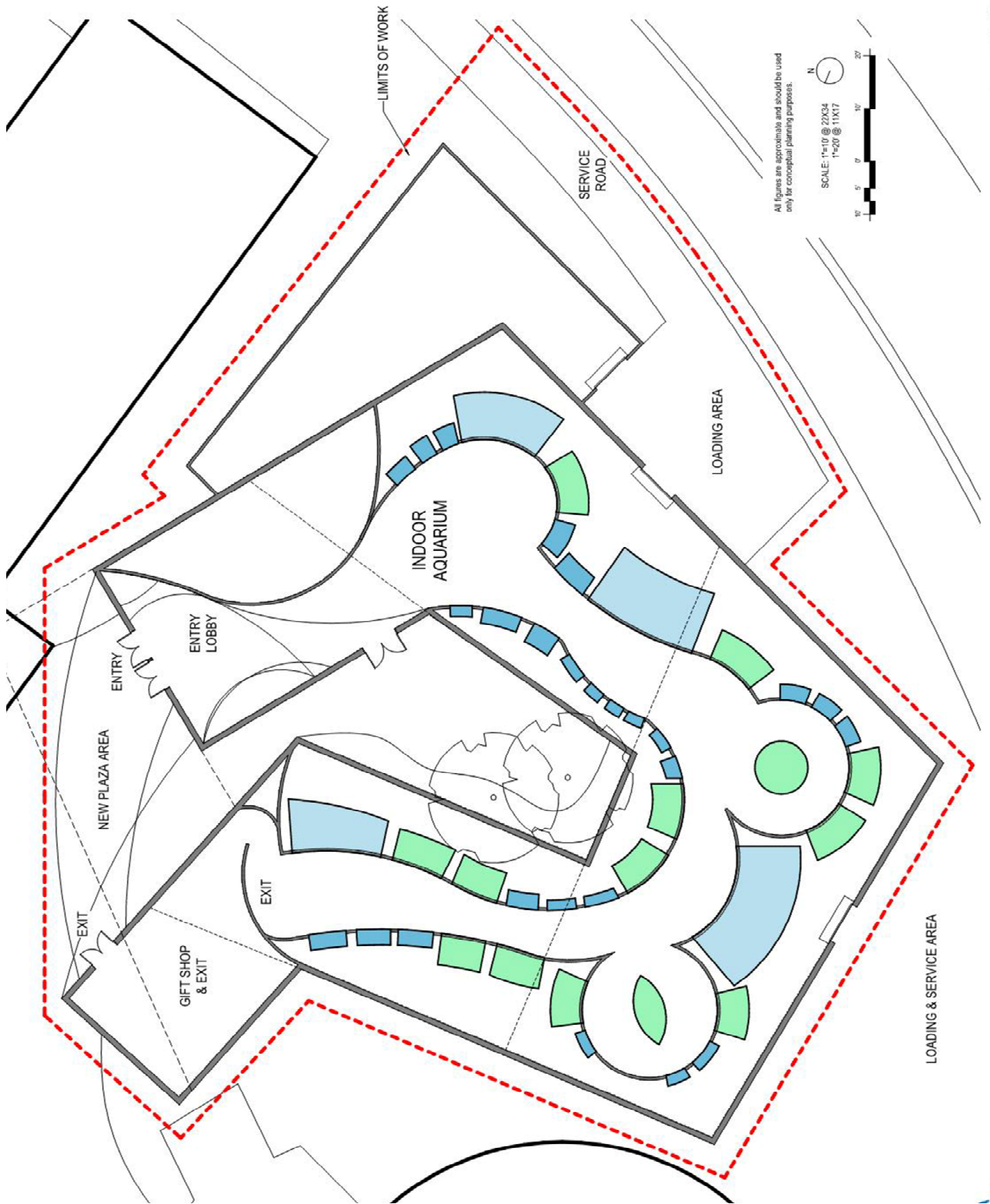


Figure 2.12

Indoor Aquarium Concept



Figure 2.13

Ocean Oddities Indoor Aquarium Rendering

2.10 Kaupō Fishing Village

The existing lū'au area will be re-purposed for the Kaupō Fishing Village. With a spectacular seascape overlooking the Pacific Ocean, Kaupō Fishing Village will be one of SLP's largest venues (*Figure 2.14*). The current lū'au facilities include a performance stage, a roofed Pavilion that can accommodate up to 240 visitors, and a thatched-roof bar. The lawn area can accommodate up to 650 visitors for a seated dinner.

The existing lū'au events area will be re-themed to portray the ancient Hawaiian fishing village of Kaupō and display a fishing stone and canoes. Replica fishing village structures will be constructed at 25 feet high within the Kaupō Fishing Village area, to include demonstrations of canoe carving, hale thatching, fabricating fishing nets, mat weaving, and food preparation. Sea Life Park is partnering with the local Waimānalo community and encourages student involvement. Hawaiian architectural elements, thatched roofs and carved columns will be added to existing buildings. The archway will include themed signage and landscaping to better define the visitor path.



The lū'au support facilities will be improved with the construction of two 15-foot 4-inch high permanent dressing rooms separated by a breezeway, breakroom, storage, and cast restroom, including an ADA-compliant sidewalk. There will also be improvements to the existing service road and trash collection area.

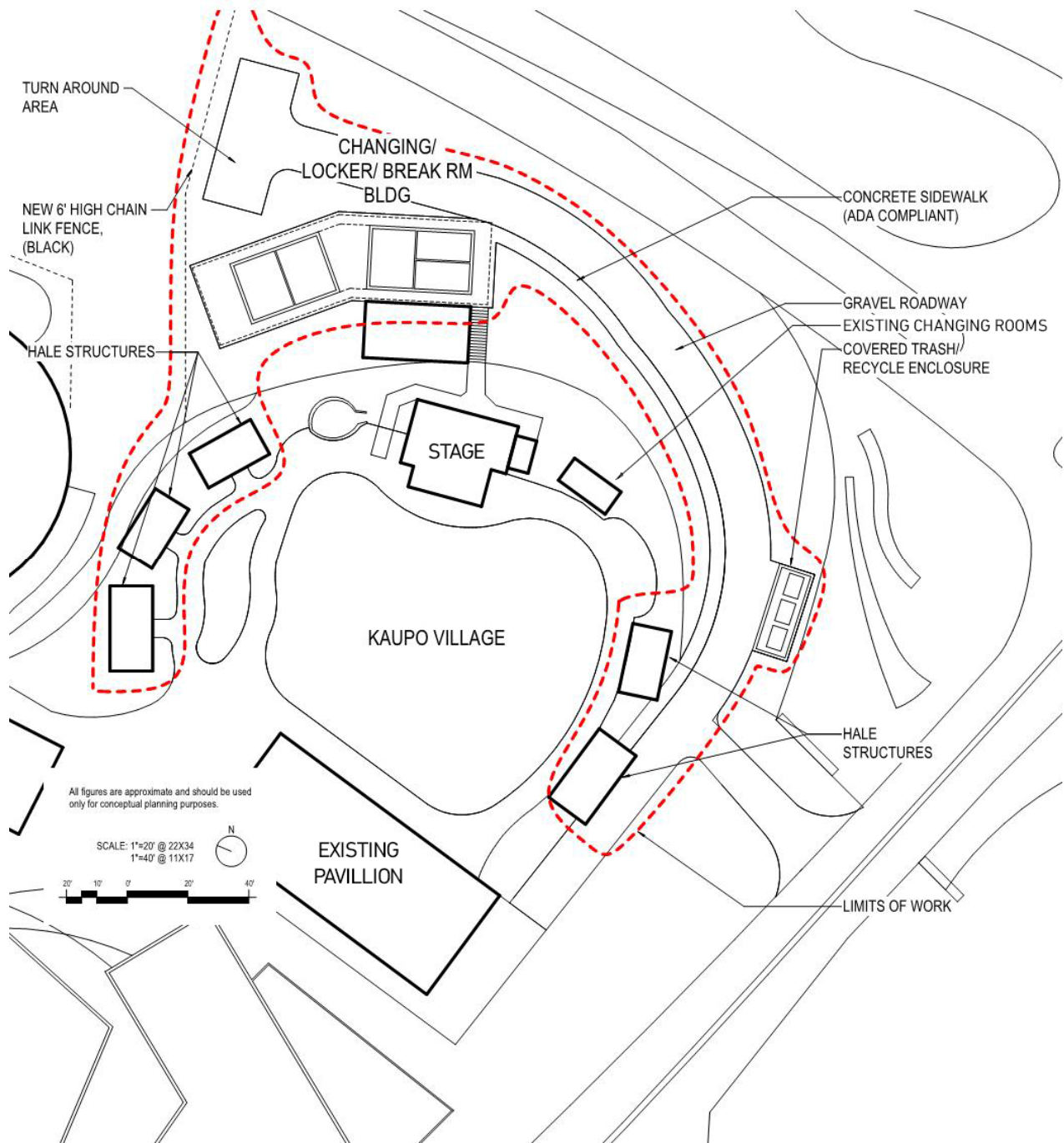


Figure 2.14

Kaupō Fishing Village Concept

2.11 Hawai'i Ocean Theatre

The existing 11,000 sf Hawai'i Ocean Theatre (HOT) features a large circular, glass-walled tank that holds 220,000 gallons with seating for 650 under one roof. This existing facility allows viewers to see the animals that are performing both below and above the water's surface. The HOT provides a performance for Pacific and Atlantic bottlenose dolphins, California sea lions, and Humboldt penguins. Attached to the HOT are two cetacean holding tanks.

The HOT is currently out of service due to the extent of needed repairs. This exhibit will be converted back to the original Sea Lion and Penguin concept. Dolphins will not be shown at this facility. Renovation of the HOT will include replacing the original 1963 wood and asbestos/fiberglass roof. The new roof height will remain the same as the existing at 28 feet. A new roof will provide shelter for the audience, and the seating area will be updated to current standards. An additional viewing level will be constructed for above-performance seating. A lower level for below-water tank observation will be created (*Figures 2.15, 2.16*). Additional showtimes can make up for potential reduced seating capacity. Theming of the area will be improved by upgrading rockwork and signage styles and colors, and bringing in more of the Hawaiian-themed elements.

The sea lion pool will be U.S. Department of Agriculture compliant, with two holding areas and haul-out locations to accommodate four sea lions (*Figure 2.17*). A deck will be extended over the existing holding tanks located behind the HOT to create a large dry haul out area. The holding tanks and haul out area will have a glass guardrail above simulated rock structures to allow visitors to see them at rest. A gate system will be used to separate the holding tanks from the main sea lion pool.

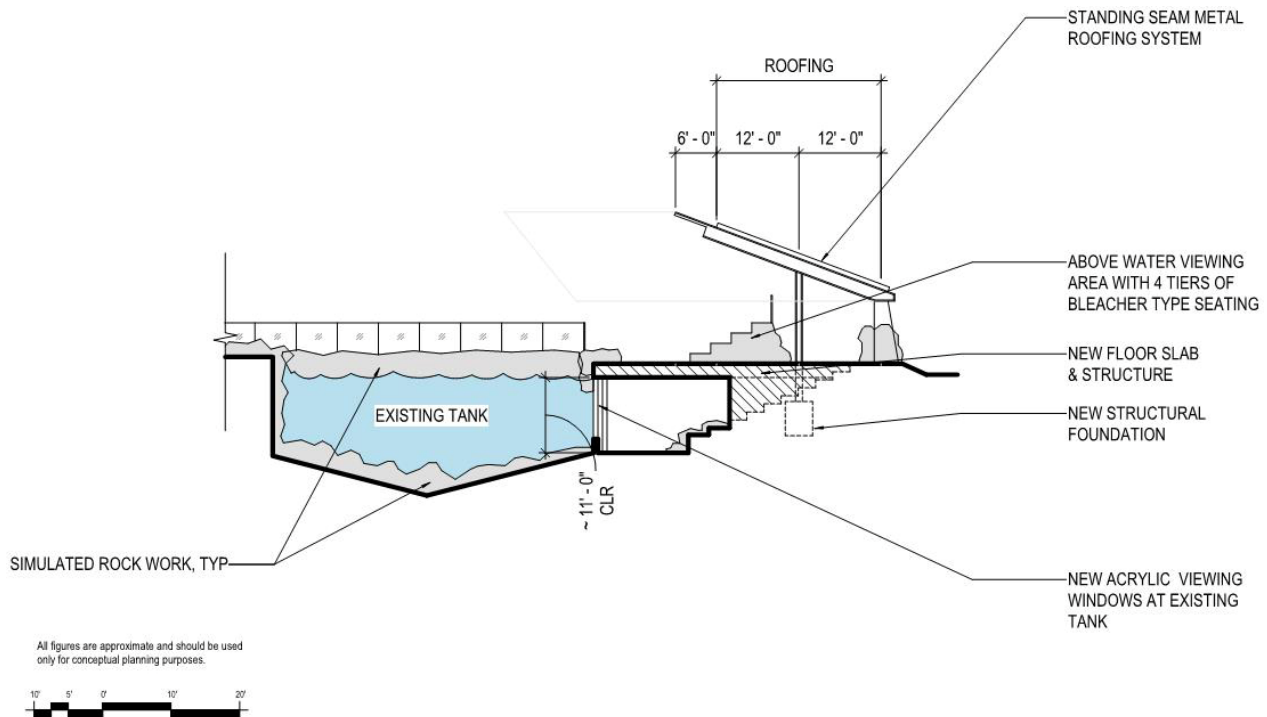


Figure 2.15

Hawai'i Ocean Theatre Split-level Viewing Concept



Figure 2.16

Hawai'i Ocean Theatre Split-level Viewing Example

2.12 Penguin Cove

A natural habitat and exhibit space for the South American Humboldt and/or African Penguins will be constructed adjacent to the Sea Lion exhibit (*Figure 2.17*). Humboldt Penguins have survived through protective laws and a Species Survival Plan of which SLP has participated. African Penguins have been sliding towards extinction since industrial fishing started around the Cape. This exhibit at SLP will help to educate the public about the penguins' plight. The current 1,000 sf Penguin exhibit will become part of the children's play area, and the animals will be relocated to this new exhibit. The Penguin Cove will have an above-ground pool with a 6-foot high underwater viewing window. A lava rock backdrop will be designed to simulate the penguin's natural environment and serve as a breeding site. It will have a beach typical of the South American and African beaches where these warm-weathered endangered penguins are found. Water inlets through small waterfalls and streams will flow through to the beach. The setting will be similar to actual penguin rookeries. The area will also be designed to allow for lectures and presentations.

2.13 Wiki Wiki Snack Bar

The existing 460 sf Snack Bar will be renovated to provide a more efficient operation. A new menu will include healthy options and kid-friendly menu items featuring local style foods. Grab and go pre-packaged foods will also improve service time. The building will be updated by summer 2019, with replacement of the umbrellas and signage.

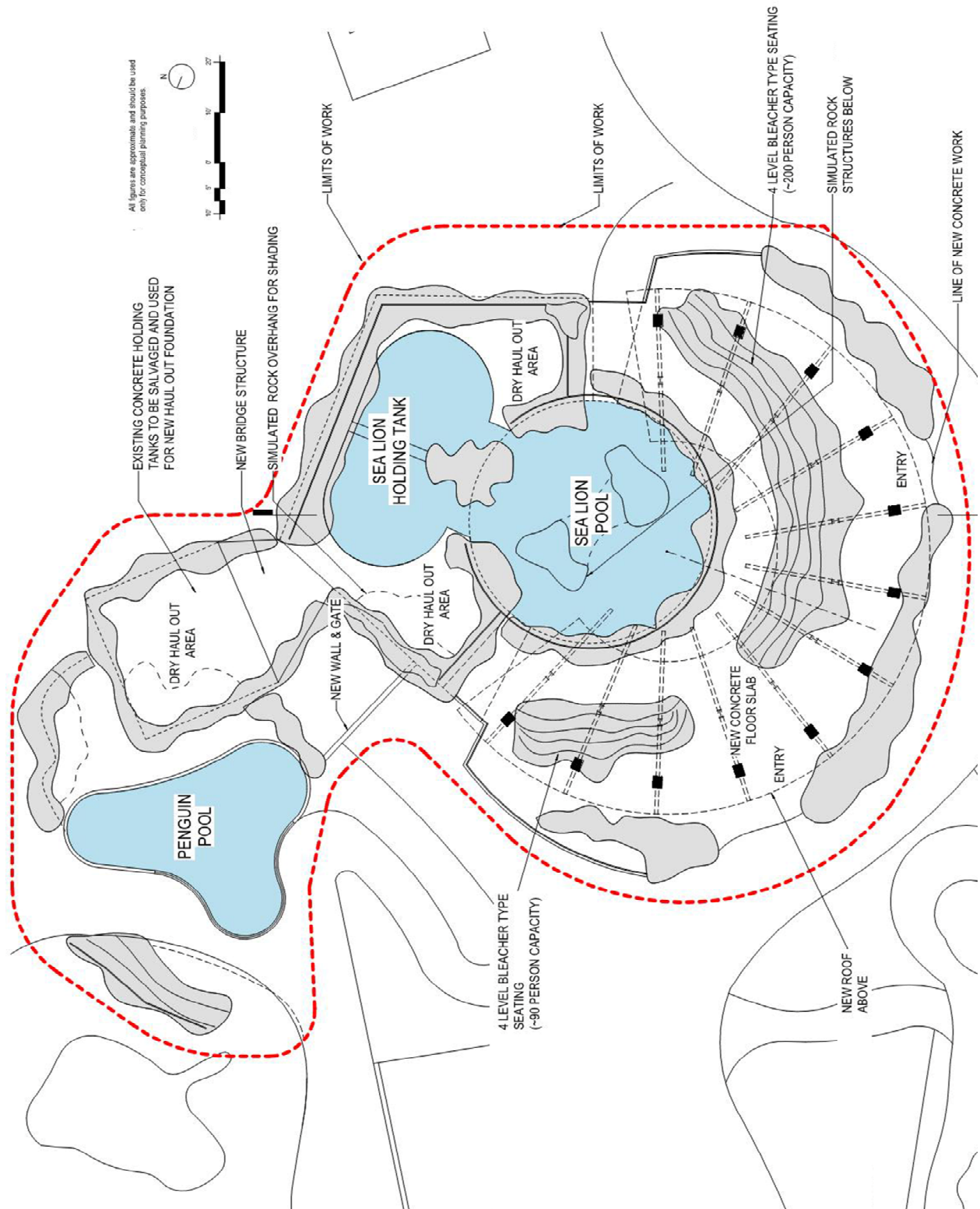


Figure 2.17

Hawai'i Ocean Theatre Concept

2.14 Seabird Sanctuary and Hale Manu Aviary

Sea Life Park has raised and rehabilitated seabirds since the mid 1960's. Outside of the Park's campus in the parking lot is the Seabird Rehabilitation Center where, each year, approximately 600 to 700 seabirds (1,600 in one peak year) are taken in and treated for injury, exhaustion, dehydration or illness. Since 2005, the Park has rescued and released thousands of seabirds. Sea Life Park was the only place on O'ahu up until 2016 and is now one of only two facilities where someone may bring an injured seabird 24 hours a day, seven days a week. Other drop-off locations around the island are available during limited hours.

When brought to the existing 500 sf Rehabilitation Center, the seabirds receive rest, water and a seabird diet consisting of an assortment of fish (smelt, herring and squid). All are treated with the aim of a successful release back into the wild. Types of birds that are often cared for include terns, shearwaters, albatross, petrels, frigates and boobies. Some birds unable to go back into the wild have become permanent residents of the 3,879 sf Seabird Sanctuary, allowing for public display and education.

The Hale Manu Aviary is home to more than 400 cockatiels and lovebirds. This 2,000 sf exhibit was built as a "value added" attraction to give children greater opportunity to participate in animal activities at the park. All visitors are welcome to step inside the aviary and enjoy the bird's company during posted hours. Feeding sticks are available at no charge.

The Seabird Sanctuary and Hale Manu Aviary will be relocated from their existing locations. The existing Seabird Rehabilitation Center in the parking lot does not meet new standards for bird holding. A new 11-foot 9-inch high, 600 sf rehabilitation and intake center to allow residents to drop off injured/ill birds will be constructed at the northernmost point of the parking lot (*Figure 2.18*). The Seabird Sanctuary will be relocated adjacent to this new drop-off location, in the low area sheltered behind the existing hedges to screen the Sanctuary from Kalaniana'ole Highway view planes. The existing rehabilitation center will be converted to additional parking.

An 18-foot high covered pavilion structure will provide a shaded viewing area as well as shade portions of the 4,000 sf Seabird Sanctuary. The seabird rehabilitation building will also be located under the covered pavilion with a planned floor area of 2,000 sf. An entrance sign, trellis and landscaping will lead visitors to this new bird sanctuary. Entrance to the Seabird Sanctuary area will occur behind the Dolphin Lagoon bleachers and guide visitors behind the grandstands and around back to a new ADA-compliant walkway and scenic lookout areas. A vertical screen will be installed in the area behind the grandstands, and a trellis with a seabird education kiosk will be located along this route. Additionally, an elevated boardwalk around the perimeter of the Dolphin Lagoon will create a nature walk around this portion of the Park, creating an opportunity for viewing and seating areas along the path.

The existing Hale Manu Aviary is the location for the Menehune Island Splash Play Area as described in *Section 2.15*. The current Seabird Sanctuary space will become the location of the new, larger 2,300 sf interactive aviary (*Figure 2.18*). The bird habitats will each have a conservation story for the public's education. A small 16-foot high covered visitor pavilion will shade the south end of the 18-foot high netted aviary area to give guests and birds partial shade. A nearby retail kiosk will offer a variety of bird-themed items.

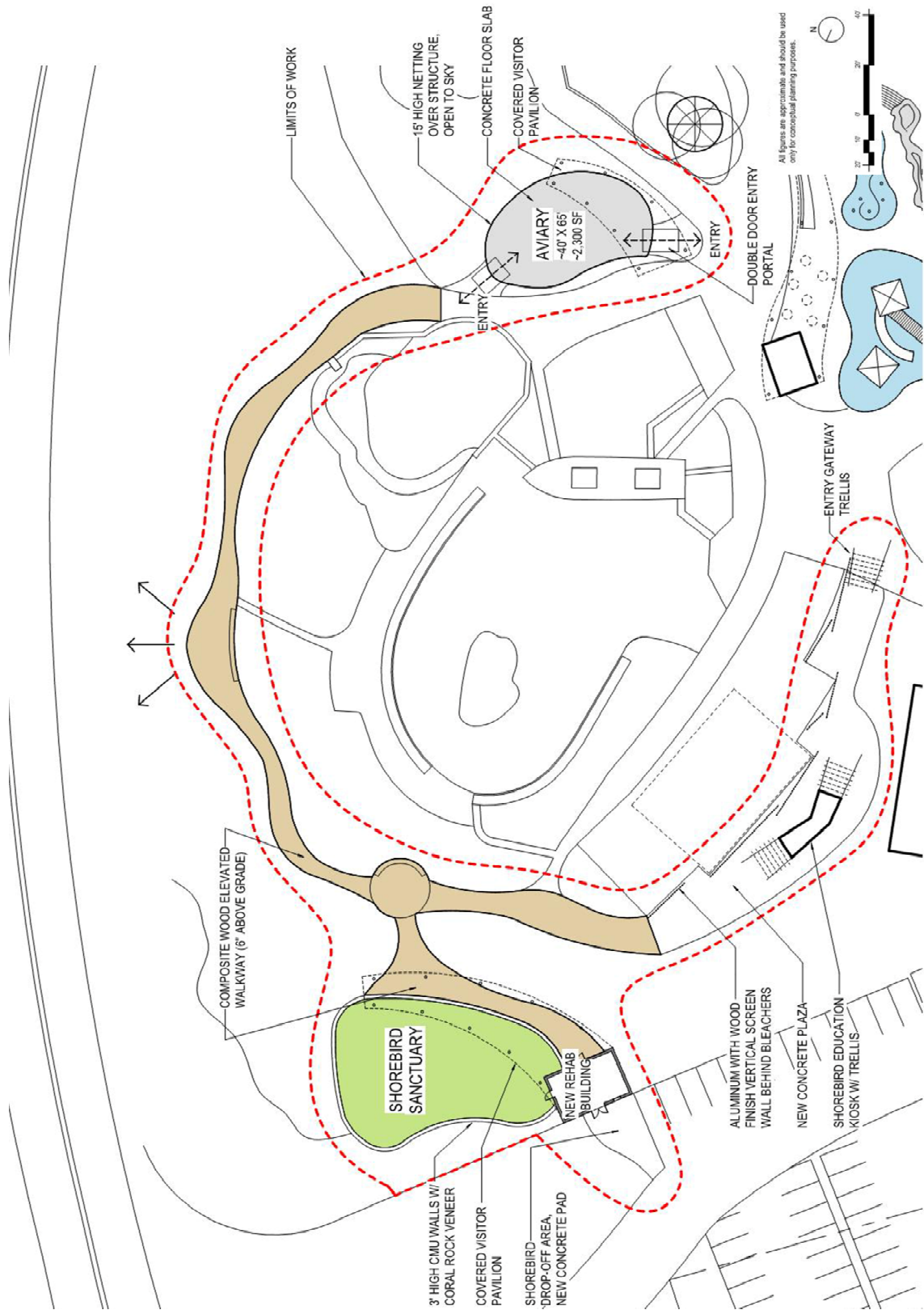


Figure 2.18

Relocated Seabird Sanctuary and Hale Manu Aviary Concept

2.15 Menehune Island Splash Play Area

The Adventure Kids Play Zone will be enlarged to include a new Menehune Island Splash Play Area with two water areas (*Figure 2.19*). One area will be a toddler play area with bubblers and sprays for the younger kids to enjoy. The other play area will potentially have a multi-level water play area and adventure course. Water features will include blow holes, volcano vents, spray guns and fountains. Caves will allow for exploring and rock climbing. The hardscapes and two-story pavilions with a total floor area of 3,350 sf, will be softened with perimeter landscaping, replacing the existing Hale Manu Aviary (see *Section 2.14*). The Splash Play Area will provide a cooling off area on hot days, appealing to visiting families. A new stair connection from the existing playground areas will create a larger Keiki play area encompassing the playground and water play areas into a larger Keiki Play Area. A new 18-foot high sloped covered pavilion adjacent to the water play areas will provide shaded seating for parents. The existing retail building will be incorporated into the new pavilion structure to create a cohesive environment around the splash pool area.

A new Sea Life Carousel will be a marine-themed carousel located in the Keiki zone. Guests can choose to ride their favorite sea horse, monk seal, honu, or other sea creature that floats up and down to the sounds of the sea. Visitors both young and old can take a pleasant spin on this colorful menagerie from the deep.

2.16 Beach Boy Lanai

The main eatery of SLP is the existing Beach Boy Lanai Food Court, which is a 14,900 sf fast-food snack bar operation. A large tabled patio area offers views of the sea lions, Dolphin Lagoon, and Mānana Island just offshore. The food court has seating for 270 and is operated by SLP. The kitchen facilities are adequate to cater to lū'aus or other functions up to approximately 700 people.

Design upgrades to the restaurant area and entry way will emphasize a Hawaiian sense of place. Upgrades to the kitchen will offer improved flooring, lighting and service areas. Loading and the bulk of the storage will occur on the first level. The second level will include an open-air deck located immediately above the food court (second floor height), commanding a panoramic view of the Pacific Ocean, the offshore Islands, and SLP (*Figure 2.20*). The rooftop deck will be constructed on top of the current roof at a height of 10 feet, with a 42-inch guardrail. Current roof gables will be replaced for a total building height of 18 feet, 6 inches. The second level can be accessed via outside stairs, an elevator in the concierge, and from the entry building bridge. The open-air deck will be available for private events and parties. Portions of the roof without the deck will accommodate a green roof, with movable 3x3 planter pans. This section of the roof may be used in the future for the installation of photovoltaic panels.

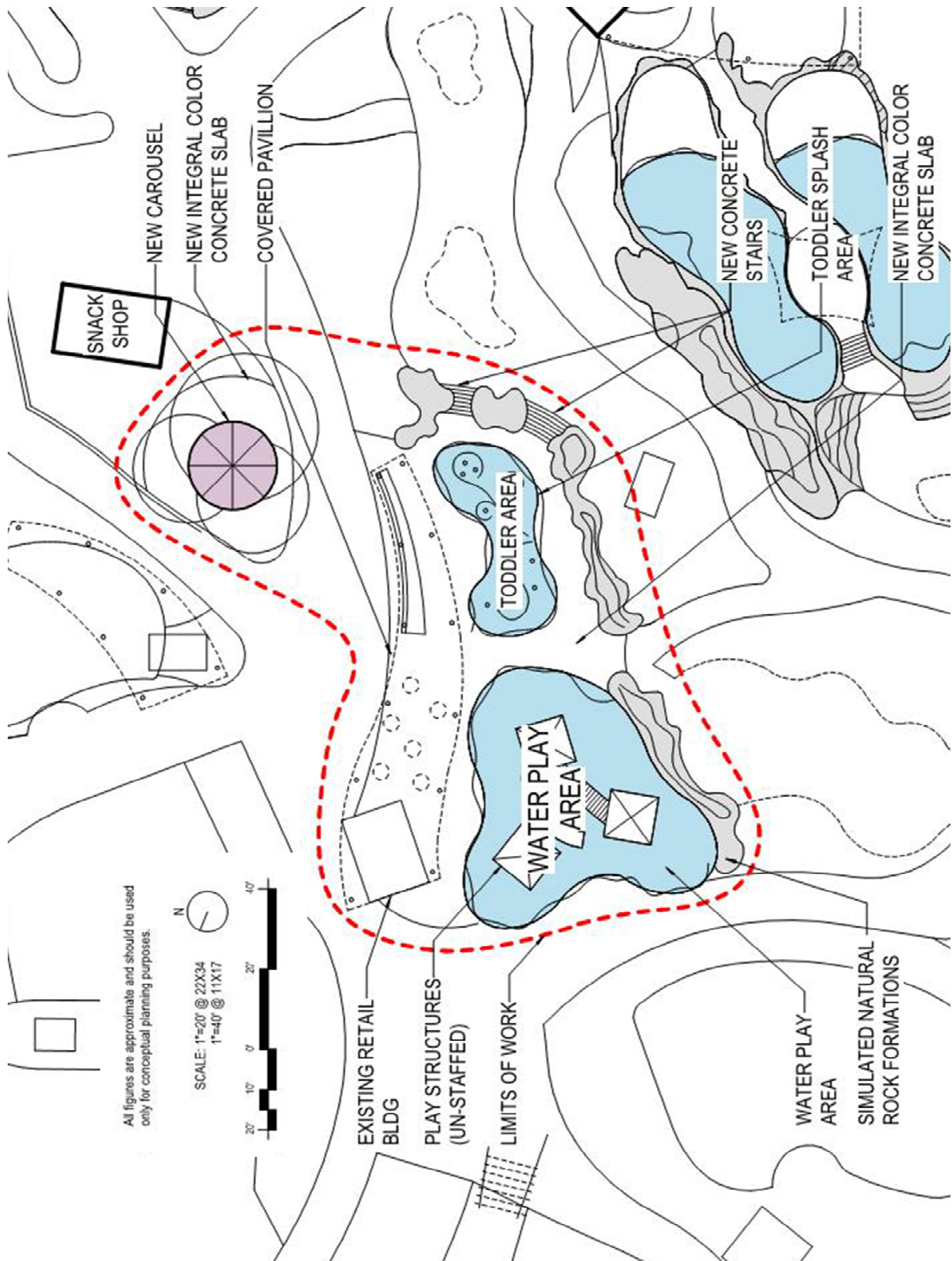


Figure 2.19

Menehune Island Splash Play Area Concept

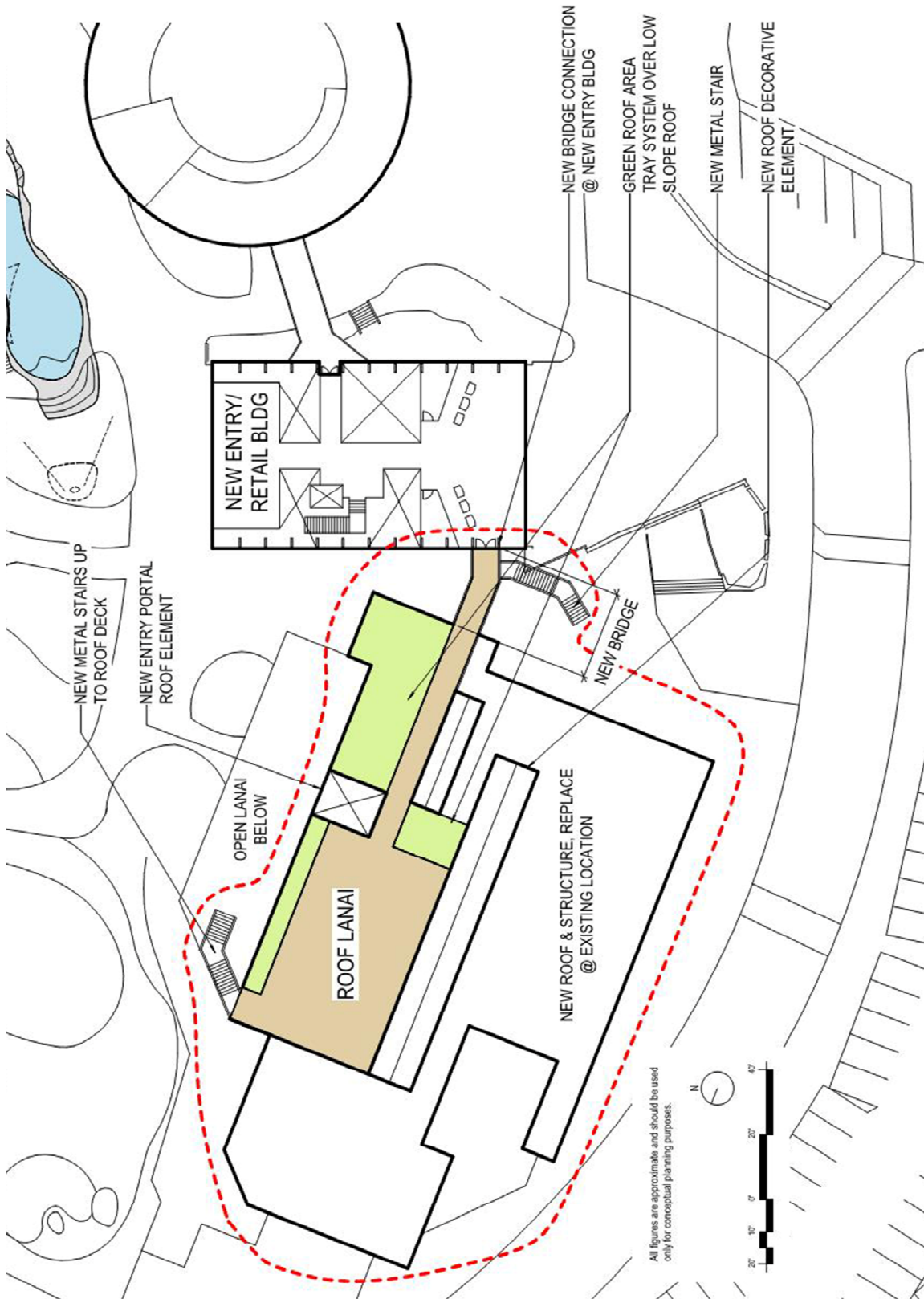


Figure 2.20

Beach Boy Lanai Roof Deck Concept

2.17 Conservation Center and Museum

The existing 2,400 sf building nestled between the Beachboy Lanai Food Court and Sea Lion Feeding Pool houses the Adventure Center activity check-in and Seaside Boutique. Program space for these two activities will move into new entry/retail building. At one time home to the Whaler's Museum, this building will again function as a museum and conservation center with interactive displays, and offices upstairs.

2.18 Circulation and Off-Street Parking

The existing paved parking area provides spaces for 199 visitors, 55 employees and six buses. As one of the many stops on the Mini Circle Island Tour, buses regularly stop for a two-hour visit to the Park for the exhibits, restaurant and/or the shops. Employees of both SLP and Oceanic Institute share parking near the western entrance of the property. The visitor parking lot rate is currently \$5 per vehicle.

Parking is currently at maximum capacity and expansion of the parking area will add 116 visitor spaces and 30 employee parking spaces (*Figure 2.21*). With the proposed expansion the parking lot capacity will accommodate 315 visitor spaces and 85 employee spaces. Approximately 50 overflow spaces will also be provided on the south side of the parking area. The existing six bus spaces located at the visitor drop off area will remain, and an additional five bus parking spaces (plus five overflow spaces) will be added in a north end holding area. Existing maintenance areas will be condensed, and the seabird drop-off facility will be relocated to the northern area of the lot to allow for expanded parking.

A new pedestrian promenade will be constructed to cross the driveway between the main park and the Training/Backstage Interactive Pools and Aloha Discovery Pool. Currently circulation causes a conflict between pedestrian traffic and cars exiting the park on the western end. In the future, cars will exit from the east driveway. Only buses and employees will continue to exit via the western driveway. The west parking lot will continue to be used for park employees and buses.

Off-Street Parking and Loading. Adequate off-street parking will be provided to support the existing and new facilities, as determined by the DPP Director per the City and County of Honolulu Land Use Ordinance (LUO) Sec. 21-6.20. The 2010 Americans with Disabilities Act Standards for Accessible Design requires eight accessible parking spaces per 301 to 400 total provided parking spaces. Four ADA compliant spaces will be added to the current four for a total of eight, as required for the total 400 parking spaces. The employee parking area will add three ADA-compliant spaces to the current one for a total of the required four spaces, as required for 76 to 100 spaces.

The number of off-street loading spaces required for SLP amount to three spaces (*Table 2.2*), as required under LUO Section 21-6.100 Off-street Loading Requirements for Use Category A (Retail). Two loading spaces are already provided at the rear of the Beach Boy Lanai, and loading access for a third truck can be accommodated along the driveway. An additional loading area will be made available behind the new Indoor Aquarium.

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2.19 Landscaping

As part of the redevelopment of SLP, the landscape in each area will be refreshed, bringing a vibrant feel to the park while complementing the natural park site. To enhance thematic immersion and ensure cohesion across the park, native plants indicative of the coastal, moderately dry ecosystem will be planted, creating the bulk of the base greenery of the park (Table 2.2, Figures 2.22, 2.23). Vibrant tropical flowers will be used as color enhancements to accent the green background across the Park landscape.

Table 2.2 Proposed Landscaping	
Common Name	Scientific Name
Coconut Palm	<i>Cocos nucifera</i>
Naupaka	<i>Scaevola sericea</i>
‘Ōhai	<i>Sesbania tomentosa</i>
Seagrape	<i>Coccoloba uvifera</i>
Plumeria	<i>Plumeria rubra</i>
Heliconia	<i>Heliconia psittacorum</i>
Hala	<i>Pandanus tectorius</i>
Noni	<i>Morinda citrifolia</i>
Guava	<i>Psidium guajava</i>
Ti Plant (various varieties)	<i>Cordyline fruticosa</i>
Hibiscus, Hau (variegated)	<i>Hibiscus tiliaceus</i>
‘Ae‘ae	<i>Bacopa monnieri</i>
Ūlei	<i>Osteomeles anthyllidifolia</i>
‘A‘ali‘i	<i>Dodonaea viscosa</i>
Alahe‘e	<i>Psydrax odorata</i>
Pa‘u O Hi‘iaka	<i>Jacquemontia ovalifolia</i>



'Ae'ae



Naupaka



'Ōhai



Pa'u O Hi'iaka



Seagrape



Ūlei



Heliconia



Ti Plant (various varieties)



'A'ali'i

Figure 2.22

Plant Palette



Alahe'e



Guava



Hala



Hibiscus, Hau (variegated)



Noni



Plumeria



Coconut Palm

Figure 2.23

Plant Palette 2

2.20 Lighting

Appropriately themed lighting will be a key element to reinforce the storyline of the updated SLP. Standardization of the fixtures enhances the thematic aura of the park and serves to improve the visual aesthetic of the park. Proper and uniform illumination will enhance and reinforce the visitor experience during low-light operations and provide safer operations.

Illumination updates will enhance park promenades, area development and landscaping as well as in-exhibit lighting in the habitats, pools and aquariums. Selection and installation of consistently-themed light fixtures will enhance the visitor experience. Exterior facility lighting fixtures will be directed downward and shielded to minimize the potential for interactions of nocturnally flying seabirds with external lights or other structures.

2.21 Various Site Information

Signs. The signage and graphics of SLP will be consistent with LUO sign regulations and will reinforce area thematic stylings and the park storyline, while clearly and directly conveying critical information. This very visible and key element of the visitor experience requires a consistent design approach that will immediately and clearly communicate the intent of the signage enabling Visitors to differentiate among the types of signage. Graphic content will be to the point and appropriately sized for maximum readability.

Wayfinding signage will be located within each zone and exhibit. This signage will be graphically clear and direct to enable quick recognition of signage to expedite visitor navigational decisions. A consistent wayfinding style will enable visitors to easily identify its function regardless of location within the park. A minimal thematic treatment will be employed to strengthen the overall park graphic style.

Education, as a key component of the SLP experience, requires visual consistency across the park. Educational signage will be executed utilizing a single and cohesive graphic style that facilitates immediate visitor recognition as educational content. Copy will be properly sized, well composed and easy to read and understand. The visual presentation of the educational signage becomes a powerful tool to communicate and share animal information and facts composed by the educational staff of SLP.

Setbacks, Yards and Other Open Spaces. SLP will be consistent with LUO yard setback standards for P-2 Preservation of 30 ft for front yards and 15 ft for side/rear yards. The lū'au dressing room will be located at distance of approximately 60 feet from the closest property boundary along Kalaniana'ole Highway.

Height, Bulk and Location of Structures. SLP will be generally consistent with LUO development standards Table 21-3.1 for P-2 maximum building heights (15 to 25 ft), building areas (5% of zoning lot), and height setbacks (one foot for each two feet of additional height above 15 ft) for all structures within the P-1 District.

2.22 Hours and Manner of Operation

Current SLP hours of operation for the park exhibits are from 9:30 a.m. to 4:30 p.m., seven days a week. The Lū'au operates from 5:15 p.m. to 8:30 p.m. five days a week – Sunday, Monday, Tuesday, Wednesday, Friday. Special events, such as private parties or concerts, typically occur on Saturday evening. SLP will adjust hours of operation based on the needs of park programs.

Sea Life Park employs approximately 160 local residents. Current visitor count ranges between 560 (2016) to 1,070 (2017) visitors per day. In 1996, park attendance reached 1,400 visitors per day. The proposed improvements are primarily to accommodate the current numbers and support some limited growth over the next ten years. Sea Life Park is planning for up to 1,300 visitors per day.

2.23 Required Permits and Approvals

State Special Management Area Use Permit (SMP) - The proposed area of use is located within the SMA and will require the approval of an SMA Use-Major Permit application (*Table 2.3*). The SMP is a prerequisite for other permits, in that denial of an SMP obviates the need for other permits; therefore, application for other permits is not expected until the SMP is granted.

Many of the exhibits and facilities have reached the end of their useful life and now need to be replaced or remodeled. A new entry concierge and retail/gift shop architectural and engineering design were completed in December 2017. The building plans were submitted to DPP Building Division. Plan approval is dependent upon submittal of a Special Management Area (SMA) Use Permit, Major.

Review by State Board of Land and Natural Resources (BLNR) – The existing and proposed uses at SLP are consistent with the conservation and education principals for which the park was established. As the planned improvements are located in the Conservation District, the proposal requires review by the State BLNR to ensure that the improvements meet the intent and purpose of the Sea Life Park Special Subzone (for recreational, educational, and commercial purposes). The proposed modifications and improvements will be presented to the general public via a public hearing due to the commercial nature of the attraction, and then to the Board for approval. Presentation to the Board will take place upon the completion of the HRS, Chapter 343 process and obtaining the County SMP approval.

Other Permits and Approvals - There are other permits and approvals that are categorized as “ministerial” because they do not require approval by a commission or department director. These approvals include a Grading, Grubbing and Stockpiling Permit and Building Permits, which will be obtained in advance of construction. Approval from the State Department of Health is required for the individual wastewater treatment and disposal system.

Table 2.3 Proposed Modifications Requiring Special Management Area Use Permit		
Project	Type of Improvement	SMP Required
Entry Feature	New sign	Exempt
Entry Concierge and Gift Shop	New Building	SMP
Shark Cave	Interior Renovation	Exempt
Honu Conservation and Education Center	Building Renovation and Animal Husbandry Exhibit	Exempt
Ocean Oddities Indoor Aquarium	New Building	SMP
Kaupō Fishing Village and Lū'au Support Facilities	New Structures	SMP
Hawai'i Ocean Theater	New Building	SMP
Penguin Cove	Animal Husbandry Exhibit	Exempt
Snack Bar	Renovation	Exempt
Seabird Sanctuary and Hale Manu Aviary	Animal Husbandry Exhibit	Exempt
Menehune Island Splash Play Area	New Structure	SMP
Beach Boy Lanai	Renovations and Deck Installation	SMP
Conservation Center and Museum	Interior Renovation	Exempt
Parking	Expansion and Paving	Previously Approved per 79/SMA-18

Section 3

**Environmental Setting,
Potential Impacts,
and Mitigation Measures**

Chapter 3

Environmental Setting, Potential Impacts, and Mitigation Measures

The environmental setting, potential impacts, and mitigation measures for the proposed improvements to Sea Life Park (SLP) are addressed in the sections below.

3.1 Climate

Existing Conditions

Average annual temperature in the Makapu'u region is generally within the low to mid 70s (degrees Fahrenheit), depending upon the time of day and the season. Precipitation in the area is moderate, with annual rainfall averaging approximately 26 inches annually – the majority of which occurs during the months of February, March and December. Makapu'u Point is one of the three windiest locations on O'ahu. The wind sensor located at Bellows Air Force base has recorded wind speeds at 25 miles per hour (mph) or more in the months of October, November and December. Approximately 25% of the time wind speeds are 20 mph or greater throughout the year, with 15 mph winds approximately 50% of the time.

Anticipated Impacts and Proposed Mitigation

The proposed action will have no effect on climatic conditions, therefore no mitigation measures are required.

3.2 Topography

Existing Conditions

The site slopes gently to the north and the east. The parking lot sits at the highest point of the property at approximately 80 feet (ft) above mean sea level (MSL). The existing park facilities along the access driveways are set at elevations ranging from 50 ft to 70 ft above MSL. The lowest elevation in the improvements area on the property is at an elevation of 40 ft above MSL. The northern park entrance along Kalaniana'ole Highway is at elevation 30 ft above MSL, while the southern park entrance sits at elevation 50 ft above MSL (*Figure 3.1*).

Anticipated Impacts and Proposed Mitigation

The proposed improvements will not have any significant impacts to the overall topography of the SLP site. Modifications to site topography are addressed under *Section 3.3 Soils and Grading*.



Figure 3.1

Soil Classifications

(Source: U.S. Department of Agriculture Soil Conservation Service)

3.3 Soils and Grading

Existing Conditions

The SLP site contains soils classified within land capability groupings as fill land (FL), rock land (rRK) and rock outcrop (rRo) (*Figure 3.1*).

- FL (Fill land) – These lands are generally found on coastal, low-lying areas of Kaua’i, O’ahu, and Maui. These types of soils were once used for disposal of waste such as dredging, garbage, and old sugar mill waste. Fill land has moderate water holding capacity and extremely fast permeability. Lands with these types of soil are suitable for urban development.
- rRK (Rock land) – These areas have very shallow soils and are also comprised of exposed bedrock. Found on all islands, rock lands are commonly found along mountain ridges that range in elevation and slope. These lands have high water holding capacity for areas covered with soil but have little to no water holding capacity in areas covered primarily by bedrock. This soil is very susceptible to runoff and erosion on steep slopes. Uses are generally limited to pasture, woodland, or wildlife habitat. The weak physical structure and steep slope make these lands unsuitable for engineering and cultivation. The thin soil layer also swells when wetted and shrinks when dried.
- rRo (Rock outcrop) - Rock outcrop consists of areas where exposed bedrock covers more than 90 percent of the surface. Found on all islands, the rock outcrops are mainly basalt and andesite, gently sloping to precipitous, with elevations ranging from nearly sea level to 10,000 feet. This land type is used for water supply, wildlife habitat, and recreation.

The fill land (FL) straddles Kalaniana’ole Highway and the front portion of the Park due to excavation and fill during construction of the road. The middle portion of the site is composed of rock land (rRK) and is the location of most of the facilities planned for upgrades or construction. The rock outcrop (rRo) is in the upper reaches of the site.

Anticipated Impacts and Proposed Mitigation

Topography of the site will remain relatively unchanged as major grading work is not anticipated for the proposed renovated exhibits and new buildings. However, minor grading work is anticipated for the parking lot expansion to add an additional parking aisle. The final design of the expanded parking aisle may need to include pedestrian ramps or stairs to account for the anticipated grading adjustments in the additional parking aisle.

Construction Best Management Practices (BMPs) will be implemented to mitigate potential adverse environmental impacts that may occur as a result of the planned improvements. Construction BMPs such as sediment traps, silt fences, dust fences, stabilized construction entrances, and truck wash-down areas, will be applied as appropriate.

Grading operations will be conducted in compliance with dust and erosion control requirements of the City Grading Ordinance. A grading permit will be obtained from the City in order to begin construction. The contractor will be required to perform proper quality control density testing during fill and sub-grade compaction in accordance with the planned improvement specification requirements.

Primary fugitive dust control methods that will be implemented include regular watering of exposed soil areas, good housekeeping on the job site, and prompt landscaping, covering or paving of bare soils in areas where construction is completed. The impact of construction activities on soils will be mitigated by practicing strict erosion control and dust control measures, particularly those specified in the following:

- City Grading Ordinance; Revised Ordinances of Honolulu Chapter 14-13 Provisions for Grading, Soil Erosion & Sediment Control
- State of Hawai'i, Department of Health (DOH), Water Quality Standards, Chapter 11-54
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Erosion and Sediment Control Guide for Hawai'i
- National Pollution Discharge Elimination System (NPDES) permit

3.4 Drainage and Hydrology

Existing Conditions

Stormwater runoff generated from the hillside and parking lot areas collects within the private driveway and diverts runoff away from the park grounds and towards the existing public stormwater structures in Kalaniana'ole Highway. Runoff generated within SLP follows the same pattern by collecting and discharging runoff towards Kalaniana'ole Highway.

The drainage infrastructure is minimal. Landscaped areas are the primary stormwater management feature used throughout the park, allowing runoff to collect and pond in vegetated areas. Ponding issues tend to occur onsite near the sea turtle and reef exhibit. A combination of limited drainage infrastructure and poor grading design are the main contributors to the issue and are likely the factors for any drainage issues experienced in the park.

Sea Life Park lies within the Waimānalo aquifer system with a basal aquifer type where fresh water is in contact with saltwater. The unconfined aquifer has a water table that is at the upper surface of a saturated aquifer. The groundwater has a low salinity of 250 to 1,000 milligrams per liter of chloride. There is no potable groundwater source in this area.

Anticipated Impacts and Proposed Mitigation

Runoff from construction will be managed under grading permit requirements. According to HAR 11-55, an NPDES Construction Stormwater permit will be required as grading of the planned improvements will involve one acre or more. Construction, grading and drainage plans for the SLP site will be submitted to appropriate agencies for review and approval. The requirements of the approved NPDES permit and erosion control plan will be adhered to during construction.

Low Impact Development (LID) measures and construction BMPs are planned at SLP. Measures that can be easily incorporated with the overall park design include the use of planter boxes and rain gardens. Rain gardens are defined as designed vegetated shallow depressions that collect runoff and allow for filtration and percolation of stormwater through planting media. Planter boxes are similar in nature to rain gardens, with the exception that it can be an above ground system that allows percolation into an underdrain system in lieu of the ground. Planter boxes can be a suitable system when combined with roof downspouts. By locating planter boxes directly adjacent to buildings, it provides a convenient and effective stormwater filtration system while also providing a useful feature for managing runoff generated from buildings.

LID measures will be implemented for the new parking aisle and paved driveways where installed. Systems that can be incorporated into a parking lot design include rain gardens, vegetated buffer strips, and swales. Additionally, a drainage system serving the LID measures will need to be installed into the existing parking lot area to account for stormwater overflow, and will need to connect or convey water to an appropriate discharge point along Kalaniana'ole Highway or within the park.

Drainage improvements such as drain inlets, catch basins, and piping will be applied as needed. Site improvements will maintain existing drainage patterns and use existing drainage systems as practicable. Conveyance and discharge of stormwater runoff will be in accordance with the City and County of Honolulu Storm Drainage Standards (2018).

Finished floors for all new buildings will be set at an elevation that will allow positive drainage away from the building and to surrounding stormwater infrastructure. Final elevations will be arranged such that accessible entry is provided for all users while continuing to be suitable with surrounding grades, buildings, and exhibits.

Construction will be located away from natural stream areas, further minimizing the potential for top soil erosion and runoff to reach surface water. Long term drainage and water quality conditions, following construction, are expected to be similar to existing conditions or improved by new landscaping.

These and other actions will be described in a Storm Water Quality Strategic Plan during the SLP planned improvements design stage, as required by the City's current storm drainage standard, Section 20-3-50 of the Rules Relating to Water Quality.

3.5 Shoreline and Near Shore Waters

Existing Conditions

The total area of the SLP leased property is approximately 62 acres located mauka of Kalaniana'ole Highway. Existing SLP facilities occupy approximately 18 acres of the total property, and the proposed improvements lie within an area limited to about 14 acres.

The nearshore ocean waters off SLP are classified as AA Waters. It is the objective of the AA class that these waters remain in their natural state as nearly as possible, with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. The uses to be protected in this class of waters are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment.

A saltwater system is required for Sea Life Park to provide marine-life displays and exhibits. Sea Life Park staff actively manage and operate the saltwater circulation system including the intake, pumps, filters, and injection wells. Saltwater is extracted from the nearby coast and pumped to the park via offsite saltwater pumps near Makapu'u Beach Park. From the pump systems, saltwater is distributed throughout the park as needed and discharged back into the ocean via injection wells, effectively creating a continuous saltwater distribution cycle throughout the park.

An existing emergency bypass saltwater line is located near the perimeter of the visitor parking lot. The exposed 18-inch HDPE (high-density polyethylene) line connects the saltwater systems between the Oceanic Institute (OI) and the Sea Life Park portion of the property. When the saltwater supply lines were not in operation due to repairs, a temporary bypass line from OI was installed to supply saltwater to the park. Park staff agreed to keep the temporary bypass line for emergency purposes in the event that OI or SLP loses saltwater supply. The emergency bypass line is capable of supplying saltwater in both directions.

Current subsurface disposal of saltwater from existing tanks show no effect on coastal waters or groundwater. There is no potable groundwater source in this area. The saltwater being discharged is similar in quality to the coastal water with possibly a slight reduction in dissolved oxygen. Federal Marine Law (Marine Mammal Act of 1972) requires SLP to maintain coliform counts in its marine mammal enclosures of less than 1,000 per 100 cc. Counts are required on a weekly basis. The counts rarely exceed 100 total coliforms per 100 cc and are usually 25 or less.

Since SLP began operating its saltwater intake and disposal system in 1963-1964, there has been no noticeable effect on the shoreline and marine ecosystem. Neither salinity nor temperature changes occur as a result of this interchange. The porous volcanic rock acts as a purifier of the water and the same amount that is pumped out of the saltwater table is returned through the injection wells. The result of saltwater injection on the area hydrology is balanced by the intake of the same amount of saltwater in the same water table area.

Anticipated Impacts and Proposed Mitigation

Saltwater supply is required to support the operations of new exhibits, such as the Ocean Oddities Indoor Aquarium and the Penguin exhibit. Existing exhibits that are undergoing renovation may be able to utilize the existing saltwater laterals as required. Per discussion with SLP staff, there is available capacity within the system to increase saltwater flows for the proposed improvements. The final saltwater system flow demands and equipment capacity will be determined in the design stage.

Proposed construction and activities at SLP will take place away from natural stream channels and the shoreline. The structure closest to the shoreline will be the Seabird Sanctuary situated approximately 400 ft away. The construction and operations of these improvements will not adversely affect the shoreline or nearshore waters. According to HAR Section 11-54-1 antidegradation policy, existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

3.6 Natural and Manmade Hazards

Existing Conditions

Hurricanes and Tropical Storms

Hurricanes and tropical storms are both categorized as tropical cyclones, which are warm-core storms which originate over tropical waters with well-defined centers of closed surface wind circulation. A hurricane is a tropical cyclone which sustains surface winds of 64 knots (74 mph) or more. Tropical storms are categorized as an organized system of strong thunderstorms with defined circulation and maximum sustained winds of 39 to 73 mph (National Oceanic and Atmospheric Administration [NOAA], 2015).

Hurricanes are considered to be relatively rare events in the Hawaiian Islands. Records show that strong wind storms have struck all major Hawaiian Islands. The first officially recognized hurricane in Hawaiian waters was Hurricane Hiki in August 1950. Since that time, five hurricanes have caused serious damage in Hawai'i: Nina (1957), Dot (1959), 'Iwa (1982), Estelle (1986), and 'Iniki (1992).

However, with rising global temperatures, Hawai'i is expected to experience a higher incidence of tropical storm events. In most recent history, Tropical Storm Olivia made landfall on Maui and Lāna'i in 2018, causing considerable flooding, power outages, and road and school closures.

Earthquakes

Based on the 2015 United States Geological Survey (USGS) International Building Code (IBC) Seismic Design Map, SLP could experience up to 0.15 earthquake ground motion accelerations (g-force). This represents the lower limits of probable force experienced by the island of O'ahu during a seismic event.

Flooding and Tsunami Inundation

The areas planned for improvements at SLP are located in Flood Zone D (Minimal Flood Risk, Outside of 0.2% Annual Chance Floodplain) (*Figure 1.6*).

The sudden displacement of the ocean floor (earthquakes), landslides, or volcanism can generate tsunamis, which are a series of waves that can reach speeds of up to 600 mph. Upon reaching a coastline, a tsunami can become a wall of water reaching heights of 30 ft or more and capable of moving inland several hundred feet. Known major tsunami events in Hawai'i include the areas of East Hawai'i (1946, 1960, 1975) and North Shore O'ahu (1952, 1957).

A portion of the SLP area adjacent to Kalaniana'ole Highway is located in the Tsunami Evacuation Zone (*Figure 1.6*). The eastern area of SLP is located in the Extreme Tsunami Evacuation Zone, including the current employee parking lot and a small portion of the park that is currently without structures. In the event of an extreme tsunami, waves may move significantly inland, and evacuation to the Safe Zone (of which the remainder of the park is located) is recommended in accordance with guidance from emergency management authorities.

Climate Change and Sea Level Rise

As a result of climate change evidence, oceans are warming and acidifying, ice sheets and glaciers are melting, and sea levels are rising. A recent study by a University of Hawai'i (UH) team of researchers predicts that tropical regions will experience drastically warmer climates by the year 2047.

In addition to rising temperatures, sea level rise is a notable concern for coastal communities such as Hawai'i, as it has historically driven shoreline changes throughout the islands. The global annual sea level rise averaged over the last century was roughly two millimeters, with previous studies indicating that this rate is now approaching three millimeters and may accelerate in the coming decades. According to the UH School of Ocean and Earth Science and Technology (SOEST), while predicting future sea level rise is challenging because of unknown parameters, research shows that global mean sea level may reach approximately one foot by mid-century and 2.5 to 6.2 ft by the end of the century.

An appropriate planning target would include a sea level benchmark of one foot by mid-century and into the lower end (about three feet) of 2.5 to 6.2 ft by the end of the century. Planners can consider the impact of a worst-case scenario of 6.2 ft by end of the century and use this in the design of appropriate projects. In addition, it is practical to expect that a hurricane will make direct landfall in Hawai'i under conditions of higher sea level and that tsunami will continue to arrive at Hawaiian shores.

According to a 2014 UH Sea Grant College Program report titled, *Climate Change Impacts in Hawai'i – A Summary of Climate Change and its Impacts to Hawai'i's Ecosystem and Communities*, Hawai'i is experiencing climate change impacts in unique ways. It will be increasingly important to focus on the localized impacts of climate change and sea level rise to adequately understand and prepare for the changes to come.

Anticipated Impacts and Proposed Mitigation

Hurricanes and Tropical Storms

The effects of past storm events have caused minimal to no damage at SLP. The future threat of hurricanes at SLP cannot be calculated, although the frequency of hurricane threats may increase with climate change and warming ocean waters.

When a hurricane is approaching a coastal location, early evacuation is usually standard mitigation to address the possibility of accompanying storm surge with high winds. The National Weather Service provides guidance and when necessary during an event, issues a hurricane watch when a storm is expected to make landfall within 36 hours. A hurricane warning is issued when landfall is likely within 12 to 24 hours.

Earthquakes

All buildings for the planned improvements will be constructed in compliance with regulatory controls to meet City and County of Honolulu Building Code requirements as appropriate to IBC seismic probabilities.

Flooding and Tsunami Inundation

Using the potential for chronic flooding with 3.2 feet of sea level rise exposure area (SLR-XA) as the vulnerability zone for planning purposes, it is noted that no portion of SLP is located within areas potentially exposed to chronic flooding with sea level rise (*Figure 3.2*). No mitigation measures are required in response to potential flooding or tsunami hazards. In the event of a tsunami or flood event, SLP has evacuation procedures in place.

Climate Change and Sea Level Rise

The SLP Improvements will not significantly contribute to adverse impacts relating to existing climate change and sea level rise. While the planned improvements are anticipated to attract additional visitors to the area, SLP is located along an existing route of Kalaniana'ole Highway that visitors often travel to access other areas of the east shore of the island. It is likely that most of these visitors would be traveling through the area with or without the proposed improvements. Therefore, the planned improvements will not significantly contribute to additional greenhouse gas emissions and overall long-term climate changes.



Figure 3.2

Sea Level Rise Exposure Area (SLR-XA)

3.7 Flora and Fauna

Existing Conditions

Flora

There are no known endangered plant species at the sites of planned SLP Improvements.

Most of the plant species on site are plants that were introduced for SLP's planted landscaping. Native plant species found within the planned improvement areas at SLP include: kukui (*Aleurites moluccanus*), naupaka (*Scaevola taccada*), and hala (*Pandanus odoratissimus*). Other introduced plants include: areca palm (*Euterpe oleracea*), bougainvillea (*Nyctaginaceae bougainvillea*), coconut (*Cocos nucifera*), croton (*Codiaeum variegatum*), hau (*Hibiscus tiliaceus*) hibiscus (*Hibiscus rosa sinensis*), Norfolk island pine (*Araucaria heterophylla*), shower tree (*Cassia x nealiae*), spider lily (*Crinum asiaticum*), ti (*Cordyline terminalis*), tiare (*Gardenia taitensis*), variegated hau (*Talipariti tiliaceum*), and Zanzibar gem (*zamioculcas zamiifolia*).

Fauna

Bird species that are most common around the SLP areas of planned improvement include the Black-crowned Night Heron (*Nycticorax nycticorax*), Common Myna (*Acridotheres tristis*), House Finch (*Haemorhous mexicanus*), House Sparrow (*Passer domesticus*), Pigeon (*Columbia livia domestica*), Red-crested Cardinal (*Paroaria coronata*), Red-vented Bulbul (*Pycnonotus cafer*), White-rumped Shama (*Copsychus malabaricus*), and Zebra Dove (*Geopelia striata*).

Seabirds of several species are common in the SLP area. Sooty terns (*Onychoprion fuscatus*), Noddy terns (*Anous stolidus*), Wedge-tailed Shearwaters (*Puffinus pacificus*) and Bulwer's Petrels (*Bulweria*) nest on Mānana Island, 3/4 mile offshore. None of these species are displayed at SLP, however, many (particularly shearwaters and sooty terns) are rehabilitated and later released when they are found injured. These species only nest on the offshore islands, and not on SLP property, and would not be impacted by the proposed construction. Frigate birds (*Fregatidae*) have never nested at SLP. The only frigates that have not been displayed are injured birds that have been turned over to SLP for care. The Laysan albatross (*Phoebastria immutabilis*) that are displayed at SLP were captured as chicks in the Northwest Hawaiian Islands and hand raised at SLP. Laysan albatross are known to nest at Ka'ena Point on the westernmost point of O'ahu.

Red-footed (*Sula sula*), Masked (*Sula dactylatra*) and Brown (*Sula leucogaster*) Boobies are displayed at SLP. These are free flying birds capable of leaving at any time. Red-footed boobies nest within park grounds, but no nests have been observed in the areas of proposed construction. Masked and Brown boobies have not been known to nest at SLP, but some have been hand raised as chicks. The closest nest of these two species are at Moku Manu Islands, ten miles north-northwest. Red-footed boobies also nest at Moku Manu and on the adjacent Mokapu peninsula.

Other birds on display at SLP include Humboldt Penguins (*Spheniscus Humboldti*), Cockatiels (*Nymphicus hollandicus*) and Lovebirds (*Agapornis*).

Several species of mammals live within SLP, including Pacific and Atlantic bottlenose dolphins (*Tursiops truncatus*), California Sea Lions (*Zalophus californianus*), and False Killer Whales (*Pseudorca crassidens*).

Non-mammal species that live within SLP include Whitetip Reef Sharks (*Triaenodon obesus*), Sandbar Sharks (*Carcharhinus plumbeus*), Blacktip Reef Sharks (*Carcharhinus melanopterus*), Green Sea Turtles (*Chelonia mydas*), Brown Hawaiian Stingray (*Dasyatis lata*), and other species of tropical fish, such as Blue Trevally (*Caranx melampygus*), and Yellow Tangs (*Zebrasoma flavescens*).

Feral house cats (*felis catus*) and small Indian mongooses (*Herpestes auro punctatus*) also inhabit the SLP planned improvements area.

Anticipated Impacts and Proposed Mitigation

The improvements to SLP will not cause long term effects to endangered or threatened plant or animal species. While there will be temporary disturbance of wildlife during construction of the various support facilities, mitigation measures will be implemented to minimize impacts. In addition, new landscaping will restore and enhance the environment at SLP for the common species living in the area.

The potential presence of the following species may require additional consideration and mitigation measures:

- **Seabirds** – Hawaiian seabirds may traverse SLP at night during the breeding season (March 1 to December 15). Seabird species may include the endangered Hawaiian petrel (*Pterodroma sandwichensis*), threatened Newell’s shearwater (*Puffinus auricularis newelli*), endangered Band-rumped storm-petrel (*Oceanodroma castro*), and a seabird species protected under the Migratory Bird Treaty Act of 1918, the Wedge-tailed Shearwater (*Ardenna pacificus*).

While no seabird nestings are located within the planned improvement areas at SLP, use of outdoor lights could pose a potential impact to birds, as lighting can disorient seabirds which can result in their downing or harm. Exterior facility lighting will be shielded to reduce the potential for interactions of nocturnally flying seabirds with external lights or other structures. Automatic motion sensor switches and controls on all outdoor lights can be installed or lights manually turned off when human activity is not occurring in the lighted area. In case of any downed seabirds, Sea Life Park has rehabilitation facilities on site.

All construction activity for the SLP improvements will take place during daylight hours and will use sealed containers for waste to avoid attracting unwanted predators. Post-construction, covered trash receptacles and bait stations for rodents and mongoose will be used to minimize predator presence.

3.8 Historical and Cultural Resources

A Cultural Impact Assessment (CIA), including archival research and ethnographic surveys of area residents, was performed by Keala Pono Archaeological Consulting, LLC (December 2018). The findings of the assessment are included as *Appendix A*.

Existing Conditions

Historically, Waimānalo was an important and sacred place to the Hawaiian people. With its bountiful coastlines and verdant streams, Waimānalo, which means “Potable Water,” was a place of abundance in traditional times. Marine resources were plentiful, and the area was known for thriving fish populations. Turtles were kept in an offshore pond for consumption by ali’i (royal). Taro was farmed in wet areas of Waimānalo, sweet potato was grown in the drier regions, and a series of fishing villages lined the coast.

Although some small fishing villages existed in the vicinity of SLP, most of the population lived around Puhā Stream, which is present-day Waimānalo Stream and located about four miles away. One of the smaller fishing villages known as Kaupō Village was located within the SLP planned improvements area. Kaupō Village was comprised of a few fishing huts, a fishing shrine, a small heiau, lava tubes, and many habitation sites. The village was known for a Kahuna named Kapoi, who was considered a gifted fisherman and a renowned healer. For this reason, some Hawaiians in Honolulu who were infected with smallpox moved to this village during the smallpox epidemic of the mid-19th century. However, the smallpox disease eventually ravaged the village, killing Kapoi. The village was abandoned, and during World War II, Kapoi's house was destroyed.

The nearby Makapu'u area just south and east of SLP is also endowed with a rich history. The well-known epic surrounding Pele and Hi'iaka details the travels of the two goddesses who landed on O'ahu at Makapu'u. From Makapu'u, the goddess Hi'iaka traveled north through Waimānalo. Moreover, in recent history this area has been a hub of activity, with a Federal Aviation Administration communications center, the Makapu'u Lighthouse, the Makapu'u Military Reservation, and Alan Davis Ranch occupying the area.

Following the Great Māhele, the ahupua'a of Waimānalo was awarded to Victoria Kamāmalu. The Kuleana Act of 1850 immediately followed and Kamāmalu leased 6,970 acres of Waimānalo Ahupua'a for \$350 a year to Thomas Cummins, husband of High Chiefess Kaumakaokane, a cousin of Kamehameha I. Thomas Cummins turned the area into a large ranch named Mauna Rose which later was used for cultivating sugarcane. The Cummins' ranching operations were detrimental to the delicate Hawaiian environment and ignored traditional ways of life. Farm animals roamed freely trampling native plants, and kuleana lots.

In 1925 the Hawaiian Homes Commission established the Waimānalo Homestead, awarding lots to native Hawaiians mauka of Kalaniana'ole Highway roughly from Waimānalo Landing to Waimānalo Beach Park. Following sugarcane production, which ceased in the area in 1947, the Waimānalo area has been designated for residential use and military use.

Anticipated Impacts and Proposed Mitigation

Sea Life Park has existed at this site since it first opened in 1964. The improvements at SLP are not anticipated to adversely impact historical or cultural resources associated with the area. The design of proposed facilities will be reflective of the natural environment and Hawaiian historical and cultural elements, including Kaupō Fishing Village. New activities at SLP will communicate unique and sensitive elements of Hawai'i's culture and values. The planned improvements will provide educational opportunities to raise public awareness and appreciation for the importance and value of Hawai'i's unique natural resources, history, and culture.

Ethnographic surveys performed by Keala Pono Archaeological Consulting, LLC (December 2018) concluded that the improvements at SLP are unlikely to adversely impact cultural or historical resources. The CIA recommended an Archaeological Inventory Survey to determine if vestiges of historical artifacts remain on the property. Interviews with individuals knowledgeable about the planned improvements produced information on its rich cultural history. While the interviewees did not know of any traditional gathering practices occurring within the areas of planned improvements at SLP, they mentioned several archaeological sites. Based on the interview information, archaeological sites that may lie within the SLP planned improvement areas include Kaupō Village, a possible heiau, and human burials.

3.9 Archaeological Resources

An Archaeological Inventory Survey will be conducted by Keala Pono Archaeological Consulting, LLC for the areas of planned improvements at SLP in 2019, and will be included as *Appendix B* upon completion.

Existing Conditions

The archaeology of the ahupua'a of Waimānalo has been well studied. Kaupō Village is a main archaeological site at SLP, and human remains have been found in the coastal portion of the village, across the highway from the SLP area of planned improvements. The village consisted of many archaeological features, including a unique ko'a (fishing shrine) that was surrounded by water at high tide, as well as a lava tube shelter, the excavation of which yielded an abundance of cultural material and midden. Kealakupapa Valley Road may have also run through the SLP area of planned improvements. Road remnants have been documented to the east, in the Waimānalo Gap area. Other sites in the vicinity to the east include a legendary stone, a rock pile, a cave, and historic features associated with the Makapu'u Lighthouse and military reservation. To the northwest were stones used for offerings, a ko'a, and Pahonu Pond, which kept turtles for the ali'i to eat.

Previous research has identified a wide range of activities that were carried out traditionally and historically in Waimānalo, including fishing, agriculture, habitation, ritual, burial, military, and cattle ranching. It follows that a variety of archaeological remains may be found during the current survey. These might include traditional agricultural features such as stone terraces and mounds, enclosures, temporary or permanent shelters, trails, human burials, or religious structures. Historic-era archaeological resources might include vestiges of cattle ranching, such as the remains of ranch houses, animal pens, cattle walls, faunal remains, and/or ceramic, glass, and metal artifacts; or military use, such as cement bunkers and ammunition.

The survey will be conducted for TMK: 4-1-014:004 (*Figure 1.2*). The purpose of the survey is to determine the presence, nature, and extent of archaeological resources in the area of planned improvements; evaluate their significance; and ensure compliance with the National Historic Preservation Act of 1966, as amended, Chapter 6E of Hawai'i Revised Statutes, and the guidelines established by the State Historic Preservation Division (SHPD).

The work will include a pedestrian survey covering 100% of the area planned for improvements, as well as test excavations of at least 10 trenches in areas both within and outside of construction footprints. In total, the pedestrian and subsurface testing areas will amount to 18 acres. The trenching plan is currently under review by SHPD. Excavations will commence upon approval.

Anticipated Impacts and Proposed Mitigation

As the area of planned improvements is developed with the buildings and infrastructure for SLP, it is likely that surface remains will only be found on the outskirts of the park where development has not already occurred. Within the park itself, subsurface remains are more likely to be found. Two archaeological sites are known for the area of planned improvements: Kaupō Village and Kealakupapa Valley Road. It is unclear if the vestiges of these sites remain within the SLP area today.

In the event that any previously unidentified historic sites or remains are encountered during site work and construction phases, all work in the immediate area will cease and an archaeologist from SHPD will be notified. Work in the area will be suspended until further recommendations are made for the appropriate treatment of cultural materials.

3.10 Socioeconomic Characteristics

Existing Conditions

Sea Life Park is located in Waimānalo near Makapu'u Point. The SLP area of planned improvements is situated within the census tract 9400.01 (Waimānalo Beach Homesteads). Adjacent tracts 113 (Waimānalo) and 9811 (Bellows Air Force Base) were also used for the area socio-economic characteristics. These three census tracts will be collectively referred to as Waimānalo. In 2010, Waimānalo had a small population of approximately 10,021 people and 2,491 housing units, which equates to about 1% of O'ahu's total population (953,207) and 0.7% of O'ahu's housing units (336,899), respectively. Compared to O'ahu, Waimānalo's population is generally young, with a racial mix of proportionately more Native Hawaiians. More than half (1,621) of the housing units are owner-occupied with an average household size of 3.69 persons per home. The median household income for the Census tract in 2010 was \$50,944.

Anticipated Impacts and Proposed Mitigation

The planned improvements to SLP have no foreseeable negative impacts on the residential population of the area. The improvements are anticipated to slightly increase the visitor activity in the area. However, marginal increases in visitor numbers should not significantly change the character or culture of Waimānalo. There are no permanent residential units being developed in conjunction with the SLP improvements, therefore the planned improvements will not affect land and housing speculation, property values of area homes, or affordable housing in the area.

The development of the SLP improvements will have some short-term economic benefits resulting from the construction of the facilities. Construction will be completed by a local contractor. Total construction cost for the facilities is estimated at approximately \$30 million. Long-term economic benefits will also result from the employment of SLP staff that will support the activities at the new facilities, such as the Seabird Rehab and Sanctuary, Ocean Oddities Indoor Aquarium, and Honu Conservation and Education Center. Because of its recreational and educational operations, SLP has provided jobs for approximately 90 people, most of whom are residents. The improvements to SLP will help the company and its employees by broadening the attractiveness of the park, thereby increasing its economic sustainability. The planned improvements will also benefit the broader community and visitor industry by providing new ways to enjoy the area as well as improve education and protection of marine life and endangered sea birds.

The overall rate and pattern of economic growth in this portion of O'ahu will not be significantly impacted by the new facility improvements. Public costs for these facilities will be negligible, as there will be no additional demand placed on public services. Public revenues will be generated in the form of State General Excise Tax and personal Income Tax on employee salaries. There will be some construction jobs and between 15 to 20 permanent staff jobs generated by the addition of the SLP Improvements.

3.11 Visual Resources

Existing Conditions

Sea Life Park is located in the District of Ko'olau Poko near the community of Waimānalo on the island of O'ahu. This area boasts unique scenery and outstanding natural beauty, which includes views of the Pacific Ocean and the steep cliffs of the Ko'olau mountain range.

SLP facilities are located at elevations from 25 ft to 100 ft above sea level and are situated adjacent to Kalaniana'ole Highway, which runs along the coast (*Figure 3.1*, and *Figures 3.3 to 3.9*). These elevations provide panoramic vistas of the coastline, as well as both Mānana (Rabbit) and Kāohikaipu (Black Rock or Turtle) Islands.

Relevant local planning guidelines and objectives uphold the importance of maintaining the rural character of the area, as well as protecting open space while supporting new development that reinforces the local culture and conforms to the natural landscape. Current facilities at SLP are low-rise and barely visible from Kalaniana'ole Highway, and the design elements are reflective of the unique history of Windward O'ahu.

Anticipated Impacts and Proposed Mitigation

Sea Life Park is an established marine life conservation facility with landscaped grounds. The natural environment of the sites at SLP and their surrounding areas will be maintained and enhanced by the proposed uses. Major trees will be retained, including many Norfolk Pines.

The topography of the site will not be significantly modified by new facilities, renovations, or new landscaping. Potential impacts to the visual environment are minimal. Existing natural landmarks will not be affected by the SLP Improvements. Scenic views of the land at SLP or the vicinity of Waimānalo and Makapu'u will not be altered by any of the facilities. The added improvements will not alter the existing views towards the mountains from Kalaniana'ole Highway.

Open space will be retained and enhanced in the area surrounding the new facilities. Open space is a key element of the setting and character for these facilities, and the existing open space of the surrounding lands and road frontage will remain. Aesthetic quality of the area will be maintained and improved with the new and updated facilities, including new landscaping.



Figure 3.3

Sea Life Park – Project Area



Figure 3.3a

Kalaniana'ole Highway at SLP Main Entrance (Driveway East) (1)



Figure 3.3b

Kalaniana'ole Highway at SLP Main Entrance (Driveway East) (2)



Figure 3.3c

Kalaniana'ole Highway – SLP Hidden by Vegetation and Slope (3)



Figure 3.3d

Kalaniana'ole Highway – SLP Hidden by Vegetation and Slope (4)



Figure 3.3e Kalaniana'ole Highway at SLP Secondary Entrance (Driveway South) (5)



Figure 3.3f Kalaniana'ole Highway at SLP Secondary Entrance (Driveway South) (6)

3.12 Utilities

A Preliminary Engineering Report (March 2019) was conducted by G70 and evaluates the existing infrastructure and utility systems at Sea Life Park to determine the extent of improvements needed for the planned improvements. This report is included as *Appendix C*. The following section provides key highlights and assesses potential impacts of infrastructure and utility needs.

Water

Existing Conditions

Potable Water

The existing SLP is served by the Board of Water Supply's (BWS) 30-inch water main within Kalaniana'ole Highway. Active water meter records for the property TMK reveal various lessees and water use within the same parcel that serves the Oceanic Institute, SLP, and the Makai Pier for domestic, fire protection and potentially other uses. Records show that SLP potable water service is provided through a 3-inch compound meter located at the southern park access across from Makapu'u Beach Park. From the water meter, a 6-inch water line serves the park for domestic use.

Three known fire hydrants are located along the private driveway and Kalaniana'ole Highway that provide fire water supply to the park and nearby chapel. A hydrant is located at each of the two access points to the private driveway servicing SLP, and within the State ROW for Kalaniana'ole Highway. A third private fire hydrant, connected to an 8-inch lateral, is located at the stairway entry to the wedding chapel near the southern entrance and along the private driveway. Site visit and BWS records confirm an existing 8-inch detector check meter for the private hydrant located at the southern entrance. According to BWS distribution maps and as-builts, each fire hydrant independently connects to the water main located within Kalaniana'ole Highway.

Non-Potable Water

A saltwater supply system is required for SLP to support its marine-life displays and exhibits. Saltwater is extracted from the ocean intake located off the coast and pumped to the park via offsite saltwater pumps near Makapu'u Beach Park. From the pump systems, saltwater is distributed throughout the park as needed and discharged back into the shallow groundwater via on-site injection wells. This system has proven to be an effective continuous saltwater distribution cycle serving the park.

Sea Life Park staff actively manage and operate the saltwater circulation system including the intake, pumps, filters, and injection wells. Per discussion with SLP staff, there is available capacity within the system to increase saltwater flows for the future Park improvements, but final flow demands and equipment capacity should be verified.

Anticipated Impacts and Proposed Mitigation

Potable Water

A boost in visitor numbers will increase the potable water demand at SLP. The projected sewer use indicates an increase in water usage. In 2017, the average use recorded by the BWS meter was approximately 136,000 gallons per day (GPD). With the proposed improvements and expected increase in SLP visitors, potable water demand is anticipated to increase by roughly 10% to a total peak use of 140,000 GPD.

The projected water demand for domestic use will not require substantial infrastructure upgrades. The existing 3-inch compound meter and 6-inch water lateral will service the proposed flow rate of 120 gallons per minute (gpm). Initial pressure calculations show negligible pressure losses in the 6-inch domestic line at the entry to the park (highest elevation point for the domestic line). Additionally, new water laterals will be installed to serve new buildings and structures. Existing buildings and structures with water laterals are not expected to require service upgrades. Appropriately sized fire flow water supply and fire suppression will be installed as required for industrial building uses.

Water efficient fixtures will be installed for new structures as practical, and water efficient practices implemented throughout SLP to reduce the increased demand on the area's freshwater resources. Low-flow plumbing fixtures may be installed in restrooms for water efficiency within the buildings and reduce the burden on municipal water supply and wastewater systems.

Landscape irrigation conservation BMPs will be implemented for the landscaped areas within SLP. Typical measures include: irrigation systems with sprinklers spaced with head to head coverage or better; using water conservation irrigation components such as rotary nozzles, pressure regulated spray heads and valves, rain switches and high efficiency nozzles; and check valves.

Non-Potable Water

Saltwater supply will be provided for new exhibits such as the deep-sea life exhibit and the penguin exhibit. Existing exhibits that are undergoing renovation may be able to utilize the existing saltwater laterals as required. If existing exhibits are to be expanded or enlarged, saltwater laterals may need to be upsized to account for the increased demand.

Wastewater

Existing Conditions

There are no municipal sewer systems located in the vicinity of the planned improvements. Sea Life Park wastewater is served via individual wastewater systems (IWS) located at several locations around the park. There are three systems on park grounds that were verified by State Department of Health (DOH) records and during site visits. The two designated "Lower" Wastewater Treatment Plant" (WWTP) and "Restroom WWTP" wastewater systems serve the park. The Lower WWTP primarily serves the main dining/food court facilities and includes a grease interceptor. The Restroom WWTP serves the restroom structure near the lū'au grounds. A third system is an IWS which serves the Snack Bar and Bird Aviary.

An additional WWTP (“Upper WWTP”) was recently installed as an extension to the Restroom WWTP. The upgraded system provides additional capacity to serve the design flows for the existing Restroom WWTP, including the lū’au service. The total design capacity of existing wastewater systems at SLP is 35,000 GPD.

The existing wastewater demand for SLP was calculated by using data obtained from as-builts, and provided IWS calculations, and by following City and State wastewater design standards. The average design flow was calculated based on visitor/staff counts, lū’au seats, and food court seats. The existing wastewater demand is estimated to have an average flow of 7,650 GPD.

The existing projected demands show systems operating within average flow capacity based on preliminary assumptions and calculations.

Anticipated Impacts and Proposed Mitigation

Wastewater flows from the SLP improvements are divided into three systems. Total wastewater flow is anticipated to increase by 2,550 GPD. The projected wastewater demand for SLP is an average flow of 10,200 GPD. According to the projected future demands, the wastewater systems will continue to operate within capacity with increased average flow. Recommendations for each proposed facility are summarized below.

Sewer service for the entry/retail building will be required based on the projected building use and conceptual designs (including restrooms) for the interior spaces. The Upper and Lower WWTP will be able to accept wastewater flows from the proposed entry building, however the Lower WWTP will be the preferred system due to the relatively close vicinity of the building.

Food court service will continue to be served by the Lower WWTP. Currently, the food court serves 270 seats and is projected to increase to 410 seats with the introduction of a rooftop deck space. Other systems that will need to be analyzed for capacities include the sewer laterals and grease interceptor.

Determination is needed for the extent of the wastewater services required for the Seabird Sanctuary and Hale Manu Aviary structures including plumbing fixtures and floor drains. Elevation differences between the existing wastewater treatment plants and the Seabird Sanctuary location will most likely require a pump to properly serve the proposed system.

Wastewater discharge for the proposed Menehune Island Splash Play Area will be entirely dependent on the type of water used, such as saltwater or domestic water. If saltwater is used to supply the play area, then the “wastewater” will follow the existing system and operations of discharging used saltwater into the existing injection wells. In this scenario, the injection wells would need to be analyzed for capacity due to the increased discharge. If fresh or domestic water is used to supply the play area, then typical treatment and filtration methods can be implemented similar to standard water feature systems. Wastewater disposal from recirculation systems or disposal needed during maintenance must be planned, while capacity within the existing IWS systems must be verified.

The proposed lū’au support facilities will require service from the upgraded Upper WWTP that is located adjacent to the lū’au grounds. Elevation differences between the Upper WWTP and the staff support facilities location will most likely require a pump to properly serve the proposed facility.

Snack Bar service and wastewater demand will remain the same, however the service will be rerouted to the Restroom/Upper WWTP. The Snack Bar service is expected to distribute pre-packaged meals; therefore, a grease interceptor is not expected to be required.

Electrical Power

Existing Conditions

The electricity for SLP is currently provided by Hawaiian Electric Co. (HECO) via 12 kilovolt (kV) distribution lines extending off Kalaniana'ole Highway. Based on as-builts and discussions with park staff, the primary electrical service is fed from an existing vault located on the ground floor of the main entry/ticket office structure. The main HECO electrical equipment (transformer/meter) is found in the electrical vault and is distributed to park facilities and exhibits.

Anticipated Impacts and Proposed Mitigation

Air conditioning and air circulation systems are expected to demand the heaviest electrical use for the park. The existing HECO electrical transmission system is adequate to serve the improvements to SLP. The introduction of a rooftop photovoltaic system is planned.

3.13 Roadways, Access and Traffic Conditions

A Transportation Impact Assessment (TIA) of the existing SLP and planned improvements was conducted by Fehr & Peers (December 2018). A turning movement traffic count survey and a pedestrian count survey on Kalaniana'ole Highway and the SLP driveway was conducted in December 2018. The findings of the assessment are included as *Appendix D*.

Existing Conditions

Kalaniana'ole Highway (State Route 72) is the main public roadway serving the lower windward coast of O'ahu. Kalaniana'ole Highway provides the only roadway access to SLP, with posted speeds of 35 mph in the vicinity of the planned improvements. The existing driveways to the park are controlled by a stop sign at both of its Tee-intersections with Kalaniana'ole Highway.

Sea Life Park is located on the mauka side of Kalaniana'ole Highway. The Oceanic Institute lies to the northwest of the planned improvements at SLP and Saint Catalina Seaside Chapel lies south. Directly across Kalaniana'ole Highway are parking lots with access to Kaupō Bay and Makapu'u Beach Park. Access to SLP is provided via two driveways on Kalaniana'ole Highway: Driveway East and Driveway North (see *Figure 2.21*).

Congestion was not observed along the study roadways during field observations in December 2018. No bike lanes or pedestrian facilities (sidewalks) are provided in this section of Kalaniana'ole Highway. Bicyclists and pedestrians typically use the roadway shoulder on either side of the road. Immediately south of Driveway East a shoulder is provided on the west side of the highway.

Routes 22, 23 and 57 are the regular service bus routes which pass through SLP. These routes all service stop ID #186 on site at the SLP entrance plaza. Ridership reports by TheBus indicate an average of 174 daily alightings at this stop.

In addition to TheBus service, private shuttles also provide service to the SLP bus stop. The Waikiki Trolley offers the Blue Line “Panoramic Coastline” route that has three services per day. The LeaLea Trolley offers the East Coast Line that also has three services per day. Finally, private tour buses also access the SLP entrance plaza and have dedicated parking along the SLP driveway past the bus stop. Sea Life Park is one of many stops on the Mini Circle Island Tour, with buses that regularly stop for a two-hour visit to the Park for the exhibits, restaurant, and/or shops.

There are no separated bike facilities along SLP driveways or Kalaniana’ole Highway, but bicyclists are allowed to share the road with motorists. Multi-modal traffic counts collected during the peak periods showed that there is currently low bike activity near the Park. Only three bicyclists were counted during the weekday midday peak hour and only two were counted during the Saturday midday peak hour. Pedestrians who were observed walking in the area or crossing Kalaniana’ole Highway in the SLP area were assumed to have arrived by other means, such as transit, private vehicle, or taxi service. Pedestrians in the area may have also walked from other nearby attractions, such as Makapu’u Beach Park or nearby hiking trails.

The highway capacity analysis performed in this TIA, is based upon procedures presented in the Highway Capacity Manual 6th Edition (HCM), published by the Transportation Research Board. HCM defines the Level of Service (LOS) as “a quantitative stratification of a performance measure or measures representing quality of service.” HCM defines the six (6) Levels of Service from the traveler’s perspective, ranging from ideal or free-flow traffic operating conditions at LOS “A” to unacceptable or potentially congested traffic operating conditions at LOS “F” (Table 3.1).

Table 3.1 Level of Service Criteria		
LOS	Control Delay (sec/veh)	Description
A	< 10	Control delay is minimal.
B	> 10 - 15	Control delay is not significant.
C	> 15 - 25	Stable operation. Queuing begins to occur.
D	> 25 - 35	Less stable condition. Increase in delays, decrease in travel speeds.
E	> 35 - 50	Unstable operation, significant delays.
F	> 50	High delays, extensive queuing.

The observed Weekday Peak Hour of traffic on Kalaniana’ole Highway at SLP occurred from 11:30 a.m. to 12:30 p.m. On a Saturday, the midday peak hour of traffic occurred from 12:30 a.m. to 1:30 p.m. The intersection movement at Kalaniana’ole Highway and the SLP Driveway East during the weekday midday peak hour operated at LOS “B,” and during the Saturday midday peak hour operated at LOS “C.” The intersection movement at Kalaniana’ole Highway and the SLP Driveway North during both the weekday midday peak hour and the Saturday midday peak hour operated at LOS “B.” There was no observed congestion or traffic delays at these intersections.

To evaluate the potential impacts of traffic generated by the planned improvements on the surrounding highway system, it was necessary to first develop estimates of future traffic conditions in the area without the planned improvements (*Figure 3.4*). Future traffic conditions without the SLP improvements reflect traffic increases due to regional growth and development, as well as traffic increases generated by other specific developments near SLP. The forecasted future traffic volumes without the SLP improvements were then used as a baseline to identify potential impacts on the roadway system.

The projected baseline intersection LOS for 2025 at both intersections during the weekday midday peak hour is expected to operate at LOS “B.” However, the westbound left-turn movement exiting the Makapu‘u Beach parking lot at Kalaniana‘ole Highway across from the SLP Driveway East during the Saturday midday peak hour is anticipated to increase to LOS “E.” The changes in operations from Existing Conditions are the result of the addition of ambient traffic growth and is expected to occur even without the planned improvements at SLP.

Trip generation was determined from visitor forecast data provided by SLP. These forecasts indicate an average three and a half percent (3.5%) annual increase in visitors between 2018 and 2025. The planned improvements are forecast to generate a total of 22 net new midday peak hour trips on a weekday, and 29 net new midday peak hour trips on a Saturday. These are the new trips that are estimated to be added to the highway and SLP driveways (*Figure 3.5*). The additional traffic generated by the planned improvements can be added to the baseline (2025) without the improvements to estimate the future LOS with the SLP improvements. Other considerations, such as new access patterns for the SLP improvements which re-routes visitors to exit at the Driveway East instead of the Driveway North, further modifies the projected LOS.

The TIA determined that there is not a substantial difference in the LOS at the two intersections between the projected baseline (2025) without the SLP improvements and the projected LOS with the SLP improvements. With the planned improvements, the eastbound left at the SLP Driveway East will increase from LOS “B” to LOS “C” during the weekday midday peak hour. Likewise, the northbound left at the SLP Driveway North will increase from LOS “B” to LOS “C” during the Saturday midday peak hour traffic. While the one LOS “E” identified in the baseline (2025) without the planned improvements will remain LOS “E” with the planned improvements, the planned improvements are anticipated to exacerbate this delay by approximately five percent (5%).

Anticipated Impacts and Proposed Mitigation

The Hawai‘i Department of Transportation (HDOT) strives to maintain LOS “D” intersection operations for State facilities, such as Kalaniana‘ole Highway. HDOT typically defines a significant intersection impact when the operation of an intersection or turning movement changes from LOS “D” or better to LOS “E” or “F.”

The analysis of Baseline (2025) Conditions compares future operations without SLP improvements to conditions with SLP improvements to determine if implementation is likely to result in a significant impact on the surrounding roadways. The TIA indicates that a LOS “E” is expected to occur at the westbound left-turn movement exiting the Makapu‘u Beach parking lot at Kalaniana‘ole Highway across from the SLP east driveway during the Saturday midday peak hour in both scenarios (with the improvements and without the improvements). Therefore, undesirable traffic conditions are likely to develop with or without the planned improvements. While the SLP improvements are likely to worsen such conditions further, it is unlikely to result in a substantial impact.

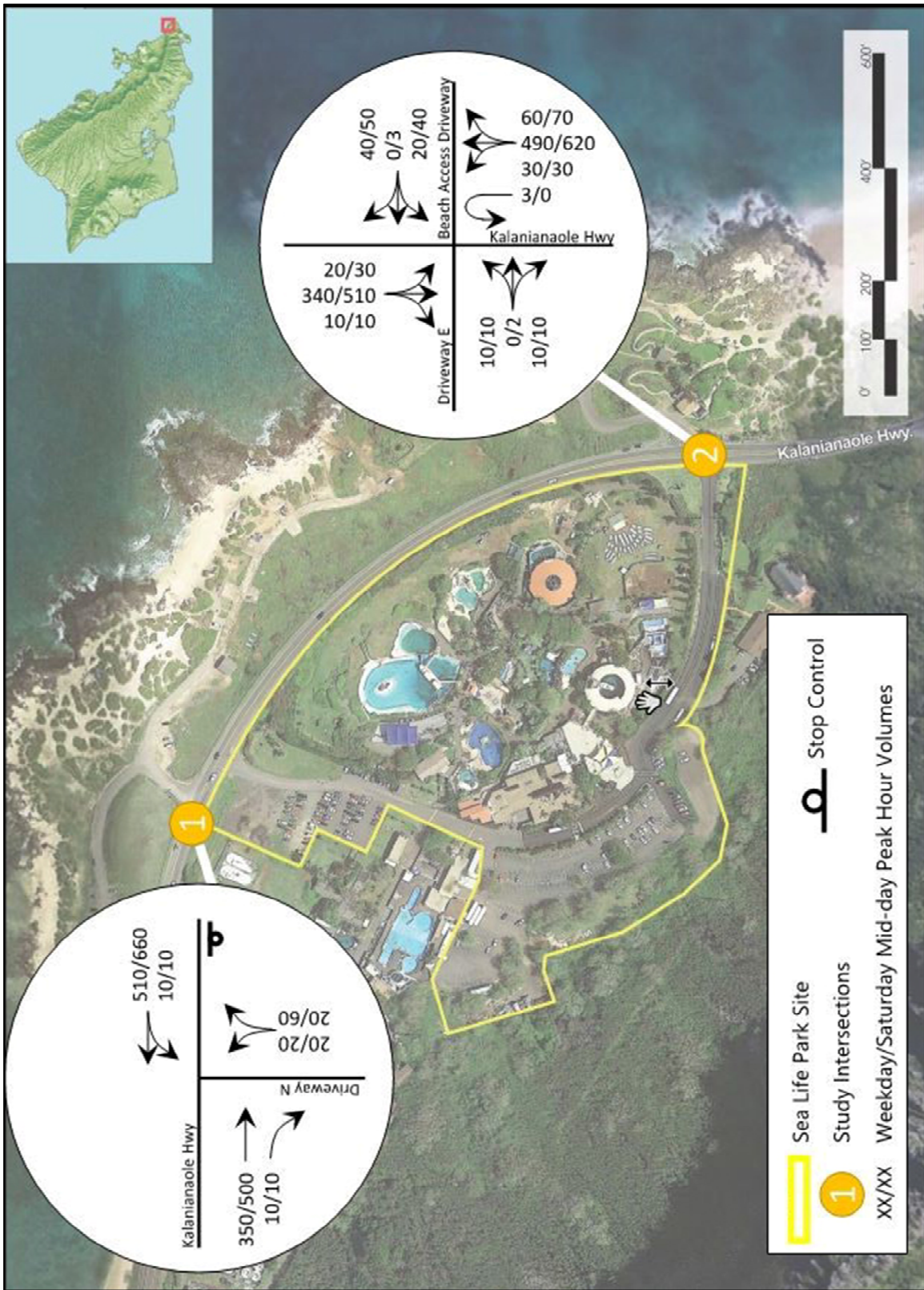


Figure 3.4

Future Traffic Conditions without SLP Improvements

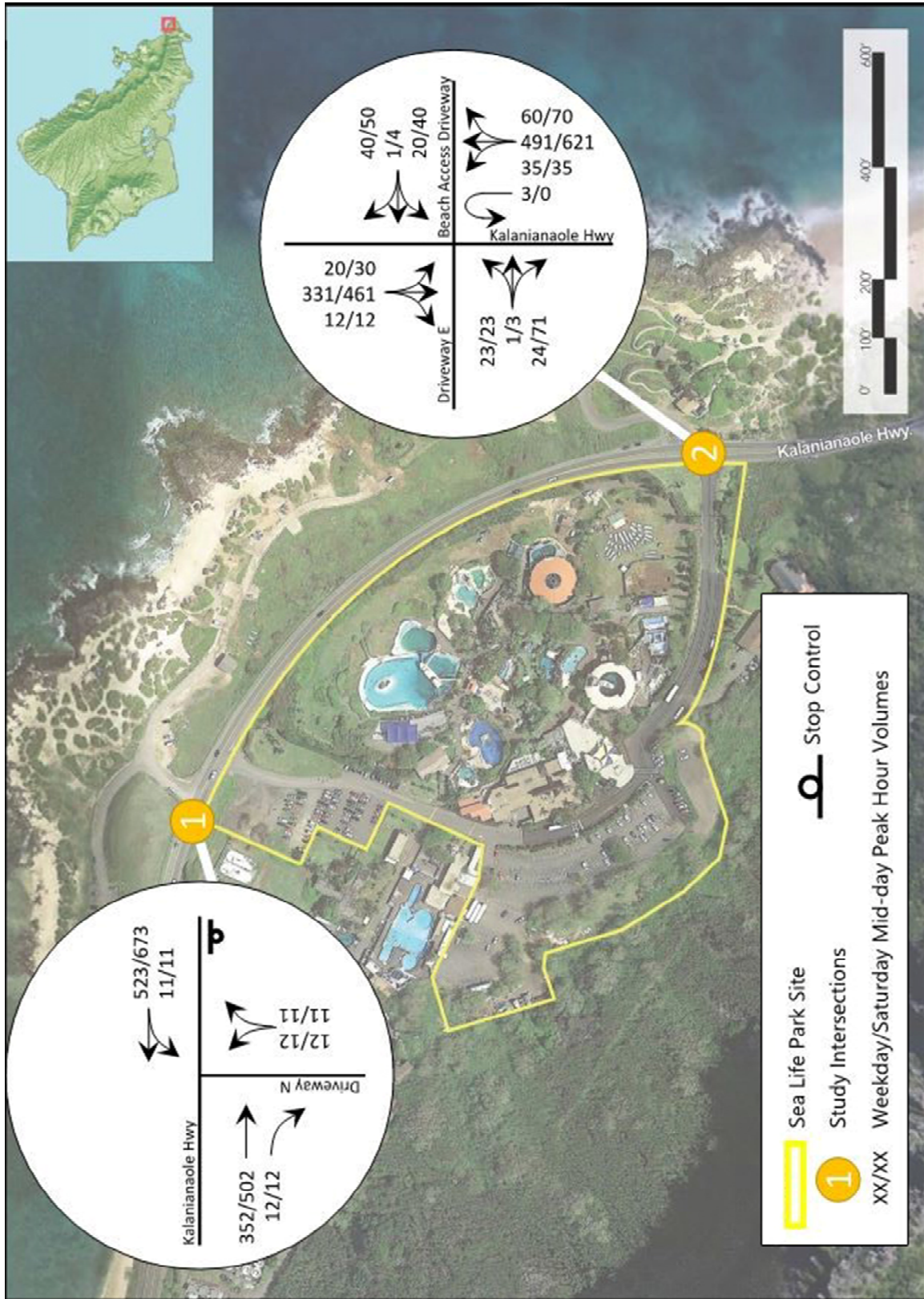


Figure 3.5

Future Traffic Conditions with SLP Improvements

Modifications to access are planned to improve on-site circulation. Currently, visitors and employees utilize both driveways connecting to Kalaniana'ole Highway. The main entrance is at Driveway East where most vehicles enter and traverse the internal loop road to the visitor and employee parking areas. Exit signs point to Driveway North from the existing visitor parking lot. Transit and tour buses also traverse this route. The planned changes to access include channeling all entering and exiting visitor trips to Driveway East. Driveway North will provide access for employees to the employee parking areas. Buses will continue to use the current travel pattern of entering from Driveway East and exiting at Driveway North.

Additional traffic improvements for SLP that will be evaluated with review agencies in the planning process include:

- 1) Add a sidewalk or walking path along Driveway East between the entrance plaza and Kalaniana'ole Highway
- 2) Install a crosswalk at Kalaniana'ole Highway/Driveway East
- 3) Provide Bicycle Parking

SLP is expected to meet all parking demand on-site. Construction period traffic will be limited in duration, mitigated by contractors combining worker vehicle use and off-peak equipment/materials delivery.

Sustainable Mobility

In the interest of Complete Streets strategies, a Circulation Plan is provided as *Figure 2.21*. The O'ahu Bike Plan has designated Kalaniana'ole Highway, including the SLP area, as a proposed bike route. Bicyclists that use SLP can access the bicycle corral via the main driveway. Center lines are not used in the SLP Driveway, facilitating the passing of people or bicycles by motor vehicles. Designated parking will also be available for motorcycles and electronic vehicles.

3.14 Air Quality

Existing Conditions

Air quality of the area of planned improvements at SLP is primarily affected by air pollutants from natural and/or vehicular sources. Natural sources of air pollution that may affect the air quality of the study area include ocean sea spray, aero-allergens from plants, and wind-blown dust from bare soil areas. Depending upon the prevailing wind direction, emissions from motor vehicles traveling on Kalaniana'ole Highway may be dispersed in the area of planned improvements. There are no adverse odor conditions emanating from SLP.

The U.S. Environmental Protection Agency (EPA) established the National Ambient Air Quality Standards (NAAQS) per the requirements of the Clean Air Act (last amended in 1990) to protect public health and welfare and prevent the significant deterioration of air quality. These standards account for seven major air pollutants: carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O₃), particulate matter smaller than 10 microns (PM₁₀), particulate matter smaller than 2.5 microns (PM_{2.5}), sulfur oxides (SO_x), and lead. DOH, Clean Air Branch (CAB) has also established State Ambient Air Quality Standards (SAAQS) for six of these air pollutants to regulate air quality statewide. The SAAQS for carbon monoxide and nitrogen dioxide are more stringent than NAAQS. Hawai'i also has a stringent standard for hydrogen sulfide, which is a common odorous pollutant associated with wastewater treatment facilities.

DOH, CAB regularly samples ambient air quality at monitoring stations throughout the State and annually publishes this information. On O’ahu, there are six monitoring stations. The DOH Air Monitoring Station nearest SLP is in Honolulu off Punchbowl Street, directly across the street from Queen’s Medical Center.

Anticipated Impacts and Proposed Mitigation

Construction activities at SLP are not expected to generate significant air quality impacts. There will be limited grading required to establish these uses, with just over one acre affected by construction activities. Job site watering will be conducted to minimize dust loss during construction. Construction equipment and vehicles will be properly maintained to minimize emissions.

Operation of the proposed recreational uses will not generate adverse air quality impacts. Vehicles traveling to and from SLP will generate emissions; however, the improvements to SLP is not anticipated to generate significantly greater numbers of vehicle trips.

3.15 Noise

Existing Conditions

Noise generated by activities at the existing SLP facilities is relatively minimal and are dispersed to the next closest residential area. The predominant noises in the area are associated with vehicles and trucks traveling along Kalaniana’ole Highway. Other noises are generated by winds, the ocean, and birds.

Title 11, Chapter 46, or the Hawai’i Administrative Rules defines maximum permissible sound levels which are intended to protect, control, and abate noise pollution from stationary sources and construction, industrial, and agricultural equipment. As detailed below, maximum permissible sound levels in various zoning districts are set for excessive noise sources during the day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) at the property line where the activity occurs.

- Class A – Residential, conservation, preservation, public space, open space, or similar type zones – 55 decibel (dBA) (day) and 45 dBA (night)
- Class B – Multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type zones – 60 dBa (day) and 50 dBa (night)
- Class C – Agriculture, country, industrial, or similar type zones – 70 dBa (day) and 70 dBA (night)

Anticipated Impacts and Proposed Mitigation

Construction noise at the proposed locations is not expected to be significant. Construction will be phased and will take place over 5,100 feet (0.97 mile) from the nearest residences. State regulations and County Building Permit conditions limit construction noise generation construction activities to allowable limits.

The operations of the proposed SLP improvements will not cause excessive noise. Of the proposed activities and improvements, the Hawai’i Ocean Theatre, Restaurant, and Menehune Island Splash Play Area will create the most noticeable noise. However, these activities will primarily take place during work hours, and are at considerable distances from neighboring residences and public parks.

3.16 Public Services

Existing Conditions and Anticipated Impacts

Medical Facilities

The closest hospital is approximately 8 miles away from SLP at the Adventist Health Castle hospital in Kailua. Other medical facilities in the area include Waimānalo Heath Center 4.3 miles away, Straub Hawaii Kai Family Health Center 5.5 miles away, Queen's Health Care Center 5.6 miles away, and Island Urgent Care Hawaii Kai 6.1 miles away. Some Park visitors may infrequently require service from local medical facilities, although this will not affect the service capacity of these medical facilities.

Educational Facilities

There are three elementary schools (Blanche Pope Elementary, Waimānalo Elementary and Intermediate, and Kamiloiki Elementary) within a five-mile radius of SLP. The nearest intermediate school and high schools are located at Waimānalo Elementary and Intermediate School and Kaiser High School, which are approximately 4.3 miles and 5.1 miles away from SLP, respectively.

The planned improvements at SLP are unlikely to have adverse effects on existing educational facilities. Beneficial effects associated with the planned improvements at SLP for local schools include increased capacity and new educational activities, making SLP a more attractive option for school field trips.

Recreational Facilities

Nearby recreational facilities include Makapu'u Beach Park (0.2 miles away), Kaupō Beach Park (1 mile away), and Makapu'u Point Lighthouse Trail (0.8 miles away). These public recreational facilities will not be affected by the SLP improvements.

Police and Fire Services

SLP falls within HPD's District 4, Sector 1; the main station for District 4 is located in Kāne'ohe, approximately 14.5 miles away from SLP. The nearest fire station is about 4.2 miles away at Honolulu Fire Station 27 in Waimānalo. Improvements at SLP will not affect police services in the area and fire protection access and firefighting support requirements for the facilities will be satisfied.

Refuse

Refuse collection at SLP is provided by a private collection service. Construction-generated solid waste will be disposed of at an approved City and County of Honolulu refuse facility.

3.17 Potential Cumulative and Secondary Impacts

Cumulative impacts are the result of incremental effects of an activity when combined with other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Minor but collectively significant actions over a period of time can result in cumulative impacts to a place. The areas within SLP which are planned for improvements have been previously disturbed from the inception of SLP operations. The improvements will take place in existing development footprints, and as a result, are not anticipated to generate significant cumulative impacts. There are no new planned or permitted development projects located within the vicinity of SLP.

Secondary effects are impacts that are associated with an activity but do not result directly from the activity. Overall, the SLP improvements will provide beneficial secondary effects for the Waimānalo and O'ahu communities by improving the functionality and aesthetics of SLP. Sea Life Park is one of the only marine and wildlife animal parks on O'ahu with a focus on education and conservation.

The improvements are anticipated to support the local economy, as SLP employs approximately 100 people. In addition, the initiatives tied to the improvements will provide secondary benefits for marine conservation efforts by creating a local interface that will increase visitor knowledge.

Section 4

Alternatives

Chapter 4

Alternatives

The following presents an analysis and discussion of potential alternatives to the planned improvements to Sea Life Park (SLP).

4.1 Alternative A – No-Action Alternative

The No-Action Alternative is the baseline against which all other alternatives are measured. “No-Action” refers to the future site conditions that would result should the planned improvements to SLP not proceed. This alternative would not proceed with the renovation, expansion, and relocation of the 14 exhibits and related facilities at SLP.

The existing condition of the gift shop has resulted in a portion of it being evacuated and boutique shops relocated. In the case of the No-Action Alternative, this facility would continue to deteriorate and could pose a safety hazard to visitors and employees. Additionally, since many other exhibits and facilities have reached the end of their useful life, if no renovations are completed it will likely diminish SLP’s ability to provide a highly desirable experience for park visitors. This option would not properly address the State’s or the City’s economic objectives for maintaining a successful visitor economy. Moreover, further deterioration of SLP facilities may diminish the park’s ability to provide the best care possible for its animals. For these reasons, the No-Action Alternative was not considered a viable alternative.

4.2 Alternative B – Build Only the Entry Concierge & Gift Shop

In 2016, a structural assessment of the gift shop, restrooms, and electrical rooms directly under the entry observation deck revealed several large areas of delaminating concrete and corrosion of the reinforcing steel (Kai Hawai’i, Inc. March 2016). The existing condition of the gift shop ceiling has reduced the load carrying capacity of the ceiling and observation deck, which has resulted in a portion of the gift shop being evacuated and boutique shops relocated.

Alternative B would include demolishing the existing structure and building a new entry concierge and gift shop facility. While this addresses the immediate safety concerns of an integral facility, and would provide some enhancements to the park, it would fail to adequately address further renovations and expansions needed to maintain SLP as a desirable visitor location. In order for SLP to meet the growing expectations of the public and remain competitive with other recreational, educational, and tourism-based opportunities on O’ahu, more complete renovations have been deemed necessary. Moreover, the complete planned improvements to SLP will better address both State and County goals for the visitor economy. For these reasons, Alternative B was not considered viable.

4.3 Alternative C – Delayed Action

The Delayed Action Alternative would involve postponing construction of the new facilities to some date in the future. As a result, the structural integrity of SLP's Entry Concierge and Gift Shop, Shark Cave, and Hawaiian Ocean Theater would continue to deteriorate and could potentially pose a risk to the safety of visitors, employees, and the park's animals. Delaying construction to a future date would also potentially result in higher construction costs due to inflation.

This alternative was eliminated from further consideration as the same concerns as those stated in the No-Action Alternative would persist. To prepare for an increase in annual visitors and provide a highly desirable experience, SLP needs to address overdue upgrades to renovate, expand, and enhance its available programs and activities.

4.4 Alternative D – Expansion to Amusement/Theme Park

In addition to the renovation, expansion, and relocation of 14 exhibits and related facilities at SLP, other exhibits and attractions, such as theme park elements, would be constructed in Alternative D. Sea Life Park would shift their focus toward more of a mainland-styled theme park. The expansion would include themed rides that would capitalize on the breathtaking views of the Ko'olau Mountains and Pacific Ocean. Under this scenario, the expansion would include roller coaster attractions which would emphasize experiencing the thrill of high-speed rides. Other elements would focus more on the entertainment elements, such as daily live music venues and theatre shows.

While an alternative focused on theme park attractions could increase visitor attendance, the use would be inconsistent within the objectives for the Sea Life Park Special Subzone. Sea Life Park is intended to further marine life conservation and education through the Park's recreational, educational, and commercial features tied to marine life. A shift in the focus of Sea Life Park to highlight an overall business model based on theme park attractions would not meet the intent and purpose of the Special Subzone. The revised theming for Sea Life Park with these types of attractions would also potentially degrade the view of the Ko'olau Mountains from the coastline. For these reasons, Alternative D is not considered a viable option.

4.5 Alternative E – Build Exhibits at a Different Location

Sea Life Park proposes to renovate, expand, and relocate 14 exhibits and related facilities for better flow of the park and guest experience. Even though the planned improvements involve expansion and relocation of some structures, the entire expansion is planned to remain on the same parcel of land which SLP currently occupies. Alternative E suggests that any new facility could be built at an alternative location nearby, such as an adjacent parcel of land, or at a remote location.

The only reason to consider this option is if it were determined that the placement of a structure in the planned improvements would produce a significant harmful impact, but this notion is not supported in the current environmental assessment. None of the structures are anticipated to result in significant adverse impact to the area.

Relocation of facilities to an alternative site could be expensive, as it would likely require SLP to lease or purchase additional land, and possibly require additional easements and permissions. Furthermore, Alternative E may require SLP to coordinate transportation services between different sites. For these reasons, this alternative was not considered a viable option.

4.6 Preferred Alternative/Proposed Action

The planned improvements will increase the capacity of the park to better serve guests, supporting an estimated 85,000 additional visitors annually and enhancing O'ahu's tourism economy. The planned improvements will create a new identity for the park that embraces its local culture, giving visitors to O'ahu the Hawaiian experience they expect from the island. The action to undertake the planned improvements was determined to be the preferred alternative, as it meets SLP's needs and it is not anticipated to result in significant adverse environmental, ecological, or social impacts.

Section 5

Plans and Policies

Chapter 5

Plans and Policies

The consistency of the Sea Life Park (SLP) planned improvements with applicable State of Hawai'i and City & County of Honolulu planning and land use objectives, policies, principles and guidelines are discussed below.

5.1 Americans with Disabilities Act of 1991

In 1991, the Federal government enacted the Americans with Disabilities Act (ADA) to provide equal accessibility for persons with disabilities. Part of this statute requires building designs to consider and incorporate the needs of persons with disabilities. Chapter 103-50 of the Hawai'i Revised Statutes (HRS) states, "...all plans and specifications for the construction of public buildings, facilities, and sites shall be prepared so that the buildings, facilities, and sites are accessible to and usable to persons with disabilities." The Disability and Communication Access Board (DCAB) shall adopt rules for the design of buildings, facilities, and site, by or on behalf of the State and Counties.

Discussion

The planned improvements to SLP include but are not limited to the expansion of the Honu Conservation and Education Center, the new indoor aquarium, and the renovations of the Hawai'i Ocean Theatre, the Shark Cave, and Makapu'u Meadows/Kaupō Fishing Village. The planned improvements will comply with ADA and DCAB accessibility requirements.

5.2 Hawai'i State Plan

The Hawai'i State Plan establishes a statewide planning system that provides goals, objectives, and policies that detail priority directions and concerns of the State of Hawai'i; these will be discussed as they relate to the planned improvements.

It is the goal of the State, under the Hawai'i State Planning Act (Chapter 226, Hawai'i Revised Statutes (HRS)), to achieve the following:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

Specific objectives and policies of the State Plan that pertain to the planned improvements are as follows:

Section 226-6 Objectives and Policies for the economy—in general:

- (a) *Planning for the State's economy in general shall be directed toward achievement of the following objectives:*
 - (1) *Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.*
- (b) *To achieve the general economic objectives, it shall be the policy of this State to:*
 - (2) *Expand Hawai'i's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.*
 - (3) *Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.*
 - (12) *Encourage innovative activities that may not be labor-intensive but may otherwise contribute to the economy of Hawai'i.*
 - (15) *Maintain acceptable working conditions and standards for Hawai'i's workers.*
 - (16) *Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and nondiscrimination measures.*
 - (19) *Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.*

Discussion

The planned improvements at SLP are complementary to the State's objectives for the general economy. The proposed expansion will support an increase in the number of visitors to the park, which will promote approximately 20 more new jobs and economic opportunities for residents. The park is owned by Parques Reunidos, an international company incorporated in Spain.

The planned designs for new and renovated exhibits at SLP are compatible with the natural environment and will promote the scenic beauty of the area. New activities at SLP will communicate unique and sensitive elements of Hawai'i's culture and values, including protection and management of Hawai'i's natural resources.

Section 226-8 Objective and policies for the economy—visitor industry:

- (a) *Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawai'i's economy.*
- (b) *To achieve the visitor industry objective, it shall be the policy of this State to:*
 - (1) *Support and assist in the promotion of Hawai'i's visitor attractions and facilities.*
 - (2) *Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.*
 - (3) *Improve the quality of existing visitor destination areas.*
 - (4) *Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.*
 - (5) *Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.*

- (6) *Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.*
- (7) *Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.*
- (8) *Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.*

Discussion

The planned improvements at SLP are complementary to the State's objectives for the visitor industry economy. New activities, such as interactive exhibit and classroom at the Honu Conservation Center, will bolster SLP's educational opportunities for both visitors and residents. Additional activities and renovations planned for SLP, such as the Beach Boy Lanai food court renovation and the Kaupō Fishing Village area, will aid in improving the quality of an existing visitor destination while communicating unique and sensitive elements of Hawai'i's culture and values.

Sea Life Park activities and planned improvements are congruent with the social, economic, and physical needs of the local area. The expansions, renovations, and new facilities will support activities and experiences that will improve the quality of this well-known visitor destination.

Section 226-11 Objectives and policies for the physical environment—land-based, shoreline, and marine resources:

- (a) *Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:*
 - (1) *Prudent use of Hawai'i's land-based, shoreline, and marine resources.*
 - (2) *Effective protection of Hawai'i's unique and fragile environmental resources.*
- (b) *To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:*
 - (1) *Exercise an overall conservation ethic in the use of Hawai'i'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 use without generating costly or irreparable environmental damage.*
 - (6) *Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.*
 - (8) *Pursue compatible relationships among activities, facilities, and natural resources.*
 - (9) *Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.*

Discussion

The use of this area for the planned improvements to SLP is consistent with State and County land use districts and zoning designations. The planned improvements are not anticipated to pose threats to Native Hawaiian endangered plant or animal species and habitats, and construction is not expected to result in substantial impacts to environmental and marine resources. To the contrary, SLP actively pursues measures to educate the public about the local environment and marine resources, and it provides services to protect endangered sea turtles and seabirds.

Sea Life Park is the only sanctioned institution in the United States that maintains an active breeding colony of green sea turtles. The planned expansion of the Honu Conservation and Education Center will raise SLP's capacity to protect and breed endangered sea turtles, as well as provide educational opportunities to the public. The proposed Honu Conservation Center will become the world's foremost sea turtle rescue and rehabilitation center.

Each year SLP takes in and treats approximately 600 to 700 seabirds. It is the only place on O'ahu where someone may bring an injured seabird 24 hours a day, seven days a week. The relocation and expansion of the Seabird Sanctuary will bolster SLP's capacity to rehabilitate seabirds as well as educate the public about seabird species.

Section 226-12 Objectives and policies for the physical environment—scenic, natural beauty, and historic resources:

- (a) *Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources.*
- (b) *To achieve the scenic, natural beauty, and historic resources objectives, it shall be the policy of this State to:*
 - (3) *Promote the preservation of views and vistas to enhance the landscapes, and other natural features.*
 - (4) *Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage*
 - (5) *Encourage the design of developments and activities that complement the natural beauty of the islands.*

Discussion

The planned improvements to SLP will not pose adverse impacts to existing scenic assets or cultural/historical resources in the area. Scenic viewsheds include panoramic views of the Pacific Ocean beyond Kalaniana'ole Highway, and two small offshore islands, Mānana (Rabbit) Island and Kāohikaipu (Black Rock or Turtle) Island.

Improvements to the park will bolster the natural beauty of the landscape and communicate a sense of the unique local culture. The design of new facilities, such as Kaupō Fishing Village, will be reflective of the natural environment and Hawaiian historical and cultural elements.

Renovations throughout the Park generally include natural rock work and other features to allow SLP to blend into and reinforce the appearance of the natural environment. The landscape in each area will be refreshed, bringing a vibrant feel to the park while complementing the natural park site. To enhance thematic immersion and ensure cohesion across the park, the landscape plan includes native palms, palm grasses and tropical ferns that will enhance the natural setting. Tropical vibrant flowers will be included as color enhancements to accent the green landscape background and reinforce the storyline of SLP.

Section 226-13 Objectives and policies for the physical environment—land, air, and water quality:

- (a) *Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:*
 - (1) *Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.*
 - (2) *Greater public awareness and appreciation of Hawai'i's environmental resources.*

- (b) *To achieve the land, air, and water quality objectives, it shall be the policy of this State to:*
- (1) *Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.*
 - (2) *Promote the proper management of Hawai'i's land and water resources.*
 - (3) *Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.*
 - (6) *Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.*
 - (8) *Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.*

Discussion

The planned improvements are appropriately scaled and will maintain Hawai'i's natural and scenic resources. The planned improvements are not anticipated to adversely affect coastal resources. Protective measures will be carried out to minimize potential impacts to the physical environment (land, air, and water). SLP aims to preserve the high quality of land, air, and water resources at the park.

The planned improvements at SLP, such as the Honu Conservation and Education Center expansion, and the Shark Cave renovation, will bolster educational opportunities to raise public awareness and appreciation for the importance and value of Hawai'i's unique natural resources. Moreover, the design of new and renovated exhibits will be reflective of the animals' natural habitat.

Currently, SLP includes participation of local elementary schools in the sea turtle release program. SLP is in the early stages of developing a 4th grade marine science curriculum. Boy Scouts and Girl Scouts can earn badges with participation in events at SLP. At the college level, SLP offers several types of un-paid internship opportunities, including: Marine Mammal Care & Training, Seabird Care & Rehabilitation, Veterinary Technician, and Educator Experiences. Many interns receive course credit for their internships. These programs help to foster recognition of the importance and value of Hawai'i's land, air and water resources.

Surface water, ground and coastal waters, botanical and biological resources, air quality, and the aural environment are evaluated in *Sections 3.4 to 3.7, 3.14 and 3.15*. Protective measures will be carried out to minimize potential impacts to the physical environment. For example, construction will be located away from drainage paths leading to the shoreline. Construction and landscaping will include runoff procedures and collection ponds to minimize drainage problems. The planned improvements are not anticipated to pose detrimental effects to the surrounding areas.

Section 226-15 Objectives and policies for facility systems—solid and liquid wastes.

- (a) *Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:*
- (1) *Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.*
- (b) *To achieve solid and liquid waste objectives, it shall be the policy of this State to:*
- (1) *Encourage the adequate development of sewerage facilities that complement planned growth.*
 - (2) *Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.*

Discussion

Sea Life Park supports the objectives and policies for facility systems regarding solid and liquid wastes. As discussed in Section 3.12, wastewater improvements will be properly designed to manage system demands. The improvements will provide for additional capacity to accommodate the entry/retail building, Beach Boy Lanai, Seabird Sanctuary, Aviary, Menehune Island Splash Play Area, and Kaupō Fishing Village. Existing solid waste disposal and recycling programs will continue to function in support of SLP operations.

Section 226-16 Objectives and policies for facility systems–water:

- (a) *Planning for the State’s facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.*
- (b) *To achieve the facility systems water objective, it shall be the policy of this State to:*
 - (1) *Coordinate development of land use activities with existing and potential water supply.*
 - (6) *Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.*

Discussion

Sea Life Park will coordinate with the City and County of Honolulu Board of Water Supply to address requirements for water supply. New and renovated facilities at SLP will promote the achievement of the State’s objectives regarding water conservation.

Section 226-21 Objectives and policies for socio-cultural advancement–education:

- (a) *Planning for the State’s socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.*
- (b) *To achieve the education objective, it shall be the policy of this State to:*
 - (1) *Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.*
 - (2) *Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.*
 - (4) *Promote educational programs which enhance understanding of Hawai‘i’s cultural heritage.*

Discussion

The planned improvements at SLP will support the State’s socio-cultural advancement objective to achieve a variety of educational programs and activities that provide recreation and enhance understanding of Hawai‘i’s cultural heritage. The planned improvements will provide educational opportunities to raise public awareness and appreciation for the importance and value of Hawai‘i’s unique natural resources, history, and culture. Currently, SLP includes participation of local elementary schools in the turtle release program. SLP is in the early stages of developing a 4th grade marine science curriculum.

Section 226-23 Objectives and policies for socio-cultural advancement–leisure:

- (a) *Planning for the State’s socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.*

- (b) *To achieve the leisure objective, it shall be the policy of this State to:*
- (1) *Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.*
 - (2) *Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.*
 - (3) *Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.*
 - (4) *Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.*
 - (8) *Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.*

Discussion

The planned improvements at SLP will support the State's socio-cultural advancement objective to provide opportunities for leisure and accommodate diverse cultural, artistic, and recreational needs for present and future generations. The expansions, renovations, and new facilities at SLP will support a range of activities and experiences that will improve the quality of this well-known visitor destination. The design of facilities and renovations are reflective of the natural environment and Hawaiian historical and cultural elements. Sea Life Park will support new activities that promote engagement in a Native Hawaiian cultural experience.

Section 226-25 Objectives and policies for socio-cultural advancement–culture:

- (a) *Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawai'i's people.*
- (b) *To achieve the culture objective, it shall be the policy of this State to:*
- (1) *Foster increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and the history of Hawai'i.*
 - (2) *Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai'i's people and which are sensitive and responsive to family and community needs.*
 - (3) *Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawai'i.*
 - (4) *Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawai'i's people and visitors.*

Discussion

The planned improvements will support the State's socio-cultural advancement objective to provide opportunities that enhance and promote Hawaiian cultural identities, traditions, values, customs, and arts.

Key components at SLP, such as the Honu Conservation and Education Center expansion, will bolster educational opportunities to raise public awareness and appreciation for the importance and value of Hawai'i's unique natural resources. The planned improvements will support new and enhanced programs and activities at SLP that will provide opportunities to enhance the visitor's understanding of Hawai'i's cultural heritage and natural resources. Moreover, the designs for new and renovated facilities are reflective of the natural environment and infused with Hawaiian historical and cultural elements.

Section 226-102 Overall Direction

The State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.

Discussion

Sea Life Park supports the overall direction of the State of Hawai'i in the areas of economic development, land resource management, quality education, and sustainability. Sea Life Park's renovations and new facilities will support activities and experiences that will improve the quality of this well-known visitor destination. The improvements will support an increase in the number of visitors to the park, which will promote new jobs and economic opportunities for residents.

Sea Life Park is devoted to the protection and conservation of marine resources and provides educational opportunities for park visitors to promote greater environmental awareness and cultivate a culture of environmental stewardship. Moreover, SLP actively provides services to protect local marine and bird species, advance marine research, and develop innovation in both marine resource conservation and community engagement in understanding Hawai'i's unique cultural and environmental resources.

New activities, such as interactive exhibit and classroom at the Honu Conservation Center, will bolster SLP's educational opportunities for both visitors and residents.

5.3 Hawai'i 2050 Sustainability Plan

The long-term strategy of the Hawai'i 2050 Sustainability Plan is supported by its main goals and objectives of respect for culture, character, beauty, and history of the State's island communities; balance among economic, community, and environmental priorities; and an effort to meet the needs of the present without compromising the ability of future generations to meet their own needs.

The 2050 Plan delineates five goals toward a sustainable Hawai'i accompanied by strategic actions for implementation and indicators to measure success or failure. The goals and strategic actions that are pertinent to the proposed improvements at Sea Life Park are as follows:

Goal One: *Living sustainably is part of our daily practice in Hawai'i.* Strategic Actions: *Develop a sustainability ethic.*

Goal Two: *Our diversified and globally competitive economy enables us to meaningfully live, work, and play in Hawai'i.* Strategic Actions: *Develop a more diverse and resilient economy; support the building blocks for economic stability and sustainability.*

Goal Three: *Our natural resources are responsibly and respectfully used, replenished, and preserved for future generations.* Strategic Actions: *Provide greater protection for air, and land-, fresh water- and ocean-based habitats; conserve agricultural, open space and conservation lands and resources.*

Goal Four: *Our community is strong, healthy, vibrant and nurturing, providing safety nets for those in need.* Strategic Actions: *Provide access to diverse recreational facilities and opportunities.*

Goal Five: *Our Kanaka Maoli and island cultures and values are thriving and perpetuated. Strategic Actions: Honor Kanaka Maoli culture and heritage; Celebrate our cultural diversity and island way of life.*

Discussion

The planned improvements at SLP will promote the goals of the Hawai'i 2050 Sustainability Plan and is in alignment with the identified strategic actions. Educational activities at SLP will foster a strong sustainability ethic. Conservation and Rehabilitation centers at SLP will protect natural resources, including endangered sea turtles and local sea birds.

The planned improvements will bolster the economy and provide opportunities for new jobs and enhanced recreational opportunities. Site improvements will help to better protect the environment and the public by bringing the facilities up to City and County standards.

The area has a rich history and SLP is committed to promoting Hawaiian culture and stewardship through its various programs and activities.

5.4 Hawai'i State Land Use District Guidelines

Under the Chapter 205, HRS, all lands of the State are to be classified in one of four categories: urban, rural, agricultural, and conservation lands. The State Land Use Commission (LUC), an agency of the State Department of Business, Economic Development, and Tourism (DBEDT), is responsible for each district's standards and for determining the boundaries of each district (Chapter 205-2(a), HRS). The LUC is also responsible for administering all requests for district reclassifications and/or amendments to district boundaries, pursuant to Chapter 205-4, HRS, and the HAR, Title 15, Chapter 15 as amended. Under this Chapter, all lands in Hawai'i are classified into four land use districts: (1) Conservation, (2) Agricultural; (3) Urban, and (4) Rural.

Sea Life Park is in the State Land Use Conservation District within a special subzone, as described below. The Conservation District generally includes lands necessary for protecting watersheds, water resources, and water supplies. This District also includes lands necessary for the conservation, preservation, and enhancement of scenic, cultural, historic, or archaeological sites and sites of unique physiographic or ecologic significance. These are also lands necessary for providing and preserving parklands, wilderness and beach reserves, for conserving natural ecosystems of indigenous or endemic plants, fish, and wildlife. All offshore and outlying islands of the State are classified conservation unless otherwise designated on the land use district maps. Typically, conservation lands may not be normally adaptable or presently needed for urban, rural, or agricultural use. Jurisdiction of this district lies primarily with the State Department of Land and Natural Resources.

Land use regulation within the Conservation District is outlined in HAR, Title 13, Chapter 5 as amended. Conservation lands are further classified into the following subzones: Protective; Limited; Resource; General; or Special. The Sea Life Park Special Subzone was established in 1981 to further marine life conservation and education through the Park's recreational, educational, and commercial features tied to marine life.

Discussion

As classified by the State of Hawai'i LUC, SLP is situated within the State Conservation District. The planned improvements are consistent with permitted uses for the Conservation District and the purposes of the Sea Life Park Special Subzone. A Special Management Area (SMA) Use Permit Major is required for the planned improvements under Chapter 25 ROH.

5.5 Hawai'i Coastal Zone Management Program

The Coastal Zone Management Act of 1972 (16 USC Section 1451), as amended through Public Law 104-150, created the coastal management program and the National Estuarine Research Reserve system. The coastal states are authorized to develop and implement a state coastal zone management program. Hawai'i Coastal Zone Management (CZM) Program received federal approval in the late 1970's. The objectives of the State's Hawai'i Coastal Zone Management (CZM) Program, Section 205A-2, HRS, are to protect valuable and vulnerable coastal resources such as coastal ecosystems, special scenic and cultural values and recreational opportunities. The objectives of the program are also to reduce coastal hazards and to improve the review process for activities proposed within the coastal zone.

Each county is responsible for designating a Special Management Area (SMA) that extends inland from the shoreline. Development within this SMA is subject to County approval to ensure the proposal is consistent with the policies and objectives of the Hawai'i CZM Program. The entire SLP site is within the SMA as delineated by the City and County of Honolulu and as such, requires an additional review under State CZM and County SMA rules. The following subsections examine the objectives of the Hawai'i CZM Program and the impacts of the planned improvements relative to the State CZM objectives and policies. Specific City and County of Honolulu SMA policies are also discussed in *Section 5.9*.

RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

- (A) *Improve coordination and funding of coastal recreation planning and management.*
- (B) *Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*
- *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*
 - *Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy beaches, when such resources will be unavoidable damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;*
 - *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
 - *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
 - *Encouraging expanded public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value;*
 - *Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;*
 - *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, artificial reefs for surfing and fishing; and*
 - *Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use Commissions, board of land and natural resources, county planning commissions, and crediting such dedication against the requirements of Section 46-6.*

Discussion

The planned improvements will not affect coordination and funding of coastal recreation planning and management. The SLP improvements will comply with State CZM guidelines, and construction will be conducted in accordance with County, State, and federal regulations. Makapu'u and the numerous beaches in the Waimānalo direction combine to make this area a prime recreational area for residents as well as a unique tourist attraction. The planned improvements are not expected to adversely affect recreational activities at nearby beaches.

HISTORIC RESOURCES

Objective: Protect, preserve and, where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawai'i and American history and culture.

- (A) *Identify and analyze significant archaeological resources;*
- (B) *Maximize information retention through preservation of remains and artifacts or salvage operations; and*
- (C) *Support state goals for protection, restoration, interpretation and display of historic resources.*

Discussion

An Archaeological Inventory Survey will be conducted for the area of planned improvements at SLP, following guidance and approval by the State Historic Preservation District.

SCENIC AND OPEN SPACE RESOURCES

Objective: Protect, preserve and where desirable, restore or improve the quality of coastal scenic and open space resources.

- (A) *Identify valued scenic resources in the coastal zone management area;*
- (B) *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*
- (C) *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*
- (D) *Encourage those developments which are not coastal dependent to locate in inland areas.*

Discussion

As discussed in Section 3.11, the planned improvements are not expected to adversely affect vistas or scenic resources. The design of facilities will be reflective of the natural environment and Hawaiian historical and cultural elements. Improvements to the site will bolster the natural beauty of the landscape and communicate a sense of the unique local culture.

COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

- (A) *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*
- (B) *Improve the technical basis for natural resource management;*
- (C) *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*

- (D) *Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and*
- (E) *Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.*

Discussion

The planned improvements are not anticipated to pose adverse effects to coastal ecosystems. Since SLP began operating its saltwater intake and disposal system in 1964, there have been no effects to the shoreline and nearshore ecosystem. Neither salinity nor temperature changes occur as a result of this interchange. The porous volcanic rock acts as a purifier of the water and the saltwater is returned to the ocean via the shallow aquifer.

Construction and activities at SLP will take place away from drainage pathways leading to the shoreline. The Seabird Sanctuary is situated approximately 400 ft away from the shoreline. The construction and operations of these improvements will not adversely affect the shoreline or nearshore waters.

ECONOMIC USES

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

- (A) *Concentrate coastal dependent development in appropriate areas;*
- (B) *Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*
- (C) *Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:*
 - (i) *Use of presently designated locations is not feasible;*
 - (ii) *Adverse environmental effects are minimized; and*
 - (iii) *The development is important to the State's economy.*

Discussion

The planned improvements are consistent with State and County plans and land regulations, and in alignment with the State's CZM program's economic objectives. The uses are tied to coastal dependent development and the expansion of the Park will be designed and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area.

COASTAL HAZARDS

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

- (A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;*
- (B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;*
- (C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and*
- (D) Prevent coastal flooding from inland projects.*

Discussion

The planned improvements support the objectives and policies with regards to coastal hazards. Sea Life Park will preserve valuable coastal ecosystems and will not pose a hazard to life and property from tsunami or storm waves.

MANAGING DEVELOPMENT

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

- (A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*
- (B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and*
- (C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

Discussion

The planned improvements support the objectives and policies with regards to managing development in coastal areas. This EA complies with the requirements for assessing and communicating the potential short and long-term impacts.

PUBLIC PARTICIPATION

Objective: Stimulate public awareness, education, and participation in coastal management.

- (A) Promote public involvement in coastal zone management processes;*
- (B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and*
- (C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.*

Discussion

In addition to the educational exhibits, the SLP Education Department offers a wide variety of field trips and education outreaches designed to make learning fun for all grade levels. For example, in the Meet the Honu program, students learn how amazing sea turtles are, and the population status for all species ranging from vulnerable to critically endangered. Students learn why it is so important to protect the sea turtles and get an up-close view of the animals while learning why they should not feed, touch, or approach a turtle in the wild.

BEACH PROTECTION

Objective: Protect beaches for public use and recreation.

- (A) *Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;*
- (B) *Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities;*
- (C) *Minimize the construction of public erosion-protection structures seaward of the shoreline;*
- (D) *Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and*
- (E) *Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.*

Discussion

The planned improvements are not anticipated to result in adverse effects to local beaches, nor should it affect public use of nearby coastal resources and recreational opportunities.

MARINE RESOURCES

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

- (A) *Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*
- (B) *Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;*
- (C) *Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;*
- (D) *Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and*
- (E) *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

Discussion

The planned improvements are not expected to adversely affect marine resources. Sea Life Park aligns with and promotes the objectives set forth in the State's ocean resources management plan. SLP is devoted to the protection and conservation of marine resources and provides educational opportunities for park visitors to promote greater environmental awareness and cultivate a culture of environmental stewardship. Moreover, SLP actively provides services to protect local marine and bird species, advance marine research, and develop innovation in both marine resource conservation and community engagement in understanding Hawai'i's unique cultural and environmental resources.

5.6 City and County of Honolulu General Plan

The General Plan for the City was adopted in 1977 and has been subsequently amended (most recently in 2002). The General Plan is a comprehensive statement of the long-range social, economic, environmental and design objectives for the general welfare and prosperity of the people of O‘ahu. The objectives and policies are organized into 11 subject areas and are intended to guide and coordinate City land use plans and regulations, and budgeting policies and decisions for public facility capital improvements, operations and maintenance.

A Draft 2035 O‘ahu General Plan Update was published for public review in November 2012, and the Revised General Plan was submitted to the City Council in April 2018 for approval. A Final Revised General Plan Update is still pending. The planned improvements at SLP are consistent with the applicable objectives and policies of the existing City and County of Honolulu General Plan as amended in 2002, described below.

The Economy

Objective A: To promote employment opportunities that will enable all people of O‘ahu to attain a decent standard of living.

- *Policy 1. Encourage the growth and diversification of O‘ahu’s economic base.*
- *Policy 2. Encourage the development of small businesses and larger industries which contribute to the economic and social well-being of O‘ahu residents.*
- *Policy 3. Encourage the development in appropriate locations on O‘ahu of trade, communications, and other industries of a nonpolluting nature.*

Objective B: To maintain the viability of O‘ahu’s visitor industry.

- *Policy 8. Preserve the well-known and widely publicized beauty of O‘ahu for visitors as well as residents.*
- *Policy 9. Encourage the visitor industry to provide a high level of service to visitors.*

Objective D: To make full use of the economic resources of the sea.

- *Policy 2. Encourage the development of aquaculture, ocean research, and other ocean-related industries.*

Objective E: To prevent the occurrence of large scale unemployment.

- *Policy 1. Encourage the training and employment of present residents for currently available and future jobs.*

Natural Environment

Objective A: To protect and preserve the natural environment.

- *Policy 1. Protect O‘ahu’s natural environment, especially the shoreline, valleys, and ridges, from incompatible development.*
- *Policy 4. Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water- recharge areas, distinctive land forms, and existing vegetation.*
- *Policy 6. Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.*
- *Policy 7. Protect the natural environment from damaging levels of air, water, and noise pollution.*
- *Policy 8. Protect plants, birds, and other animals that are unique to the State of Hawai‘i and the Island of O‘ahu.*

- *Policy 9. Protect mature trees on public and private lands and encourage their integration into new developments.*
- *Policy 10. Increase public awareness and appreciation of O'ahu's land, air and water resources.*

Objective B: To preserve and enhance the natural monuments and scenic views of O'ahu for the benefit of both residents and visitors.

- *Policy 1. Protect the Island's well-known resources: its mountains and craters; forests and watershed areas; marshes, rivers, and streams; shorelines, fishponds, and bays; and reefs and offshore islands.*
- *Policy 2. Protect O'ahu's scenic views, especially those seen from highly developed and heavily traveled areas.*
- *Policy 4. Provide opportunities for recreational and educational use and physical contact with O'ahu's natural environment.*

Physical Development and Urban Design

Objective A: To coordinate changes in the physical environment of O'ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

- *Policy 2. Coordinate the location and timing of new development with the availability of adequate water supply, sewage treatment, drainage, transportation, and public safety facilities.*

Health and Education

Objective B: To provide a wide range of educational opportunities for the people of O'ahu.

- *Policy 2. Encourage the provision of informal educational programs for people of all age groups.*

Culture and Recreation

Objective A: To foster the multiethnic culture of Hawai'i.

- *Policy 1. Encourage the preservation and enhancement of Hawai'i's diverse cultures.*
- *Policy 2. Encourage greater public awareness, understanding, and appreciation of cultural heritage and contributions to Hawai'i made by the City's various ethnic groups.*

Objective B: To protect O'ahu's cultural, historic, architectural, and archaeological resources.

- *Policy 1. Encourage the restoration and preservation of early Hawaiian structures, artifacts, and landmarks.*
- *Policy 2. Identify, and to the extent possible, preserve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance.*
- *Policy 4. Promote the interpretive and educational use of cultural, historic, architectural, and archaeological sites, buildings, and artifacts.*

Objective D: To provide a wide range of recreational facilities and services that are readily available to all residents of O'ahu.

- *Policy 4. Encourage public and private botanic and zoological parks on Oahu to foster an awareness and appreciation of the natural environment.*
- *Policy 7. Provide for recreation programs which serve a broad spectrum of the population.*
- *Policy 8. Encourage ocean and water-oriented recreation activities that do not adversely impact on the natural environment.*
- *Policy 10. Encourage the private provision of recreational and leisure-time facilities and services.*
- *Policy 13. Encourage the safe use of O'ahu's ocean environments.*

Discussion

The planned improvements support the objectives of the City and County of Honolulu General Plan and are complementary to the City's objectives for the visitor industry economy. The renovations and new facilities will support activities and experiences that will improve the quality of this well-known visitor destination. The planned improvements will be developed with adequate water supply, sewage treatment, drainage, transportation, and public safety facilities. Sea Life Park will promote engagement in a Native Hawaiian cultural experience that shares unique elements of Hawaiian history and values.

Improvements to SLP will be in accordance with sustainable practices and will maintain convenient and safe access to beaches and ocean environments. Sea Life Park is devoted to the protection and conservation of marine resources and provides services to protect endangered sea turtles and injured sea birds. Moreover, educational opportunities at SLP promote greater environmental awareness and cultivate a culture of environmental stewardship.

The planned improvements will not adversely affect scenic views in the area. The design of facilities and renovations are reflective of the natural environment and Hawaiian historical and cultural elements. Improvements to the site will bolster the natural beauty of the landscape and communicate a sense of the unique local culture.

5.7 City and County of Honolulu Land Use Ordinance Guidelines

The purpose of the Land Use Ordinance (LUO) is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the County General Plan and development plans. The LUO is also intended to provide reasonable development and design standards. These standards are applicable to the location, height, bulk and size of structures, yard areas, off-street parking facilities, and open spaces, and the use of structures and land for agriculture, industry, business, residences or other purposes (Revised Ordinance for the City and County of Honolulu, Chapter 21).

Discussion

The Park is located within the City and County of Honolulu P-1 Preservation District, which permits outdoor recreation uses. Lands within the P-1 District and under State Conservation District jurisdiction are governed by the requirements and procedures of Chapter 205, HRS, Department of Land and Natural Resources (HRS Section 183C-3). According to HAR Section 13-5, the SLP Special Subzone, established in 1981, permits recreational, educational and commercial uses. The planned improvements at SLP are compatible with the this HAR and the LUO.

5.8 City and County of Honolulu Ko'olau Poko Sustainable Communities Plan

The island of O'ahu is divided into eight regional plan areas; six areas (including Ko'olau Poko) are addressed in "sustainable communities plans" (SCP) in keeping with modest development patterns and rural characteristics. Each plan implements the objectives and policies of the General Plan and provides guidance on public policy, investment, and decision-making within each respective region. Together with the General Plan, they guide population and land use growth over a 20- to 25-year time span.

Sea Life Park is located within the region encompassed by the Ko'olau Poko SCP (*Figure 5.1*). The Ko'olau Poko SCP was last revised in August 2017 by Ordinance No. 17-42, and it reflects the results of a community-based comprehensive review program to guide development in the region through 2035. The 2017 Plan's vision for Ko'olau Poko focuses on the long-term protection of community resources, the preservation of its residential character, and the adoption of public improvement programs and development regulations that reflect a stable population.

Key elements of the vision applicable to SLP include: preserve and promote open space throughout the region; preserve and enhance scenic, recreational and cultural features that define Ko'olau Poko's sense of place; emphasize alternatives to the private passenger vehicle as modes for travel; and maintain the Community Growth Boundary to protect agricultural, open space, and natural resources.

The SLP improvements relate to the following policies of the Ko'olau Poko SCP:

Open Space Preservation

- *Provide both active and passive open spaces. Active areas include community-based parks, golf courses, cemeteries and intensive agricultural uses. Passive areas include lands in the State Conservation District, drainage and utility corridors, nature parks, preserves and wetlands, and agricultural lands such as pastures, aquaculture ponds and fallow fields. Beach parks, which may be either active or passive, depending on the extent to which the landscape has been modified by grading and construction of facilities and the intensity of public use, are also part of the open space system.*
- *Improve the accessibility of recreational open space for public recreational use, especially in shoreline and mountain areas (as required by City ordinance and State law). Address the need for parking and emergency vehicle access.*
- *Protect endangered species and their habitats.*
- *Protect scenic beauty and scenic views and provide recreation.*

Historic and Cultural Resources

- *Emphasize physical references to Ko'olau Poko's history and cultural roots.*
- *Protect existing visual landmarks and support the creation of new, culturally appropriate landmarks.*
- *Retain significant vistas associated with archaeological features.*
- *Establish the degree of public access and interpretation that would best promote the preservation of the historic, cultural and educational value of the site, recognizing that economic use is sometimes the only feasible way to preserve a site. Public access to a historic site can take many forms, from direct physical contact and use to limited visual contact. In some cases, however, it may be highly advisable to restrict access to protect the physical integrity or cultural value of the site.*

Discussion

Sea Life Park is situated within the institutional land use district of the Ko'olau Poko SCP (*Figure 5.1*). The planned improvements at SLP will be compatible with the goals and objectives outlined in the Ko'olau Poko SCP. The planned improvements will provide an active open space, allowing park visitors to enjoy a unique Hawaiian experience. Sea Life Park will preserve and enhance scenic recreational and cultural features that define Ko'olau Poko's sense of place, protect scenic beauty and scenic views, and protect endangered species through its rehabilitative and breeding services and through its educational programs.

5.9 City and County of Honolulu Special Management Area Guidelines

Sea Life Park is located within the Special Management Area (SMA), which was established to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawai'i. Special controls on development within the SMA are necessary to avoid permanent loss of valuable resources and foreclosure of management options. The review guidelines of Section 25-3.2 of the Revised Ordinances of Honolulu (ROH) are used by the Department of Planning and Permitting and the City Council for the review of developments proposed in the SMA. These guidelines are derived from Section 205A-26 HRS.

- (1) *All Development in the SMA shall be subject to reasonable terms and conditions set by the council in order to ensure that:*
 - *Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;*
 - *Adequate and properly located public recreation areas and wildlife preserves are reserved;*
 - *Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources; and*
 - *Alteration to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation or failure in the event of an earthquake.*

- (2) *No development shall be approved unless the council has first found that:*
 - *The development will not have any substantial, adverse environmental or ecological effect except such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interests. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect, and the elimination of planning options;*
 - *The development is consistent with the objectives and policies set forth in Section 25-3.2 and area guidelines contained in Section 205A-26, Hawai'i Revised Statutes; and*
 - *The development is consistent with the County General Plan, Development Plans, Zoning and subdivision codes and other applicable ordinances.*

- (3) *The Council shall seek to minimize, where reasonable:*
 - *Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;*
 - *Any development which would reduce the size of any beach or other area usable for public recreation;*
 - *Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach;*
 - *Any development which would substantially interfere with or detract from the line of sight toward the sea from the State highway nearest the coast; and*
 - *Any development which would adversely affect water quality, existing areas of open water free of visible structure, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.*

Discussion

The planned improvements to SLP are in alignment with the City and County of Honolulu SMA guidelines. The development is consistent with the objectives and policies set forth in Section 25-3.2 and area guidelines contained in Section 205A-26, HRS. It is also consistent with the County General Plan, Development Plans, Zoning and subdivision codes and other applicable ordinances.

The potential cumulative effects of the planned improvements are not expected to have substantial environmental or ecological impacts to open water, fisheries, wildlife habitat, or agricultural land. On the contrary, the Sea Life Park program will further protect and restore natural and marine resources and provide the public with educational programs and activities to promote understanding of local resource preservation and Hawaiian culture and values.

The planned improvements will not reduce the size of any nearby public beaches, adversely affect access to public shoreline or recreation areas, or adversely affect wildlife preserves. The SLP improvements will not interfere with or detract from the line of sight towards the ocean from Kalaniana'ole Highway.

Alterations to existing land and vegetation for the construction and renovation of facilities are not anticipated to adversely affect coastal areas or recreational resources. The required permit conditions and best management practices will be implemented throughout the construction. Construction mitigation measures will be implemented as outlined in *Sections 3.3, 3.4, and 3.5* to prevent impacts to environmental resources. SLP has enough wastewater flow capacity with the existing system to provide for planned improvements. Refuse will continue to be collected by a private refuse service, and construction-generated solid waste will be disposed at an approved City and County of Honolulu refuse facility.

Section 6

Findings Supporting the Anticipated Determination

Chapter 6

Findings Supporting the Anticipated Determination

6.1 Anticipated Determination

Based on a review of the significance criteria outlined in Chapter 343, Hawai'i Revised Statutes (HRS), and Section 11-200.1-13, Hawai'i Administrative Rules, the planned improvements to Sea Life Park (SLP) are not anticipated to result in significant adverse effects on the natural or human environment. A Finding of No Significant Impact (FONSI) is anticipated.

6.2 Reasons Supporting the Anticipated Determination

The potential impacts of the SLP improvements have been fully examined and discussed in this Environmental Assessment (EA). As stated earlier, there are no significant environmental impacts expected to result from the planned improvements. This determination is based on the assessments as presented below for criterion (1) to (13).

(1) *Irrevocably commit a natural, cultural or historic resource.*

The archaeological and cultural landscapes have been documented in studies conducted specifically for SLP. As detailed in *Section 3.9* of this report, the planned improvements do not involve any known loss or destruction of existing natural, cultural, archaeological or historical resources. There is the unknown potential for the inadvertent discovery of subsurface historical or cultural resources, including the unknown possibility of iwi kūpuna (ancestral remains). If any cultural or archaeological resources are unearthed or ancestral remains are inadvertently discovered, the DLNR, SHPD, the O'ahu Island Burial Council representative and participating interests from lineal descendants and individuals will be notified. The treatment of these resources will be conducted in strict compliance with the applicable historic preservation and burial laws.

(2) *Curtail the range of beneficial uses of the environment.*

The improvements to SLP will not curtail the range of beneficial uses of the environment. Existing uses conform to existing land use designations. The planned improvements will provide a beneficial effect, protecting and caring for animals that could not otherwise survive in the wild.

(3) *Conflict with the State's environmental policies or long-term environmental goals established by law.*

The planned improvements at SLP will not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.

- (4) *Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.*

The planned improvements to SLP will result in short-term economic benefits during construction that include direct, indirect, and induced employment opportunities and multiplier effects, but not at a level that would generate significant economic activity. The employment of 10 additional people in the Park will have a beneficial impact on longer-term employment for O'ahu. Further, the operation of SLP has a significant beneficial effect on the visitor industry, which is critical to the economic welfare of O'ahu.

- (5) *Have a substantial adverse effect on public health.*

The planned improvements to SLP will be consistent with existing land uses and are not expected to affect public health. However, there will be temporary short-term impacts to air quality from possible dust emissions and temporary degradation of the acoustic environment in the immediate vicinity resulting from construction equipment operations. The planned improvements will comply with State and County regulations during the construction period and will implement best management practices to minimize temporary impacts.

- (6) *Involve adverse secondary impacts, such as population changes or effects on public facilities.*

The planned improvements to SLP will provide additional exhibits and renovations to existing facilities. The planned improvements will not incur secondary impacts, such as population changes or effects on public facilities. Makapu'u Beach Park is located south of SLP, and the planned improvements will not preclude the City's ability to maintain those facilities.

- (7) *Involve a substantial degradation of environmental quality.*

The planned improvements to SLP will not involve a substantial degradation of environmental quality. Long-term impacts to air and water quality, noise, and natural resources are not anticipated. The use of standard construction and erosion control best management practices will minimize the anticipated construction-related short-term impacts.

- (8) *Be individually limited but cumulatively have substantial adverse effect upon the environment or involved a commitment for larger actions.*

The development and implementation of the planned improvements to SLP will have a limited and negligible effect on the natural and cultural environment, while providing an overall general improvement to the social, recreational, and economic environments. These improvements independently and collectively do not require or influence a commitment for larger actions.

- (9) *Have a substantial adverse effect on a rare, threatened or endangered species, or its habitat.*

Sea Life Park is a home for known identified rare, threatened, or endangered species such as the Hawaiian Monk Seal. An "Enhancement Permit" requires the Park to educate their visitors about the importance of the endangered Monk Seals; therefore, each day at 2:00 p.m. a lecture is given at the exhibit about the seals. The Hawaiian Monk Seals are well cared for by the staff veterinarian, who has extensive marine mammal experience. As outlined in Section 3.7, exterior facility lighting will be shielded to reduce the potential for interactions of nocturnally flying seabirds with external lights or other structures. No negative impacts are anticipated.

(10) *Have a substantial adverse effect on air or water quality or ambient noise levels.*

General temporary impacts associated with construction are identified in Section 3.0 of this EA. Mitigation measures which are outlined in this EA will be applied during the on-going construction activity. No detrimental long-term impacts to air, water, or acoustic quality are anticipated with the planned improvements. The improvements are not anticipated to detrimentally affect air or water quality or ambient noise levels.

(11) *Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.*

The planned improvements are not located in environmentally sensitive areas such as flood plains, beach, erosion-prone areas, geologically hazardous lands, estuaries, or fresh or coastal waters. The lowest portion of the Park closest to Kalaniana'ole Highway lies within the tsunami evacuation zone; however, no structures are planned for this area. No impact is anticipated.

(12) *Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.*

SLP provides an opportunity for the visitor to experience and "see" the island reef and off-shore environment without physically entering or disturbing the reef ecosystem. In that regard, SLP satisfies the curiosity of thousands of visitors concerning the marine environment without directly impacting the reef and offshore waters. In addition, the Park is located on the mauka side of Kalaniana'ole Highway and thus does not affect ocean views from the road. The park is screened by landscaping, and the employee/bus parking lot will also be screened to not detract from the coastal headlands and cliffs that grace the backdrop of SLP. The improvements at SLP will not affect any scenic vistas and view-planes identified in City or State plans within the Project vicinity. No significant adverse impacts are anticipated.

(13) *Require substantial energy consumption or emit substantial greenhouse gases.*

Construction of the improvements to SLP will not require substantial energy consumption relative to other similar sized projects. The introduction of a rooftop photovoltaic system is planned.

6.3 Summary

The improvements proposed for Sea Life Park are not anticipated to result in significant adverse environmental effects to the site and surrounding area. The EA recommends mitigation measures to alleviate impacts when such impacts are identified. A Finding of No Significant Impact (FONSI) is anticipated.

The planned improvements to Sea Life Park are consistent with the Hawai'i State Land Use District Boundaries, Hawai'i State Plan, 2050 Sustainable Plan, Hawai'i Coastal Zone Management Plan, Hawai'i Water Quality Standards, City and County of Honolulu General Plan; City and County of Honolulu Zoning Ordinance, Ko'olau Poko Sustainable Communities Plan, Shoreline Setback Ordinance, and Special Management Area. The improvements to SLP will present a very positive image of Hawai'i's culture and natural resources to the visitor population as it contributes to the overall knowledge of the marine environment. In summary, the planned improvements will provide a public benefit while resulting in minimal impacts to the surrounding environment.

Section 7

**List of Agencies,
Organizations and Individuals
Receiving Copies of the EA**

Chapter 7

List of Agencies, Organizations and Individuals Receiving Copies of the EA

Early consultation on the planned improvements to Sea Life Park has been carried out with various agencies and stakeholders as part of the scoping process for this Project. Parties contacted in preparation of the Draft Environmental Assessment (EA) process, comments received, those that were provided an opportunity to review the Draft EA, and Draft EA comments received are identified below. Comment letters received during these consultation processes are also provided following this list.

Table 7.1 Agencies, Organizations and Individuals Receiving Copies of the EA			
Respondents and Distribution	Early Consultation	Receiving Draft EA	Draft EA Comments Received
Federal Agencies			
U.S. Department of Commerce		X	
U.S. Fish and Wildlife Service		X	
U.S. National Marine Fisheries Service		X	
U.S. National Oceanic Atmospheric Administration		X	
State of Hawai'i Agencies			
Department of Business, Economic Development & Tourism (DBEDT)		X	
Department of Hawaiian Home Lands		X	
Department of Health (DOH)		X	
DOH, Clean Water Branch		X	
DOH, Environmental Health Administration		X	
DOH, Wastewater Branch		X	
Department of Land and Natural Resources (DLNR), Land Division		X	
DLNR, Aquatic Resources Division		X	
DLNR, Commission on Water Resource Management		X	
DLNR, Department of Forestry and Wildlife		X	
DLNR, Division of State Parks		X	

Table 7.1 Agencies, Organizations and Individuals Receiving Copies of the EA			
Respondents and Distribution	Early Consultation	Receiving Draft EA	Draft EA Comments Received
State of Hawai'i Agencies			
DLNR, Engineering Division		X	
DLNR, Land Division – O'ahu District	X	X	
DLNR, Office of Conservation and Coastal Lands	X	X	
DLNR, State Historic Preservation Division		X	
Department of Transportation		X	
Disability and Communication Access Board (DCAB)		X	
Office of Hawaiian Affairs		X	
Office of Planning		X	
University of Hawai'i at Mānoa (UHM), Hawai'i Institute of Marine Biology		X	
UHM, Water Resources Research Center		X	
City and County of Honolulu Agencies			
Board of Water Supply		X	
Department of Environmental Services		X	
Department of Parks and Recreation		X	
Department of Planning and Permitting	X	X	
Department of Transportation Services		X	
Honolulu Fire Department		X	
Honolulu Police Department		X	
Office of Climate Change, Sustainability and Resiliency		X	
Elected Officials			
Senator Laura H. Thielen – State Senate District 25	X	X	
Representative Chris Lee – State House District 51	X	X	
Mayor Kirk Caldwell		X	
Council Member Ikaika Anderson – Honolulu City Council District 3	X	X	
Waimānalo Neighborhood Board No. 32		X	
Other			
Honolulu Star Advertiser		X	

Table 7.1 Agencies, Organizations and Individuals Receiving Copies of the EA			
Respondents and Distribution	Early Consultation	Receiving Draft EA	Draft EA Comments Received
Libraries			
Hawai'i State Library		X	
Waimānalo Public Library		X	
Community Groups, Individuals, and Consulted Parties			
Ann Marie Kirk	X	X	
Harold "Bunny" Ahuna	X	X	
Hawaiian Civic Club of Waimānalo		X	
Oceanic Institute of Hawai'i Pacific University		X	
Scotty Reis-Moniz	X	X	
Wilson Kekoa Ho	X	X	

Section 8

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Chapter 8

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Appendices

Appendix A

Cultural Impact Assessment for Sea Life Park

**DRAFT—Cultural Impact Assessment for Sea Life Park in
Waimānalo Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu**

TMK: (1) 1-014:013 (por.)

Prepared For:
Sea Life Park
41-202 Kalamiana‘ole Hwy,
Waimānalo, Hawaii 96795

Prepared By:
Windy McElroy, PhD
and
Kalenani McElroy, MA

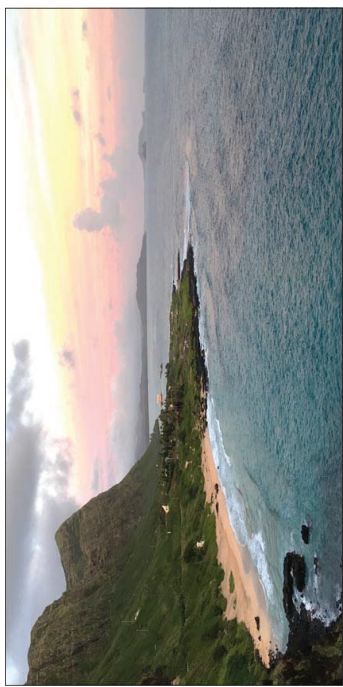
December 2018



Keala Pono Archaeological Consulting, LLC • PO Box 1645, Kane‘ohe, HI 96744 • Phone 808.381.2361

**DRAFT—Cultural Impact Assessment for Sea Life Park in
Waimānalo Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu**

TMK: (1) 1-014:013 (por.)



Prepared For:
Sea Life Park
41-202 Kalamiana‘ole Hwy,
Waimānalo, Hawaii 96795

December 2018



Keala Pono Archaeological Consulting, LLC • PO Box 1645, Kane‘ohe, HI 96744 • Phone 808.381.2361

MANAGEMENT SUMMARY

A Cultural Impact Assessment was conducted for TMK: (1) 1-014:013 (por.) in Waimānalo Ahupua'a, Ko'olaupoko District on the island of O'ahu. This was done in preparation for ground disturbance associated with construction and renovations at Sea Life Park. The current study took the form of background research and an ethnographic survey consisting of three interviews with community members, all of which are included in this report.

The background research synthesizes traditional and historic accounts and land use history for the Waimānalo area. Community consultations were performed to obtain information about the cultural significance of the subject property and the surrounding area, as well as to address possible concerns of community members regarding the effects of the proposed project on places of cultural or traditional importance.

As a result of this work, the cultural significance of the project vicinity has been made clear. The background study revealed that Waimānalo supported a large population, with taro and sweet potato grown in the ahupua'a. Marine resources were important in the project area, and the fishing village of Kaupō once stood there. Historically, the region just south and east of Sea Life Park was a hub of activity, with a Federal Aviation Administration communications center, the Makapu'u Lighthouse, the Makapu'u Military Reservation, and Alan Davis Ranch occupying the area.

Interviews with individuals knowledgeable about the project lands produced information on its rich cultural history. While the interviewees did not know of any traditional gathering practices occurring in the project area, they did mention several archaeological sites. Archaeological sites that may lie within the Sea Life Park project area are Kaupō Village, a possible heiau, and human burials. An archaeological inventory survey is recommended to determine if vestiges of these or other sites remain on the property.

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INTRODUCTION

At the request of G70 on behalf of Sea Life Park, Keala Pono Archaeological Consulting conducted a Cultural Impact Assessment (CIA) for TMK: (1) 1-014-013 (por.) in Waimānalo Ahupua'a, Ko'olaupoko District, on the island of O'ahu. Sea Life Park plans to construct, renovate, expand, and relocate exhibits and facilities to improve the living conditions of the animals and guest experience. This CIA was designed to identify any cultural resources or practices that may occur in the area and to gain an understanding of the community's perspectives on the proposed activity on the property.

The report begins with a description of the study area and a historical overview of land use and archaeology in the ahupua'a. The next section presents methods and results of the ethnographic survey. Results are summarized and recommendations are made in the final section. Hawaiian words, flora and fauna, and technical terms are defined in a glossary. Also included are appendices with documents relevant to the ethnographic survey, including full transcripts of the interviews.

The Project Location and Environment

The project area is located on the island of O'ahu in the district of Ko'olaupoko, in the ahupua'a of Waimānalo. Waimānalo is bounded on the north and east by the Pacific Ocean, south by the ahupua'a of Maunaloa, and west by Kailua Ahupua'a. The Ko'olaupoko Mountain Range runs along Waimānalo from Kailua to Makepū u Point. TMK: (1) 1-014-013 (por.) is a 12-acre (4.86 ha) parcel is owned by The State of Hawai'i Department of Land and Natural Resources (DLNR). The parcel is bounded by the Ko'olaupoko Mountains on the southwest, Kalamiana'ole Highway to the north and east, and an undeveloped parcel to the northwest (Figures 1 and 2).

The project area is situated in the eastern-most part of O'ahu below the slopes of the Ko'olaupoko Mountains, at an elevation of roughly 12 m (40 ft.). The Ko'olaupoko volcano is relatively old, having ceased activity approximately one million years ago (Macdonald et al. 1983:298). However, the Kaupō flow, which built the Kaupō Peninsula, is one of the youngest flows of O'ahu, thought to be only 32,000 years old (Macdonald et al. 1983:448). Several landmarks in the project vicinity are collectively known as the Koko fissure volcanics (Macdonald et al. 1983:448). These include Koko Head, Hanauma Bay, the Kalamia cinder cone, the Kaupō vent, as well as the islands of Kāohikaipu and Mānana.

The region has a mean annual rainfall of approximately 72 cm (28 in.) per year (Giambelluca et al. 2013). Sea Life Park is approximately 200 m (656 ft.) from the Makapu'u coastline. The nearest stream is on the opposite side of the Ko'olaupoko Mountains in Maunaloa Ahupua'a. This is Napaia Stream, a non-perennial watercourse, the head of which lies approximately 900 m (.56 mi.) from Sea Life Park as the crow flies. Topography in the project area is mostly flat to gently sloping, and vegetation consists of landscaped plants and grasses within the park, and scrub brush such as kiawe and koa haole in undeveloped areas.

Soils of the project area consist mostly of Fill land, mixed (FL) and Rock land (rRK), with Rock outcrop (rRO) at the base of the Ko'olaupoko Mountains (Figure 3). Fill land, mixed "consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources" (Foote et al. 1972:31). Rock land consists of places where exposed rock covers 25-90% of the ground surface, while Rock outcrop is where Rock outcrop is exposed over

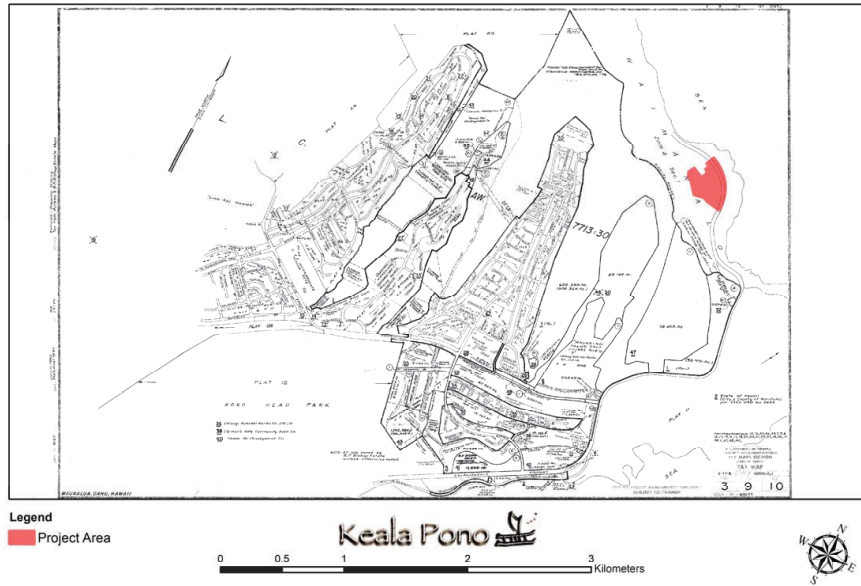
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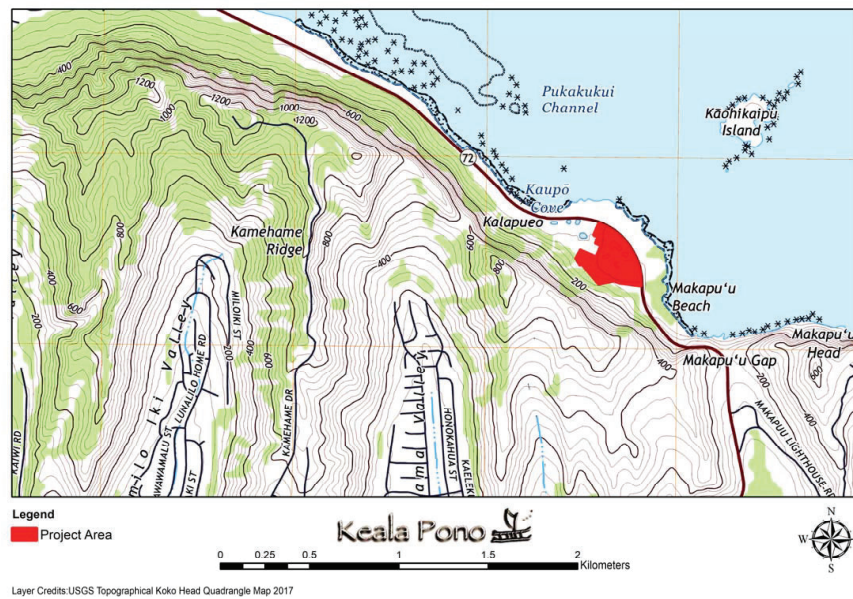
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2

more than 90% of the surface (Foote et al. 1972:119). Also in the vicinity are Beaches (BS), Kaena stony clay 2–6% slopes (KaeB), Kawaihapai stony clay loam 2–6% slopes (KlaB), and Luualuālei extremely stony clay 3–35% slopes (LPE).

The Project

The project will involve construction, renovation, expansion, and relocation of exhibits and facilities at Sea Life Park (Figure 4). These include ticketing, retail, the Hawai'i Ocean Theater, Shark Cave, restaurant, splash play area, lū'au area, indoor aquarium, and conservation center. Renovation and expansion will occur for the Honu Conservation and Education Center. The Penguin Exhibit, Seabird Sanctuary, and Hale Manu Aviary will be relocated and upgraded along with the seawater life support delivery system.

The parking lot will also be renovated and expanded to accommodate the increase in facility floor area and visitors. Vehicle access and circulation will be upgraded to include pedestrian safety measures. There will be improved signage and landscaping throughout the park. The expansion will accommodate an anticipated visitor increase and create a new identity for the park where kama'āina and visitors to O'ahu can experience marine wildlife and the culture of the islands. Completion of the project is anticipated for 2025.

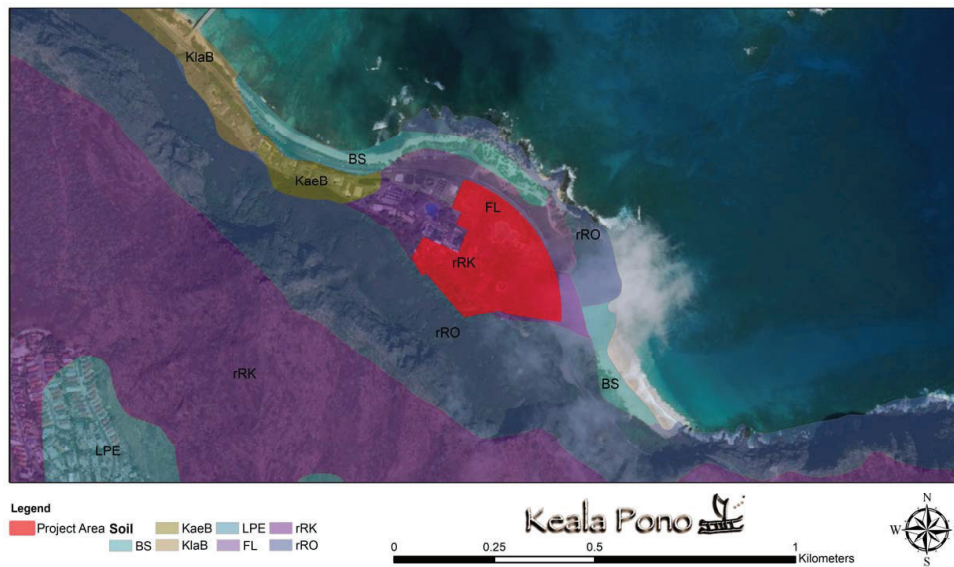


Figure 3. Soils in the vicinity of the project area.

BACKGROUND

A brief historic review of Waimānalo is provided below, to offer a better holistic understanding of the use and occupation of the project area. In the attempt to record and preserve both the tangible (e.g., traditional and historic archaeological sites) and intangible (e.g., mo'olelo, "ōlelo no'ēau) culture, this research assists in the discussion of anticipated finds. Research was conducted at the Hawai'i State Library, the University of Hawai'i at Mānoa libraries, the SHPD library, and online at the Office of Hawaiian Affairs website and the Waihoia Aina and Ulukou databases. Archaeological reports and historical reference books were among the materials examined.

Waimānalo in The Pre-Contact Era

Information compiled for the pre-contact era includes data on place names, land use, and subsistence, as well as several mo'olelo, mele, and "ōlelo no'ēau. Together, they give us an idea of what life may have been like in the past.

Subsistence and Traditional Land Use

Waimānalo, whose name means "Potable Water," was an area of abundance in traditional times. Kalo was grown along the main watercourse, Pūhā Stream, as well as in the back of the valley, watered by natural springs (Handy et al. 1991:457). 'Uala was also grown in the drier regions of the ahupua'a, marine resources were plentiful, and turtles were kept in an offshore pond for ali'i consumption (Handy et al. 1991:458-459). Charles Aloa and McAllister (1933) both describe the enclosure called Pāhōnu. It is located next to present day Kaiona Beach Park:

There was once a chief who was so fond of turtle meat that he ordered a sea wall built to keep captured turtles from escaping. Every turtle caught by a fisherman was put into this enclosure. No one else was allowed to partake of turtle meat under penalty of death. No one dared to eat turtle as long as the old chief lived. (Aloa 1939 in Sterling and Summers 1978:249)

Alona also mentions many ko'a throughout Waimānalo, suggesting a thriving fish population. Out on the offshore island of Mānana, he saw old burials eroding out of the cliffside and two fishing shrines. The fishing shrines were erected for 'āholehole and moi, which flourished in the area (Alona 1939 in Sterling and Summers 1978:256). Alona also references Kini Ko'a, which drew schools of akule and 'ō'io, and Kauhāhine Ko'a, which was probably destroyed (Alona 1939 in Sterling and Summers 1978:249, 251). Both are located near Makai Pier, not far from the current project area.

In the book *Native Planters*, Waimānalo is used as an example to explain the traditional planting of bananas, next to the native houses; around the taro terraces; and along the edge of the forest.

Bananas have been from prehistoric times until today planted by Hawaiians in clumps around their dwellings and on the well-watered banks of flooded taro terraces... On the lower forest fringe the native varieties were planted in small protected gulches, as along the base of the cliffs at Waimānalo, Oahu... (Handy et al. 1991: 161-162)

Fresh water springs were abundant in Waimānalo, and some of these potable water sources were important in understanding the settlement patterns in the area:

At Olomana above the sugar mill there was a fine old spring. This area was then thickly populated. There was another spring across the road from what is now Bellows Air Force

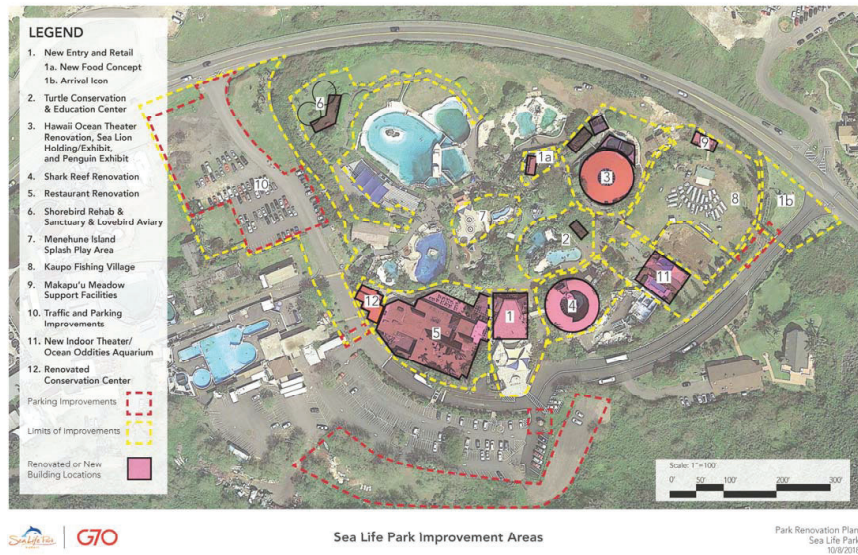


Figure 4. Plans for proposed renovations and improvement at Sea Life Park (courtesy of G70).

Base. Near this is Maha'ilua, another thickly populated place with a good water supply in earlier days. (Handy et al. 1991:458)

Much of the population was concentrated around Puhā Stream, now referred to as Waimānalo Stream, but several coastal villages are also known to have existed in the vicinity of the project area. Ka lalapuo, or "The Rallying of the Owls," was a small settlement consisting of a few fishermen's houses. It was located near Makapu'u Point (Handy et al. 1991:459).

Kaupō Village stood within the project area at the present location of Sea Life Park. Translated as "Landing of Canoes at Night" (Pukui et al. 1974:96), Kaupō is thought to have been established by Hawaiians fleeing Honolulu as a result of an 1853 smallpox epidemic (McAllister 1933; Stump 1981). The disease eventually ravaged the village and it was abandoned. Excavation of one of the Kaupō Village features, however, indicates greater antiquity for the site, with occupation beginning in the pre-contact period and continuing into the historic era (Gormley et al. 1971). Kaupō was originally known as Ko'ona'pou, or "staff posts," named for the posts that held up the thatched roofs of the houses (Pukui et al. 1974:117). Another source states that the village was named after a kahuna whose house was reinforced by posts to secure it against the strong wind coming in from the sea (Handy et al. 1991:459). The kahuna was a renowned healer and this is the reason that the villagers populated the area during the epidemic. The spring that watered the village dried up after the death of the kahuna, and the remains of his house and a nearby ko'a were destroyed during World War II (Handy et al. 1991:459).

Farther west, across from Waimānalo Beach Park, was the village of Pu'u o Moloka'i (Handy et al. 1991:458). The village was established by settlers from Moloka'i, who kept themselves distinct from others, for if a resident married someone from elsewhere in Waimānalo they were banished from Pu'u o Moloka'i (Handy et al. 1991:458).

Kaiona Beach Park is said to have been named after one of Pele's family members, a kind goddess of the Wa'i'anae Mountains (Pukui et al. 1974:70). "*Nani ke kula a Kaiona i ka ho'ala'i a nā 'iwa'*" is an old adage that translates to "The plain of Kaiona is pretty as the frigate birds soar" (Pukui et al. 1974:70).

Makapu'u, the famous surfing beach, was named for an idol located in a cave called Ke-ana-o-ke-akua-pōloli (Pukui et al. 1974:103, 142). Ke-ana-o-ke-akua-pōloli, or "The Cave of the Hungry God," was visible only from the ocean. It is said that a goddess lived in the cave but the area was too dry to cultivate crops.

Place Names

One often-overlooked source of history is the information embedded in the Hawaiian landscape. Hawaiian place names "usually have understandable meanings, and the stories illustrating many of the place names are well known and appreciated... The place names provide a living and largely intelligible history" (Pukui et al. 1974:xi).

Many place names for Waimānalo and the current project area are listed in *Place Names of Hawaii* along with their meanings and/or other comments about the specific locales:

Kaiona. Beach park...said to be named for a benevolent relative of Pele... (Pukui et al. 1974:70)

Kākalāioa. Rock in the sea off Makapu'u, O'ahu. *Lit.*, gray nickers (a rough bramble; the rocks here are as sharp as *kākalāioa* thorns). (Pukui et al. 1974:71)

Kāohikaipu. Islet (a tuff cone, 11 acres, 40 feet elevation) near Rabbit Island, O'ahu. A native reports that the island was formerly called Mokuhope (island behind), and that a rock that projects at low tide was Kāohikaipu (hold back the container), so called because the rock blocked sea-swept matter. (Pukui et al. 1974:86)

Kaupō...A peninsula and once a fishing village northwest of Makapu'u Point, O'ahu, now the site of a beach park and of Sea Life Park. The point of land was formed by lava which flowed to the sea from a vent about 200 feet up the cliffside; this was perhaps the most recent of the secondary eruptions on O'ahu...See Ko'ona'pou. *Lit.*, landing [of canoes] at night. (Pukui et al. 1974:96)

Keanaoakekua-pōloli. A cave at Makapu'u, O'ahu, visible only from the sea...*Lit.*, the cave of the hungry god. (A goddess lived here; the area was too dry to grow food.) (Pukui et al. 1974:103)

Ko'olau Poko. District, southern windward O'ahu. *Lit.*, short Ko'olau. (Pukui et al. 1974:117)

Ko'ona'pou. Old name for Kaupō, Waimānalo, O'ahu. *Lit.*, staff posts (posts supported thatched roofs of the stone houses in this village). (Pukui et al. 1974:117)

Makapu'u...*Lit.*, hill beginning or bulging eye (the name of an image said to have been in a cave known as Keanaoakekua-pōloli.) (Pukui et al. 1974:142)

Mānana. Offshore island, also known as Rabbit Island, a tuff cone (67 acres, 200 feet elevation)... (Pukui et al. 1974:145)

Mokuhope. See Kāohikaipu. *Lit.*, island behind. (Pukui et al. 1974:155)

Muliwai'ōhena. Stream, Waimānalo, O'ahu. *Lit.*, tumerite river or yellow river. (Pukui et al. 1974:158)

Puhā. Stream, Waimānalo, O'ahu. *Lit.*, a hollow (as in a tree). (Pukui et al. 1974:192)

Pu'uokona. Peak (2,200 feet high), above Waimānalo, O'ahu. *Lit.*, hill of leeward. (Pukui et al. 1974:204)

Pu'uomoloka'i. Hill, Waimānalo, O'ahu. *Lit.*, hill of Moloka'i. (Pukui et al. 1974:204)

Waimānalo...*Lit.*, potable water. (Pukui et al. 1974:225)

Mo'olelo

The well-known epic surrounding Pele and Hi'iaka details the travels of the two goddesses who landed on O'ahu at Makapu'u:

As they [Hi'iaka and her companion Māle] traveled on, Makapu'u and its neighbor hills passed out of sight. Arriving at Ka-ala-pueo, they caught view of the desolate hill Pohaku-loa, faint, famished, forlorn... It [southeastern Waimānalo] is indeed a barren land. Fish is the only food it produces. Our vegetables come from Waimānalo. When the people of that district bring down bundles of food we barter for it with our fish." (Emerson 1997:89)

Ka Leo o Ka Lāhui, a Hawaiian language newspaper published the legend of Hi'iaka I Ka Poli O Pele in 1893. In this story Hi'iaka continues her journey through Waimānalo where she overheard 'Āpuakea compare herself to Hi'iaka's beauty. 'Āpuakea and her mother, Muliwai'ōlena were eventually killed for this comment:

They traveled past Kūhū (Kukui?) and Pahoua where the people shouted at the beauty of Hi'iaka. The news reached the ears of Āpuakea and she said to her mother, Muliwai'ōlena, "Oh, Muliwai'ōlena, go and take a look at the women whose beauty the people are shouting about and see if they are as beautiful as I am." Muliwai'ōlena came out and looked. Never had she seen anything on O'ahu to equal the beauty of these women. Turning to Āpuakea she said, "Daughter, your beauty does not compare with their great beauty. You are like the soles of their feet." Hearing this, the expression on Āpuakea's face changed and she fainted away.

Hi'iaka overheard the words of the woman to her daughter and she uttered this chant:

O Āpuakea-nui, you beautiful woman, Comparisons have been made of your charms,
You are beautiful, beautiful indeed.

Muliwai'ōlena then called out to Hi'iaka and her friend, "Come in, eat and drink and when you are full then continue on your long journey." But the travelers did not accept as they did not like the embarrassing comparison that had been made between themselves and the young girl, Āpuakea.

As the travelers went off Muliwai'ōlena suddenly fell dead. Shortly afterwards Āpuakea died...(*Ka Leo o Ka Lāhui* 1893 in Sterling and Summers 1978:248-249)

'Āpuakea was once the name for the coastal region of central Waimānalo where Waimānalo Beach Park is today (Alona 1939 in Sterling and Summers 1978:245). Kapu a, the setting of the tale, is thought to be located at Muliwai'ōlena Stream, which runs to the ocean near Waimānalo Beach Park.

Not far from the project area at Kaupō Beach Park is a black stone named Pōhaku Pa'akiki. The stone is said to have once been higher up and supported by another stone, but has since fallen. Pōhaku Pa'akiki is linked to the human-eating shark god Kamohoali'i who lived in the area:

Near Kalaekiona lived a man who liked to catch sharks and annoyed Kamohoali'i by chopping off the tails and bringing them to this spot [Pōhaku Pa'akiki] to throw into the sea... The shark god caught him fishing one day and began to devour him, beginning at his feet. He kept on chewing all the way up to the buttocks. The smell of excrement in his bowels nauseated Kamohoali'i and so he swore an oath never again to hurt nor allow any other shark to hurt any person from Makapu'u to Kalaekoaia. From that time on, no shark has ever eaten human flesh at Waimānalo. (Alona 1939 in Sterling and Summers 1978:252)

Around the same area is a spot called Kalaehine. A ko'a is said to be in this location, where fishermen once offered their first catch of the day. The name Kalaehine means old woman and may refer to a beautiful girl who lived here. It is said that even though she was young, she had the wrinkly face of an old woman, yet was still eerily beautiful (Alona 1939 in Sterling and Summers 1978:251). Just beyond Kalaehine is Kalaekiona, which housed an 'alaea deposit used in medicinal practices.

Kaupō Village at Sea Life Park is the setting for a story about a talented chanter and healer named Kapoi. He built a wall and thatched roof in the area, but there was no potable water. After praying to the gods, a spring began flowing and Kapoi was able to live off the land. People came from across the islands for his renowned ability to heal the sick. Some of those he cured stayed at Kaupō and lived alongside Kapoi, turning the area into a small village. One day when Kapoi's wife was away, he committed adultery and later had a dream prophesying his death. Soon after, smallpox killed many villagers including Kapoi, and the springs dried up leaving Kaupō Village abandoned (Alona 1939 in Sterling and Summers 1978:254).

OHI

An oli refers to a chant that is done without any accompaniment of dance, while a mele refers to a chant that may or may not be accompanied by a dance. Waimānalo's rightful place in Hawaiian history is bolstered by its appearance in traditional chants. These expressions of folklore have not lost their merit in today's society. They continue to be referred to in contemporary discussions of Hawaiian history, identity, and values.

One such chant appears in Hi'iaka's saga mentioned earlier. In this chant Hi'iaka calls out to Makapu'u upon her arrival to O'ahu, and Makapu'u replies in answer. The account is described in Emerson's *Pele and Hi'iaka: A Myth From Hawaii*, and depicts the Makapu'u area of Waimānalo as a barren and desolate place:

Hi'iaka's adventurous tour of Moloka'i ended at Kaunakakai from which place she found no difficulty in obtaining the offer of transportation to Oahu... It was a question with Hi'iaka whether to follow the Koolau or the Kona side of the island. The consideration that turned the scale in favor of the Koolau route was that this side would have sight of a large number of aunts and uncles, members of the Pele family whose ghosts still cling to the dead volcanic cones and headlands which stood as relics of their bygone activities, and where they eked out a miserable existence. The region was thickly strewn with these skeleton forms. Hi'iaka first addressed herself to Makapu'u:

Noho ana Makapu'u i ka lae,

He wahine a ke Akua Pololi:

Pololi, ai ole, make i ka pololi, e!

Makapu'u dwells at the Cape,

Wife to the god of Starvation:

Hunger and death from starvation!

To this Makapu'u answered: "We love the place, the watchtower, from which we can see the canoes, with their jibing triangular sails, sailing back and forth between here and Moloka'i." To this she added a little chant:

E Makapu'u nui, kua ke au e!

Na mauu moe o Malei, e,

I ai na maua, i ai na maua, e!

Oh Makapu'u, the famous,

Back pelted by wind and by tide,

Oh the withered herbs of Malei!

Oh give us some food for us both! (Emerson 1997:86-88)

Soon after Hi'iaka's visit Makapu'u, she addresses the kupua Malei. In historic times, a stone ki'i was found in a cave in the area and was said to be that of Malei. Here is Hi'iaka's chant to Malei:

O wau e hele i na lae ino o Koolau,
I na alae makakai o Moeau;
E hele ka wahine ahihula ana o ka pali,
Nana uhu ka'i o Makapu'u
He'i'a ai na Malei, na ka wahine
E noho ana i ka ulu o ka makani.
I Koolau ke ola, i ka huaka'i malihini,
Kamaeae i ka weuwe'u,
Ola i ka pua o ka maau.
E Malei e, e uwe kaula;
A e Malei e, aloha ino no, e.
*I walk your stormy capes, Koolau,
The wave-beaten capes of Moeau,
Watchtowers, where the women who brave the sea
May see the uhu coursing by
Meat for the woman who faces the gale,
Seafood for the woman Malei;
For her living comes from Koolau,
From pilgrim hands that pass her way;
Yet we bless the herbs of the field,
Whose bud and flower is meat for Malei;
We pity and weep for Malei.*

You are quite right," answered Malei: "the only food to be had in this desolate spot is the herbage that grows hereabouts; and for clothing we have to put up with such clouds as are tossed us by travelers. When the wind blows one has but to open his mouth to get his belly full. That has been our plight since your sister left us two old people here. Cultivate this plain, you say; plant it with sweet potatoes; see the leaves cover the hills; then make an oven and so relieve your hunger. Impossible..." (Emerson 1997:88-89).

‘Ōlelo No‘eau

Waimānalo's place from pre-contact Hawaiian history has also been preserved in 'ōlelo no'eaui traditional proverbs and wise sayings. In 1983, Mary Kawena Pukui published a volume of close to 3,000 'ōlelo no'eaui that she collected throughout the islands. The introductory chapter of that book reminds us that if we could understand these proverbs and wise sayings well, then we would understand Hawai'i well (Pukui 1983).

Although there are no 'ōlelo no'eaui specifically listed for Waimānalo, there is one which refers to Makapu'u. This proverb suggests that Makapu'u was a known fishing ground for uhu, or parrotfish. There is another, which refers to the Ko'olau region in general. This proverb suggests

that Waimānalo and other windward ahupua'a are lush and verdant. Here are the two 'ōlelo no'eaui as they appear in Pukui's book:

Ka pali nānā uhu ka'i o Makapu'u,
The uhu-observing cliff of Makapu'u.
The sea surrounding Makapu'u Point, O'ahu, is the favorite haunt of the uhu (parrotfish). (Pukui 1983:165)
Nā pali hāniani o ke Ko'olau.
The dark hills of Ko'olau.
The hills and cliffs of the windward side of O'ahu are always dark and beautiful with trees and shrubs. (Pukui 1983:249)

Waimānalo in the Historic Era

During the early historic era, Waimānalo was an important site of passage to and from the island of O'ahu. Waimānalo was an area relatively cut off from the rest of the island by land, however the long lengths of sandy beaches provided easy access by sea. King Kamehameha took advantage of this during his conquest to unite the Hawaiian Islands. He sent a runner to the O'ahu chief, Kahekili, and later ordered a portion of his fleet to disembark at Makapu'u:

Ki-kane, Kamehameha's messenger to Kahekili, threw down two maika stones, this stone (the white) brings life through farming and fishing, rearing men, and providing them with food; this other stone (the black) brings war. Let the reader ponder the meaning of this answer. Kahekili asked, Is Kamehameha coming to O'ahu to fight? 'Yes' answered Ki-kane. What harbor will he choose? It was Kiko'o's counsel to make Waimānalo the harbor and battle site. 'It is too low there to east sling stones to reach the heights. It is good only for food and fish...' (Kamakau 1961:150)

Upon taking control of O'ahu, King Kamehameha I allocated portions of the island to his chiefs, keeping the Waimānalo Ahupua'a and other regions for himself. The ahupua'a of Waimānalo stayed within the monarchy's private lands until it was passed down to Kautikeanui, Kamehameha III (Hawaii Commission of Public Lands 1929:28).

Changes in Land Tenure

With such foreign influence during Kamehameha III's reign, sweeping changes were made to the traditional land tenure system. The first big change came with the Māhele of 1848 where the ahupua'a of Waimānalo was awarded to Victoria Kāmāmalu. The Kuleana Act of 1850 immediately followed and Kāmāmalu leased 6,970 acres of Waimānalo Ahupua'a for \$350 a year to Thomas Cummins, husband of High Chiefess Kaumakaokane, a cousin of Kamehameha I (Harland Bartholomew and Associates 1959).

The Māhele was an instrument that began to settle the undefined rights of three groups with vested rights in the dominion of the Kingdom --- the government, the chiefs, and the hoi'āna. These needed to be settled because it had been codified in law through the Declaration of Rights and laws of 1839 and the Constitution of 1840, that the lands of the Kingdom were owned by these three groups... Following the Māhele, the only group with an undefined interest in all the lands of the Kingdom were the native tenants, and this would be later addressed in the Kuleana Act of 1850. (Beamer 2008:194-195)

Although the Māhele had specifically set aside lands for the King, the government, and the chiefs, this need not be interpreted as a selfish act that alienated the maka'ānana from the land. The reciprocal relationships between the commoners and the chiefs continued to exist, and for this

reason, perhaps the chiefs were expected to better care for the commoners' rights than the commoners themselves who arguably might not have been as well versed in foreign land tenure systems. Indeed, the ahupua'a rights of the maka'ānana were not extinguished with the advent of the Māhele, and Beamer points out that there are "numerous examples of ho'a'āma living on Government and Crown Lands Post-Māhele which indicate the government recognized their rights to do so" (Beamer 2008:274).

Hoa'āina who chose not to acquire allodial lands through the Kuleana Act continued to live on Government and Crown Lands as they had been doing as a class previously for generations. Since all titles were awarded, "subject to the rights of native tenants." The ho'a'āina possessed habitation and use rights over their lands. (Beamer 2008:274)

For those commoners who did seek their individual land titles, the process that they needed to follow consisted of filing a claim with the Land Commission; having their land claim surveyed; testifying in person on behalf of their claim; and submitting their final Land Commission Award (LCA) to get a binding royal patent. However, in actuality, the vast majority of the native population never received any land commission awards recognizing their land holdings due to several reasons such as their unfamiliarity with the process, their distrust of the process, and/or their desire to cling to their traditional way of land tenure regardless of how they felt about the new system. In 1850, the king passed another law, this one allowing foreigners to buy land. This further hindered the process of natives securing lands for their families.

Most of the LCAs in Waimānalo are situated in the northwestern portion of the ahupua'a, along Waimānalo Stream, with a few LCAs scattered along the coast. In Waimānalo, it was common for a coastal LCA to have an associated upland lot, the upland parcel used for taro cultivation and the coastal property for fishing (Alona 1939 in Sterling and Summers 1978:246). There are no LCAs located in the vicinity of the project area. The closest LCA is in the vicinity of Pahonu Pond to the northwest. This is LCA 3265.2, granted to Lauheauku (see Figure 7).

Historic Land Use

Thomas Cummins leased the ahupua'a of Waimānalo from Victoria Kamāmālu for 50 years starting in 1850 when he turned the area into a large ranch named Mauna Rose (Harland Bartholomew and Associates 1959). His son John later leased parts of it to Chinese rice farmers. Soon the Chinese farmers began cultivating sugarcane and John Cummins established a sugar mill and the Waimānalo Landing. A railroad was also built, linking the Cummins ranch to the landing:

Kamehameha V often visited the [Cummins'] plantation. When he grew too heavy to make the trip over the Pali on horseback, he is said to have acquired a small steamboat to transport him around the southern tip of Oahu to Waimānalo. A railroad track was laid to carry the rotund monarch from the landing to the Cummins home. (Thomas 1983:77)

The Cummins' ranching operations were detrimental to the delicate Hawaiian environment and ignored traditional ways of life. Farm animals roamed freely trampling native plants, and kuleana lots. An account published in *Kiwo'koa*, a Hawaiian language newspaper describes the landscape of Waimānalo before and after Cummins ranch:

At that time, it seemed that the valley was filled with breadfruit, mountain apples, kukui and coconut trees. There were taro patches, with banks covered with ti and wauke plants. Grass houses occupied the dry lands, a hundred of them here and sweet potatoes and sugar cane were much grown. It was a great help toward their livelihood...The whole ahupua'a of Waimānalo was leased to white men except the native kuleanas and because the cattle wandered over them, they were compelled to build fences for protection. The

taro patches that were neatly built in the time when chiefs ruled over the people and the land, were broken up. The sugar cane, ti and wauke plants were destroyed. The big trees that grew in those days, died because the roots could not get moisture. The valley became a place for animals. (*Kiwo'koa* 1906 in Sterling and Summers 1978:244)

By 1890 Cummins controlled the Waimānalo Sugar Company, which bought cane from Chinese farmers until the turn of the century when the company cultivated most of its own sugar. The Waimānalo Sugar Company later fell into the hands of C. Brewer & Company, and production of sugar ceased in 1947 (Harland Bartholomew and Associates 1959).

South of the project area, a Federal Aviation Administration communications center with several radio towers stood where the Hawaii Kai Golf Course is now. The Makapu'u Lighthouse was constructed in 1906 after the luxury ocean liner Manchuria ran aground on the Makapu'u reef (Stump 1981), and the Makapu'u Military Reservation was established in the lighthouse area in 1922. In 1932 Bishop Estate trustee Alan Davis leased 600 acres of land for cattle ranching near Queen's Beach (Stump 1981). The area would later come to be known as "Alan Davis." A 1946 tsunami destroyed Davis' ranch along with many coastal sites in the ahupua'a.

West of the project area, the 1,510-acre Bellows Field was set aside for military use in 1917, and is still operating today. Kalaniana'ole Highway was opened in 1924, providing easier access into the region. The next year, 90 acres of beachfront property was sold to private bidders as the Waimānalo Beach Lots adjacent to Waimānalo Beach Park (Harland Bartholomew and Associates 1959). Also in 1925 the Hawaiian Homes Commission established the Waimānalo Homestead, awarding lots to native Hawaiians mauka of Kalaniana'ole Highway roughly from Waimānalo Landing to Waimānalo Beach Park.

Historic Maps

Historic maps help to paint a picture of Waimānalo in times past and illustrate the changes that have taken place in the region over the years. The earliest map found for this area is dated 1833 (Figure 5). It depicts O'ahu in its entirety and labels the locations of Waimānalo, Makapu'u, and Awaiamalu in the mountain pass. One island in the waters off of the project area is also portrayed.

The second map is dated 1880, and it specifically shows the "Southside of O'ahu" (Figure 6). In Waimānalo near the project area, Makapu'u Point and four offshore islands: Manana I, Black Rock, Mokuhohe I, and Chickens Rocks are illustrated. To the northwest, a sugar house, mill, and cane fields are clearly depicted. A railroad is labeled as "Tramway," and Waimānalo town appears more developed, with more structures and a "Road to Honolulu" shown.

The next map labeled "Waimānalo Ko'olaukoko, O'ahu," was compiled in 1916 from surveys done by G.E.G. Jackson in 1884, and M.D. Monsarrat in 1880 (Figure 7). The map outlines Waimānalo Ahupua'a bounded by the Ko'olau Mountain Range and depicts Waile'a Point on the northwest, Makapu'u Point on the southeast, as well as Waimānalo Bay, the Waimānalo Beach Lots, the U.S. Military Reservation, and Olomana. "Executive Order No. 197, Sept. 9, 1925 Public Park" is marked at the Sea Life Park project area. The ocean directly offshore is labeled as having a depth of 9 feet, and three islands: Manana, Black Rock, and Mokuhohe are shown. Down the coast to the northwest is LCA 3265.2, granted to Lauheauku. Farther west is a semi-circle of rocks on the shoreline depicting Pahonu, with what appear to be house lots behind it. The landing is visible farther to the northwest with a railroad track leading mauka from it, along with a "pipe line

to light-house.” The Waimānalo Beach Lots are shown in this vicinity on the coast, and sugarcane land is inland. A “proposed Kamehameha Highway” segment is also in the vicinity, near the sugar mill.

A 1902 map of O’ahu depicts Waimānalo in green, which is designated as public lands (Figure 8). A large tract in the west of the ahupua’a is outlined in red and labeled “Waimanalo Sugar Co.” This area is also designated as crown lands. A sugar mill is depicted roughly in the center of the ahupua’a, alongside a red and blue dot, which signify a post office and school, respectively. Railroad tracks can be seen running from the landing at the coast to the sugar mill. A road skirts the coast in the Makapu’u area, where Kalamiana’ole Highway is today. Offshore islets are labeled “Manana (or Rabbit Is)” and “Kaohikaipu Island.” In the ocean outside of the landing is a bench of shifting sand.

Contemporary History

Within a few decades after the Māhele, much of the land throughout Hawai’i (though not necessarily in the project area) was owned by foreign businessmen. The turn of the century found these foreigners running the government in Hawai’i after the monarchy was overthrown. As the decades continued, agriculture strengthened as the main industry throughout the Hawaiian Islands, and a market for tourism began to grow. The prominence of agriculture and tourism remained strong throughout the 20th century until today. Tourism on O’ahu was centered on the southwest shore of Waikiki and Honolulu.

Waimānalo was left for residential development, and in 1921 following the Hawaiian Homes Commission Act signed by President Warren Harding, construction of Hawaiian homesteads began. As mentioned above, Hawaiian Homestead lots were first awarded in Waimānalo in 1925. By 1940 the first set of 88 houses was constructed, and by 1958 a second set of 108 homes and a third set of 30 homes were completed (Harland Bartholomew and Associates 1959). The newest homestead subdivision, Kaka’ia is currently in construction in the northwestern part of Waimānalo (Department of Hawaiian Homelands 2017).

Sea Life Park

The Pacific Foundation for Marine Research leased the land around Makapu’u in 1960 for marine education, science, and ocean industry operations. Sea Life Park became its own entity in 1972 and was acquired by the Mexican company, Dolphin Discovery in 2005 before quickly changing ownership again in 2008 to Palace Entertainment. Palace Entertainment is the U.S. subsidiary of Parques Reunidos, which together operates more than 80 amusement parks, zoos, water parks, entertainment centers, and marine animal parks throughout the world.

Today, Sea Life Park Hawaii features marine habitats and exhibits, an aviary, sea bird sanctuary, animal shows, lit’au, and ocean animal encounters such as swimming with dolphins and sea lions. The enterprise also rents indoor and outdoor venues for weddings and special events.

Previous Archaeology

Previous archaeological surveys offer significant information regarding traditional and historic land use. Several studies have been conducted in and around the study area (Figure 9 and Table 1). The following discussion summarizes the findings of archaeological studies in the Sea Life Park vicinity, based on reports found at the SHPD Kapolei library. State Inventory of Historic Places (SIHP) numbers are prefixed by 50-80-15, unless otherwise noted (Figure 10).

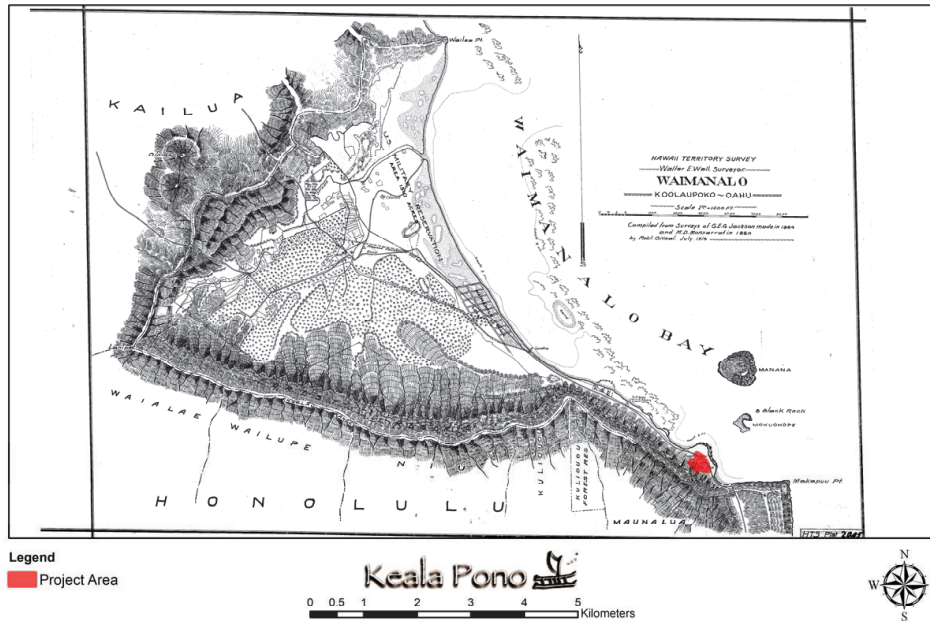
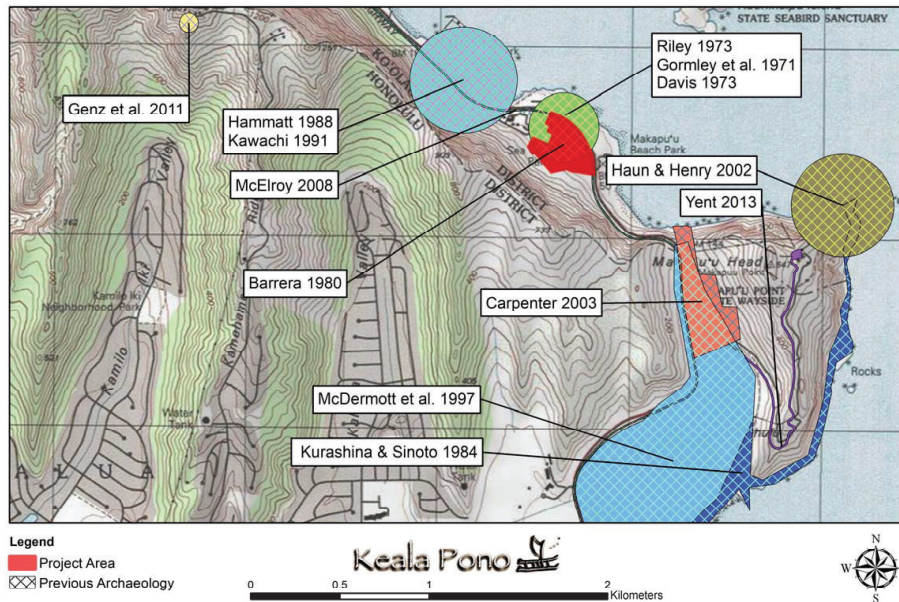


Figure 7. Early map of Waimānalo [ONeal 1916 (compiled from surveys in 1880 and 1884)].



Layer Credits: USGS Topographical Koko Head Quadrangle Map 1999

Figure 9. Previous archaeological work in the vicinity of the project area.

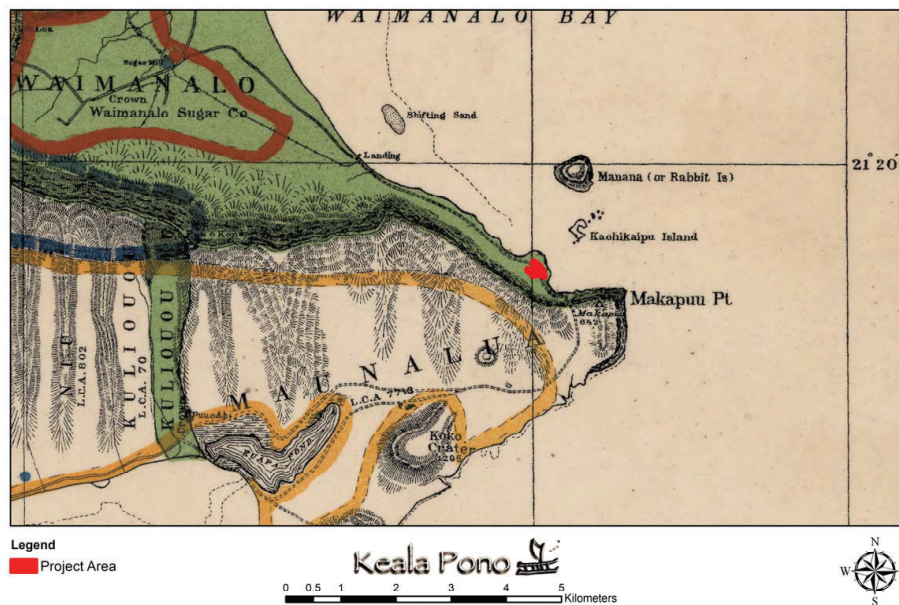


Figure 8. Portion of an O'ahu land use map (Wall 1902).

Table 1. Previous Archaeology at and Near Sea Life Park

Author/Year	Location	Study	Results
McAllister 1933	Island-Wide	Survey	Identified five sites within approximately 1 km of the project area: Site 1 (Mala'i Stone), 2 (Stone Pile), 3 (Kealakipapa Valley Road), 383-A (Pahonu Pond), and 384 (Kaupo Village).
Gornley et al. 1971	Kaupo Village	UH Field School	Excavated a lava tube shelter and platform, Bishop Museum Site 50-Oa-3000.
Yent 1971	Kaupo Village	Midden Analysis	Analyzed midden from UH field school excavations. Marine shell was abundant, and fish and animal bone was also present.
Davis 1973	Kaupo Village	Artifact Analysis	Analyzed 203 traditional and 60 historic artifacts from UH field school excavations.
Sterling and Summers 1978	Kaupo Village to Pahonu Pond	Synthesis of Archaeological Information	Noted three sites not recorded by McAllister (1933): Site 21 (Kini), 22 (Kaluahine Koa), and 23 (Pohaku Pa'akiki).
Barrera 1980	Sea Life Park	Reconnaissance	None.
Kurashina and Smito 1984	Queen's Beach Park to Kealakipapa Valley	Reconnaissance	Recorded four sites in the Makapu'u area: McAllister's Sites 1 and 2; a road segment, possibly McAllister's Site 3; and a newly-identified cave.
Hammat 1988	Oceanic Institute	Reconnaissance	None.
Kawachi 1991	Kaupo Beach Park	Burial Removal/ Subsurface Testing	At SHHP 384, Kaupo Village, two individuals were removed; several others were noted.
Carpenter 1992	Kealakipapa Valley Road	Field Check	Two remnants of Kealakipapa Valley Road (SHHP 03) were recorded.
McDermott et al. 1997	Queen's Beach Park to Kealakipapa Valley	Archaeological Inventory Survey	Identified a remnant of Kealakipapa Valley Road (SHHP 03).
Major and Carpenter 1999	Kealakipapa Valley Road	Preservation Plan & Field Check	Preservation recommended.
Hann and Henry 2002	Makapu'u Point	Survey	None.
Carpenter 2003	Kealakipapa Valley Road	Data Recovery & Preservation Plan	Preservation recommended.
McElroy 2008	Kalaniana'ole Hwy. from Nakini St. to Sandy Beach	Archaeological Monitoring	No findings near Sea Life Park.
Gerz et al. 2011	Kamehame Ridge	Cultural Impact Assessment	Conducted background research and interviewed three community members.

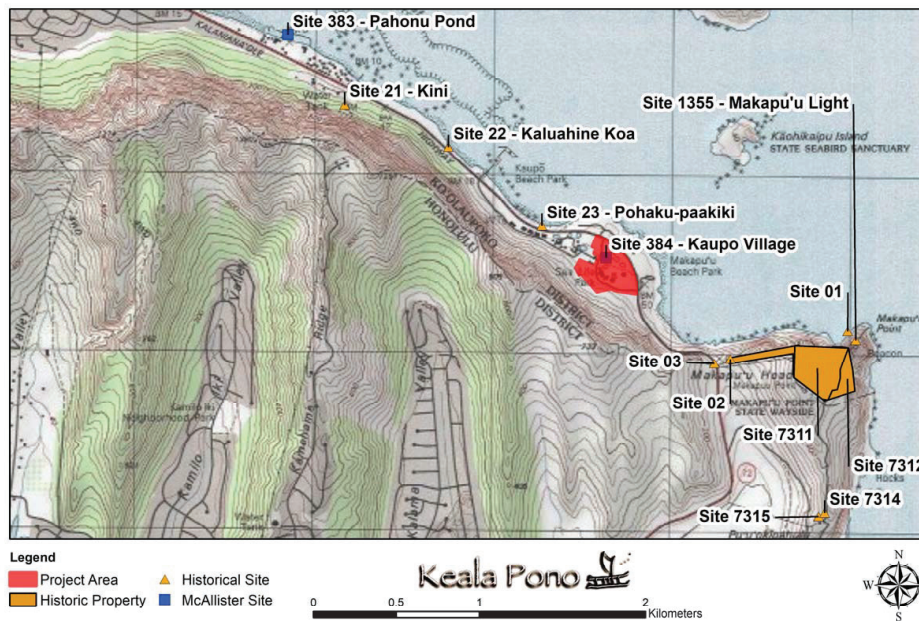


Figure 10. Recorded archaeological sites in the vicinity of the project area.

Table 1. (Continued)

Author/Year	Location	Study	Results
Yent 2012, 2013	Ka Iwi State Scenic Shoreline	Preservation & Monitoring Plan	Delineated preservation measures for sites associated with the Makapu'u Lighthouse (SIHP 1355), Makapu'u Road (7310), Makapu'u Point Light Station (7311), and Makapu'u Point Military reservation (7312, 7314, 7315). Also notes SIHP 3989, a cave.

McAllister's (1933) early archaeological survey recorded one site that lies within the project area. Site 384 constitutes the remains of Kaupō Village, which was partially at the current location of Sea Life Park (Figure 11). Archaeological remains included many enclosures, platforms, lava tube shelters, a roadway, a wall, a ko'a, and part of a platform thought to have been a heiau (McAllister 1933:193–195). McAllister questions the antiquity of the site and notes that it went by a different name:

Mr. Chalmers, Manager of the Waimanalo Sugar Company, was told years ago that the village was built about 1853 during the disastrous smallpox epidemic, when the Hawaiians attempted to escape the quarantine. On the official map of the Bishop Estate the area is indicated as "Koaupou." "Kaupo" is undoubtedly incorrect. (McAllister 1933:193)

McAllister (1933:193) cites two early 19th century accounts of travelers that visited the region and did not mention the village. In 1820, M.S. Loomis walked from Maunaloa to Kailua and made no note of Kaupo Village. In 1821, G.F. Mathison entered Waimānalo from the Nu'uamu Pali and walked to the Makapu'u side of Kohelepele (near the present Sandy Beach). Mathison's local guide was not familiar with the area and led the party through Makapu'u over a difficult and precarious route. McAllister (1933:193) posits that if in fact a village was located in Kaupō, its inhabitants would have directed the party to the Kealakipapa trail, which leads through a gap in the cliffs, a much easier route.

McAllister believed that the most important features of the site (and probably older than the smallpox epidemic habitation) were located close to the coast in the vicinity of the fishing shrine (Figure 12). He listed these in order of importance: Features o, j, b, k, n, and e (McAllister 1933:195). The fishing shrine, Feature o, was built just off the coast so that at high tide it was surrounded by the ocean (Figure 13). It lacked coral pieces that are typical of ko'a in other parts of Hawai'i, and is thought to have once been paved to form a level platform.

Feature j is the remnant of a possible heiau, only a corner of which remained at the time of McAllister's (1933:195) survey. McAllister stated that the construction of Kalamī'anoole Highway destroyed the rest of the heiau. Feature b was a lava tube with a modified entrance and partially paved floor. Within the tube, excavation of a small enclosure yielded bone and pearl buttons and bone fragments, possibly both human and animal.

Feature k was a cattle pen that may have formerly been a heiau. It is a large rectangular enclosure with two adjacent smaller enclosures. Another large rectangular enclosure is just to the south, and open to the cattle pen. Feature n is a possible house site, and Feature e is an old roadway.



Figure 11. 1926 photo of Kaupō Village (courtesy of Maunaloa.net).

It is difficult to tell from McAllister's (1933) map, but Features c, d, and e may have been located where Sea Life Park is today. Feature c is a lava bubble with a sand floor that was used as a shelter. Feature d consists of a series of enclosures. As mentioned above, Feature e was the old road. It was partially paved with lava slabs and bordered with 2 foot-tall walls.

Kaupō Village was also designated Site 50-Oa-3000 by the Bishop Museum and further investigated by a University of Hawai'i archaeological field school (Gormley et al. 1971; Yent 1971; Davis 1973). Excavation of a lava tube shelter and associated platform produced abundant marine shell midden, fish and animal bone, as well as traditional and historic artifacts, including fishing gear, tools, ornaments, and debris (Gormley et al. 1971; Yent 1971; Davis 1973). A later reconnaissance of the Sea Life Park parking lot produced no findings (Barrera 1980).

Many years later, human remains eroding out of a gully bank after heavy rain were found at Kaupō Beach Park (Kawachi 1991). During removal of the first individual and part of a second individual, it became apparent that the remains were part of a larger burial area. A total of 21 shovel test pits were excavated, eight of which yielded human remains or evidence of a burial pit. The point of a two-piece bone fishhook was found near one of the pit stains. Plans were made for preservation of the burial site, designated as part of SIHP 384, Kaupō Village.



Figure 13. 1923 photo of the ko'a in the ocean at Kaupō Village (courtesy of Maunaloa.net).

A second archaeological site may have been located within the project area. Site 3, Kealikipapa Valley Road was first documented in detail by McAllister (1933). The road wound through Waimānalo Gap to the Makapu'u Lighthouse Road and on through Kaupō Village. In 1992, two segments of the road were recorded during a field check (Carpenter 1992). Both segments were located to the east of Sea Life Park, and both were slated for preservation. One section of the road borders Kalamiana'ole Highway from the Makapu'u Lighthouse Road to the lookout, and the second remnant starts at the lookout and crosses the gap into Maunaloa. The road was again documented during an extensive archaeological inventory survey of the Queen's Beach area (McDermott et al. 1997). It was noted that the road had been impacted by ground clearing and removal of moss rock, and that it was no longer significant. A preservation plan was drawn up in 1999 that proposed passive preservation of the road remnants (Major and Carpenter 1999). A second preservation plan preceding construction of the Makapu'u lookout, roads, and parking areas called for two forms of mitigation: data recovery and preservation of the site (Carpenter 2003).

In addition to the two sites within the Sea Life Park area, McAllister (1933) recorded three sites nearby. Site 1, located above the Makapu'u Lighthouse, is a legendary stone that Hi'iaka addressed as the kupua Malei. At one point the stone was removed and was in the possession of ranching and sugar magnate John Cummins (McAllister 1933:57-58). Upon his death, Cummins wanted the stone to be displayed at the Bishop Museum, however it was returned to Makapu'u Point and cemented to the cliffside. At the time of McAllister's (1933) study, only the cement base remained, and the stone itself had disappeared.

Site 2, located near the Makapu'u Lighthouse Road, was recorded as a stone pile. Coral was incorporated in with the rocks, and it was said that from a distance, the pile resembled a wall (McAllister 1933:59). This site, the cement base for the Malei stone, and an old road segment were identified during a later archaeological reconnaissance, along with a newly-identified cave site (Kurashina and Sinoto 1984).

Pahonu Pond, Site 383-A, is located a little over one mile from the project area on the shoreline east of Kaiona Beach Park. This pond was 152 m (500 ft.) long and 15 m (50 ft.) wide and held turtles for ali'i; consumption (McAllister 1933:192). Sterling and Summers (1978:249) note that the pond visible in the 1960s (likely the pond that stands today) was a restoration constructed upon the foundation of the original structure.

Sterling and Summers (1978) noted an additional three sites in the vicinity that were not recorded by McAllister (1933). Kini (Site 21) is to the east of Pahonu Pond. This site is a stone with a

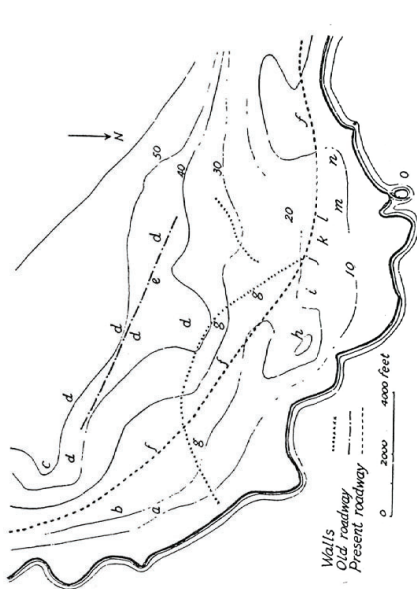


FIGURE 67.—Map of the so-called "Kaupo Village" ruins, eastern end of Waimānalo, showing contour at intervals of 10 feet: a, well-preserved sand-floored inclosure 5 by 14 paces, with two wide entrances in walls which are 3 to 4 feet high, lava tube near inland end 15 feet long and 2 to 3 feet high, adjoining clear area 25 by 30 feet marked by line of stones; b, ruins centered about a lava tube (pl. 7, B) 15 feet long, 4 feet high, floor 10 feet wide, entrance faced with stones leads to floor down three steps, surrounding wall 1 to 4 feet high incloses an area about 24 by 35 feet, in corner of which is a small inclosure 6 by 7 feet, in the wall a cache (pl. 7, C) 2.5 feet wide, 2 feet deep and 1.1 feet high is concealed by a circular slab of lava, east of tube is another small inclosure, and adjoining this site are many walls; c, lava bubble used as shelter, sanded floor 37 feet in diameter, dome-like top 6 feet high, center opening 14 feet in diameter, on floor are bits of ash, charcoal, *opihiti* and cowrie shells; d, many inclosures varying in size and workmanship; e, portion of old roadway 14 feet wide bordered by walls 2 feet high, part of it paved with flat slabs of lava; f, present roadway; g, irregular narrow semi-circular wall 3 feet high made of blocks of lava; h, area 20 by 95 feet inclosed by low walls on all but inland side with inner wall separating eastern third; i, well-built platform 3 feet high on seaward side, paved with small rough fragments of lava, rocks at base of wall placed on end; j, corner of platform 5 feet high built of lava blocks evenly fitted to form the faces, adjoining is an old weathered coral wall 3 feet high; k, rectangular inclosure 79 by 110 feet and 5 feet high before its top stones had been removed; l, small platform surrounded by large lava blocks on end and paved with small fragments of lava and coral; m, two inclosures each 5 by 10 feet with walls 3 to 4 feet high and 2 feet thick, east of it an outlined rectangle 30 by 60 feet with walls on three sides, probably one; n, slightly elevated area 10 by 20 feet with low walls on three sides, probably house site; o, fishing shrine (*ko'a*) (pl. 6, C) about 10 feet high and made of a pile of stones with an uneven surface 15 by 25 feet.

Figure 12. Archaeological features of Kaupō Village documented by McAllister (1933:194).

depression where 'awa was poured before setting out to fish, and the first catch left after a successful fishing expedition. The stone was later moved during construction of a road in the area. Farther east is a ko'a (Site 22), made up of piled stones, where fishermen would leave their first catch. And even farther to the east is Pohaku Pa akiki (Site 23), a stone once used to offer 'awa to the shark deity Kamohoali'i. The stone was located on the northwest side of Kaupō Village.

Archaeological reconnaissance was conducted for a 3.9-acre parcel at the current Oceanic Institute site adjacent to the project area to the west (Hammar 1988). The parcel was heavily disturbed, and no evidence of surface archaeological remains was found.

An archaeological inventory survey for improvements to Kalamiana'ole Highway was conducted at Makapu'u Point on the southeast side of Waimānalo Ahupua'a (Haun and Henry 2002). No archaeological remains were found. Also on Kalamiana'ole Highway, archaeological monitoring during construction for an underground telecommunications system produced no findings near the Sea Life Park area (McElroy 2008).

An archaeological preservation and monitoring plan was drawn up for improvements made to the Makapu'u lighthouse trail located to the east of the project area (Yent 2013). During the inventory survey, 10 new sites were found and assigned SIHP numbers (Yent 2012). Preservation measures were defined for the Makapu'u Lighthouse (SIHP 1355), Makapu'u Road (SIHP 7310), Makapu'u Point Light Station (SIHP 7311), and Makapu'u Point Military reservation (SIHP 7312, 7314, 7315). Also noted was SIHP 3989, a cave.

A cultural impact assessment was conducted for a radio facility project located on the summit of Kanehame Ridge above the project area (Genz 2011). Background research on the Waimānalo and Maunaloa Ahupua'a was compiled and three community members were interviewed.

Summary and Settlement Patterns

With its bountiful coastline and verdant streams, Waimānalo was thought to be well populated in ancient times. Taro was farmed in wet areas of Waimānalo, sweet potato was grown in the drier regions, and a series of fishing villages lined the coast. One of these, Kaupō Village was located within the project area. The village is thought to have originated in pre-contact times and was later modified into a settlement for those afflicted by smallpox in the 1850s. The historic period brought other changes to the area, with large tracts of land converted to cattle ranches and sugarcane fields, as Waimānalo became increasingly developed.

The ahupua'a of Waimānalo has been well studied archaeologically. Kaupō Village is a main archaeological site at Sea Life Park, and human remains have been found in the coastal portion of the village, across the street from the current project area. The village consisted of many archaeological features, including a unique ko'a that was surrounded by water at high tide, as well as a lava tube shelter; the excavation of which yielded an abundance of cultural material and midden. Kealakipapa Valley Road may have also run through the project area. Road remnants have been documented to the east, in the Waimānalo Gap area. Other sites in the vicinity to the east include a legendary stone, a rock pile, a cave, and historic features associated with the Makapu'u Lighthouse and military reservation. To the northwest were stones used for offerings, a ko'a, and Patonu Pond, which kept turtles for the all'i to eat.

ETHNOGRAPHIC SURVEY

There are some things that cannot be found in the archives, in textbooks, or at the library. It is here, through the stories, knowledge, and experiences of our kama'āina and kūmāna, that we are able to better understand the past and plan for our future. With the goal to identify and understand the importance of, and potential impacts to, traditional Hawaiian and/or historic cultural resources and traditional cultural practices of Waimānalo, ethnographic interviews were conducted with community members who are knowledgeable about the project area.

Methods

This Cultural Impact Assessment was conducted through a multi-phase process between October and December, 2018. Guiding documents for this work include The Hawai'i Environmental Council's Guidelines for Assessing Cultural Impacts, A Bill for Environmental Impact Statements, and Act 50 (State of Hawai'i). Personnel involved with this study are Windy McElroy, PhD, Principal Investigator of Keala Pono Archaeological Consulting, and Kālemalani McElroy, MA, Ethnographer and Archival Researcher.

Interviewees were selected because they met one or more of the following criteria: 1) was referred by Keala Pono Archaeological Consulting or G70; 2) had/had ties to the project area or vicinity; 3) is a known Hawaiian cultural resource person; 4) is a known Hawaiian traditional practitioner; or 5) was referred by other cultural resource professionals. Three individuals participated in the current study. Mana'o and 'Ike shared during these interviews are included in this report.

Interviews were taped using a digital MP3 recorder. During the interviews, each person was provided with a map or aerial photograph of the subject property, the Agreement to Participate (Appendix A), and Consent Form (Appendix B), and briefed on the purpose of the Cultural Impact Assessment. Research categories were addressed in the form of open questions which allowed the interviewee to answer in the manner that he/she was most comfortable. Follow-up questions were asked based on the interviewee's responses or to clarify what was said.

Transcription was completed by listening to recordings and typing what was said. A copy of the edited transcript was sent to each interviewee for review, along with the Transcript Release Form. The Transcript Release Form provided space for clarifications, corrections, additions, or deletions to the transcript, as well as an opportunity to address any objections to the release of the document (Appendix C). When the forms were returned, transcripts were corrected to reflect any changes made by the interviewee.

Several potential interviewees were contacted, resulting in three interviews (Table 2). The ethnographic analysis process consisted of examining each transcript and organizing information into research themes, or categories. Research topics include: connections to the project lands, mo'olelo, archaeological sites, gathering practices, change through time, and concerns and recommendations for the project. Edited transcripts are presented in Appendices D-F.

Interviewee Background

The following section includes background information for each interviewee, in their own words. This includes information on their 'ohana and where the interviewee was born and raised. The interviewees are Harold "Bunny" Ahuna, Wilson Kekoa Ho, and Ann Marie Kirk.

Table 2. List of Individuals Contacted

Name	Affiliation	Method of Contact	Result of Contact
Harold “Bunny” Ahuna	Longtime resident of Waimānalo	Telephone, In Person	Interviewed
Wilson Kekoa Ho	Waimānalo Neighborhood Board	Telephone, Email, In Person	Interviewed
Haywood Kalima	Waimānalo Boat Ramp Association	Telephone, through Son	No Reply
Ann Marie Kirk	Maunaloa.net	Telephone, Email, In Person	Interviewed

Harold “Bunny” Ahuna

...My name is Harold Ahuna. I was born Kapipōlani Hospital and I was raised in Waimānalo [on the stretch of houses on the beach closest to Sea Life Park]. I went to a few [schools]. Like Waikīki Elementary, Saint Patrick’s, Lili’uokalani, Kaimuki Intermediate and Kalani High School. Those days we went to school in town. ‘Cause only had Waimānalo and my dad went to work in town and then we would stay with my grandma in Kapaehulu, Waikīki side yeah. That’s why we went to Waikīki Elementary.

Wilson Kekoa Ho

I was born 1942 in Waimānalo... We were the 17th house in Waimānalo. We grew up on the beaches. Mostly on the beaches ‘cause that’s where all the fun was. Well, we climbed the mountains...[I went to] Waimānalo School. Kindergarten to 6th grade and then I went to ‘Iolani. Then ‘Iolani got expensive so I went to McKinley. We’re talking \$250 a year. That was expensive.

My family came from Kaka’ako and Nu’uanu. My dad was one of 13. My dad was number three, his oldest brother is Don Ho’s father. Don was the oldest of all the cousins down the line. My grandmother had six and then there was a 10-year break and she had seven more. My grandfather was a bartender, a taxi driver...

So what my dad did was he assigned each child, the older kids, every time she had another kid, to take the kids and so each one of them raised the kids. My dad raised two of ‘um. One of ‘um, number 13 was a Beach Boy. You know Michael and Derek Ho, those kids, their father.

Ann Marie Kirk

...My name is Ann Marie Kirk, I was born in 1963. My first home was in Punalu‘u, but I’ve been in Maunaloa since I was three or four years old. [I went to] Sacred Hearts Academy.

...I’m from the Kupanu family. We’re from Waiāhole and Wai‘anae and so my family was also in Kāhili. My roots go through that family and the Cullen family, that’s my mother’s side. On my father’s side I’m from New York, Scottish. My mother is Hawaiian.

Topical Breakouts

The following sections are extended quotations from the interviews, organized by topic. Interviewees provided information on connections to the project lands, mo‘olelo, archaeological sites, gathering practices, change through time, and concerns and recommendations for the proposed Sea Life Park project.

Connections to the Project Area

My Tutu Man them were taking care of turtles for the King yeah [at Pahou Pond]. That’s how come they got that ahupua‘a. They used to tell us stories, now these guys, they got to be over 100 already, ‘cause they were older than my dad. [Bunny Ahuna]

So I spent many years of my life over here. So across the way there, do you see that flat area over there? [pointing to rocks jutting out from beneath Mākāpu‘u Point]...We just came for the waves. Jump in the water at 8 o’clock in the morning and jump out at 5 o’clock in the evening and hitchhike back home. [Wilson Kekoa Ho]

But, no we lived here. Waimānalo is divided into couple area. Along the highway to the park and first row in and second row in were half-acre lots. We used to raise chickens and turkeys and rabbits, I had a garden and we raised all of our food. That went by the wayside after people moved in and they said we don’t like the noise, we don’t like the stink, you know. It was a real nice neighborhood to grow up in because everybody was together. I mean, I had my father’s brother, next door to us was my father’s sister, two doors away was my father’s sister, the one that he raised, and over there he built a house for his mom. [Wilson Kekoa Ho]

He sent my aunty to Guam and said whatever you make for your paycheck, I need you to send it to me. And she said oh, how come I get pushed out of Hawai‘i and I have to give you all my money and everything. So after a while he was building a house and after the house was built he ships her back and he said this is your house. You know. Which is still up today. She still lives there. I have four aunts, all in their late ‘80s and ‘90s. Last year his sister that lives next door to us just died. She was 100. It was a nice place to grow up in and of course Waimānalo at that time was the boondocks. You know, if you live in town and Waikīki and stuff, whoever in their right mind wants to go to Waimānalo. Now with the west coast being all settled, and all the traffic and all the houses and everything, everybody wants to move to Waimānalo. [Wilson Kekoa Ho]

Well, being in Maunaloa, I created a website called Maunaloa.net that tells the story of Maunaloa from Kūpikipiki‘ō to actually Waimānalo since Maunaloa was once an ‘ili of Waimānalo. So although that changes in the late 1850s, I still want to honor that relationship, so I’ve been gathering stories for a number of years now. In doing that I’ve been collecting stories. I’ve talked to kūpuna, different cultural practitioners, community activists through the area to try and get a deeper understanding of the area. The website goes up to about the 1950s because we kind of have a lot of that recorded history. The history before that we don’t have, so I spent time gathering stories and then putting them on the website to share those stories. [Ann Marie Kirk]

Yeah, the first year people didn’t know what I was doing and I didn’t really know what I was doing either. It was done to save a heiau. And I’m like how are we going to get this message out about Hawai‘i. And then it was like ok I’ll put this on the web, but I’ve been collecting stories about the area for a long time. So it just kept growing and growing and

growing. It's been amazing, they're using it in classrooms. I've done talks on it. People are really appreciative of having that information. [Ann Marie Kirk]

Mo'olelo

You know there's pi'ikoi with the puka, you know that story right? So there's that story. Yeah there's a bunch...One of the things I've heard here is that there's night marchers that come through here, through this area...if you go to my website they're there. Well one of the cool stories when you start going through is that Manana is the tip of the mo'o's tongue. So it goes down under and along the Ko'olau until you get to the other side. [Ann Marie Kirk]

There's Makapu'u of course and the cave and all of that, but those aren't the ones I think about because they're out there. I'm actually more interested in the ones I haven't heard before. And I know at Kalapueo, and it's on the website as well, that the Kini stone is there. So, no one knew where it was, it had been lost and I just happened to talk to Mr. Correa, and in fact my friend that's a cultural photographer said "I've been looking for that for years," and I said, "I just went up to the guy and he said let me show it to you." [Ann Marie Kirk]

The malei stone. That's a famous one, you know that story right?...Oh that's an unreal story. It's like a white stone and it's moved from Makapu'u and it was actually for the 'uhu fish that would run, especially on the Ka Iwi side. Mr. Cummings takes it. They say he takes it and it appears again and they do a big ceremony for it up here and then it disappears again.... You gotta read about malei. I might have a picture of it.... Well then they said it was in DOWNTOWN [Honolulu]. There's all these different versions of what happened to it.... [Ann Marie Kirk]

So Auntie May tells a story of swimming with her 'aumakua between Manana and the smaller island, which I can't remember its name right now and I should know it. It goes by two names. These are the four [islands offshore from Kaupō]. She swam in here and fed her 'aumakua, which is the manō. When she told me that story she had no idea that it goes back to the story of the shark god who's here and that black rock is part of the story.. [Ann Marie Kirk]

[Makapu'u] is supposed to have been the refuge for Hi'iaka and her girlfriend. Yeah. Buiging eye [this is the translation of "Makapu'u"] was one of the princesses that also lived here. No dates. No proof. It's just the stuff we grew up with. [Wilson Kekoa Ho]

When you're leaving Hawaii Kai and you're going through the back roads there's a big condominium. Right behind that is the Ka Iwi Marshlands and every second Sunday, they have an older lady that comes and talks story about the area. Because that's part of the ahupua'a of Waimānalo, I'd imagine she knows some stories too about that. I don't know her name. They have the talk story and she tells stories about the area and the people. Her brother's a lifeguard. I have her name in my phone. I'm on the neighborhood board so I know plenty people. The area has always, always been beautiful. In December this is the area that about 20 whales come and swash around. Ohhh old stories, I was never good with mo'olelo. [Wilson Kekoa Ho]

When we were younger had this guy, Uncle Dodo Spencer, when you turn to go down the road, next to Gabby's house was Uncle Dodo's house. That's my good friend's uncle. They said he had one stroke, but they bullshit, they when move one rock. The rock when

move about three times, next thing he couldn't move...Yeah, from the [Sea Life Park] parking lot. That's why I tell you, this place is haunted. [Bunny Ahuna]

Archaeological Sites

At the archives there's pictures. I did a presentation to a leadership group about Waimānalo in the early days and part of it was over here. We had pictures of the early settlements over here. Probably you can find it in the library...All of us who live in Waimānalo are very passionate about this area. [Wilson Kekoa Ho]

If you go underneath there [pointing to rocks jutting out from beneath Makapu'u Point], there's supposed to be burial caves... We tried to go but it was kinda rough. You know, like I've been saying, never been proven. But somewhere over there they say there's caverns. [Wilson Kekoa Ho]

This used to be a stone village [pointing to flat area between the Makapu'u parking lot and Baby Makapu'u near the ocean] and needless to say, all the rocks..if you go Waimānalo and you see the nice stone walls, all the rocks are now stone walls. [Wilson Kekoa Ho]

After the stone village you saw was gone this became a fishing village and there are some old fisherman that used to live here....Scotty Reis-Moniz they want to build the village again. The rock village. Somewhere right in this area. [pointing to same area as before] [Wilson Kekoa Ho]

Well some say that there's some burial areas, but I've never heard of it or I've never seen it. But where Sea Life Park is...the parking lot. There's a flat area way in the back and they have some houses there and they have that bird vet that works out of there that fixes up birds and lets them go again. But this has a lot of stories. Stories I don't know, but there's a lot of stories over there. [Wilson Kekoa Ho]

... There was a trail coming right around here. And on top...you know what Waimānalo means?...Potable water, yeah. On the top here there's a spring. I don't know if the spring is still going but there was a natural spring. [Wilson Kekoa Ho]

I think they already have run over some [archaeological sites]. But you know, this was originally Hawaiian Homes Land and somebody wanted the area, so somebody in the State allowed them to buy it and they sold it. And then of course, it's on its fourth buyer now...The road here is interesting because it's not like going through a cave on the side of the road. It was just a trail and they built it out. You can see all the concrete that's out there. If the road crashes or is destroyed, there's nothing. [Wilson Kekoa Ho]

...Even by our house...you know when you're going out past the pier [small pier in the ocean west of Makai Pier]? Used to have one rock over there in the water. Every time we come home my dad used to go take fish and stuff and then I don't know, one day the rock was gone. Now you know that small flat rock by the bay?...That's supposed to be like one healing stone. But see this is stuff my Tutu Man them taught us yeah. [Bunny Ahuna]

...But little bit past that surfing area where they get the parking lot was the fishing village Kaupō. Had one big...when we were young kids I remember had rocks. Had fallen down already. And then the 1960 tidal wave when kinda washed everything. That's why when you look good, kinda look like ponds you know. [Bunny Ahuna]

You seen all the rock on top the mountain? When they built the water tank, the rocks when fall down. You know Bobby [Teixiera]? Their house was in one heiau. The father sold all the rocks. Yeah, 'cause when we were young kids had the water tank right by the heiau. [Bunny Ahuna]

So the only thing I can tell you is that this whole place...because there wasn't anyone living there, the only thing I know was that fishing village. [Bunny Ahuna]

Well definitely Kaupō. Kaupō wrapped around and I apologize, I can't remember the older name. I can get it to you, I know I have it...I know that a number of structures were there. There was a fishing--let me just show you. [Brings up photos of Kaupō on Maunaloa.net on phone] So for example, right out of Kaupō was the fishing shrine in the water and then they built up which I'm sure you've seen. [Ann Marie Kirk]

So this is one of the structures that were there. [still looking at photos on phone] I don't have the original name here. Yeah, so this is a shrine from 1923. So of course there's no pier and there's no road here, right. [talking about Kalamiana'ole Hwy.] So, the road hasn't come yet. [Ann Marie Kirk]

So we know those cultural sites are there and then there's also sites that have come later with significance to people although it is controversial. Which is the site that's right over here [pointing at heiau and rocks near the coast at Baby Makapu'u]...Because that came much later. So, I know what they're doing as far as honoring the past, but that has maybe a 20 or 30 year history at the most and I know that some of the rocks were moved here and used at moss walls and other places, and they actually passed. They came here in like the '30s or '40s to stop people from driving away with the rocks that were part of the site. And then we know like a site here of Makapu'u and the different sites here [pointing toward Makapu'u Point] with Moiau on one side also up mauika. So as you go through Kealaikapapa, which I'm sure you're aware of, Kealaikapapa came down through here, so that changes as the road comes in the 1930s, but that site is still there. I'm sure Wilson [Ho] told you about Kealaikapapa and about part of it still being there, but it's built over. Which they said is part of an archaeological way of caring for things, but I don't actually agree with that. I would like to see it at least exposed. I think those are the kind of things, where, I don't know. Sea Life Park is not about that, but there is cultural integrity to this side of the island. You actually see the beach and you see the mountains, but there's all stories or mo'olelo that go with them. So if you go around Kaupō then there's Kalanauo and the Kini Stone and all of that's there too. I can't remember the name of the break in the reef...that has significance to the area and to stories and to fishing. [Ann Marie Kirk]

So I went and it's all on the website. The whole story is there. I'm not going to repeat it, you can go watch it. So these are the stories that interest me more. I'm trying to get into some of the caves over here. But right on the grounds, that's why I was like where are they building [before recording we looked at the map and AMK asked about a spot where the parking lot expansion meets Kalamiana'ole Hwy. near Kaupō], because there's also burials there as well. Are you aware of them coming across iwi in the past when they were building? [Ann Marie Kirk]

So what has been shared with me is that there are people that have concerns that they've had for a long time. They feel that there is a heiau on the property that has not properly been respected so they have strong feelings that that hasn't been done by the people who own that property. [Ann Marie Kirk]

Gathering Practices

I haven't witnessed it [traditional gathering in the area], but I'm sure there is. [Ann Marie Kirk]

Uh not really [I don't know about any traditional gathering in the area] [Wilson Kekoa Ho]

...Never have [traditional gathering practices in the area]. [Bunny Ahuna]

Change Through Time

It hasn't really changed a lot except for the parking lot and the bathhouse. But it's basically...luckily, stayed in the same. [Wilson Kekoa Ho]

By the trail where it goes down [from the lighthouse toward Maunaloa]. That used to be a mansion over there...But there's a lagoon over there and his house was circling the lagoon and in the 1944 tidal wave it was destroyed....Alan Davis. It's pretty much stayed pretty like this. I don't know what to tell you that's interesting. [Wilson Kekoa Ho]

Oh, there used to be a trail from that parking thing [Makapu'u Lookout parking] across and going around that corner...On the side. Where the fisherman came. You can hardly see it now because it's overgrown, but when a guy fell to his death they kinda stopped. The fisherman. [Wilson Kekoa Ho]

Down to the rocks. Down in the inside area. This is all deep water. You can tell by the color of the water, the blue is deep water. But we used to swim and catch waves and there used to be sharks in the area. So whenever we'd catch a wave and we'd be coming back out, every so often you would see a shark. And so we'd all go down to the bottom and hold onto rocks and hold onto something until the shark either caught the wave or passed. These kind of stories are just a part of you, you know. [Wilson Kekoa Ho]

Ok so when my dad told me in '32 when he started making the road, he was about five years old. When they made the highway come through, he [Castle] took all the land up to what s-his-name's place...You know that house they made all out of shake, just before Mike? ...Right there, that was all pigeons. They used to have millions of white pigeons. And then I guess Mike [Muller] put about six lots out of there. But I heard the guy Castle, he went on the boat and he just retired. I don't think he died on the ship, but he just stayed there and kept going around. And then it was about '62, '63 when they build Prior's house. Now you see, Sea Life Park...that's all homestead. They went steal 'um and give 'um to Prior. [Bunny Ahuna]

...Back then Waimānalo was all sugar plantations. In 1947 my father took Horus Sasaki. He took the brothers, the cousins, all them fishing at Rabbit Island. They found one bomb. They came back, they threw the bomb down. But those days, no more...but my tutu them never know until the next day. So a few years ago, I went up there to make one monument. I don't see the monument, I don't know who took 'um down, but they used their rights to go on the island for family tradition kinda stuff yeah. [Bunny Ahuna]

You know before Makapu'u could be owned, you had to hike from the Pali down or you had to be a billy goat and climb down the Makapu'u cliff, you know what I mean? The

homestead owned all that. Till the end of the road was the homestead. Now here come the governor them taking away stuff right? The quarry, same thing. [Bunny Ahuna]

You know how you come Makapu'u Lookout? You could drive up the road over there. Kaiser always be with his pink Continental. And on the top they had corrugated roofing. He'd be up there looking down. If this guy never die...he would have built up all of Alan Davis. Alan Davis, they took the water from Waiāhole. They brought the water all the way Makapu'u, that's why get that tunnel through Makapu'u. They did it in the '60s. You don't remember when they when blow the thing?...Get guys sunbathing and the rocks was falling on them!...Kaiser was going to build an eight-lane freeway from town to Hawaii Kai. The state wouldn't listen to him. This guy had a vision. That whole Maunaloa Bay was 'Save our Surf' now, it was all supposed to be a marina like Ala Moana. We would've lost all our surf spots. [Bunny Ahuna]

Remember now, no matter what any of these Hawaiians tell you, that place was only from '32 when the road came through. Before, everything was walking. That's why, can you imagine how beautiful Makapu'u must have been in the 1800s and the early 19? 'Cause nobody was in there. [Bunny Ahuna]

From my own memories of coming down here, you could drive for quite a while. There was no Kalamia Valley, it was still the pig farms and all of that so it was pretty isolated once you left the Maunaloa area and came around. This part hasn't changed. The beach has changed. Sea Life Park, I spent a lot of time there as a kid because I played sports in the Maunaloa area and a lot of our banquets were held at Sea Life Park. So I have fond memories of going there. As I've gotten older that's been separated. And then the pier. Really, other than the park kind of expanding, a lot of it seems to be pretty intact. I mean there's a much higher use. [Ann Marie Kirk]

Concerns and Recommendations

No [the project won't affect any cultural resources]...they when screw this place up already. But I'll tell you something, when we were young kids and they were making this place, that was exactly like we said, it was all junkies...We even used to throw away stuff. I was one of the worst guys because if I'm building something, I used to load up the truck, and my father used to get nuts with me. Yeah, yeah tomorrow I'm going. Night time let's go hurry up, I get Roger them in the car, just find some place and dump 'em. You figure whoever going develop the place, they're going to clean it. We used to dump all knee crap. And then Makapu'u used to have dumpsters...[Bunny Ahuna]

So what has been shared with me is that there are people that have concerns that they've had for a long time. They feel that there is a heiau on the property that has not properly been respected so they have strong feelings that that hasn't been done by the people who own that property. [Ann Marie Kirk]

As far as cultural gathering I would say no [the project would have no effect] because it has been a private area for a long time. As far as sites it could have the potential because I think there hasn't been enough archaeological study done on the site and I think someone like your mom [Windy McElroy] I really admire because for the first time we have someone who has a Hawaiian perspective and knows how to look at a site as a Pacific Islander instead of as a continental-trained archaeologist and there's nothing wrong with that, but you know, you don't go to the eye doctor when you have a problem with your foot. They're both doctors, but their specialties are different. I think that when this was

made, because I was reading about it. I actually didn't know that this was going to happen and so I was reading about Kaupō and you can't read about that without attaching to what has happened to Sea Life Park. When I was reading about Sea Life Park I was thinking that I don't think they did a lot of proper archaeological work. So when you ask me if I think that sites could be damaged or in danger, I would say yes, only because I think they were from the first time and they weren't protected properly. So, that's my feeling on it. [Ann Marie Kirk]

Our natural resources don't expand, but our population does. So that's been what I've noticed is the amount of people using these areas from going to the walk at Makapu'u to just our beach area. And then with that comes an increased use of natural resources and also sometimes the degradation of it. [Ann Marie Kirk]

This is a real cherished place. As long as I've been coming here, as long as I've been away, it's never left. This place is sacred to me. [Wilson Kēkoa Ho]

Summary of Ethnographic Survey

The interviewees have extensive knowledge of Waimānalo and the area around Sea Life Park. Two of them grew up in Waimānalo and the third was raised in the adjacent ahupua'a of Maunaloa. They shared several mo'olelo about the project vicinity, including one about Hi'iaka and another about Manana, stories associated with significant stones, accounts of swimming with sharks, and mo'olelo about night marchers.

Whereas the interviewees did not know of any specific traditional gathering practices occurring in the project area, they did mention many archaeological sites. Archaeological sites noted for Sea Life Park in particular are Kaupō Village and a possible heiau and human burials. Archaeological sites mentioned in the vicinity include burial caves, trails, a spring, a healing stone, and Pāhōnu Pond.

The interviewees also voiced their concerns and recommendations for the project. It was stated that archaeological sites were not protected properly from the earlier days when Sea Life Park was established, and that more archaeological work should be conducted to determine if there are cultural remains that have survived the construction. And finally, increasing population has an effect on the natural environment, and that should be considered.

SUMMARY AND RECOMMENDATIONS

The Waimānalo region has been an important area of O'ahu since pre-contact times and has retained its importance today. Waimānalo was well populated in ancient times, with taro farmed in wet areas, sweet potato grown in the drier regions, and fishing villages scattered along the coast. One of these, Kaupō Village was located within the project area. The village is thought to have originated in the pre-contact era and was later modified into a settlement for those afflicted by smallpox in the 1850s. The historic period brought other changes to the area, with large tracts of land converted to cattle ranches and sugarcane fields, as Waimānalo became increasingly developed.

This study highlights the unique history of Waimānalo and demonstrates the importance of this place to the community. Three community members were interviewed to share their mana'o and to help identify any potential cultural resources or practices that might be affected by the proposed project at Sea Life Park.

Cultural Resources, Practices, and Beliefs Identified

Archival research and ethnographic interviews compiled for the current study revealed that Waimānalo was a culturally significant area with many of the natural resources which supported traditional subsistence activities. In the project area, this would have centered on the harvesting of marine resources. In the historic period, most activity was focused on the region to the south and east, where a Federal Aviation Administration communications center, the Makapu'u Lighthouse, the Makapu'u Military Reservation, and Alan Davis Ranch were established.

The interviewees did not know of any specific traditional cultural practices or gathering that are carried out in the project area today. Archaeological sites discussed during the interviews include Kaupō Village, heiau, burial caves, trails, a healing stone, and a fishing shrine in the ocean. Specifically on the Sea Life Park property, Kaupō Village, a possible heiau, and burials were noted. In addition, a rock on the Sea Life Park property is thought to have caused the death of someone that moved it.

Potential Effects of the Proposed Project

The interviewees had different opinions on whether or not the proposed project would affect any places of cultural significance. One interviewee believed that archaeological sites on the property have already been destroyed, while another asserted that more archaeological work is necessary to determine if the project will affect any cultural resources.

Confidential Information Withheld

During the course of researching the present report and conducting the ethnographic survey program, sensitive or confidential information was revealed, as one interviewee asked to speak off the record. This confidential information was withheld from the current report.

Conflicting Information

No conflicting information was obvious in analyzing the gathered sources. On the contrary, a number of themes were repeated and information was generally confirmed by independent sources.

Recommendations/Mitigations

One interviewee did not believe that mitigation is needed, as the area around Sea Life Park was used as a trash dump in the recent past. Another interviewee stated that archaeological sites were not protected properly from the earlier days when Sea Life Park was established, and that more archaeological work should be conducted to determine if there are cultural remains that have survived the construction.

Summary and Conclusion

In sum, background research and oral history interviews identified several archaeological resources within and outside the project area, although it is unclear if they may be affected by the proposed project. An archaeological inventory survey is recommended to determine if any surface or subsurface cultural resources remain on the property. The community should be kept informed on the renovation plans, and their concerns and recommendations should be considered during all phases of the proposed work. The area is clearly significant, both past and present, as summed up by one interviewee: "This is a real cherished place. As long as I've been coming here, as long as I've been away, it's never left. This place is sacred to me."

GLOSSARY

‘āholehole	Young stage of the Hawaiian flagtail fish.
ahupua‘a	Traditional Hawaiian land division usually extending from the uplands to the sea.
akule	Big-eyed or goggle-eyed sead fish (<i>Trachurus crumenophthalmus</i>).
‘alaia	Red ocher.
ali‘i	Chief, chiefess, monarch.
‘aumakua	Family or personal gods. The plural form of the word is ‘aumākua.
‘awa	The shrub <i>Piper methysticum</i> , or kava, the root of which was used as a ceremonial drink throughout the Pacific.
boulder	Rock 60 cm and greater.
breadfruit	The Polynesian-introduced tree <i>Artocarpus altilis</i> , or ‘ulu in Hawaiian.
cobble	Rock fragment ranging from 7.6 cm to less than 25 cm.
coconut	The palm tree <i>Cocos nucifera</i> , or niu in Hawaiian.
gravel	Rock fragment less than 7.6 cm.
hale	House.
heiau	Place of worship and ritual in traditional Hawai‘i.
hoa‘āina	Native tenants that worked the land.
honu	The general name for a turtle or tortoise.
‘ike	To see, know, feel, knowledge, awareness, understanding.
kahuna	An expert in any profession, often referring to a priest, sorcerer, or magician.
kākalaioa	An indigenous thorny vine, <i>Caesalpinia major</i> , commonly known as gray nickers. The seeds were traditionally used for lei and powdered into medicine.
kalo	The Polynesian-introduced <i>Colocasia esculenta</i> , or taro, the staple of the traditional Hawaiian diet.
kama‘āina	Native-born.
kiawe	The algaroba tree, <i>Prosopis</i> sp., a legume from tropical America, first planted in 1828 in Hawai‘i.
ki‘i	Image, drawing, idol, petroglyph.
ko‘a	Fishing shrine.
koa haole	The small tree <i>Leucaena glauca</i> , historically-introduced to Hawai‘i.
kukui	The candlenut tree, or <i>Aleurites maluccana</i> , the nuts of which were eaten as a relish and used for lamp fuel in traditional times.
kuleana	Right, title, property, portion, responsibility, jurisdiction, authority, interest, claim, ownership.
kupua	Demigod, hero, or supernatural being below the level of a full-fledged deity.

lū‘au	Hawaiian feast, named for the taro tops always served at one; this is not an ancient name, but goes back to at least 1856.
Māhele	The 1848 division of land.
maka‘āinana	Common people, or populace; translates to “people that attend the land.”
makai	Toward the sea.
mana‘o	Thoughts, opinions, ideas.
manō	General name for shark.
mauka	Inland, upland, toward the mountain.
mele	Song, chant, or poem.
mīddēn	A heap or stratum of refuse normally found on the site of an ancient settlement. In Hawai‘i, the term generally refers to food remains, whether or not they appear as a heap or stratum.
moi	The threadfish <i>Polydactylus sexfilis</i> , a highly prized food item.
mō‘o	Lizard, dragon, water spirit.
mō‘olelo	A story, myth, history, tradition, legend, or record.
mountain apple	The tree ‘ōhi‘a ‘ai, or <i>Eugenia malaccensis</i> , that produces edible fruit.
night marchers	The legendary warrior ghosts that march at sacred places on certain nights. It is said to avoid death, one must lie face down on the ground to avoid their detection.
‘ohana	Family.
‘ō‘io	Ladyfish, bonefish (<i>Albula vulpes</i>).
‘ōlelo no‘eau	Proverb, wise saying, traditional saying.
oli	Chant.
pali	Cliff, steep hill.
pōhaku	Rock, stone.
pali	Cliff, steep hill.
stone	Rock fragment ranging from 25 cm to less than 60 cm.
sugarcane	The Polynesian-introduced <i>Saccharum officinarum</i> , or kō, a large grass traditionally used as a sweetener and for black dye.
ti (ki)	The plant <i>Cordyline terminalis</i> , whose leaves were traditionally used in house thatching, raincoats, sandals, whistles, and as a wrapping for food.
Tutu Man	Grandfather
‘uala	The sweet potato, or <i>Ipomoea batatas</i> , a Polynesian introduction.
uhu	An adult parrotfish, one of two genera of the <i>Scaridae</i> family known to occur in Hawai‘i.
wauke	The paper mulberry, or <i>Broussonetia papyrifera</i> , which was made into tapa cloth in traditional Hawai‘i.

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APPENDIX A: AGREEMENT TO PARTICIPATE

**Agreement to Participate in the Cultural Impact Assessment for the
Sea Life Park Project**
Kālena McElroy, Ethnographer, Keala Pono Archaeological Consulting

You are invited to participate in a Cultural Impact Assessment (CIA) for the Sea Life Park Project in Waimānalo, on the island of O‘ahu (herein referred to as “the Project”). The Assessment is being conducted by Keala Pono Archaeological Consulting (Keala Pono), a cultural resource management firm, on behalf of C70. The ethnographer will explain the purpose of the Assessment, the procedures that will be followed, and the potential benefits and risks of participating. A brief description of the Assessment is written below. Feel free to ask the ethnographer questions if the procedures need further clarification. If you decide to participate, please sign the attached Consent Form. A copy of this form will be provided for you to keep.

Description of the Project

This CIA is being conducted to collect information about the Property in the Waimānalo area in Ko‘olaupoko on O‘ahu Island through interviews with individuals who are knowledgeable about this area, and/or about information including (but not limited to) cultural practices and beliefs, mo‘olelo, mele, or oli associated with this area. The goal of this Assessment is to identify and understand the importance of any traditional Hawaiian and/or historic cultural resources, or traditional cultural practices within the Project area. This Assessment will also attempt to identify any effects that the proposed development may have on cultural resources present, or once present within the Property area.

Procedures

After agreeing to participate in the Project and signing the Consent Form, the ethnographer will digitally record your interview and it may be transcribed in part or in full. The transcript may be sent to you for editing and final approval. Data from the interview will be used as part of the ethnographic report for this project and transcripts may be included in part or in full as an appendix to the report. The ethnographer may take notes and photographs and ask you to spell out names or unfamiliar words.

Discomforts and Risks

Possible risks and/or discomforts resulting from participation in this Project may include, but are not limited to the following: being interviewed and recorded; having to speak loudly for the recorder; providing information for reports which may be used in the future as a public reference; your uncompensated dedication of time; possible misunderstanding in the transcribing of information; loss of privacy; and worry that your comments may not be understood in the same way you understand them. It is not possible to identify all potential risks, although reasonable safeguards have been taken to minimize them.

Benefits

This Project will give you the opportunity to express your thoughts and opinions and share your knowledge, which will be considered, shared, and documented for future generations. Your sharing of knowledge may be instrumental in the preservation of cultural resources, practices, and information.

Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected upon request. You may request, for example, that your name and/or sex not be mentioned in Project material, such as in written notes, on tape, and in reports; or you may request that some of the information you provide remain off-the-record and not be recorded in any way. To ensure protection of your privacy, confidentiality and/or anonymity, you should immediately inform the ethnographer of your requests. The ethnographer will ask you to specify the method of protection, and note it on the attached Consent Form.

Refusal/Withdrawal

At any time during the interview process, you may choose to not participate any further and ask the ethnographer for the tape and/or notes. If the transcription of your interview is to be included in the report, you will be given an opportunity to review your transcript, and to revise or delete any part of the interview.

APPENDIX B: CONSENT FORM

Consent Form

I, _____, am a participant in the Cultural Impact Assessment for the Sea Life Park Project (herein referred to as "Project"). I understand that the purpose of the Project is to conduct oral history interviews with individuals knowledgeable about the subject property and surrounding area of Waimānalo on O'ahu Island. I understand that Keala Pono Archaeological Consulting and/or G70 will retain the product of my participation (digital recording, transcripts of interviews, etc.) as part of their permanent collection and that the materials may be used for scholarly, educational, land management, and other purposes.

_____ I hereby grant to Keala Pono and G70 ownership of the physical property delivered to the institution and the right to use the property that is the product of my participation (e.g., my interview, photographs, and written materials) as stated above. By giving permission, I understand that I do not give up any copyright or performance rights that I may hold.

_____ I also grant to Keala Pono and G70 my consent for any photographs provided by me or taken of me in the course of my participation in the Project to be used, published, and copied by Keala Pono and G70 and its assignees in any medium for purposes of the Project.

_____ I agree that Keala Pono and G70 may use my name, photographic image, biographical information, statements, and voice reproduction for this Project without further approval on my part.

_____ If transcripts are to be included in the report, I understand that I will have the opportunity to review my transcripts to ensure that they accurately depict what I meant to convey. I also understand that if I do not return the revised transcripts after two weeks from the date of receipt, my signature below will indicate my release of information for the draft report, although I will still have the opportunity to make revisions during the draft review process.

By signing this permission form, I am acknowledging that I have been informed about the purpose of this Project, the procedure, how the data will be gathered, and how the data will be analyzed. I understand that my participation is strictly voluntary, and that I may withdraw from participation at any time without consequence.

_____	_____
Consultant Signature	Date
_____	_____
Print Name	Phone
_____	_____
Address	

Thank you for participating in this valuable study.

Transcript Release

I, _____, am a participant in the Cultural Impact Assessment for the Sea Life Park Project (herein referred to as "Project") and was interviewed for the Project. I have reviewed the transcripts of the interview and agree that the transcript is complete and accurate except for those matters delineated below under the heading "CLARIFICATION, CORRECTIONS, ADDITIONS, DELETIONS."

I agree that Keala Pono Archaeological Consulting and/or G70 may use and release my identity, biographical information, and other interview information, for the purpose of including such information in a report to be made public, subject to my specific objections, to release as set forth below under the heading "OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS."

CLARIFICATION, CORRECTIONS, ADDITIONS, DELETIONS:

OBJECTIONS TO RELEASE OF INTERVIEW MATERIALS:

_____ Consultant Signature	_____ Date
_____ Print Name	_____ Phone
_____ Address	

APPENDIX C: TRANSCRIPT RELEASE

TALKING STORY WITH

BUNNY AHUNA (BA)

Oral History for the Sea Life Park project by Kālena McElroy (KM)
For Keala Pono 11/16/2018

It is Friday, November 16, 2018 at 2 pm. I am in Niu Valley at the home of Bunny Ahuna accompanied by my Grandfather and Bunny's longtime friend, Bernard Rodrigues (BR).

BA: ...Even by our house Bernard, you know when you're going out past the pier [small pier in the ocean west of Makai Pier]? Used to have one rock over there in the water. Every time we come home my dad used to go take fish and stuff and then I don't know, one day the rock was gone. Now you know that small flat rock by the bay?

KM: Which bay?

BA: The small bay, that surfing bay.

BR: Cockroach Bay?

BA: Yup. That's supposed to be like one healing stone. But see this is stuff my Tutu Man them taught us yeah. Sweetheart, I was five years old when my Tutu Man died so my grandpa raised us. But little bit past that surfing area where they get the parking lot was the fishing village Kaupō. Had one big...when we were young kids I remember had rocks. Had fallen down already. And then the 1960 tidal wave when kinda washed everything. That's why when you look good, kinda look like ponds you know.

KM: Yeah.

BA: And then you remember where you parked your boat [in the area of the small pier]?

BR: Yeah.

BA: Bernard, what happened to those rocks over there? Remember right by your house had that...Remember all those rocks? That thing was one fishpond. And then get that one rock over there. You remember that one rock? That's the one poor Roger he lived by us, bought one boat, brand new sweetheart, this is New Year's Day I think. The boat ended up on top the rock. Broke down, brand new boat.

[Everyone laughing]

BR: I remember your dad would tell me stories. Do you remember the Prior's house? They always had problems over there.

BA: Yeah, yeah.

BR: I forget the exact story.

BA: Ok. Listen real good brah. You ever went down there to the beach? You remember Mike's house is like this yeah. Had one bridge to where the house is and had one da kine, what do you call that? The kine with the round roof?

BR: Gazebo or something?

BA: Yeah gazebo. And then Governor Burns made all kinda bullshit for them to build the house. If you look at the house from the side, look like our original net house in Waimānalo. The front house we get. That old lean-to type, that's what the architect when make yeah.

[Talking about Waimānalo quarry and Pacific Concrete]

KM: Just for the record can you just say your name, when you were born and where you grew up?

BA: Oh, my name is Harold Ahuna. I was born Kapi'olani Hospital and I was raised in Waimānalo.

KM: And what school did you go to?

BA: I went to a few. Like Waikīkī Elementary, Saint Patrick's, Lili'uokalani, Kaimukī Intermediate and Kalam High School. Those days we went to school in town. 'Cause only had Waimānalo and my dad went to work in town and then we would stay with my grandma in Kapahulu, Waikīkī side yeah. That's why we went to Waikīkī Elementary.

KM: Do you know about any other cultural sites around the Makapu'u area?

BA: Well see, you know where we lived [first stretch of houses on the beach west of Sea Life Park]. You grew up at the house yeah?

KM: Yeah.

BA: Ok. That was the end of the road you know. Our driveway was the end of the road. You heard of that guy Castle?

KM: Yeah.

BA: Ok so when my dad told me in '32 when he started making the road, he was about five years old. When they made the highway come through, he [Castle] took all the land up to what's-his-name's place... You only had one neighbor near you ah? 'Cause the rest was my grandpa them's stuff. You know that house they made all out of shake, just before Mike?

KM: Yeah.

BA: Right there, that was all pigeons. They used to have millions of white pigeons. And then I guess Mike [Muller] put about six lots out of there. But I heard the guy Castle, he went on the boat and he just retired. I don't think he died on the ship, but he just stayed there and kept going around. And then it was about '62, '63 when they build Prior's house. Now you see, Sea Life Park sweetheart, that's all homestead. They wen steal 'um and give 'um to Prior. If you go back to the '50s, Jack Burns was almost like Bill Clinton type. The scam in those years was that they were going to close all the bays down and make natural preserves. So they had a meeting, it was all aquaculture and stuff that they were talking about and the idea was that they were going to close down from Makapu'u all the way to Kahuku. So the old man, George Hanawahine, he was something in his time. He wen' get kids from his own daughters and stuff, I mean this guy was real spooky. But he said get the fuck out of here, you guys go close down Waikīkī.

[Talking about lessons from his dad]

KM: Your family was connected to the turtles at Turtle Pond right?

BA: Yeah. My Tutu Man them were taking care of turtles for the King yeah. That's how come they got that ahupua'a. They used to tell us stories, now these guys, they got to be over 100 already, 'cause they were older than my dad. But when they were young, they used to come with their father, but the big scam was that these guys were blacksmiths. They would do work on the sugar plantations. Back then Waimānalo was all sugar plantations. In 1947 my father took Hortus Sasaki. He took the brothers, the cousins, all them fishing at Rabbit Island. They found one bomb. They came back, they threw the bomb down. But those days, no more...but my tutu them never know until the next day. So a few years ago, I went up there to make one monument. I don't see the monument, I don't know who took 'um down, but they used their rights to go on the island for family tradition kinda stuff yeah.

BA: I'm talking about those guys that died on Rabbit Island [to BR]. So that's why Rabbit Island was kinda off limits. But you see in Hawai'i, get Hawaiian that live in Waimānalo that cannot go Rabbit Island, but the haoles can go on Twin Island...We used to always get caught on the island.

[Talking about old friends from Waimānalo]

KM: Do you want to hear about the project?

BA: Yeah. So what are they trying to do now over there now?

KM: So all the colored buildings, they're renovating all that. Then the red and the yellow, they're going to expand it. It's the parking lot.

BA: Ok. this the highway yeah?

KM: Yup. That's the highway.

BA: Ok. You know when you come back here? Is that still Oceanic Institute?

[Talking about Oceanic Institute's old projects]

BA: This place get some spooks up here.

[Talking about mountain lions in Aina Haina, Kalama Valley, and Waimānalo]

BA: When we were younger had this guy, Uncle Dodo Spencer, when you turn to go down the road, next to Gabby's house was Uncle Dodo's house. That's my good friend's uncle. They said he had one stroke, but they bullshit, they when move one rock. The rock when move about three times, next thing he couldn't move.

KM: From this area? From Sea Life Park?

BA: Yeah, from the parking lot. That's why I tell you, this place is haunted.

[Talking about his family and friends from high school]

KM: Do you know of any traditional gathering places around this area or Makapu'u?

BA: Baby never have. Never have road, you know what I mean? When Tutu Man them was living there, I think my mom was about six years old. My Grandpa's friend was working in the lighthouse. My mother always told me that she never believed that

she'd ever live there [Waimānalo] because from the lighthouse you can see. That's why the pictures that they get, it's all in the '20s.

[Talking about working on the movies]

BA: You know before Makapu'u could be owned, you had to hike from the Pali down or you had to be a billy goat and climb down the Makapu'u cliff, you know what I mean? The homestead owned all that. Till the end of the road was the homestead. Now here come the governor them taking away stuff right? The quarry, same thing.

[Talking about the quarry]

BA: You don't remember this now, but '62, '63 we used to go home and you know when you come by the [Hawaii Kai] golf course?

KM: Yup.

BA: Ok. You know how you come Makapu'u Lookout?

KM: Yup.

BA: You could drive up the road over there. Kaiser always be with his pink Continental. And on the top they had corrugated roofing. He'd be up there looking down. If this guy never die sweetie, he would have built up all of Alan Davis. Alan Davis, they took the water from Waiāhole. They brought the water all the way Makapu'u, that's why get that tunnel through Makapu'u. They did it in the '60s. You don't remember when they when blow the thing? Sweetheart, get guys sunbathing and the rocks was falling on them!

[Everyone laughs]

BA: No really! Kaiser was going to build an eight-lane freeway from town to Hawaii Kai. The state wouldn't listen to him. This guy had a vision. That whole Maunaloa Bay was 'Save our Surf' now, it was all supposed to be a marina like Ala Moana. We would've lost all our surf spots.

[Talking about land grab and environment on the South Shore]

KM: Do you think that anything that they're doing, the renovations are going to affect...

BA: No baby, they when screw this place up already. But I'll tell you something, when we were young kids and they were making this place, that was exactly like we said, it was all junk.

KM: So they were dumping here [Sea Life Park area]?

BA: Baby we even used to throw away stuff. I was one of the worst guys because if I'm building something, I used to load up the truck, and my father used to get nuts with me. Yeah, yeah tomorrow I'm going. Night time let's go hurry up, I get Roger them in the car, just find some place and dump 'um. You figure whoever going develop the place, they're going to clean it. We used to dump all kine crap. And then Makapu'u used to have dumpsters. Sweetheart if you go fishing on a Saturday or Sunday, you ever smelled lobster how stink couple days later?

KM: Yeah.

BA: That's why I used to take it Makapu'u.

[Talking about family and the Big Island]

BA: So for this stuffs, I cannot remember any kind of fishing areas. Honest to God, I don't think anything over there, only on the beach. You know when you're coming out of that back gate? [the road going into Sea Life Park closest to Makapu'u]

KM: Yeah.

BA: You seen all the rock on top the mountain? When they built the water tank, the rocks when fall down. You know Bobby [Teixiera]? Their house was in one heiau. The father sold all the rocks. Yeah, 'cause when we were young kids had the water tank right by the heiau.

KM: Where was that at?

BA: Right above our house! [Along Kalamiana'ole Hwy.] By the Correas. So when you go, you know Makapu'u right now if you're coming down Makapu'u you try look. On the mountain, look like one slab. I don't know who did that, but right below get that chapel [the one at Sea Life Park].

KM: Yeah there's that chapel there.

BA: Sweetheart, that was the tank that came and took water to the lighthouse. So my Tutu Man them, when they built the stuff, they never had water. That's the only water

they had. So when that water came, I think it was about '65, '66, they brought that water around to Hawaii Kai.

[Talking about sewer system at Sandy Beach]

BA: So that's what you were more concerned about if there had anything [at Sea Life Park]?

KM: Yeah, yeah.

BA: I really cannot, and I tell you. Remember now, no matter what any of these Hawaiians tell you, that place was only from '32 when the road came through. Before, everything was walking. That's why, can you imagine how beautiful Makapu'u must have been in the 1800s and the early 19? 'Cause nobody was in there. If you can come one day we can take you on the boat and show you all. You are more than welcome, anytime you want to come down Waimānalo. You can come anytime.

[Talking about Kalama Valley]

BA: So the only thing I can tell you is that this whole place...because there wasn't anyone living there, the only thing I know was that fishing village.

BA: You guys want some more water for the road, you guys good?

KM: No we're good, thank you, bye.

BA: Yeah, come by anytime.

TALKING STORY WITH

WILSON KEKOA HO (WH)

Oral History for the Sea Life Park project by Kālena McElroy (KM)
For Keala Pono 11/14/2018

It is Wednesday, November 14, 2018 at 10 am. We are standing at the northern end of the Makapu'u Beach parking lot.

WH: So I spent many years of my life over here. So across the way there, do you see that flat area over there? [pointing to rocks jutting out from beneath Makapu'u Point]

KM: Yeah.

WH: If you go underneath there, there's supposed to be burial caves.

KM: Really?

WH: Yeah. We tried to go but it was kinda rough. You know, like I've been saying, never been proven. But somewhere over there they say there's caverns.

KM: Yeah. I've heard there's a lot of caves over there.

WH: Yeah. This used to be a stone village [pointing to flat area between the Makapu'u parking lot and Baby Makapu'u near the ocean] and needless to say, all the rocks...If you go Waimānalo and you see the nice stone walls, all the rocks are now stone walls.

[Both laugh]

KM: They're from here?

WH: No respect you know the Hawaiians, you know. They went where the rocks were plentiful. I have a stone wall, but I never took my rocks from there. Yeah.

KM: Oh yeah, what year were you born and what area did you grow up?

WH: I was born 1942 in Waimānalo. Yeah. So we were the 17th house in Waimānalo. We grew up on the beaches. Mostly on the beaches 'cause that's where all the fun was. Well, we climbed the mountains. My Dad did a rescue up here [pointing to ridge near the puka], but he had to go from behind that ridge and go up there and come all the way over here to rescue somebody.

KM: Like a hiker?

WH: He was a fireman.

KM: Oh he was a fireman, ok.

WH: And of course on the other side was all pig farms and junkyards and stuff. Now there's a winner's camp someplace over here.

KM: And then what school did you go?

WH: Waimānalo School. Kindergarten to 6th grade and then I went to 'Iolani. Then 'Iolani got expensive so I went to McKinley. We're talking \$250 a year. That was expensive.

[both laugh]

KM: Well back then...

WH: Yeah, back then that was expensive. Now it's \$20,000. Well, I don't know what to tell you. After the stone village you saw was gone this became a fishing village and there are some old fisherman that used to live here.

KM: Do you know anything about the area where Sea Life Park is now? Do you know if there was anything there?

WH: Well some say that there's some burial areas, but I've never heard of it or I've never seen it. But where Sea Life Park is...the parking lot. There's a flat area way in the back and they have some houses there and they have that bird vet that works out of there that fixes up birds and lets them go again. But this has a lot of stories. Stories I don't know, but there's a lot of stories over there.

KM: Do you know about any traditional gathering practices that happen in this area?

WH: Uh not really.

KM: Just from what you remember.

WH: Yeah, yeah. Not really, but Scotty Reis-Moniz they want to build the village again. The rock village. Somewhere right in this area. [pointing to same area as before]

KM: They're planning to expand the parking lot and refurbish some of the buildings.

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WH: The buildings, yeah 'cause the buildings are all old. The concrete is falling apart and stuff.

KM: Yeah. Do you think that that would affect any of the cultural sites around here?

WH: I think they already have run over some. But you know, this was originally Hawaiian Homes Land and somebody wanted the area, so somebody in the State allowed them to buy it and they sold it. And then of course, it's on its fourth buyer now. Yeah. The road here is interesting because it's not like going through a cave on the side of the road. It was just a trail and they built it out. You can see all the concrete that's out there. If the road crashes or is destroyed, there's nothing.

KM: So there was a trail coming through here? [pointing to gap in mountain where Kalamiana 'ole Highway runs]

WH: Yes, there was a trail coming right around here. And on top...you know what Waimānalo means?

KM: No, oh wait yes. Potable water.

WH: Potable water, yeah. On the top here there's a spring. I don't know if the spring is still going but there was a natural spring.

KM: Up on the top there?

WH: Yeah.

KM: Wow.

WH: Yeah. And so what these guys wanted to do, not too long ago they owned it. Kamehameha Schools. And that part right here that goes down [pointing to slope above Kalamiana 'ole Highway on south side of Sea Life Park] they wanted to put log cabins. They wanted to put 80 log cabins over there. So I work with Ka Iwi Coastline and we bought all of that property and we turned it over to the state never to be improved. Kept in itself.

KM: So they were going to do it on the mountain right here?

WH: No, on the other side [slope on Sea Life Park side facing Makapu'u Lookout parking lot].

KM: Oh on the other side. Ok.

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[Both move to sit on the concrete barrier]

KM: Can you just say a little about your 'ohana and their background?

WH: My family came from Kaka'ako and Nu'uamu. My dad was one of 13. My dad was number three, his oldest brother is Don Ho's father. Don was the oldest of all the cousins down the line. My grandmother had six and then there was a 10-year break and she had seven more. My grandfather was a bartender, a taxi driver, and I don't know, banana.

[both laugh]

WH: So what my dad did was he assigned each child, the older kids, every time she had another kid, to take the kids and so each one of them raised the kids. My dad raised two of 'um. One of 'um, number 13 was a Beach Boy. You know Michael and Derek Ho, those kids, their father.

KM: Ok. Yup.

WH: He was staying in Kaka'ako and one of the people that he watched. She's 88, 89 now, but all the girls stayed in the house and my dad stayed in the garage. So she came out of the house and stayed in the garage with him. Just I guess knowing that he's the one that's raising her.

But, no we lived here. Waimānalo is divided into couple area. Along the highway to the park and first row in and second row in were half-acre lots. We used to raise chickens and turkeys and rabbits. I had a garden and we raised all of our food. That went by the wayside after people moved in and they said we don't like the noise, we don't like the stink, you know. It was a real nice neighborhood to grow up in because everybody was together. I mean, I had my father's brother, next door to us was my father's sister, two doors away was my father's sister, the one that he raised, and over there he built a house for his mom.

He sent my aunt to Guam and said whatever you make for your paycheck, I need you to send it to me. And she said oh, how come I get pushed out of Hawai'i and I have to give you all my money and everything. So after a while he was building a house and after the house was built he ships her back and he said this is your house. You know. Which is still up today. She still lives there. I have four aunts, all in their late '80s and '90s. Last year his sister that lives next door to us just died. She was 100. It was a nice place to grow up in and of course Waimānalo at that time was the boon docks. You know, if you live in town and Waikīkī and stuff, whoever in their right mind wants to go to Waimānalo. Now with the west coast being all settled, and all the traffic and all the houses and everything, everybody wants to move to Waimānalo.

WH: There's a nice slope going down and they can build 'um on both sides of the slope.

KM: Oh ok.

WH: So what does Makapu'u mean?

KM: Bulging Eye.

WH: There you go girl. This is supposed to have been the refuge for Hi'iaka and her girlfriend. Yeah. Bulging eye was one of the princesses that also lived here. No dates. No proof. It's just the stuff we grew up with.

KM: And then, you've seen this place from way back. Has it changed a lot? How was it from back then when you were growing up till now?

WH: It hasn't really changed a lot except for the parking lot and the bathhouse. But it's basically...luckily, stayed in the same. And that's why the Ka Iwi Coastline, I think theirs ends at Baby Makapu'u, the Ahupua'a, so for building and stuff. You know where the trail comes down on the top, by when you go to the lighthouse?

KM: Uh huh.

WH: They wanted to build concession stands, parking for eight busses and parking 53 cars. And they thought they could do it because it sank down and it would be below the view line, so some of us were flabbergasted. Well, I joined the group that was flabbergasted. And so we worked to buy it all.

KM: You're talking about, not the lookout, but where they have the trail? The beginning of the trail?

WH: By the trail where it goes down. That used to be a mansion over there. Shoot, just because I told you that I forgot his name. But there's a lagoon over there and his house was circling the lagoon and in the 1944 tidal wave it was destroyed.

KM: You're talking about the Alan Davis lagoon?

WH: Yeah. Alan Davis. It's pretty much stayed pretty like this. I don't know what to tell you that's interesting.

KM: Let me see if I have anything else to ask.

body surf like him. This is before we had paipo boards. So he got drafted, went to war, got shot up. He was carrying bullets for his machine gun and a whole bunch of bullets went off. Close to death, I think he lost a leg, but one, two years passed, I was sitting on the beach and I seen this guy hopping down and it was Black. He came back to his beach.

KM: Still going.

WH: Yeah. What else you got?

KM: We went over everything, but if you remember anything else you wanted to add?

WH: Oh, there used to be a trail from that parking thing [Makapu'u Lookout parking] across and going around that corner.

KM: On the side? [the cliff face below the lookout]

WH: Yup on the side. Where the fisherman came. You can hardly see it now because it's overgrown, but when a guy fell to his death they kinda stopped. The fisherman.

KM: Where would they go fishing? Down to the rocks over there? [flat rocks right below the lookout]

WH: Down to the rocks. Down in the inside area. This is all deep water. You can tell by the color of the water, the blue is deep water. But we used to swim and catch waves and there used to be sharks in the area. So whenever we'd catch a wave and we'd be coming back out, every so often you would see a shark. And so we'd all go down to the bottom and hold onto rocks and hold onto something until the shark either caught the wave or passed. These kind of stories are just a part of you, you know.

KM: Yeah.

WH: I cannot go tell somebody now, oh yeah I used to go swim with the sharks over here. And they'll say yeah right.

[talking about his family and Kamehameha Schools]

WH: I don't know what else to tell you.

[WH shown map of the project area and work to be done]

WH: You know these guys are trying to build a zip line here.

KM: Yeah.

[talking about where KM lives]

KM: I don't have that much more, but do you know any mo'olelo or mele you heard growing up about this area?

WH: We were never with the language. When we grew up we spoke the language and then when Hawai'i wanted to become a state, a territory they outlawed speaking in the homes, in the churches, in the schools, so we lost a lot of that. But, in Hawaii Kai in the marshlands...you know where the marshlands is in Hawaii Kai?

KM: Where it used to be?

WH: No where it is now.

KM: Oh I didn't know there was marshlands there.

WH: Yeah. When you're leaving Hawaii Kai and you're going through the back roads there's a big condominium. Right behind that is the Ka Iwi Marshlands and every second Sunday, they have an older lady that comes and talks story about the area. Because that's part of the ahupua'a of Waimānalo, I'd imagine she knows some stories too about that. I don't know her name. They have the talk story and she tells stories about the area and the people. Her brother's a lifeguard. I have her name in my phone. I'm on the neighborhood board so I know plenty people. The area has always, always been beautiful. In December this is the area that about 20 whales come and swash around. Ohhh old stories, I was never good with mo'olelo.

KM: No?

WH: We were never good with that. We just came for the waves. Jump in the water at 8 o'clock in the morning and jump out at 5 o'clock in the evening and hitchhike back home.

KM: Is there anything else you wanted to add about this area or Sea Life Park?

WH: At the archives there's pictures. I did a presentation to a leadership group about Waimānalo in the early days and part of it was over here. We had pictures of the early settlements over here. Probably you can find it in the library. I'm not very helpful. But all of us who live in Waimānalo are very passionate about this area. This is just an off story. Charles Lum King, his name is "Black" Lum King, he used to body surf in over here and he was the "King of Makapu'u." I mean there was no one ever who could

KM: Really? I never knew that.

WH: Yeah, yeah. Up there going all the way across to their property. This came in the newspaper two Sundays ago with this picture. [talking about map of project area] So they're going to build this?

[Showing map and description of project]

WH: My wife made a lot of improvements in the park. She did a lot of work.

KM: Oh, does she work there?

WH: She did last year. She did just a whole lot of improvements and this year she did some. And then she does the weddings when they have the arches and the flowers. She does all that. And then she does the Halloween party, Mermaid Grotto. And she did the Christmas parties years back, well the decorations anyway. Just on consignment. She was never employed by the park. When you were employed by the park, you give your life. I don't know if it's worth the deal, but you give your life. Thank you. I'll show this to her [map and description of project]. She'll be interested.

KM: Yeah, thank you.

WH: This is a real cherished place. As long as I've been coming here, as long as I've been away, it's never left. This place is sacred to me. Ok my dear, thank you.

KM: Thank you.

TALKING STORY WITH

ANN MARIE KIRK (AMK)

Oral History for the Sea Life Park project by Kālena McElroy (KM)
For Keala Pono 11/16/2018

It is Friday, November 16, 2018 at 6 pm. We are sitting at a picnic table near Makapu'u Beach. AMK was shown a map of the project area and work to be done.

KM: Can you just start with your name, where you grew up, and when you were born?

AMK: So my name is Ann Marie Kirk, I was born in 1963. My first home was in Punahū'u, but I've been in Maunaloa since I was three or four years old.

KM: And what school did you go to?

AMK: Sacred Hearts Academy

KM: Can you tell me just a little bit about your 'ohana?

AMK: Yeah, so I'm from the Kupau family. We're from Waiāhole and Wai'anae and so my family was also in Kalihi. My roots go through that family and the Cullen family, that's my mother's side. On my father's side I'm from New York, Scottish. My mother is Hawaiian.

KM: So what is your association with this area? (Pointing towards Kaupō/Sea Life Park)

AMK: Well, being in Maunaloa, I created a website called Maunaloa.net that tells the story of Maunaloa from Kūpikipiki'ō to actually Waimānalo since Maunaloa was once an 'ili of Waimānalo. So although that changes in the late 1850s, I still want to honor that relationship, so I've been gathering stories for a number of years now. In doing that I've been collecting stories. I've talked to Kūpuna, different cultural practitioners, community activists through the area to try and get a deeper understanding of the area. The website goes up to about the 1950s because we kind of have a lot of that recorded history. The history before that we don't have, so I spent time gathering stories and then putting them on the website to share those stories.

KM: That's really interesting, I've never seen it.

AMK: Yeah, the first year people didn't know what I was doing and I didn't really know what I was doing either. It was done to save a heiau. And I'm like how are we

going to get this message out about Hawea. And then it was like ok I'll put this on the web, but I've been collecting stories about the area for a long time. So it just kept growing and growing and growing. It's been amazing, they're using it in classrooms. I've done talks on it. People are really appreciative of having that information.

KM: Yeah, because if you don't gather it now, it will be lost. We want to know. Can you share your mana'o on this project area specifically, Sea Life Park?

AMK: Well, how is this information going to be used?

KM: We're including it in a report for Sea Life Park.

AMK: Can I talk off the record for a sec. Can you stop recording?

[Recorder turned off]

KM: Do you want to just explain a little bit about that [the previous question]? Whatever you feel like you want to say.

AMK: So what has been shared with me is that there are people that have concerns that they've had for a long time. They feel that there is a heiau on the property that has not properly been respected so they have strong feelings that that hasn't been done by the people who own that property.

KM: And then as far as you remember, how has this area changed?

AMK: From my own memories of coming down here, you could drive for quite a while. There was no Kalama Valley, it was still the pig farms and all of that so it was pretty isolated once you left the Maunaloa area and came around. This part hasn't changed. The beach has changed. Sea Life Park. I spent a lot of time there as a kid because I played sports in the Maunaloa area and a lot of our banquets were held at Sea Life Park. So I have fond memories of going there. As I've gotten older that's been separated. And then the pier. Really, other than the park kind of expanding, a lot of it seems to be pretty intact. I mean there's a much higher use. Our natural resources don't expand, but our population does. So that's been what I've noticed is the amount of people using these areas from going to the walk at Makapu'u to just our beach area. And then with that comes an increased use of natural resources and also sometimes the degradation of it.

KM: Do you know of any cultural or historical sites in this area?

AMK: Well definitely Kaupō. Kaupō wrapped around and I apologize, I can't remember the older name. I can get it to you, I know I have it.

the Kimi Stone and all of that's there too. I can't remember the name of the break in the reef, but you guys lived there for a long time. So that has significance to the area and to stories and to fishing. So, I hoped that answered your questions, but I told you stuff you probably already know.

KM: Oh, don't worry, it's good to hear it from you. Do you know any mo'olelo or oli about the area?

AMK: Oh yeah. You know there's pi'ikoi with the puka, you know that story right? So there's that story. Yeah there's a bunch. I'm going blank now, but there's a bunch of them. One of the things I've heard here is that there's night marchers that come through here, through this area. I'm completely blank now, but if you go to my website they're there. Well one of the cool stories when you start going through is that Manana is the tip of the mo'o's tongue. So it goes down under and along the Ko'olau until you get to the other side.

KM: Oh, I've never heard that one.

AMK: So that was shared. It's actually on the website. There's those kind of stories. I'm just drawing a blank. There's Makapu'u of course and the cave and all of that, but those aren't the ones I think about because they're out there. I'm actually more interested in the ones I haven't heard before. And I know at Kalapueo, and it's on the website as well, that the Kimi stone is there. So, no one knew where it was, it had been lost and I just happened to talk to Mr. Correa, and in fact my friend that's a cultural photographer said "I've been looking for that for years," and I said, "I just went up to the guy and he said let me show it to you."

KM: Really?

AMK: Yeah. So I went and it's all on the website. The whole story is there. I'm not going to repeat it, you can go watch it. So these are the stories that interest me more. I'm trying to get into some of the caves over here. But right on the grounds, that's why I was like where are they building [before recording we looked at the map and AMK asked about a spot where the parking lot expansion meets Kalamiana'ole Hwy. near Kaupō], because there's also burials there as well. Are you aware of them coming across iwi in the past when they were building?

KM: Not that I know of. They only construct on the mauka side, I know that there's the burial on the makai side.

AMK: Yes, burials. So, I think that, again, that's sorta being aware of the community that you live in. So maybe that's something they want to do as they create the

KM: Yeah, I know I have it somewhere as well.

AMK: I know that a number of structures were there. There was a fishing...let me just show you. [Brings up photos of Kaupō on Maunaloa.net on phone] So for example, right out of Kaupō was the fishing shrine in the water and then they built up which I'm sure you've seen.

KM: So that was...?

AMK: This is Kaupō [pointing to photo] so this is along the left [near Cockroach Bay].

KM: Oh, ok, ok.

AMK: So this is one of the structures that were there. [still looking at photos on phone] I don't have the original name here. Yeah, so this is a shrine from 1923. So of course there's no pier and there's no road here, right. [talking about Kalamiana'ole Hwy.] So, the road hasn't come yet. I usually put...oh here it is. This is the aerial of the area. So, what you're looking at is Kaupō. So we're here right now. You and I, are there right? This is all the area that's being built and that has been transgressed.

So we know those cultural sites are there and then there's also sites that have come later with significance to people although it is controversial. Which is the site that's right over here [pointing at heiau and rocks near the coast at Baby Makapu'u].

KM: Are you talking about the rocks and heiau? [pointing]

AMK: Yeah, yeah. Because that came much later. So, I know what they're doing as far as honoring the past, but that has maybe a 20 or 30 year history at the most and I know that some of the rocks were moved here and used at moss walls and other places and they actually passed. They came here in like the '30s or '40s to stop people from driving away with the rocks that were part of the site. And then we know like a site here of Makapu'u and the different sites here [pointing toward Makapu'u Point] with Moiaua on one side also up mauka. So as you go through Kealaikapapa, which I'm sure you're aware of, Kealaikapapa came down through here, so that changes as the road comes in the 1930s, but that site is still there. I'm sure Wilson [Ho] told you about Kealaikapapa and about part of it still being there, but it's built over. Which they said is part of an archaeological way of caring for things, but I don't actually agree with that. I would like to see it at least exposed. I think those are the kind of things, where, I don't know. Sea Life Park is not about that, but there is cultural integrity to this side of the island. You actually see the beach and you see the mountains, but there's all stories or mo'olelo that go with them. So if you go around Kaupō then there's Kalapueo and

expansion. Yeah, 'cause you know all the stories. I like to think of ones that people don't know. That's what I'm more interested in collecting.

KM: Do you know of any gathering practices in this area?

AMK: Um, I haven't witnessed it, but I'm sure there is. If you talk to people from Waimānalo like, have you talked to Kalani Kalima?

KM: No.

AMK: Ok. He's someone you want to talk to. Kalani is a really great guy. He's very involved in the Waimānalo community. I know also that they bring the kids out here and they're teaching them cultural practices from um...

KM: Hui Mālama O Ke Kai?

AMK: Hui Mālama O Ke Kai. But I think Kalani is a really good one to talk to about some of the things that are being done here. I'm trying to think what else is going on because I know there are, but I'm just drawing a blank now, but Kalani would be the one to speak to. I'm going to remember later and email you.

KM: Do you think that this project is going to impact the cultural gathering or any of the sites?

AMK: As far as cultural gathering I would say no because it has been a private area for a long time. As far as sites it could have the potential because I think there hasn't been enough archaeological study done on the site and I think someone like your mom [Windy McElroy] I really admire because for the first time we have someone who has a Hawaiian perspective and knows how to look at a site as a Pacific Islander instead of as a continental-trained archaeologist and there's nothing wrong with that, but you know, you don't go to the eye doctor when you have a problem with your foot. They're both doctors, but their specialties are different. I think that when this was made, because I was reading about it. I actually didn't know that this was going to happen and so I was reading about Kaupo and you can't read about that without attaching to what has happened to Sea Life Park. When I was reading about Sea Life Park I was thinking that I don't think they did a lot of proper archaeological work. So when you ask me if I think that sites could be damaged or in danger, I would say yes, only because I think they were from the first time and they weren't protected properly. So, that's my feeling on it.

KM: And well, you already kind of explained this but do you know of any concerns that the community would have? You already spoke about the sites.

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AMK: Yeah I would think it would be that. And again I'm coming from a sister community. I'm coming from that side, so again I think if you haven't spoken to Kalani he's really involved and he could actually give you that perspective. I don't want to say more. If you were on this side I could say a little bit more. [pointing to Maunaulua]

KM: Around the corner.

AMK: Yeah, around the corner. So I got to work with Kalani when we were doing Save Ka Iwi Mauka, so the lands right up here. [pointing to the slope behind Makapu'u Beach] It was a huge community effort and it just completed two years ago.

KM: What were they going to do up there?

AMK: They were going to build vacation cabins.

KM: Oh yup. I heard about that.

AMK: So it was such a huge fight and to raise the money. So it was really great because there's no way we can talk about Ka Iwi Mauka and be absent of Waimānalo. So with Kalani and his wife coming in and different members of the Waimānalo community it was really nice coming together. I can share as much but I think Kalani would be the one. He can turn you on to someone else too. He's really a wonderful guy.

KM: Is there anything else you want to share about the area or stories?

AMK: I'm sure there are going to be when I get home.

KM: Yeah, it's always like that.

AMK: 'Cause I was just thinking...is it Kamohoali'i? With the stone there? That black stone that has the whole story right?

KM: Which one is that?

AMK: Oh, ok. Back to my own website haha.

[Tells a funny story and gives information about the website]

AMK: The mai'i stone. That's a famous one, you know that story right?

KM: No, I'm not sure I heard that one actually.

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story and she doesn't understand the relation to the other story. And I only did it because I was like oh my god, now I... But it's only people from Waimānalo who don't get bit out there. Didn't your grandma used to swim out there all the time?

KM: Yeah, she used to swim to the island and back.

AMK: I can't believe it.

KM: Yeah it's crazy.

AMK: That's nuts. Yeah I'm sure there's other stuff that will pop in, but like I said I'm interested in ones that people don't know.

KM: That's all the questions I have for you. Thank you.

AMK: I hope I was helpful.

AMK: Oh that's an unreal story. It's like a white stone and it's moved from Makapu'u and it was actually for the 'uhu fish that would run, especially on the Ka Iwi side. Mr. Cummings takes it. They say he takes it and it appears again and they do a big ceremony for it up here and then it disappears again.

KM: I never heard that one!

AMK: Ok. You gotta read about malei. I might have a picture of it.

KM: So they took it from Makapu'u and put it down there?

AMK: Well then they said it was in DOWNTOWN [Honolulu]. There's all these different versions of what happened to it. It's still loading. It's going to take a moment. Oh and you know the story of...oh wait maybe I have it with Manana [looking at stories on Maunaloa.net]. Because that's the story of the black rock that's on the beach.

KM: You have a lot of content on there.

AMK: I have more content off it than I have on it. When I first started people where like there's no stories in Maunaloa. There's no stories in Hawaii Kai. I'm like ok, let's take that on.

So Auntie May tells a story of swimming with her 'aumakua between Manana and the smaller island, which I can't remember its name right now and I should know it. It goes by two names. These are the four [islands offshore from Kaupō]. She swam in here and fed her 'aumakua, which is the manō. When she told me that story she had no idea that it goes back to the story of the shark god who's here and that black rock is part of the story. And it's because of what happened, long story short, I don't know if they were harassing him or ridiculing him and he actually goes after one and eats him and he goes up to the middle section where the bowels are and it's so pilau he's like no. I'm never going to attack anyone here again. But I'm telling you a really bad version, so don't use that part of the recording.

[trying to find story on Maunaloa.net]

AMK: You have a picture of Kealaikapapa right?

KM: I think so, yeah.

AMK: If not, I have some on here. I can't find it, sorry, but that's one of the famous stories. I'll text it to you when I get home. But yeah, it's about that stone. It was weird to have that story, that mo'olelo and then all these years later have a kupuna tell you a

Appendix B

Archaeological Assessment for Improvements to Sea Life Park

Appendix C

Preliminary Engineering Report for Sea Life Park

PRELIMINARY ENGINEERING REPORT

FOR
SEA LIFE PARK

March 2019

Prepared for:
Sea Life Park
41-202 Kalanianaʻole Highway
Waimanalo, HI 96795

Prepared by:



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1 INTRODUCTION

1.1 Overview

Sea Life Park (SLP) has served as a recreational and educational attraction focusing on marine animals and sea birds since opening in 1964. Over the years many of the major exhibits and attractions have aged and require renovations and improvements. Facilities must be upgraded and modernized to continue to attract park visitors. SLP is seeking to expand the number of attractions and improve other existing exhibits and facilities to increase the number of daily park attendees.

1.2 Site Location

The Sea Life Park project area is located on the windward side of O'ahu at TMK 4-1-014:004. The project parcel is approximately 104 acres with SLP occupying nearly 18 acres of the parcel. The proposed improvements will be limited to nearly 14 acres of the SLP site. Sharing the same parcel is the Oceanic Institute that sits adjacent to the park to the west. SLP is also bound by the Koolau Mountains to the south and Kalaniana'ole Highway to the north and east sides of the park. Opposite of the park, across from Kalaniana'ole Highway, are the recreational beaches Kaupo Bay and Makapuu Beach Park. See **Figure 1 – Location and Vicinity Map**

1.3 Purpose of Report

The purpose of this report is to assess the existing site topography and infrastructure of Sea Life Park and to determine the location and extent of proposed infrastructure improvements necessary to support implementation of the park improvements.

2 EXISTING CONDITIONS

2.1 Land Uses

Sea Life Park is currently situated in the State Conservation District, under the restricted Preservation (P-1) county zoning. As part of the lease agreement with the State, SLP must provide a recreational and educational attraction with a park-like atmosphere. Per the Hawaii Administrative Rules (HAR) Section 13-5, Department of Land and Natural Resources, a special subzone is designated in the Conservation District where any development must be for recreational, educational, and commercial purposes. Sea Life Park is in this special subzone.

The existing park facilities include a surface parking lot, restrooms, food court, snack bars, marine life displays and exhibits, theaters, luau grounds, gifts shops, and a play area for children. Support structures and facilities include the ticket office, wastewater treatment and disposal systems, sea water circulation pumps and filtration systems, and equipment storage areas.

2.2 Topography and Drainage Runoff Patterns

Sea Life Park is located along the base of the Koolau Mountains at the easternmost point of the mountain chain. Stormwater runoff generated from the hillside and parking lot areas collects within the private driveway and diverts runoff away from the park grounds and towards the existing public stormwater structures in Kalaniana'ole Highway. Runoff generated within SLP follows the same pattern by collecting and discharging runoff towards Kalaniana'ole Highway.

The parking lot sits at the highest point of the project parcel at approximately 80' above mean sea level (MSL). The existing park facilities along the access driveways are set at elevations ranging from 50' to 70' above MSL. The lowest elevation area is the Seaside Garden and Dolphin Lagoon at elevation 40' above MSL. The northern park entrance along Kalaniana'ole Highway is at elevation 30' above MSL, while the southern park entrance sits at elevation 50' above MSL.

2.3 Flood Hazards

Based off the geographic information system (GIS) information, the property is located in Zone D. This indicates that the property is in an unstudied area where flood hazards are undetermined, but flooding is still possible. See **Figure 2 – Flood Hazard Assessment Map**.

2.4 Roadways and Access

2.4.1 Park Access

Access to the park is through Kalaniana'ole Highway, a two-lane State roadway within a 40-foot right-of-way fronting the project site. Asphalt pavement driveway entrances are located at two locations along Kalaniana'ole Highway that provide different means to access the park.

2.4.1.1 Northern Access

The northern most entrance is near the Kaupo Bay park entrance and provides a dedicated right-turn into the park when traveling south-bound. Upon exiting the park, a dedicated left-turn and right-turn lane onto Kalaniana'ole Highway is provided for drivers.

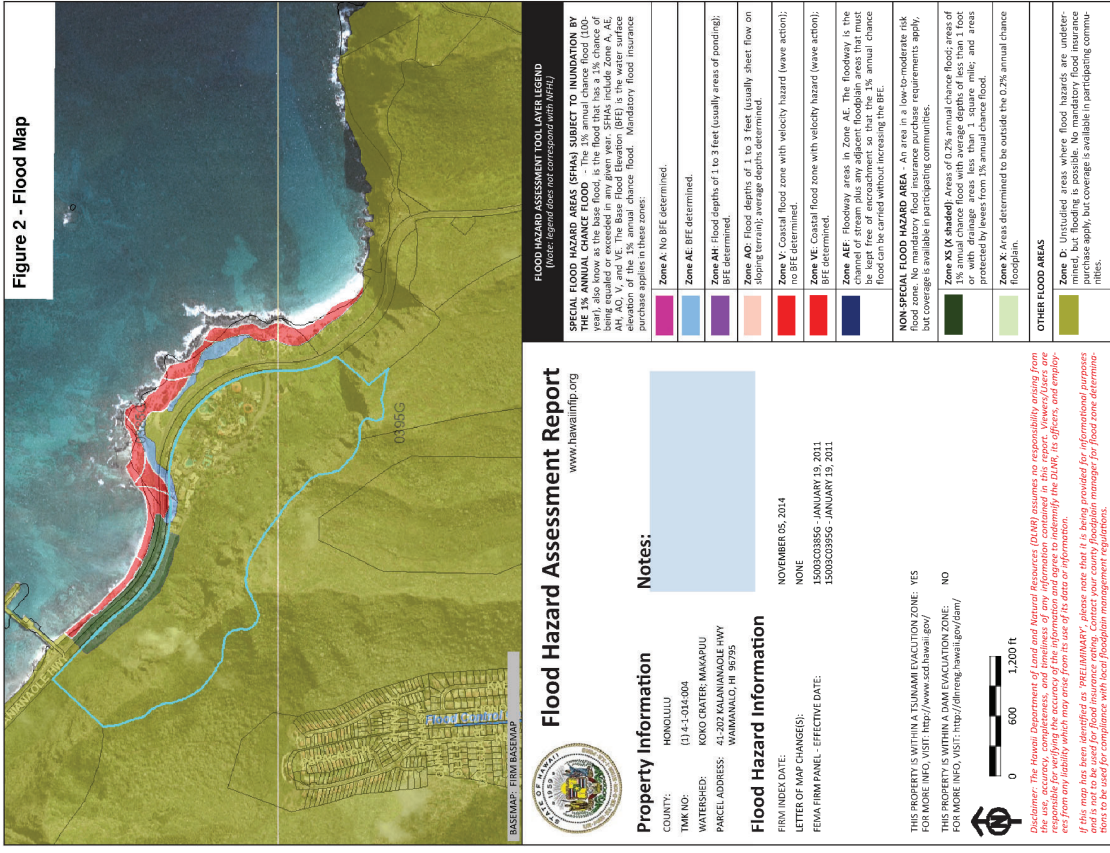
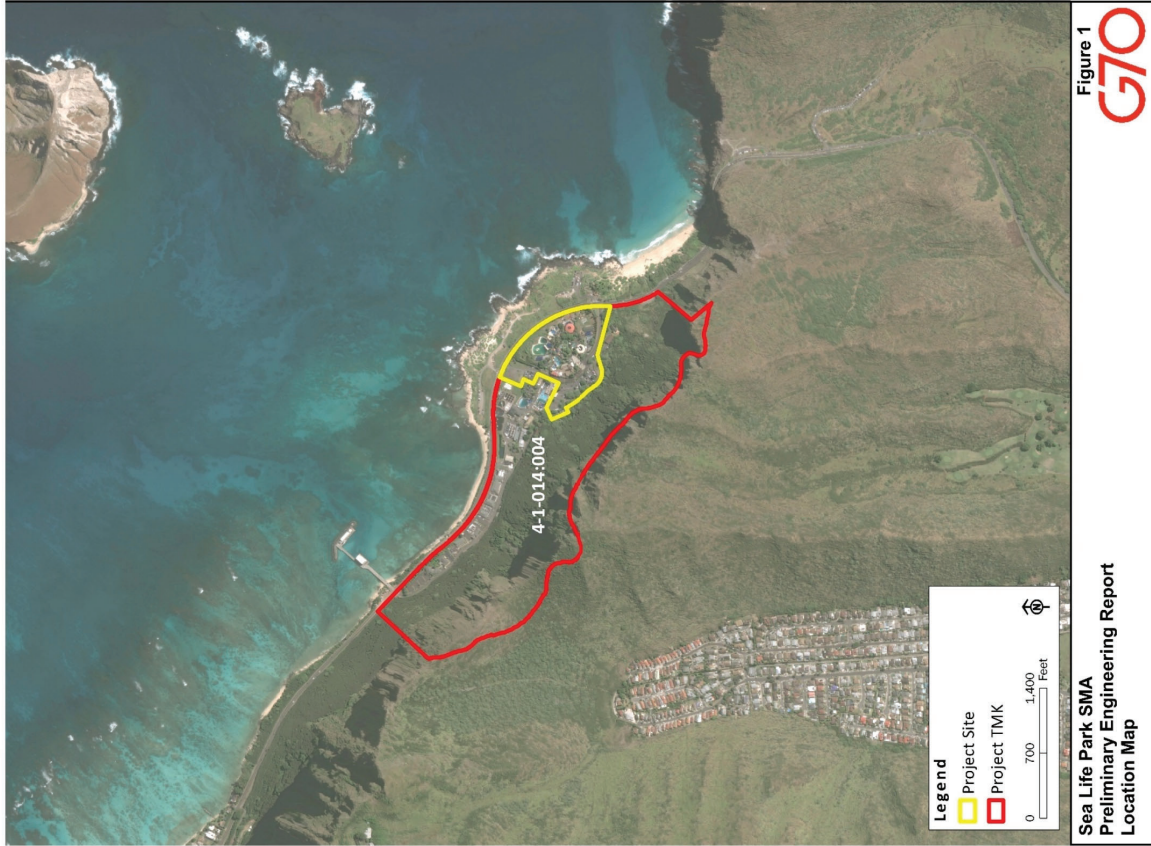
2.4.1.2 Southern Access

The southern entrance, approximately 1,200 feet from the northern entrance, is located across and slightly offset from the Makapuu Beach Park entrance. When entering the site while traveling north-bound, a dedicated left-turn lane into the park is provided. Upon exiting the park, a dedicated left-turn and right-turn lane onto Kalaniana'ole Highway is provided. The southern entrance appears to be the primary entrance with visitors accessing the park from East O'ahu.

See **Figure 3 – Existing Site Plan** for locations of the existing northern and southern access.

2.4.2 Private Driveway

A single, two-lane private asphalt driveway connects both the northern and southern entrances to Sea Life Park and provides travel in both directions. The private driveway is also used by the city bus system that provides a bus stop near the park entry/ticket kiosk area. Tour bus loading and parking stalls are also provided along the private driveway near the park entrance. The main parking area for visitors is also accessed via the private driveway



See Figure 3 – Existing Site Plan for the location of the private driveway.

2.4.3 Visitor Parking

The parking lot for park visitors is located at the highest elevation point on the property. Upon parking, visitors walk to a lower elevation to access the park. Entry into the parking lot is through an employee-operated kiosk that requires a parking fee. Approximately 200 vehicle stalls and 4 ADA stalls are provided for visitor use.

See Figure 3 – Existing Site Plan for the location of the visitor parking.

2.4.4 Staff Parking

Staff parking is provided near the northern entrance to the park. Currently the existing parking near the northern entrance is asphalt paved. When needed, overflow parking on compacted dirt is also provided in this area. Approximately 53 vehicle stalls are offered for park employees.

See Figure 3 – Existing Site Plan for the location of the staff parking.

2.5 Structures

Some structures on the Sea Life Park campus are almost 60 years old. Although upkeep and maintenance were performed on the structures, there are clear indications that further repair or replacement will be required. Further structural assessments may be needed based on the age and conditions of the facilities and their proposed uses.

2.6 Sewer Infrastructure

2.6.1 Existing Wastewater Demand

There are limited records of existing wastewater usage on the SLP campus so an estimate has been prepared to calculate the expected wastewater demand from current conditions. The estimated existing wastewater demands were determined by using data obtained from as-builts, SLP usage data and existing IWS design calculations, and by following City and State wastewater design standards.

The average flow shown in the table was calculated using collected counts for visitors/staff, luau seats, and food court seats. Additional factors were applied per the City and County of Honolulu Wastewater Design Chapter 2 (July 2017) and can be reviewed in Appendix A. The existing projected demands show systems operating within average flow capacity based on preliminary assumptions and calculations.

EXISTING PROJECTED WASTEWATER DEMANDS			
	Count	Calculated Avg Flow	WWTP
Visitors/Staff	1,100	3,300 gpd	Upper + Restroom WWTP
Luau Seats	400	2,000 gpd	
Subtotal	--	5,300 gpd	
Aviary/Snack Bar	--	1,000 gpd	Aviary/Snack Bar WWTP
Subtotal	--	1,000 gpd	
Food Court Seats	270	1,350 gpd	Lower WWTP
Subtotal	270	1,350 gpd	
Total	--	7,650 gpd	

Assumptions
 1. Food court seat flow of 5 gpd was used for fast-food-style type of dining
 2. Luau seat flows are based on previous WWTP design: 5 gpd
 3. Visitor flows are based on existing parking calculations: 3 gpd
 4. Aviary flows are taken from existing design calculations.

2.6.2 Existing Wastewater Treatment Plants

There are no municipal sewer systems located in the vicinity of the project site. Sea Life Park wastewater is served via individual wastewater systems (IWS) located at several locations around the park. There are three known systems on park grounds that were verified by State Department of Health (DOH) records and during site visits. The designated "Lower" Wastewater Treatment Plant" (WWTP) and "Upper and Restroom WWTP" appear to be the main systems serving the park. According to as-built drawings provided by SLP, the Lower WWTP primarily serves the food court facilities and includes a grease interceptor. After treatment, wastewater is disposed to seepage pits that are located near the food court and existing sea lion exhibit. The Restroom WWTP serves the restroom structure near the luau grounds and disposes treated wastewater to a nearby injection well. The third system recognized by DOH is an IWS located near the existing Snack Bar and Bird Aviary which serves both areas and uses a seepage pit for disposal.

According to as-builts provided by SLP, an additional WWTP ("Upper WWTP") was recently installed as an extension to the Restroom WWTP. The upgraded system provides additional capacity needed to accommodate the growing luau service. Recently, a leach field was constructed near the Hawaii Ocean Theater as a secondary disposal system for the Upper WWTP as required by the State DOH. Plans for the upgraded system also show wastewater being rerouted from the existing Snack Bar and Aviary wastewater system to the Upper WWTP. Discussions with the wastewater designer indicate that the work to convey the wastewater has not yet begun and will eventually allow the existing Aviary and Snack Bar wastewater system to be abandoned. The new system is not yet in the DOH Waste Water records, possibly due to its recent construction. A summary of the design capacity of the systems and the calculated average flow in gallons per day (GPD) is prepared below.

EXISTING WASTEWATER SYSTEM ANALYSIS				
	Average Daily Flow	Calculated Average Flow	System Capacity	Discharges To
Upper + Restroom WWTP	Average Daily Flow	3,300 gpd	6,000 gpd	Injection Well and Leach Field
	Peak Flow (4-hr)	5,300 gpd	18,000 gpd	
Lower WWTP	Average Daily Flow	1,350 gpd	8,500 gpd	Seepage Pits
	Peak Flow (4-hr)	N/A	17,000 gpd	

Assumptions

1. Upper + Restroom WWTP average flow based on visitor/staff flows
2. Upper + Restroom WWTP peak flow based on combined visitor/staff, and luau seats

See Figure 3 – Existing Site Plan for locations of the wastewater treatment plants.

2.7 Water Infrastructure

2.7.1 Potable Water Demand

Past water demand was provided through water meter data from the Board of Water Supply (BWS). In 2017, lowest max consumption was 129,592 gallons per day, and the highest max consumption was 142,570 gallons per day. The average consumption for 2017 was approximately 136,000 gallons per day.

Existing Projected Potable Water Demand			
Program	Avg Daily Wastewater Flow	Water Estimate Factor (%)	Projected Potable Water Demand
Visitors/Staff	3,300 gpd	120%	3,960 gpd
Luau Seats	2,000 gpd	120%	2,400 gpd
Food Court Seats	1,350 gpd	120%	1,620 gpd
Aviary	1,000 gpd	120%	1,200 gpd
TOTAL	7,650 gpd	--	9,180 gpd

When comparing the calculated sewer demand and the reported water-use there is a divide between the approximate use of 9,000 gallons of water per day for potable purposes and the reported water consumption from BWS which may imply that water-use will go to uses other than potable uses. Other uses or systems such as irrigation, and/or cleaning and maintenance may be responsible for the discrepancy.

2.7.2 Domestic Water Supply

The existing Sea Life Park is served by the BWS 30-inch water main within Kalaniana'ole Highway. Active water meter records for the property TMK reveal various lessees and water use within the same parcel that appear to serve the Oceanic Institute, SLP, and the Makai Pier for domestic, fire protection and potentially other uses. Records show that SLP potable water service is provided through a 3-inch compound meter located at the southern park access across from Makapuu Beach Park. From the water meter, a 6-inch water line appears to serve the park for domestic use.

See Figure 3 – Existing Site Plan for existing water lines and their approximate locations.

2.7.3 Fire Water Supply

Three known hydrants are confirmed along the private driveway and Kalaniana'ole Highway that appear to provide fire water supply to the park and nearby chapel. A hydrant is located at each of the two access points to the private driveway servicing SLP, and within the State ROW for Kalaniana'ole Highway. A third, private fire hydrant, connected to an 8-inch lateral, sits at the stairway entry to the wedding chapel near the southern entrance and along the private driveway. Site visit and BWS records confirm an existing 8-inch detector check meter for the private hydrant located at the southern entrance. According to Board of Water Supply (BWS) distribution maps and as-builts, each fire hydrant independently connects to the water main within Kalaniana'ole Highway. Pressure data for the two hydrants along Kalaniana'ole Highway is summarized in the table below.

Fire Hydrant Number	Location	BWS Pressure Data		
		Static Pressure	Residual Pressure	Pressure at 2,000 GPM ²
W-01887	Northern Entrance	105 psi	76 psi	96 psi
W-01888	Southern Entrance	97 psi	68 psi	88 psi

¹ Pressures provided by BWS, for hydrants along Kalaniana'ole Highway only

² Pressure calculated using system curve calculation

See Figure 3 – Existing Site Plan for the locations of the fire hydrants.

2.7.4 Sea Water Supply

A salt water system is required for Sea Life Park to provide marine-life displays and exhibits. Salt water is extracted from the nearby coast and pumped to the park via offsite salt water pumps near Makapuu Beach Park. From the pump systems, salt water is distributed throughout the park as needed and discharged back into the ocean via injection wells, effectively creating a continuous saltwater distribution cycle throughout the park.

Sea Life Park staff actively manage and operate the salt water circulation system including the intake, pumps, filters, and injection wells. Per discussion with SLP staff, there is available capacity within the system to increase saltwater flows for the proposed development, but final flow demands and equipment capacity should be verified.

An existing emergency bypass sea water line is located near the perimeter of the visitor parking lot. The exposed 18-inch HDPE line connects the sea water systems between the Oceanic Institute (OI) and the Sea Life Park portion of the property. When the sea water supply lines were not in operation due to repairs, a temporary bypass line from OI was installed to supply sea water to the park. Park staff agreed to keep the temporary bypass line for emergency purposes in the event that OI or SLP loses sea water supply. The emergency bypass line is capable of supplying sea water in both directions.

See **Figure 3 – Existing Site Plan** for the approximate locations of the sea water supply line and emergency bypass line.

2.8 Drainage Infrastructure

The drainage infrastructure appears to be minimal due to the limited amount of drainage structures encountered during site visits. Landscaped areas appear to be the primary storm water management feature used throughout the park by allowing runoff to collect and pond in vegetated areas. Discussions with Sea Life Park managers revealed that areas with drainage infrastructure are collected and discharged to existing surrounding drainage ways near Kalanianaʻole Highway. Discussions with staff also revealed reoccurring drainage issues such as flooding near the sea turtle and shark cave exhibit exit. A combination of limited drainage infrastructure and adverse slopes towards localized low spots are the main contributors to the issue and will likely be the factors for any drainage issues experienced in the park.

2.9 Electrical and Telecom Infrastructure

Based on as-builts and discussions with park staff, the primary electrical service is fed from an existing vault located on the ground floor of the main entry/ticket office structure. The main HECO electrical equipment (transformer/meter) is found in the electrical vault and is distributed to park facilities and exhibits. Air conditioning and circulation systems are expected to demand the heaviest electrical use for the park.

See **Figure 3 – Existing Site Plan** for the location of the main electrical vault.

3 PROPOSED CONDITIONS

3.1 Land Uses

Sea Life Park is expected to continue to operate under the same land use as a premiere marine educational attraction in Hawaii. The proposed improvements are developments that will bring renewed interests to the park and increase visitor counts and park attendees. The proposed development includes:

- o New ticket entry/retail building with restrooms
- o New seabird sanctuary, public seabird drop-off, and aviary building with a new boardwalk walkway from within the park
- o New indoor deep-sea life indoor aquarium that includes an entry lobby, numerous aquarium exhibits, and gift shop
- o New multi-story kids splash play area including a separate toddler splash area
- o New Kaupo Fishing Village thatched hale for the luau area
- o Renovated turtle conservation and education center/exhibit with new below grade glass viewing panes, rock forms, gathering area, education pavilion, and shade structure

- o Renovated Ocean Theatre to a sea lion exhibit with new surface and sub-surface viewing areas, and tiered seating
- o New penguin exhibit (located near the sea lion exhibit)
- o Renovated shark cave exhibit and other smaller aquarium exhibits
- o Renovated main food court area including a new rooftop deck space with seating, and bridge access from the new ticket entry building
- o Renovated snack bar
- o New luau support facility that includes changing rooms, lockers, and a break room
- o New onsite fire access along the existing maintenance road that includes a fire turnaround, ADA-compliant concrete sidewalk, and covered trash enclosure
- o Expanded parking lot with walkways, stairs, ramps, and retaining walls
- o Updated front/entrance arrival (southern access) that includes new landscaping, park signage, and rock walls
- o Site improvements including utility, fire access, and driveway improvements

No offsite improvements are expected for the scope of the project. Improvements to the driveway entrance will be limited to work within Sea Life Park-controlled property and will maintain site distance requirements along Kalanianaʻole Highway.

3.2 Topography

Topography of the site will remain relatively unchanged as major grading work will not be anticipated for the proposed or renovated exhibits and new buildings. Grading work will be required, however, for the parking lot expansion to add an additional parking aisle. Due to the location of the aisle, a system of retaining walls may be warranted due to the steep grades at the base of the Koolau Mountain. Rockfall protection is recommended along the retaining wall to safeguard park attendees, and proper protection for the saltwater bypass line must be considered for the areas abutting the outside perimeter of the parking lot.

3.2.1 Parking Lot Improvements

To accommodate increased park visitor counts an additional parking aisle may be warranted to provide additional parking spaces for attendees. The final design of the expanded parking aisle will need to include pedestrian ramps or stairs to account for the grading adjustments in the additional parking aisle.

Improvements to the existing parking lot may be needed to meet the requirements outlined by the Americans with Disabilities Act (ADA). A pathway with curb ramps and/or pedestrian ramps must be provided between ADA stalls and the park entrance that meets ADA code. With additional parking stalls, the minimum number of accessible parking spaces required for cars and vans will increase and will need to be incorporated into the final design of the parking lot.

See **Figure 4 – Concept Site & Utility Plan** for the location of new expanded parking.

3.2.2 Building Elevations

Improvements are primarily expected to utilize existing structures which will be renovated and improved to meet current code requirements while providing visitors with a fresh and updated exhibit design. Finish elevations for the theatre (penguin and sea lion exhibit), shark cave, food court and snack bar is anticipated to remain the same, although interior improvements may adjust prior floor or exhibit seating elevations.

Finish floor elevations for all new buildings will be set an elevation that will allow positive drainage away from the building and to surrounding storm water infrastructure. Final elevations will be arranged such that accessible entry is provided for all users while continuing to be suitable with surrounding grades, buildings, and exhibits.

3.3 Roadways and Access

3.3.1 Property Access

Improvements to the property access are expected to be aesthetic and limited to the southern entrance only. Upgrades such as new signage and striping, and a new park sign entrance are the proposed scope of the improvements. Careful planning and locating of the new park sign will be necessary due to the numerous existing water connections in the vicinity. No offsite improvements are expected for the public roadways.

3.3.2 Private Driveway

Improvements along the driveway leading to the parking lot and ticket entrance are expected to be limited. Pedestrian crosswalks will be located appropriately for all applicable areas including the new parking lots and proposed modifications to the private driveway. The overall concept of the existing connected driveway will be altered to a single separate entrance for park visitors and a single separate entrance for staff parking and public seabird rescue drop-off. Park visitors will utilize the southern entrance for entry and exit to the park, while park staff will use the northern entrance for entry and exit. Private and public buses, and emergency vehicles will continue to utilize the entirety of the driveway, effectively changing the roadway into a one-way road for buses and emergency vehicles only, entering through the southern entrance and exiting through the northern entrance. Access control, such as in the form of a gated system or movable bollards, for this proposed scheme will need to be determined to separate the public accessible parking lot from the employee parking area, while maintaining access and circulations for the bus and emergency vehicles through the private driveway.

3.3.3 Emergency Access

An emergency access into the park will need improvements to meet fire access requirements for the new buildings and structures. The location of the fire access driveway will utilize the existing private maintenance road on the SLP campus near the southern portion of the park adjacent to Kalanianaʻole Highway. Access road material will meet requirements for all users (maintenance, emergency vehicles, etc.) and can include or be a combination of concrete, asphalt, gravel or grass with an approved sub-surface structural system.

See **Figure 4 – Concept Site & Utility Plan** for the location of proposed emergency access.

3.3.4 Visitor Parking

The extent of the visitor parking improvements will include a new parking aisle, and re-paving where existing asphalt is in poor condition. The new parking aisle will provide approximately 112 new standard parking stalls, and 7 ADA stalls, increasing the total visitor stall count to nearly 315 stalls. Bus parking and loading will continue to be provided near their existing locations, with the addition of overflow bus parking near the northern entrance. The parking attendant kiosk will be relocated and centered along the private driveway to better serve and control vehicles entering and exiting the park.

See **Figure 4 – Concept Site & Utility Plan** for the location of new expanded parking aisle.

3.3.5 Staff Parking

Staff parking will continue to be in its existing location near the northern entrance. An additional 32 parking will be added to increase staff parking to 85 stalls for employees and staff. Parking surface material will need to be considered for the new parking that meets the user's needs such as asphalt or gravel.

3.3.6 Fire Access

Design of the sites, structures, and fire access and water supply systems for the project will be based upon the State Fire Code: National Fire Protection Agency (NFPA) 1, Uniform Fire Code, dated 2006 and all additional amendments as part of the Hawai'i Administrative Rules (HAR) Title 12, Subtitle 7, Chapter 45.2. Additional requirements are noted in the BWS Water System Standards, dated 2002. Based upon the above referenced standards, the following criteria should be met in terms of adequate fire access and water supplies:

- o Road Width = Unobstructed 20 ft.
- o Road Vertical Clearance = Unobstructed 13.5 ft.
- o Surface = Capable supporting 73,000 lbs and constructed with an all-weather material.
- o Turning Radius = 42 ft. minimum on outside front wheel. 28.4 ft. minimum on inside rear wheel.
- o Dead Ends = Provide appropriate turnaround (cul-de-sac or hammerhead).
- o Signage = Required for entire length of roadway.
- o Provide an adequate fire water supply, capable of supplying the required fire flow as determined by BWS Water Standards, dated 2002. According to Table 100-19, under land-use classification for education and shopping, the required fire flow is 2,000 gallons per minute for a duration of 2 hours.
- o Provide a residual pressure of 20 psi for on-site hydrants.

- o Hydrant spacing at 250 ft. (applied to private driveways).
- o Fire Department Connections (FDCs) for sprinkler systems should be placed on the address side of the building and within 50 ft. of an adequate water supply / fire hydrant.
- o Further coordination with the Honolulu Fire Department (HFD) will be required as the design progresses.

3.4 Structures

The following improvements will be classified as renovation work to an existing structure or limited to work within the existing structure footprint:

- o Sea Lion Exhibit (Hawaii Ocean Theatre)
- o Shark Cave
- o Main food court area
- o Snack Bar

Limited impact is expected for the above projects; however, construction access will be difficult, when navigating between existing exhibits.

The following projects will require new structures and may require compliance with applicable building and fire codes:

- o Entry/Retail Building
- o Kaupo Fishing Village
- o Deep-sea Life Indoor Aquarium
- o Turtle Conservation & Education Center/Exhibit
- o Luau Support Facility
- o Seabird Sanctuary
- o Menehune Island Splash Play Area

Building classification and its proposed use can determine the extent of the applicable fire codes such as the required fire protection and emergency access. Careful determination of the building-use can help establish the appropriate fire protections needed for each building.

See **Figure 4 – Concept Site & Utility Plan** for the locations of the proposed new and renovated buildings.

3.5 Sewer

The existing onsite wastewater treatment systems show capacity is available for increased demand based on preliminary calculations. Upgrades to the existing wastewater piping for the park will most likely be determined by locations of the proposed buildings/exhibits due to elevation differences and extended distances. The projected sewer demand for the project is summarized below.

	FUTURE PROJECTED WASTEWATER DEMANDS			
	Count		Calculated Avg Flow (gpd)	
	Exist	Proposed	Exist	Proposed
Visitors/Staff	1,100	1,300	3,300	3,800
Luau Seats	400	650	2,000	3,250
Aviary	--	--	1,000	1,000
Subtotal	--	--	6,300	8,150
Food Court Seats	270	410	1,350	2,050
Subtotal	270	410	1,350	2,050
Total	--	--	7,650	10,200

Assumptions
 1. Food court seat flow of 5 gpcd was used for fast food-style type of dining
 2. Luau seat flows are based on previous WWTP as-builts: 5 gpcd
 3. Visitor/staff flows are based on existing wastewater calculations: 3 gpcd

3.5.1 Entry/Retail

Sewer service for the proposed entry/retail building will be required based on the projected building use and conceptual designs for the interior spaces. The Upper and Lower WWTP will be able to accept wastewater flows from the proposed entry building, however the Lower WWTP will be the preferred system due to the relatively close vicinity of the building and topography, and will eliminate the need for a sewer lift system.

3.5.2 Food Court

Food court service will continue to be served by the Lower WWTP. Currently, the food court serves 270 seats and is projected to increase to 410 seats with the introduction of a rooftop deck space. Other systems that will need to be analyzed for capacities include the sewer laterals and grease interceptor.

3.5.3 Seabird Sanctuary

Determination is needed for the extent of the wastewater services required for the proposed Seabird Sanctuary building/structure including plumbing fixtures and floor drains. Elevation differences between the existing wastewater treatment plants and the Seabird Sanctuary location will most likely require a pump to properly serve the proposed system.

3.5.4 Menehune Island Splash Play Area

Wastewater discharge for the proposed Menehune Island Play Area will be entirely dependent on the type of water used, such as salt water or domestic water. If salt water is used to supply the play area, then the "wastewater" will follow the existing system and operations of discharging used salt water into the existing injection wells. In this scenario, the injection wells would need to be analyzed for capacity due to the increased discharge. If fresh or domestic water is used to supply the play area, then typical treatment and filtration methods can be implemented similar to standard water feature systems. Wastewater disposal from recirculation systems or disposal needed during maintenance must be planned.

3.5.5 Luau Support Facility

The proposed luau support facility is anticipated to require service from the upgraded Upper WWTP that is located adjacent to the luau grounds. Elevation differences between the Upper WWTP and the staff support facility location will most likely require a pump to properly serve the proposed facility.

3.5.6 Makapuu Meadows Luau Grounds

The existing luau grounds are primarily served by the nearby restrooms. The existing analysis from earlier sections were based on record drawing calculations done by the original IWS designer. Discussions with SLP revealed the possibility of accommodated upwards to 650 guests for the luau service which can be properly served due to the recent upgrades to the Upper and Restroom WWTP.

3.5.7 Snack Bar

Snack bar service and wastewater demand are anticipated to remain the same and will be routed to the Upper WWTP. The snack bar service is expected to distribute pre-packaged meals; therefore, a grease interceptor is not expected to be required.

3.5.8 Wastewater System Analysis

According to the projected future demands, the wastewater systems will continue to operate within capacity with increased average flow. A summary of the projected wastewater use is provided below.

PROJECTED WASTEWATER SYSTEM ANALYSIS					
	Calculated Average Flow		Design Capacity	Discharges To	
	Existing	Proposed			
Upper + Restroom WWTP	Average Daily Flow	4,300 gpd	6,000 gpd	Injection Well and Leach Field	
	Peak Flow (4-hr)	6,300 gpd	10,000 gpd		
Lower WWTP	Average Daily Flow	1,350 gpd	8,500 gpd	Seepage Pits	
	Peak Flow (4-hr)	N/A	17,000 gpd		

Assumptions
1. Upper + Restroom WWTP average flow based on combined visitor/staff, and aviary flows
2. Upper + Restroom WWTP peak flow based on combined visitor/staff, aviary flows, and luau seats

See Figure 4 – Concept Site & Utility Plan for the locations of the proposed wastewater point of connections.

3.6 Water

3.6.1 Potable Water Demand

A boost in park visitor numbers will increase the water demand for Sea Life Park. The projected sewer-use indicates an increase in potable water usage from 9,000 gallons per day to 12,000 gallons per day due to the proposed improvements and increases in visitor counts, luau seats, and food court seats. When incorporating the water usage increase with the BWS records for

overall water-use, the projected overall water-use could be as large as 140,000 gallons per day with typical fluctuations seen in the BWS records.

FUTURE PROJECTED POTABLE WATER DEMAND			
Program	Avg Daily Wastewater Flow	Water Estimate Factor (%)	Projected Potable Water Demand
Visitors/Staff	3,900 gpd	120%	4,680 gpd
Luau Seats	3,250 gpd	120%	3,900 gpd
Food Court Seats	2,050 gpd	120%	2,460 gpd
Aviary	1,000 gpd	120%	1,200 gpd
TOTAL	10,200 gpd	--	12,240 gpd

See Figure 4 – Concept Site & Utility Plan for the locations of proposed domestic water point of connections.

3.6.2 Fire Protection

According to the fire code, implementation of fire sprinklers for buildings has the capability of decreasing required fire access requirements. The use of fire sprinklers may have benefits for buildings where fire access may be difficult to provide due to the location of existing buildings and exhibits or other factors. Appropriate fire protections will be applied to the building based on the proposed use.

Infrastructure to supply proper fire protection to the site may require upgrades along the private driveway. New fire hydrants are proposed along the private driveway leading to the park entry that will be located and spaced appropriately. The fire line along the southern side of the private driveway will be an extension of the existing private 8-inch hydrant line that serves the chapel. According to the American Water Works Association (AWWA) Manual M6, the existing 8-inch detector check meter appears capable of operating at the proposed flow rates. The fire line along the northern side of the private driveway will be a new connection to the 30-inch water main and will require a new 8-inch detector check meter and back flow preventer. Adequate pressure is expected for both 8-inch fire lines for the required 2,000 gallons per minute flow rate, see Appendix B for calculations. The private driveway will continue to function as an emergency access lane that follows spacing requirements outlined in the fire code.

3.6.3 Water Infrastructure

The projected water demand for domestic use is not anticipated to require substantial infrastructure upgrades. Calculations show the existing 3-inch compound meter and 6-inch water lateral operating at a proposed flow rate of 120 gallons per minute or 0.27 cfs. Initial pressure calculations show negligible pressure losses in the 6-inch domestic line at the entry to the park (highest elevation point for the domestic line). Additionally, new water laterals will be needed to serve new buildings and structures as required and will be dependent on the proposed water use. If building layout and water use are to remain the same, existing buildings and structures with water laterals are not expected to require upgrades.

3.6.4 Salt Water Supply

Salt water supply is expected for new exhibits such as the deep-sea life indoor aquarium and the penguin exhibit. Existing exhibits that are undergoing renovation may be able to utilize the existing salt water laterals as required. If existing exhibits are to be expanded or enlarged, salt water laterals may need to be upsized to account for the increased demand.

3.7 Drainage

3.7.1 Drainage Infrastructure Improvements

Drainage improvement such as drain inlets, catch basins, and piping will be applied as needed. All development will maintain existing drainage patterns and use existing drainage systems as practicable. New buildings/structures will utilize roof gutter systems to properly convey runoff and reduce unwanted erosion and scouring. Conveyance and discharge of stormwater runoff will be in accordance with the City and County of Honolulu Storm Drainage Standards as amended in 2018.

3.7.2 Low Impact Design

New buildings will need to comply with the City and County of Honolulu rules for Low Impact Development (LID). Measures that can be easily incorporated with the overall park design include the use of planter boxes, and rain gardens. Rain gardens are defined as designed vegetated shallow depressions that collect runoff and allows for filtration and percolation of storm water through planting media. Planter boxes are similar in nature to rain gardens, with the exception that it can be an above ground system that allows percolation into an underdrain system in lieu of the ground. Planter boxes can be a suitable system when combined with roof downspouts. By locating planter boxes directly adjacent to buildings, it provides a convenient and effective storm water filtration system while also providing a useful feature for managing runoff generated from buildings.

LID measures will also be required for the new parking aisle and paved driveways where installed. Systems that can be incorporated into a parking lot design include rain gardens, vegetated buffer strips, and swales. Additionally, a drainage system serving the LID measures will need to be installed into the existing parking lot area to account for storm water overflow and will need to connect or convey water to an appropriate discharge point along Kalanianaʻole Highway or within the park.

3.8 Solid Waste Management

3.8.1 Solid Waste Management for Construction Activities

Efficient planning of the building and exhibit demolition work can provide benefits to the project that are often overlooked. Appropriate materials management practices in the demolition and construction phases of the project may result in cost savings and revenue generation if coordinated properly.

Construction and demolition materials will be reduced through coordination with local reuse and recycling services to the extent practicable, while all remaining materials will go to the sole construction and demolition landfill located on Oahu. All solid waste during construction shall be

managed in accordance with Hawaii Administrative Rules (HAR) 11-58 Solid Waste Management Control. Impacts due to demolition and construction to potential stormwater runoff will be minimized using construction Best Management Practices (BMP). Specific methods to be used at the project site will be specified in the Storm Water Pollution Protection Plan (SWPPP) that is required with all NPDES permits and the construction BMP plan as reviewed by the City and County of Honolulu Department of Planning and Permitting. Any and all hazardous materials encountered will be handled and disposed of in accordance with HAR 11-261 Hazardous Waste Management.

APPENDIX A

WASTEWATER DEMAND CALCULATIONS

EXISTING PROJECTED WASTEWATER DEMANDS																		
	EXISTING COUNT	FLOW PER VISITOR (gpd)	FLOW PER LUAU SEAT (gpd)	FLOW PER STAFF (gpd)	FLOW PER SEAT (gpd)	AVG FLOW (gpd)	FLOW FACTOR	MAX FLOW (gpd)	DRY I/I (gpcd)	TOTAL DRY I/I (gpcd)	DESIGN AVE FLOW (GPD)	DESIGN MAX FLOW (GPD)	WET WEATHER I/I (gpd)	ACRES	TOTAL WET WEATHER I/I (gpd)	DESIGN PEAK (gpd)	DESIGN PEAK (gpm)	DESIGN PEAK (cfs)
VISITORS/STAFF	1,100	3	--	--	--	3,300	5	16,500	35	105	3,405	16,605	3,000	0.76	2,280	18,885	13.11	0.03
LUAU	400	--	5	--	--	2,000	5	10,000	35	175	2,175	10,175	3,000	0.28	840	11,015	7.65	0.02
AVIARY	--	--	--	--	--	1,000	5	5,000	35	--	--	--	3,000	--	--	--	--	--
RESTAURANT	270	--	--	--	5	1,350	5	6,750	35	175	1,525	6,925	3,000	0.40	1,205	8,130	5.65	0.01
TOTAL	1,770	--	--	--	--	7,650	--	38,250	140	455	7,105	33,705	3,000	1.44	4,325	38,030	26.41	0.06

FUTURE PROJECTED WASTEWATER DEMANDS																		
	PROPOSED COUNT	FLOW PER VISITOR (gpd)	FLOW PER LUAU SEAT (gpd)	FLOW PER STAFF (gpd)	FLOW PER SEAT (gpd)	AVG FLOW (gpd)	FLOW FACTOR	MAX FLOW (gpd)	DRY I/I (gpcd)	TOTAL DRY I/I (gpcd)	DESIGN AVE FLOW (GPD)	DESIGN MAX FLOW (GPD)	WET WEATHER I/I (gpd)	ACRES	TOTAL WET WEATHER I/I (gpd)	DESIGN PEAK (gpd)	DESIGN PEAK (gpm)	DESIGN PEAK (cfs)
VISITORS/STAFF	1,300	3	--	--	--	3,900	5	19,500	35	105	4,005	19,605	3,000	0.76	2,280	21,885	15.20	0.03
LUAU	650	--	5	--	--	3,250	5	16,250	35	175	3,425	16,425	3,000	0.30	895	17,320	12.03	0.03
AVIARY	--	--	--	--	--	1,000	5	5,000	35	--	--	--	3,000	0.40	1,200	1,200	0.83	0.00
RESTAURANT	410	--	--	--	5	2,050	5	10,250	35	175	2,225	10,425	3,000	0.40	1,205	11,630	8.08	0.02
TOTAL	2,360	--	--	--	--	10,200	--	51,000	35	455	9,655	46,455	3,000	1.86	5,581	52,036	36.14	0.08

Assumptions:

1. Restaurant seat flow of 5 gpcd was used for fast food-style type of dining
2. Luau seat flows are based on previous WWTP as-builts. 5 gpcd
3. Visitor/Staff flows are based on existing wastewater calculations. 3 gpcd
4. Aviary flows were obtained from existing wastewater calculations

Definitions:

Ave Flow = (Flow per Seat * Seats + Flow per Employee * Employee)
 Max Flow = Ave Flow * Rabbit Factor
 Total Dry = ((Seats*Employees) * Dry I/I)
 Design Ave Flow = Ave Flow + Total Dry I/I
 Design Max Flow = Max Flow + Total Dry I/I
 Total Wet Weather = Wet Weather I/I * Acres
 Design Peak = Design Max Flow + Total Wet Weather

APPENDIX B

WATER PRESSURE CALCULATIONS

Head Loss for Northern Entrance Line		FIRE HYDRANT	
New 8-inch PVC FH Lateral		Hazen-William Formula = $H_f = 10.44 L Q^{1.85} / C^{1.85} d^{4.87}$	
Q =	2000 gpm	(Water demand for individual pipe segment)	
C =	150 For PVC	(Friction Coefficient)	
D =	8.00 in	(Pipe Diameter, in)	
L =	668 ft	(Pipe Length, ft)	
hf =	33.93 ft	(Friction head loss)	
hf =	14.71 psi	Convert from ft to psi	
he =	40.00 ft	(Elevation head loss)	
he =	17.34 psi	Convert from ft to psi	
hb =	1.47 psi	(Head loss from pipe bends (10% of friction head loss))	
Total Head Loss (hf+he+hb) =		33.52	psi

Residual Pressure @ 4000 gpm	76
System Pressure @ 2000 gpm	96.00
Hazen Williams Pressure Losses:	33.53
Meter/BFP Losses (assumed):	20.00
Residual @ New FH @ Project Site	<u>42.47</u>

Head Loss for Southern Entrance Line		FIRE HYDRANT	
New 8-inch PVC FH Lateral		Hazen-William Formula = $H_f = 10.44 L Q^{1.85} / C^{1.85} d^{4.87}$	
Q =	2000 gpm	(Water demand for individual pipe segment)	
C =	150 For PVC	(Friction Coefficient)	
D =	8.00 in	(Pipe Diameter, in)	
L =	237 ft	(Pipe Length, ft)	
hf =	12.04 ft	(Friction head loss)	
hf =	5.22 psi	Convert from ft to psi	
he =	29.00 ft	(Elevation head loss)	
he =	12.57 psi	Convert from ft to psi	
hb =	0.52 psi	(Head loss from pipe bends (10% of friction head loss))	
Total Head Loss (hf+he+hb) =		18.31	psi

Residual Pressure @ 4000 gpm	68
System Pressure @ 2000 gpm	88.00
Hazen Williams Pressure Losses:	35.49
Meter/BFP Losses (assumed):	20.00
Residual @ New FH @ Project Site	<u>32.51</u>

Appendix D

**Transportation Assessment
Report for the Proposed
Sea Life Park Improvements**



DRAFT REPORT

Transportation Assessment Report for the Proposed Sea Life Park Improvements in Waimanalo, HI

Prepared for:
G70

December 26, 2018

SD18-0290



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1.0 EXECUTIVE SUMMARY

This report documents the forecasted impacts to transportation and access that are expected to occur with the renovation of the existing Sea Life Park marine park in Waimanalo, Hawaii on the island of Oahu. The project site is located mauka of Kalaianā'ole Highway and is currently occupied by existing land uses including 9.47 acres of gated park area, 1.9 acres of backstage pools and administration uses, 1.94 acres of guest parking, 0.67 acres of employee parking, and 2.07 acres of dirt overflow parking. Proposed improvements to Sea Life Park include a total of 19,835 square feet of renovations, including a remodeled entry, updated exhibits, renovated restaurant, a new pedestrian promenade, additional parking, and enhanced circulation between the parking lots and driveways.

Modifications to access are also proposed to improve on-site circulation. Currently, visitors and employees utilize both driveways connecting to Kalaianā'ole Highway. The main entrance is at Driveway East where most vehicles enter and traverse the internal loop road to the visitor and employee parking areas. Exit signs point to Driveway North from the existing visitor parking lot. Transit and tour buses also traverse this route. The proposed changes to access include channeling all entering and exiting visitor trips to Driveway East. As proposed, Driveway North would provide access for employees to the employee parking areas. Buses will continue to use the current travel pattern of entering from Driveway East and exiting at Driveway North.

The impacts of the proposed project to transportation and access surrounding the project site were evaluated following guidelines established by the State of Hawaii Department of Transportation – Highways Division (HDOT). The operations of two intersections were evaluated during a weekday and Saturday midday (MD) peak hours for Existing (2018) and Baseline (2025) conditions without and with the project. The midday peak hours represent the time of day with the highest volumes of traffic, as determined through review of historical traffic data along Kalaianā'ole Highway.

Since there are no published vehicle trip rates by the Institute of Transportation Engineers (ITE) for a comparable facility, project-generated trips were estimated using the forecasted increase in visitors provided by Sea Life Park which equates to approximately three and a half percent (3.5%) increase in visitors at buildout in 2025. Based on the forecasted increase, the proposed project is estimated to generate 22 net new midday peak hour trips on a weekday (11 inbound/11 outbound) and 29 net new midday peak hour trips on a Saturday (11 inbound/ 18 outbound). The total number of project trips turning into and out of the site driveways is 142 weekday midday peak hour trips, and 189 Saturday midday peak hour trips.

The key findings of the report are summarized below:

- The addition of project trips is not expected to significantly impact the intersection of Kalaianā'ole Highway/Driveway North during the midday peak hour. However, the westbound left-turn movement at Kalaianā'ole Highway/Driveway East is expected to operate at undesirable LOS E under forecast Baseline (2025) No Project conditions. The addition of project trips exacerbate this delay by more than five percent (5%). The critical (westbound left-turn) movement serves Makapuu Beach access across from the Sea Life Park driveway (Driveway East). The intersection does not meet the four-hour signal warrant at buildout conditions. Due to the existing offset intersection configuration, substantial modifications would be needed to improve the delay on the westbound approach.
- The proposed project is also not expected to substantially increase the walking, biking, or transit demand in the study area. The project does not conflict with any planned multimodal projects. Due to the location of the on-site bus stop, the attraction of Makapuu Beach and the surrounding trails, a walkway along the driveway and a marked crosswalk with a rectangular rapid flashing beacon (RRFB) is recommended to improve the pedestrian access and visibility. A small bike rack located near the site entrance is recommended to encourage access by alternative modes of transportation.
- The proposed project is expected to meet all parking demand on-site. No additional improvements to on-site vehicle circulation or parking are recommended.

Recommended improvements include:

- Add a sidewalk or walking path along Driveway East between the entrance plaza and Kalaianā'ole Highway.
- Install a crosswalk at Kalaianā'ole Highway/Driveway East.
- Provide bicycle parking.

2.0 INTRODUCTION

This transportation assessment report (TAR) presents the results of the study conducted by Fehr & Peers for the proposed Sea Life Park Improvements in the Waimanalo community of the island of O'ahu. Sea Life Park located on land owned by the State of Hawaii. The project site is located mauka of Kalaniana'ole Highway (Route 72) across from Makapuu Beach.

Sea Life Park is an attraction in East Oahu that provides educational and interactive experiences with ocean wildlife. Hours of operation are 9:30 AM to 4:00 PM daily. Evening luaus are hosted as a separate event five days per week from 5:30 PM to 8:30 PM. This analysis included evaluation of the forecasted increase in traffic and visitors as a result of the proposed park improvements. No changes to the luau operations are proposed, therefore luau-related traffic was not included in the assessment.

This TAR includes a description of the assumptions and methods used to conduct the study, as well as a discussion of the results. This TAR was conducted in accordance with the guidelines and standards of the affected government agencies, and it addresses the potential impact of the project on all travel modes.

2.1 PROJECT DESCRIPTION

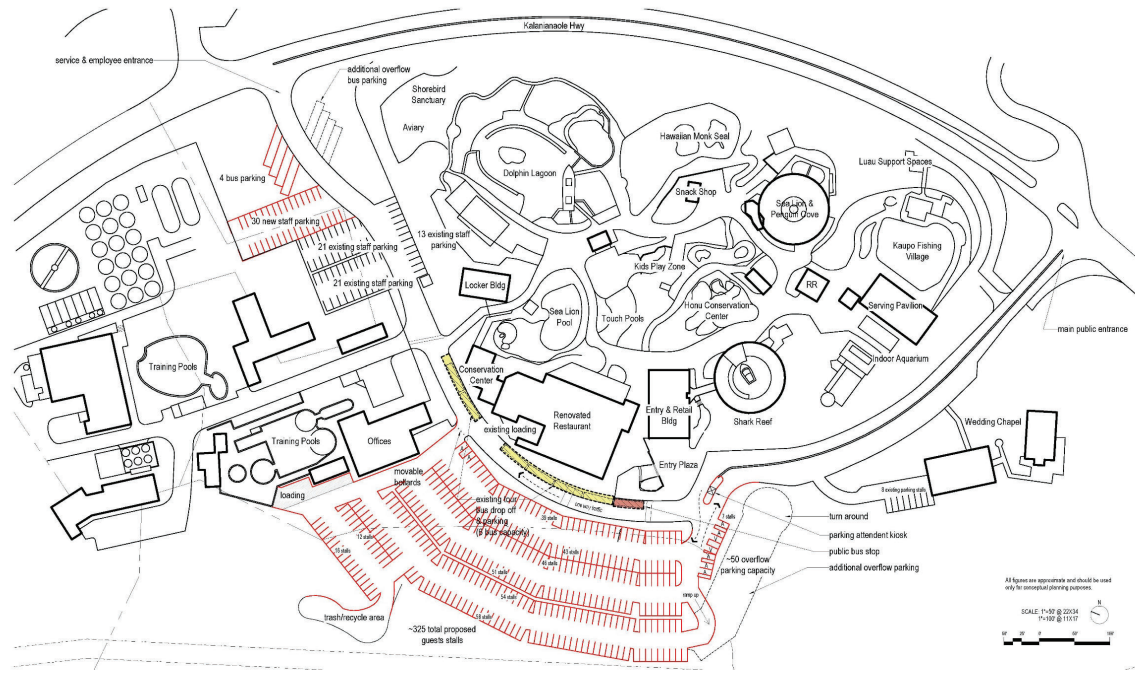
The proposed project includes renovation of Sea Life Park in Waimanalo, Hawaii. Currently, the existing site includes 9.47 of gated park area, 1.9 acres of backstage pools and administration uses, 1.94 acres of guest parking, 0.67 acres of employee parking, and 2.07 acres of dirt overflow parking.

The proposed project includes approximately 19,835 square feet of net new area and renovations, including:

- Remodeled entry and retail shop (4,535 square feet of new area)
- New Kaupo Fishing Village with demonstration structures (12,000 square feet of new area)
- Renovated Ocean Oddities Aquarium (3,300 square feet of new area)
- Interior and/or aesthetic renovations to the following exhibits (no net increase in area):
 - Honu Conservation Center
 - Hawaii Ocean Theater
 - Shark Cave Aquarium
 - Beach Boy Restaurant
 - Shorebird Rehab/Sanctuary and Lovebird Aviary
 - Conservation Center

- Additional parking for visitors, employees, and buses
- New Pedestrian Promenade
- Driveway and access improvements

The location of the project site and immediate study area is shown on **Figure 1**. The proposed site plan showing the building locations and site layout is illustrated on **Figure 2**.



PROPOSED PARKING PLAN | **A2**
 CONCEPT DESIGN
 SEA LIFE PARK | 11/15/2018



Figure 2
 Proposed Site Plan



Sea Life Park Location

Park Renovation Plan
 Sea Life Park
 9/17/2018



Figure 1
 Project Location

2.2 PROJECT STUDY AREA

Sea Life Park is located in the Waimanalo Community on Oahu, mauka of Kalaianā'ole Highway. The Oceanic Institute lies to the northwest of the project site and Saint Catalina Seaside Chapel lies south of the project site. Directly across Kalaianā'ole Highway are parking lots with access to Kaupo Bay and Makapuu Beach, which attracts recreation and tourism. Access to Sea Life Park is provided via two driveways on Kalaianā'ole Highway. The transportation assessment evaluated the operations at the following two driveway intersections that serve the project site:

1. Kalaianā'ole Highway / Driveway East (E)
2. Kalaianā'ole Highway / Driveway North (N)

The study analyzed the potential project-related traffic impacts under typical weekday and Saturday midday (MD) peak hour traffic conditions. The midday peak hour is the highest one-hour total of traffic between 10:00 AM and 2:00 PM.

2.3 STUDY SCENARIOS

The operations of the study intersections were evaluated during the weekday and Saturday midday peak hours for the following scenarios:

- **Existing Conditions** – The analysis of existing traffic conditions was based on 2018 counts collected for the project during midday peak hours. The existing conditions analysis includes a description of key area roadways and an assessment of the transit facilities and services near the site.
- **Baseline (2025) No Project Conditions** – Existing peak-hour volumes increased to account for growth in the area to the year of anticipated project occupancy in 2025. Traffic growth was estimated based on an annual growth factor to account for ambient growth *plus* traffic generated from approved but not yet constructed and pending developments in the study area. This scenario forms the baseline for identifying project impacts.
- **Baseline (2025) Plus Project Conditions** – This traffic scenario provides projected traffic volumes and an assessment of operating conditions under Baseline Conditions with the addition of project-generated traffic. The impacts of the proposed project on future traffic conditions were identified.

2.4 TRAFFIC ANALYSIS METHODOLOGY

The analysis of roadway operations performed for this study is based on procedures presented in the *Highway Capacity Manual 6th Edition* (HCM 6th), published by the Transportation Research Board in 2016. The operations of roadway facilities are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. LOS E represents "at-capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. Both study intersections are unsignalized, therefore the methodology for assessing unsignalized intersections is described below.

2.4.1 UNSIGNALIZED INTERSECTIONS

The operations of the two unsignalized study intersections were evaluated using the method contained in Chapter 20: Two-Way Stop-Controlled (TWSC) Intersections of the *HCM 6th*. LOS ratings for stop-signalized intersections are based on the average control delay expressed in seconds per vehicle. The average control delay is calculated for each minor-street stopped movement and the major-street left turns, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. For approaches with multiple lanes, the control delay is computed for each movement; the movement with the worst (i.e., longest) delay is presented for TWSC. The average control delay for unsignalized intersections is calculated using Synchro 10.0 analysis software and is correlated to a LOS designation as shown in **Table 1**.

TABLE 1: UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 100
B	Short traffic delay.	> 10.0 to 15.0
C	Average traffic delays.	> 15.0 to 25.0
D	Long traffic delays.	> 25.0 to 35.0
E	Very long traffic delays.	> 35.0 to 50.0
F	Extreme traffic delays with capacity exceeded.	> 50.0

Source: Highway Capacity Manual 6th Edition, Transportation Research Board, 2016.

2.4.2 SIGNIFICANT IMPACT CRITERIA

The analysis of Baseline (2025) Conditions compares future no-project operations with conditions when the project is fully built out to determine whether or not project implementation is expected to result in a significant impact on the surrounding roadways. The Hawaii Department of Transportation (HDOT) strives to maintain LOS D intersection operations for State facilities, such as Kalamiana'ole Highway. HDOT typically defines a significant intersection impact when the operation of an intersection or turning movement changes from LOS D or better to LOS E or F. Impacts are also defined to occur when the addition of project traffic exacerbates locations already operating or projected to operate at LOS E or F. When evaluating intersection operations at any location, other factors are considered in the analysis, such as traffic volumes, volume-to-capacity (V/C) ratios (should ideally be less than 1.00), and potential secondary impacts to pedestrian, bicycle, and transit travel.

Each of the identified significant impacts is categorized as either a project-related or cumulative impact. For unsignalized intersections, the project is determined to have a significant project-specific impact if the addition of project traffic causes an unsignalized intersection to degrade from LOS D or better to LOS E or F and if the peak hour signal warrant is satisfied. An impact is considered a cumulative impact when it adds traffic to a study location that includes a controlled approach that operates at an undesired level (i.e., LOS E or F) and if the peak hour signal warrant is satisfied. The use of the peak hour signal warrant is one indication that an alternate traffic control device may be needed at a study location.

HDOT does not publish impact criteria for pedestrian, bicycle, and transit impacts. However, these impacts are generally evaluated based on whether a proposed project would: 1) conflict with existing or planned pedestrian, bicycle, or transit facilities and services, or 2) create substantive walking, bicycling, or transit use

demand without providing adequate and appropriate facilities for non-motorized mobility. The existing amenities for pedestrians, bicycles, and transit users were inventoried to evaluate the quality and scope of facilities/services currently in place. The assessments of planned facilities were conducted using information in planning documents, such as the *Oahu Bike Plan (2012)* and the *Koolau Piki Sustainable Communities Plan (2017)*. For non-motorized modes, if the proposed project is expected to conflict with existing or planned improvements to pedestrian and bicycle facilities, or if the project is expected to generate a substantial demand which could warrant additional transit service, then the project would be determined to have a project-specific impact to active transportation.

3.0 EXISTING CONDITIONS

This chapter describes the existing mobility network and includes a discussion of the roadway, bicycle, pedestrian, and transit facilities located in the project study area. This chapter also includes a discussion of the existing intersection LOS results.

A comprehensive data collection effort was undertaken to identify existing transportation conditions in the vicinity of the proposed project. The assessment of existing conditions relevant to this study includes an inventory of the street system, traffic volumes on these facilities, and operating conditions at adjacent intersections.

3.1 EXISTING TRANSPORTATION FACILITIES

3.1.1 EXISTING ROADWAY SYSTEM

The key roadways providing access to or in the vicinity of the site are described below.

Kalaniana'ole Highway (Route 72) is the primary street that serves the project site. Adjacent to the project, it is a two-lane principal arterial that extends across Oahu beginning at the Kailua Road junction near Kailua, circles the island, and ultimately terminates at Ainakoa Avenue in Honolulu, where it joins with H1 Highway. The posted speed limit near the project is 35 mph. Kalaniana'ole Highway and Sea Life Park are under the jurisdiction of HDOT. The Sea Life Park driveways that intersect with Kalaniana'ole Highway are controlled by a stop sign for the driveway approaches; the highway movements are uncontrolled. Separated turn lanes are provided at each entry point, including a separate northbound left-turn lane at Driveway East and a separate eastbound right-turn lane at Driveway North. Driveway North also provides access to the Oceanic Institute.

Congestion was not observed along the study roadways during field observations. No bike lanes or pedestrian facilities (sidewalks) are provided on Kalaniana'ole Highway. Bicyclists and pedestrians use the roadway shoulder, which is provided on either side of the road except for immediately south of Driveway East where a shoulder is only provided on the west side.

3.1.2 EXISTING TRANSIT FACILITIES AND SERVICES

TheBus is the main public transportation service on the Island of Oahu, where it served over 69 million riders in the fiscal year of 2015-2016. A fleet of 542 buses transports over 216,000 riders a week via fixed-route,

express, and paratransit service. Routes 22, 23 and 57 are the regular service bus routes which pass through the project site. In the eastbound direction, Route 22 starts in Waikiki and travels to Diamond Head, Kahala, Aina Haina, Hanauma Bay, and Sandy Beach before it terminates at the Sea Life Park site. Traveling westbound, Route 22 retraces the reverse path. In the eastbound direction, Route 23 starts at the Ala Moana Center and travels through Waikiki, Kahala, Aina Haina, Hawaii Kai, and Kalama Valley before it terminates at the Sea Life Park site. Traveling westbound, Route 23 retraces the reverse path. In the westbound direction, Route 57 starts at the Ala Moana Center and travels along the Pali Highway to Kailua and Waimanalo before it terminates at the Sea Life Park site. Every other service terminates in Waimanalo instead of continuing to Sea Life Park. Traveling eastbound, Route 57 retraces the reverse path. The existing transit schedules for these Routes are summarized in **Table 2** and shown in **Figure 3**.

TABLE 2: EXISTING TRANSIT SERVICES

Route	From	To	Weekdays		Saturday		
			Operating Hours	Headway (Minutes)			
22	Waikiki Kalakaua Ave & Olohana St/ Sea Life Park	Sea Life Park/Waikiki Kalakaua Ave & Pau St	5:40 AM to 6:20 PM	30 min	80 min	6:10 AM to 6:45 PM	30 min
			5:45 AM to 8:30 PM	30 min	60 min	5:50 AM to 8:20 PM	60 min
57	Ala Moana Center Kona St/ Sea Life Park	Sea Life Park/ Ala Moana Center Kona St	4:50 AM to 11:45 PM	30 min	60 min	4:50 AM to 11:40 PM	60 min

Source: Fehr & Peers, 2018

Routes 22, 23, and 57 all service stop ID #186 on site at the Sea Life Park entrance plaza. Ridership reports by TheBus indicate an average of 174 daily alightings at this stop. The reported ridership indicates there are no boardings, however it is assumed that this is a tracking error and that the boardings at this stop are of the same order of magnitude as the alightings. A long bench is provided at the bus stop, and additional covered benches within the Sea Life Park entrance plaza can also be used by bus riders.

In addition to TheBus service, private shuttles also provide service to the Sea Life Park bus stop. The Waikiki Trolley offers the Blue Line "Panoramic Coastline" route that has three (3) services per day. The Lealea Trolley offers the East Coast Line that also has three (3) services per day.

Finally, private tour buses also access the Sea Life Park entrance plaza and have dedicated parking along the project driveway past the bus stop. Sea Life Park is one of many stops on the Mini Circle Island Tour, with buses that regularly stop for a two-hour visit to the Park for the exhibits, restaurant, and/or shops.



3.1.3 EXISTING BICYCLE FACILITIES AND VOLUMES

There are no separated bike facilities along Sea Life Park driveways or Kalamiana'ole Highway but bicyclists are allowed to share the road with motorists. Multi-modal traffic counts collected during the peak periods showed that there is currently low bike activity near Sea Life Park. Only three bicyclists were counted during the weekday midday peak hour and only two were counted during the Saturday midday peak hour.

3.1.4 EXISTING PEDESTRIAN FACILITIES AND VOLUMES

Pedestrian counts collected during the peak periods showed that the highest volumes occurred during the Saturday midday peak hour with 27 people crossing at the Kalamiana'ole Highway/Driveway East intersection. Anecdotal information from the community indicates that some of these pedestrians could be transit users who walk from the bus stop at Sea Life Park to Makapuu Beach or the surrounding trails. Some pedestrians are likely from the Mini Circle Island Bus Tour which regularly stops at Sea Life Park/Makapuu for two hours. Counts were lower on the weekday with 12 pedestrians crossing at the Kalamiana'ole Highway/ Driveway East/ intersection. At the Kalamiana'ole Highway/ Driveway North intersection, no pedestrians were counted on Saturday and two (2) pedestrians were counted on the weekday.

3.1.5 EXISTING PARKING

Parking is currently provided for approximately 200 visitors, 50 employees, and ten (10) buses on park land. On-site parking for visitors is provided for a fee of five dollars (\$5.00) per vehicle. Based on anecdotal data, parking is currently at capacity with demand for additional parking space.

3.1.6 COLLISION HISTORY

According to collision data from the Hawaii State Office of Planning, there has been one collision in the study area from 2007 through June 2018. The collision occurred approximately 400 feet west of the Kalamiana'ole Highway/Driveway North intersection in 2016 and involved a motorcycle/moped. No other collisions were found to be reported.

3.2 EXISTING INTERSECTION VOLUMES/LANE CONFIGURATIONS

The operations of the two existing study intersections were evaluated during weekday and Saturday peak period (10:00 AM – 2:00 PM) conditions. Traffic counts were collected at the study intersections in early

November 2018 when local schools were in session. The weekday midday peak hour of traffic for the study area occurred from 11:30 AM to 12:30 PM. On a Saturday, the midday peak hour of traffic occurred from 12:30 PM to 1:30 PM.

Existing lane configurations and signal controls were obtained through field observations. **Figure 4** presents the existing weekday and Saturday midday peak hour turning movement volumes, corresponding lane configurations, and traffic control devices. Raw traffic count data sheets are provided in **Appendix A**.

3.3 EXISTING INTERSECTION LEVELS OF SERVICE

Peak hour intersection capacity analysis was performed for the study intersections using the methodology described previously and the recently collected traffic count data. **Table 3** below shows the results of the intersection operations analysis for Existing Conditions. Detailed LOS Worksheet can be found in **Appendix B**.

TABLE 3: EXISTING (2018) INTERSECTION LEVELS OF SERVICE

Intersection	Traffic Control	Day of Week	Delay (seconds/vehicle) ¹	Midday Peak Hour LOS ²
1. Kalaniana'ole Hwy / Driveway East	SSSC	WKDY SAT	12.7 22.8	B C
2. Kalaniana'ole Hwy / Driveway North	SSSC	WKDY SAT	10.9 10.7	B B

Source: Fehr & Peers, 2018

Notes:

¹ The vehicular delay for the worst movement is reported for side-street stop-controlled (SSSC) intersections.

² LOS calculations performed using the Highway Capacity Manual 6th Edition (HCM 6th) method.

As shown in **Table 3**, both study intersections currently operate at LOS C or better during the midday peak hours. During field observations, delays or queues were not observed.

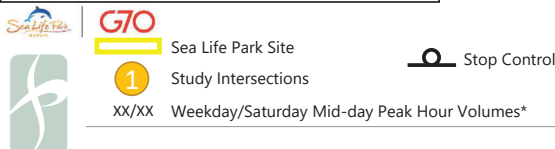
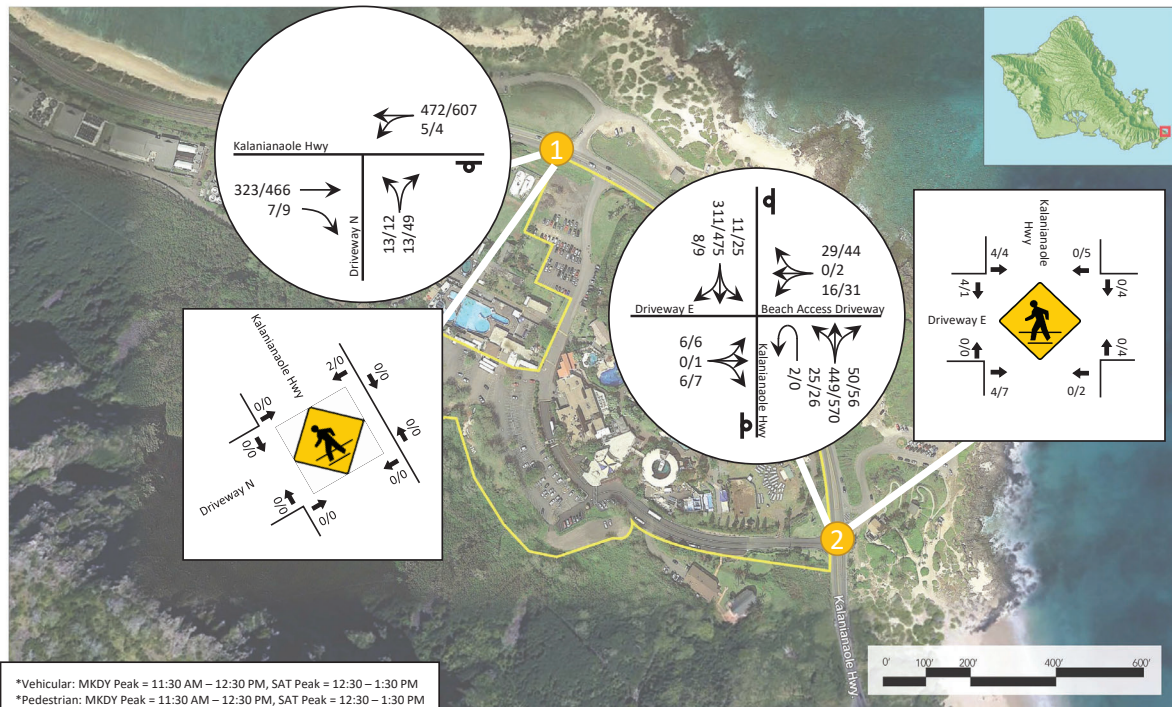


Figure 4
Peak Hour Traffic Volumes and Lane Configurations
–Existing (2018) Conditions

4.0 BASELINE (2025) NO PROJECT CONDITIONS

To evaluate the potential impacts of traffic generated by the proposed project on the surrounding street system, it was necessary to first develop estimates of future traffic conditions in the area without the project. Future traffic conditions without the project reflect traffic increases due to regional growth and development, as well as traffic increases generated by other specific developments near the project site. The forecasted future traffic volumes were then used as a baseline to identify impacts on the roadway system from the project. Development of this future traffic scenario is described in this chapter.

4.1 BASELINE (2025) NO PROJECT TRAFFIC ESTIMATES

The following section summarizes the growth assumptions used to estimate the amount of traffic that would be added to existing intersection volumes under Baseline (2025) No Project Conditions.

4.1.1 AREA-WIDE OR AMBIENT TRAFFIC GROWTH

A growth factor was applied to the study roadway and project driveways to account for future regional growth. Based on base year (2012) and future year (2040) forecasts from the Oahu Metropolitan Planning Organization regional travel demand model for Kalaniana'ole Highway in Waimanalo Beach, the growth in traffic at this location is expected to be approximately 0.7 percent per year over the 28-year period. Accordingly, a one percent (1%) annual growth factor was applied to the existing intersection traffic volumes collected in early November 2018 to assume some level of regional growth and to provide a more conservative analysis. This growth rate is considered reasonable given the limited planned development in the Makapuu area. For the purposes of this analysis, this growth rate was compounded over the seven-year timeframe (2018 to 2025) when full development of the proposed project is anticipated.

4.1.2 FUTURE TRANSPORTATION IMPROVEMENTS

No transportation infrastructure improvements are planned in the immediate study area. Therefore, the intersection lane configurations and traffic control devices are expected to remain the same as under Existing Conditions.

Figure 5 shows the peak hour traffic volumes for the Baseline (2025) No Project Conditions.



Figure 5
Peak Hour Traffic Volumes and Lane Configurations
–Baseline (2025) No Project Conditions

4.2 BASELINE (2025) NO PROJECT LEVELS OF SERVICE

Levels of service (LOS) calculations were conducted to evaluate operations at the study intersections under Baseline (2025) No Project Conditions based on the anticipated growth in traffic. The results of the LOS analysis are presented in **Table 4**. The corresponding LOS calculation sheets are included in **Appendix C**.

TABLE 4: BASELINE (2025) NO PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Traffic Control	Day of Week	Delay – Critical Movement (seconds/vehicle) ¹	Midday Peak Hour LOS ²
1. Kalaniana'ole Hwy / Driveway East	SSSC	WKDY	14.7 - EBL	B
		SAT	44.0 - WBL	E
2. Kalaniana'ole Hwy / Driveway North	SSSC	WKDY	11.9 - NBL	B
		SAT	11.0 - NBL	B

Source: Fehr & Peers, 2018

Notes:

¹ The vehicular delay for the worst movement is reported for side-street stop-controlled (SSSC) intersections.

EBL = Eastbound Left, WBL = Westbound Left, NBL = Northbound Left

² LOS calculations performed using the *Highway Capacity Manual 6th Edition* (HCM 6th) method.

The changes in operations from Existing Conditions are the result of the addition of ambient traffic growth. As shown in **Table 4**, the analysis results indicate that the Kalaniana'ole Hwy/Driveway East intersection is forecasted to operate at undesirable levels (LOS E) under Baseline (2025) No Project Conditions. The worst critical movement is the westbound left-turn movement exiting the Makapu'u Beach parking lot. The Baseline (2025) forecasted volumes include 40 vehicles making the westbound left-turn movement that results in the reported LOS E conditions. The overall average delay at this intersection is 3.8 seconds per vehicle during the peak hour.

5.0 PROJECT TRAFFIC ESTIMATES

This section describes the anticipated volume and distribution of vehicle trips would result from implementation of the proposed project. Future traffic added to the roadway system by the project was estimated using a three-step process: (1) project trip generation, (2) trip distribution, and (3) trip assignment. The first step estimates the amount of project-generated traffic that would be added to the roadway network. The second step estimates the direction of travel to and from the project site. The new trips are assigned to specific street segments and intersection turning movements during the third step. This process is described in more details in the following sections.

5.1 PROJECT TRIP GENERATION ESTIMATES

The Institute of Traffic Engineers' *Trip Generation Manual* does not have rates for a wildlife park, therefore the project trip generation was determined from visitor forecast data provided by Sea Life Park. These forecasts indicate an average three and a half percent (3.5%) annual increase in visitors between 2018 and 2025. Trips associated with the project were determined by applying the compounded growth rate to the existing peak hour total trips entering and exiting the site. The resulting trip generation estimate for the proposed project is shown in **Table 5**.

As shown in **Table 5**, the project is forecast to generate a total of 22 net new midday peak hour trips on a weekday (11 inbound/11 outbound), and 29 net new midday peak hour trips on a Saturday (11 inbound/18 outbound). These are the new trips that are estimated to be added to the highway and project driveways with development of the project site as proposed.

TABLE 5: FORECAST PROJECT TRIP GENERATION

Land Use	Weekday Midday Peak Hour		Saturday Midday Peak Hour		Total
	In	Out	In	Out	
Sea Life Park	11	11	11	18	29

Source: Fehr & Peers, 2018

5.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of traffic generated by the project onto the roadway system was based on existing traffic volumes and access patterns for the proposed project, which includes re-routing visitors to exit at Driveway East instead of Driveway North (under existing conditions). The resulting trip assignment for Weekday midday and Saturday midday conditions is shown in **Figure 6**.



6.0 BASELINE (2025) PLUS PROJECT CONDITIONS

This section presents the analysis of the potential impacts on the roadway system due to projected increases in traffic, including traffic generated by the project in 2025. The analysis compares the project levels of service at each study intersection under future Baseline (2025) No Project conditions against the "Plus Project" scenario to determine potential impacts.

6.1 PROPOSED TRANSPORTATION IMPROVEMENTS

As shown in the site plan, the project does not propose to make any changes to the existing roadway configurations or intersection geometries. However, a change in on-site circulation is proposed. Under existing conditions, visitors enter at Driveway East and head to the visitor parking lot. Upon departure, visitors are currently routed to exit from the visitor parking lot to the Driveway North intersection to access Kalaniana'ole Highway. The project proposes to re-route outbound visitor trips from the visitor parking lot to the Driveway East intersection. Inbound and outbound employee trips will occur at Driveway North, which is shared with traffic from the Oceanic Institute. Public and private transit vehicles (buses) arrive at Driveway East traverse along the driveway to load/unload passengers, and exit the site at Driveway North. No changes to transit vehicle access or routing is proposed.

The park currently provides parking for approximately 200 visitors, 50 employees, and 10 buses. At buildout, the project proposes to include parking for 325 visitors, 85 employees, and 10 buses. Overflow parking areas are planned as part of the project to provide capacity for an additional 50 vehicles and an additional 4 buses.

6.2 BASELINE (2025) PLUS PROJECT INTERSECTION LEVEL OF SERVICE

To forecast the peak hour operating conditions at each study intersection, the project trip assignment was superimposed on Baseline (2025) No Project traffic volumes to yield Baseline (2025) Plus Project volumes. **Figure 7** presents the anticipated Baseline (2025) Plus Project Weekday midday and Saturday midday peak hour volumes. The volumes on **Figure 7** were used to analyze operations using the aforementioned LOS methodology.

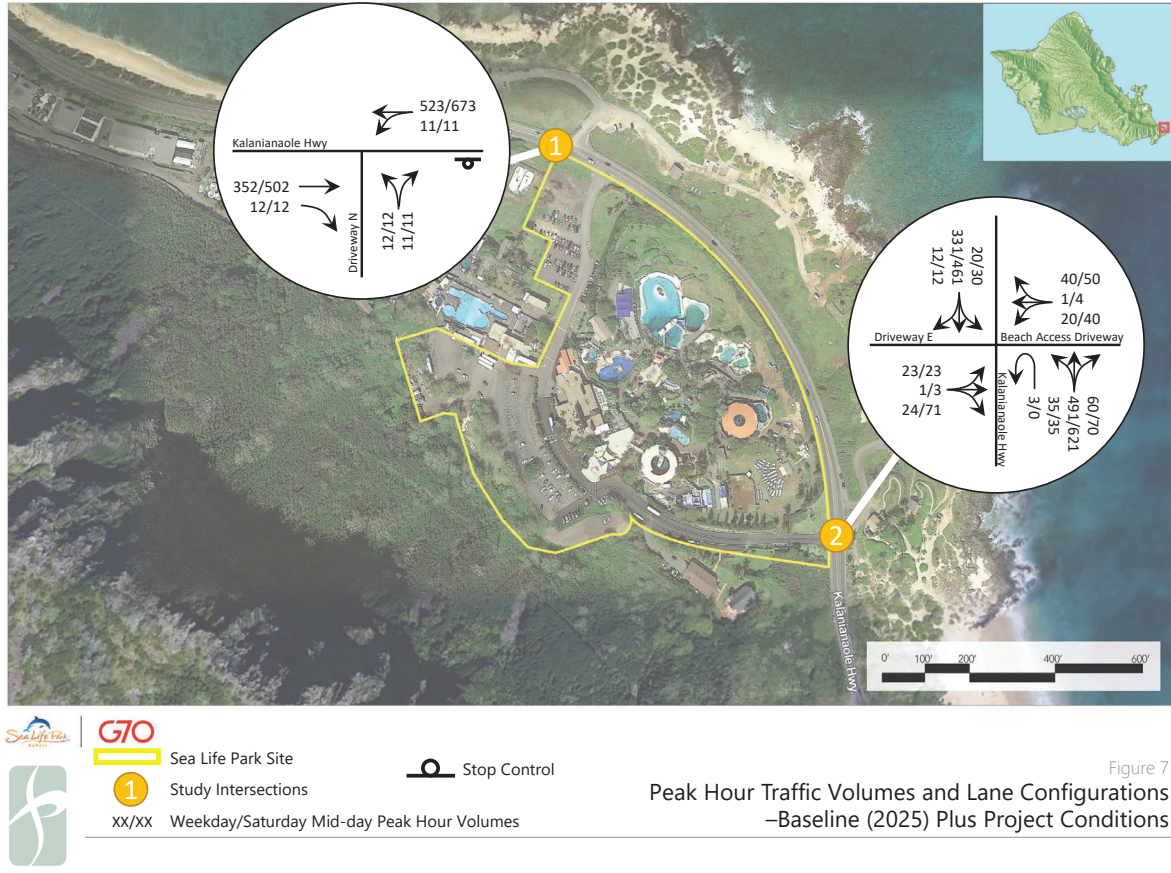


Figure 7
Peak Hour Traffic Volumes and Lane Configurations
-Baseline (2025) Plus Project Conditions

The results of the LOS analysis for the study intersections are presented in **Table 6**. Detailed LOS results for intersection movements and corresponding LOS calculation sheets are included in **Appendix C**.

TABLE 6: BASELINE (2025) WITHOUT AND WITH PROJECT INTERSECTION LEVELS OF SERVICE

Intersection	Traffic Control	Day of Week	Baseline (2025) Without Project Conditions		Baseline (2025) With Project Conditions		Change in Delay (seconds)
			Delay - Movement (sec/veh) ¹	Peak Hour LOS ²	Delay - Movement (sec/veh) ¹	Peak Hour LOS ²	
1. Kalamiana ole Hwy / Driveway E	SSSC	WKDY	14.7 - EBL	B	15.5 - EBL	C	0.8
		SAT	44.0 - WBL (3.8)	E	51.0 - WBL (5.0)	E	7.0 (1.2)
2. Kalamiana ole Hwy / Driveway N	SSSC	WKDY	11.9 - NBL	B	12.1 - NBL	B	0.2
		SAT	11.0 - NBL	B	17.1 - NBL	C	6.1

Source: Fehr & Peers, 2018

Notes:

¹ The vehicular delay for the worst movement is reported for side-street stop-controlled (SSSC) intersections. Where applicable, the average vehicular delay is reported in parentheses.

EBL = Eastbound Left; WBL = Westbound Left; NBL = Northbound Left

² LOS calculations performed using the *Highway Capacity Manual 6th Edition* (HCM 6th) method.

As shown in **Table 6**, the Kalamiana ole Hwy / Driveway East intersection is forecast to operate undesirably (LOS E) under Baseline Without and With Project conditions. The addition of project trips to the intersection results in a change in delay of seven (7) seconds under the critical or worst movement (westbound left-turn). This proportion translates to an approximate 16 percent (16%) increase in delay with the addition of project trips to the roadway network. Based upon HDOT and TRB significance criteria, this is a cumulative project impact. Note that the undesirable operations apply to the westbound left-turn movement, which serves as Makapuu Beach access across from the project site. The overall average delay at this intersection is five (5.0) seconds per vehicle. All other locations and peak periods are forecast to operate at LOS C or better with the addition of project trips at buildout.

Delay on minor streets approaches at two-way side-street stop-controlled intersections is common, and in this case the affected side street volumes are relatively low (ranging from 20 to 40 vehicles during the peak hour). Potential improvements were explored that would reduce side-street delay and enhance operations. Installation of traffic signal would provide improved operations for all movements; however, this would unnecessarily increase delay along Kalamiana ole Highway which is currently uncontrolled. A four-hour signal warrant analysis was performed for the Baseline (2025) Plus Project Saturday midday peak hour, which

had the highest volumes of all studied scenarios. The result of the signal warrant found that the forecasted intersection volumes do not meet the warrant threshold (see **Appendix E**). Another mitigation would be a refuge pocket along Kalamiana ole Highway that could accommodate one vehicle and allow for a two-stage left-turn movement. However, due to the offset configuration of the intersection to both Sea Life Park and Makapuu Beach, it does not appear that an adequate transition could be provided to meet standards and sight distance requirements without substantial intersection and roadway modifications. Thus, no improvements to the intersection are recommended at this time.

7.0 SITE ACCESS, CIRCULATION, AND PARKING

This chapter includes a review of the site access and on-site circulation for vehicles, bicyclists and pedestrians. An evaluation of off-site active and transit travel modes is presented in Chapter 8.

7.1 SITE ACCESS

Primary visitor vehicle access to the site will continue to be provided by the Driveway East intersection at Kalaniana'ole Highway. While under existing conditions visitors exit using the Driveway North intersection, the proposed project includes re-routing the outbound visitor vehicles to exit at the Driveway East intersection. The Driveway North intersection will continue to provide inbound and outbound access for employees and the Oceanic Institute. The proposed flow of traffic is anticipated to better separate visitors and employees, as well as provide improved pedestrian connections between the visitor parking area and main entrance. No site access issues are identified based on field observations and review of the proposed access plans for the park. Overall, the number of driveway and access connections will provide adequate capacity to serve project traffic and no modifications to site access are recommended.

Due to the remote nature of the site and surrounding uses, few visitors are expected to arrive to the site by walking or biking. Approximately 18 pedestrians were observed crossing Kalaniana'ole Highway during the Saturday midday peak hour traffic counts. It is assumed that the pedestrians arrived by bus at Sea Life Park or parked along the highway and walked to Makapuu Beach or surrounding areas.

7.2 ON-SITE VEHICLE CIRCULATION

The site plan includes two-way parking and drive aisles with no "dead-end" aisles. Egress from the parking lot is provided either by the two-way entrance near the ticketing office or via the one-way driveway that leads to Driveway North. All of the parking spaces can be readily accessed and are not expected to cause vehicle circulation problems. The overflow parking area includes a turnaround. It is recommended that the turnaround be consistent with all fire and safety requirements. No additional recommendations to on-site vehicle circulation are recommended.

7.3 ON-SITE PEDESTRIAN AND BICYCLE CIRCULATION

Three (3) existing marked crosswalks provide pedestrian access from the visitor parking lot to the ticket sales and entrance plaza. The bus/trolley stops are located along the main driveway frontage at the main entrance. The proposed project includes rerouting outbound visitor trips from Driveway North to Driveway East, which reduces the volume of vehicles traveling along the park frontage to the main entrance. This access improvement will enhance pedestrian access by reducing the potential for conflicts with vehicles. It is recommended that a sidewalk or pathway is provided along Driveway East between the park plaza entrance and Kalaniana'ole Highway to provide improved access for pedestrians who walk to and from Makapuu Beach.

Based on the existing volume of pedestrians, a crosswalk is also recommended at Kalaniana'ole Highway/ Driveway East intersection. HDOT does not provide specific guidance for crosswalk warrants, but Fehr & Peers has developed the XWalk+ tool to provide guidance on appropriate crossing treatments for various streets and under various conditions. The tool is based on research from the National Cooperative Highway Research Program, the National Association of City Transportation Officials' (NACTO's) Urban Streets Design Guide, and the Federal Highway Administration. Based on the configuration of the Kalaniana'ole Highway/ Driveway East intersection, existing traffic/pedestrian volumes, and speed limit, the Xwalk+ tool suggests improvements such as:

- reduced curb radii to reduce turning speeds,
 - high visibility crosswalk markings, and
 - a rectangular rapid flashing beacon (RRFB)
- An RRFB uses flashing beacons that are triggered by either push buttons or a detection system. According to the National Highway Traffic Safety Administration, RRFBs improve safety conditions by reducing crashes between people walking and vehicles at unsignalized intersections. It is noted that a sight distance of 305-feet should be provided, assuming that Kalaniana'ole Highway has a design speed of 40 mph (per the American Association of State Highway and Transportation Officials' (AASHTO's) *Policy on Geometric Design on Highways and Streets*).

The Xwalk+ worksheet is provided in **Appendix D**.

Due to the remote nature of the site, few visitors are expected to access the site by bike, however bike access is allowed along Kalaniana'ole Highway. Bike racks are recommended to be provided near the entrance plaza to encourage access by alternative modes of transportation.

7.4 PARKING

The proposed project includes increasing parking on-site by 155 vehicle spaces. The park currently provides parking for approximately 200 visitors, 50 employees, and 10 buses. At buildout, the project proposes to include parking for 325 visitors, 85 employees, and 10 buses. Overflow parking areas are planned as part of the project to provide capacity for an additional 50 vehicles and an additional four (4) buses. The existing loading space for public transit buses will be maintained and is not included in the bus parking mentioned above. The proposed parking is consistent with the previously approved 1981 Special Management Area Use Permit.

8.0 MULTIMODAL ASSESSMENT

The potential impact of the proposed project on the off-site pedestrian, bicycle and transit facilities and services is addressed in this chapter.

8.1 TRANSIT FACILITIES AND SERVICES

Sufficient transit service is currently provided to Sea Life Park by TheBus and private trolley/bus providers. The transit stop and private bus loading/parking is provided on-site directly along the park frontage. Therefore, no modifications to transit stop locations are recommended as a result of the proposed Sea Life Park Improvements project. Some increase in demand to transit is anticipated as part of the forecasted increase in visitors to Sea Life Park which can be accommodated based on existing service, frequency, and transit parking on-site. No significant impacts to transit is forecast to occur with buildout of the proposed project.

8.2 BICYCLE FACILITIES

The project site is accessible by bike via Kalaniana'ole Highway, which bicyclists are permitted to share the road with vehicles. Separate bike lanes are not currently provided. Within the project study area, the Oahu Bike Plan (2012) indicates implementation of the proposed project is not expected to conflict with any existing or planned bicycle facilities. Bicyclists will be able to access the site via the existing Driveway East. No significant impacts to bicyclists is forecast to occur with buildout of the proposed project.

8.3 PEDESTRIAN FACILITIES

Consistent with the natural and suburban setting of the surroundings, sidewalks or separated pedestrian pathways are currently not provided along Kalaniana'ole Highway nor along the project driveways. Pedestrians were observed traveling within the roadway shoulders between Sea Life Park and Kalaniana'ole Highway. Within the project study area, the Primary Urban Center Development Plan (2004) indicates implementation of the proposed project is not expected to conflict with any existing or planned pedestrian facilities. No significant impacts to pedestrians is forecast to occur with buildout of the proposed project.

9.0 RECOMMENDED IMPROVEMENTS

Based on the review of the proposed project improvements and site plan, the following supplemental improvements are recommended to support mobility within and around the project site:

- **Add a sidewalk or walking path along Driveway East between the entrance plaza and Kalaniana'ole Highway.** Currently there is no paved pathway between the entrance plaza and highway, however a fair amount of pedestrian activity was observed crossing the intersection. Due to the location of the bus stop at Sea Life Park, pedestrians arrive by transit/trolley/private bus to visit Sea Life Park, Makepau Beach, and/or surrounding areas. A separated walking path will better separate pedestrians from traveling in the roadway, particularly if all outbound visitor trips will be re-routed to Driveway East resulting in higher traffic volumes along the roadway.
- **Install a crosswalk at Kalaniana'ole Highway/Driveway East.** Based on the configuration of the Kalaniana'ole Highway/ Driveway East intersection, existing traffic/pedestrian volumes, and speed limit, the Xwalk+ tool suggests pedestrian facility improvements such as:
 - reduced curb radii to reduce turning speeds,
 - high visibility crosswalk markings, and
 - a rectangular rapid flashing beacon (RRFB)
 An RRFB uses flashing beacons that are triggered by either push buttons or a detection system. According to the National Highway Traffic Safety Administration, RRFBs improve safety conditions by reducing crashes between people walking and vehicles at unsignalized intersections. It is noted that a sight distance of 305-feet should be provided, assuming that Kalaniana'ole Highway has a design speed of 40 mph (per the American Association of State Highway and Transportation Officials' (AASHTO's) *Policy on Geometric Design on Highways and Streets*).
- **Provide bicycle parking.** A small facility for bike parking such as a bike rack is recommended. Due to the remote nature of the site, few visitors are expected to access the site by bike, but bike parking is recommended to be provided near the entrance plaza to encourage access by alternative modes of transportation.

APPENDIX A: TRAFFIC COUNT DATA



Intersection																	
Int Delay, s/veh														0.8			
Movement																	
EBL	EBT	EBL	WBL	WBT	WBR	NBL	NBT	NBL	NBT	NBL	NBT	NBL	SBT	SBR			
Lane Configurations																	
Traffic Vol, veh/h	6	0	6	16	0	29	2	25	449	50	11	311	8	8			
Future Vol, veh/h	6	0	6	16	0	29	2	25	449	50	11	311	8	8			
Conflicting Peds, #/hr	8	0	8	4	0	4	4	8	0	4	4	0	4	0			
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free			
RT Channelized	-	-	Stop	-	Stop	-	-	Yield	-	-	-	-	-	None			
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-	-			
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-	0	-			
Grade, %	-	0	-	-	0	-	-	0	-	-	-	-	0	-			
Peak Hour Factor	95	95	95	95	95	92	95	95	95	95	95	95	95	95			
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
Mvmt Flow	6	0	6	17	0	31	2	26	473	53	12	327	8	8			
Major/Minor																	
Minor2	Minor1	Minor1	Major1	Major2	Major2	Major1	Major2	Major1	Major2	Major1	Major2	Major1	Major2	Major1	Major2		
Conflicting Flow All	896	896	347	919	927	512	-	343	0	0	477	0	0	0	0		
Stage 1	363	363	-	556	560	-	-	-	-	-	-	-	-	-	-		
Stage 2	533	533	-	363	367	-	-	-	-	-	-	-	-	-	-		
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	4.12	-	-	-	-		
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3,518	4,018	3,318	3,518	4,018	3,318	-	2,218	-	-	2,218	-	-	-	-		
Pot Cap-1 Maneuver	261	280	696	252	268	562	-	1216	-	-	1085	-	-	-	-		
Stage 1	656	625	-	515	511	-	-	-	-	-	-	-	-	-	-		
Stage 2	531	525	-	656	622	-	-	-	-	-	-	-	-	-	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	240	273	685	244	261	556	-	~13	-	-	1081	-	-	-	-		
Mov Cap-2 Maneuver	240	273	-	244	261	-	-	-	-	-	-	-	-	-	-		
Stage 1	656	611	-	515	509	-	-	-	-	-	-	-	-	-	-		
Stage 2	498	523	-	636	608	-	-	-	-	-	-	-	-	-	-		
Approach																	
EB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB		
HCM Control Delay, s	12.7	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6		
HCM LOS	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
Minor Lane/Major Mvmt																	
NBL	NBT	NBR	EBL	WBL	NBL	NBT	NBR	EBL	WBL	NBL	NBT	NBR	EBL	WBL	NBL	NBT	NBR
Capacity (veh/h)	-	-	-	480	686	1081	-	-	-	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	0.026	0.069	0.011	-	-	-	-	-	-	-	-	-	-	-
HCM Control Delay (s)	-	-	-	12.7	10.6	8.4	0	-	-	-	-	-	-	-	-	-	-
HCM Lane LOS	-	-	-	B	B	A	A	-	-	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0.2	0	-	-	-	-	-	-	-	-	-	-	-
Notes																	
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon																	

APPENDIX B: EXISTING LOS WORKSHEETS



HCM 6th TWSC
2: Sea Life Park Driveway & Kalanianole Hwy

HCM 6th TWSC
1: Kalanianole Hwy & Sea Life Park Driveway

Existing Conditions
WKDY MD

Existing Conditions
SAT MD

Intersection	Int Delay, s/veh											
	0.4											
Movement	EBT	EBR	WBL	WBT	NBL	NBR						
Lane Configurations	↑	↑	↑	↑	↑	↑						
Traffic Vol, veh/h	323	7	5	472	13	13						
Future Vol, veh/h	323	7	5	472	13	13						
Conflicting Peds, #/hr	0	2	0	0	2	0						
Sign Control	Free	Free	Free	Free	Stop	Stop						
RT Channelized	-	None	-	None	-	Stop						
Storage Length	-	170	-	-	-	0						
Veh in Median Storage, #	0	-	-	0	0	-						
Grade, %	0	-	-	0	0	-						
Peak Hour Factor	93	93	93	93	93	93						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	347	8	5	508	14	14						
Major/Minor	Major1	Major2	Minor1									
Conflicting Flow All	0	0	357	0	869	349						
Stage 1	-	-	-	-	349	-						
Stage 2	-	-	-	-	520	-						
Critical Hwy	-	-	4.12	-	6.42	6.22						
Critical Hwy Stg 1	-	-	-	-	5.42	-						
Critical Hwy Stg 2	-	-	-	-	5.42	-						
Follow-up Hwy	-	-	2.218	-	3.518	3.318						
Pot Cap-1 Maneuver	-	-	1202	-	322	684						
Stage 1	-	-	-	-	714	-						
Stage 2	-	-	-	-	597	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	-	-	1200	-	319	683						
Mov Cap-2 Maneuver	-	-	-	-	319	-						
Stage 1	-	-	-	-	708	-						
Stage 2	-	-	-	-	596	-						
Approach	EB	WB	NB									
HCM Control Delay, s	0	0.1	10.9									
HCM LOS	B											
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT							
Capacity (veh/h)	638	-	-	1200	-							
HCM Lane V/C Ratio	0.044	-	-	0.004	-							
HCM Control Delay (s)	10.9	-	-	8	0							
HCM Lane LOS	B	-	-	A	A							
HCM 95th %tile Q(veh)	0.1	-	-	0	-							

Intersection	Int Delay, s/veh											
	2											
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations												
Traffic Vol, veh/h	6	1	7	31	2	44	26	570	56	25	475	
Future Vol, veh/h	6	1	7	31	2	44	26	570	56	25	475	
Conflicting Peds, #/hr	10	0	10	17	0	17	10	0	17	17	0	
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	Stop	-	-	Stop	-	Yield	-	-	None	
Storage Length	-	-	-	-	-	100	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	0	-	-	0	-	
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	7	1	8	34	2	48	28	620	61	27	516	
Major/Minor	Minor2	Minor1	Major1									
Conflicting Flow All	1279	1278	548	1317	1314	685	636	0	0	637	0	
Stage 1	585	585	-	724	724	-	-	-	-	-	-	
Stage 2	694	693	-	593	590	-	-	-	-	-	-	
Critical Hwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	
Critical Hwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	
Critical Hwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	
Follow-up Hwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	
Pot Cap-1 Maneuver	143	166	536	134	168	448	1032	-	-	947	-	
Stage 1	497	498	-	417	430	-	-	-	-	-	-	
Stage 2	433	445	-	492	495	-	-	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	116	151	522	121	144	434	1022	-	-	932	-	
Mov Cap-2 Maneuver	116	151	-	121	144	-	-	-	-	-	-	
Stage 1	479	473	-	399	412	-	-	-	-	-	-	
Stage 2	367	426	-	456	470	-	-	-	-	-	-	
Approach	EB	WB	NB									
HCM Control Delay, s	21	22.8	0.3									
HCM LOS	C											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1022	-	240	285	932	-	-	-				
HCM Lane V/C Ratio	0.028	-	0.063	0.294	0.029	-	-	-				
HCM Control Delay (s)	8.6	-	21	22.8	9	0	-	-				
HCM Lane LOS	A	-	C	C	A	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	0.2	1.2	0.1	-	-	-				

Intersection	0.6											
Int Delay, s/veh												
Movement	EBT	EBR	WBL	WBT	NBL	NBR						
Lane Configurations	↑	↑	↑	↑	↑	↑						
Traffic Vol, veh/h	466	9	4	607	12	49						
Future Vol, veh/h	466	9	4	607	12	49						
Conflicting Peds, #/hr	0	0	0	0	0	0						
Sign Control	Free	Free	Free	Free	Stop	Stop						
RT Channelized	-	None	-	None	-	Stop						
Storage Length	-	170	-	-	-	0						
Veh in Median Storage, #	0	-	-	0	0	-						
Grade, %	0	-	-	0	0	-						
Peak Hour Factor	90	90	90	90	90	90						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	518	10	4	674	13	54						
Major/Minor	Major1	Major2	Minor1									
Conflicting Flow All	0	0	528	0	1200	518						
Stage 1	-	-	-	-	518	-						
Stage 2	-	-	-	-	682	-						
Critical Hwy	-	-	4.12	-	6.42	6.22						
Critical Hwy Stg 1	-	-	-	-	5.42	-						
Critical Hwy Stg 2	-	-	-	-	5.42	-						
Follow-up Hwy	-	-	2.218	-	3.518	3.318						
Pot Cap-1 Maneuver	-	-	1039	-	204	558						
Stage 1	-	-	-	-	598	-						
Stage 2	-	-	-	-	502	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	-	-	1039	-	203	558						
Mov Cap-2 Maneuver	-	-	-	-	203	-						
Stage 1	-	-	-	-	594	-						
Stage 2	-	-	-	-	502	-						
Approach	EB	WB	NB									
HCM Control Delay, s	0	0.1	10.7									
HCM LOS	B											
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT							
Capacity (veh/h)	695	-	-	1039	-							
HCM Lane V/C Ratio	0.098	-	-	0.004	-							
HCM Control Delay (s)	10.7	-	-	8.5	0							
HCM Lane LOS	B	-	-	A	A							
HCM 95th %ile Q(veh)	0.3	-	-	0	-							



APPENDIX C: BASELINE (2025) LOS WORKSHEETS

Intersection													
Int Delay, s/veh 1.1													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SBR
Lane Configurations	+	+	+	+	+	+	+	+	+	+	+	+	+
Traffic Vol, veh/h	10	0	10	20	0	40	3	30	490	60	20	340	10
Future Vol, veh/h	10	0	10	20	0	40	3	30	490	60	20	340	10
Conflicting Peds, #/hr	8	0	8	4	0	4	4	8	0	4	4	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Stop	-	Stop	-	-	Yield	-	-	-	-	None
Storage Length	-	-	-	-	-	-	-	-	100	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0
Peak Hour Factor	95	95	95	95	95	95	92	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	11	21	0	42	3	32	516	63	21	358	11
Major/Minor	Minor2	Minor1	Major1	Major2	Minor1	Minor2	Major1	Major2	Minor1	Minor2	Major1	Major2	Minor1
Conflicting Flow All	1002	1004	380	1030	1041	560	-	377	0	0	520	0	0
Stage 1	414	414	-	616	622	-	-	-	-	-	-	-	-
Stage 2	588	590	-	414	419	-	-	-	-	-	-	-	-
Critical Hwy	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	4.12	-	-
Critical Hwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Critical Hwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Follow-up Hwy	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	221	242	667	212	230	528	-	1181	-	-	1046	-	-
Stage 1	616	593	-	478	479	-	-	-	-	-	-	-	-
Stage 2	495	495	-	616	590	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	196	233	657	202	221	522	-	~11	-	-	1042	-	-
Mov Cap-2 Maneuver	196	233	-	202	221	-	-	-	-	-	-	-	-
Stage 1	616	573	-	478	477	-	-	-	-	-	-	-	-
Stage 2	452	493	-	586	571	-	-	-	-	-	-	-	-
Approach	EB	WB	NB	WB	NB	SB	SB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	14.7	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6
HCM LOS	B	B	B	B	B	B	B	B	B	B	B	B	B
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR	NBLn1	EBR	WBR	WBT	WBT
Capacity (veh/h)	-	-	-	392	606	1042	-	-	568	-	-	1168	-
HCM Lane V/C Ratio	-	-	-	0.054	0.104	0.02	-	-	0.076	-	-	0.009	-
HCM Control Delay (s)	-	-	-	14.7	11.6	8.5	0	-	11.9	-	-	8.1	0
HCM Lane LOS	-	-	-	B	B	A	A	-	B	-	-	A	A
HCM 95th %ile Q(veh)	-	-	-	0.2	0.3	0.1	-	-	0.2	-	-	0	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

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Intersection													
Int Delay, s/veh 0.6													
Movement	EBT	EBR	WBT	WBR	NBL	NBR	WBT	WBR	NBL	NBR	WBT	WBR	NBL
Lane Configurations	+	+	+	+	+	+	+	+	+	+	+	+	+
Traffic Vol, veh/h	350	10	10	510	20	20	350	10	10	510	20	20	20
Future Vol, veh/h	350	10	10	510	20	20	350	10	10	510	20	20	20
Conflicting Peds, #/hr	0	2	0	2	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	Stop	-	None	-	Stop	-	Stop	Stop
Storage Length	-	170	-	-	-	0	-	-	-	0	-	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-	-	-	0	-	-	-
Grade, %	0	-	-	-	0	0	-	-	-	0	-	-	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	376	11	11	548	22	22	376	11	11	548	22	22	22
Major/Minor	Major1	Major2	Minor1	Minor2	Major1	Minor1	Major1	Major2	Minor1	Minor2	Major1	Minor1	Minor2
Conflicting Flow All	0	0	389	0	950	378	-	-	-	-	378	-	-
Stage 1	-	-	-	-	378	-	-	-	-	-	378	-	-
Stage 2	-	-	-	-	572	-	-	-	-	-	572	-	-
Critical Hwy	-	-	4.12	-	6.42	6.22	-	-	-	-	6.42	6.22	-
Critical Hwy Stg 1	-	-	-	-	5.42	-	-	-	-	-	5.42	-	-
Critical Hwy Stg 2	-	-	-	-	5.42	-	-	-	-	-	5.42	-	-
Follow-up Hwy	-	-	2.218	-	3.518	3.318	-	-	-	-	3.518	3.318	-
Pot Cap-1 Maneuver	-	-	1170	-	288	669	-	-	-	-	288	669	-
Stage 1	-	-	693	-	565	-	-	-	-	-	693	565	-
Stage 2	-	-	-	-	565	-	-	-	-	-	565	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1168	-	284	668	-	-	-	-	284	668	-
Mov Cap-2 Maneuver	-	-	-	-	284	-	-	-	-	-	284	-	-
Stage 1	-	-	-	-	682	-	-	-	-	-	682	-	-
Stage 2	-	-	-	-	564	-	-	-	-	-	564	-	-
Approach	EB	WB	NB	NB	WB	NB	WB	NB	WB	NB	WB	NB	NB
HCM Control Delay, s	0	0.2	0.2	11.9	11.9	11.9	0.2	0.2	0.2	11.9	11.9	11.9	11.9
HCM LOS	B	B	B	B	B	B	B	B	B	B	B	B	B
Minor Lane/Major Mvmt	NBLn1	EBR	WBR	WBT	WBT	WBT	NBLn1	EBR	WBR	WBT	WBT	WBT	WBT
Capacity (veh/h)	568	-	-	1168	-	-	568	-	-	1168	-	-	-
HCM Lane V/C Ratio	0.076	-	-	0.009	-	-	0.076	-	-	0.009	-	-	-
HCM Control Delay (s)	11.9	-	-	8.1	-	-	11.9	-	-	8.1	-	-	0
HCM Lane LOS	B	-	-	A	-	-	B	-	-	A	-	-	A
HCM 95th %ile Q(veh)	0.2	-	-	0	-	-	0.2	-	-	0	-	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

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Intersection													
Int Delay, s/veh													
3.8													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	10	2	10	40	3	50	30	620	70	30	510	10	
Traffic Vol, veh/h	10	2	10	40	3	50	30	620	70	30	510	10	
Future Vol, veh/h	10	2	10	40	3	50	30	620	70	30	510	10	
Conflicting Peds, #/hr	10	0	10	17	0	17	10	0	17	17	0	10	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	Stop	-	Stop	-	Yield	-	-	-	-	None	
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	0	-	0	-	0	-	
Grade, %	-	0	-	0	-	0	-	0	-	0	-	0	
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	11	2	11	43	3	54	33	674	76	33	554	11	
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2							
Conflicting Flow All	1395	1393	587	1439	1436	746	575	0	0	691	0	0	
Stage 1	636	636	-	795	795	-	-	-	-	-	-	-	
Stage 2	759	757	-	644	641	-	-	-	-	-	-	-	
Critical Hwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-	
Critical Hwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Critical Hwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Follow-up Hwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-	
Pot Cap-1 Maneuver	119	142	510	111	133	413	998	-	-	904	-	-	
Stage 1	466	472	-	381	399	-	-	-	-	-	-	-	
Stage 2	399	416	-	461	469	-	-	-	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	92	127	497	97	119	400	988	-	-	889	-	-	
Mov Cap-2 Maneuver	92	127	-	97	119	-	-	-	-	-	-	-	
Stage 1	446	442	-	362	380	-	-	-	-	-	-	-	
Stage 2	325	396	-	418	439	-	-	-	-	-	-	-	
Approach	EB	WB	NB	NB	SB	SB							
HCM Control Delay, s	28.5	44	44	0.4	0.4	0.5							
HCM LOS	D	E	E										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	988	-	-	177	189	889	-	-					
HCM Lane V/C Ratio	0.033	-	-	0.135	0.535	0.037	-	-					
HCM Control Delay (s)	8.8	-	-	28.5	44	9.2	0	-					
HCM Lane LOS	A	-	-	D	E	A	A	-					
HCM 95th %tile Q(veh)	0.1	-	-	0.5	2.8	0.1	-	-					

Intersection													
Int Delay, s/veh													
0.8													
Movement	EBT	EBR	WBL	WBT	NBL	NBR							
Lane Configurations	↑	↑	10	10	660	20	60			↑	↑	↑	↑
Traffic Vol, veh/h	500	10	10	660	20	60				660	20	60	
Future Vol, veh/h	500	10	10	660	20	60				660	20	60	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None	-	None	-	None	-	None	-
Storage Length	-	170	-	-	-	0	-	0	-	-	0	-	-
Veh in Median Storage, #	0	-	-	-	0	0	-	0	-	0	-	0	-
Grade, %	0	-	-	0	-	0	-	0	-	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	556	11	11	733	22	67				733	22	67	
Major/Minor	Major1	Major2	Minor1	Minor1									
Conflicting Flow All	0	0	567	0	1311	556							
Stage 1	-	-	-	-	556	-							
Stage 2	-	-	-	-	755	-							
Critical Hwy	-	-	4.12	-	6.42	6.22							
Critical Hwy Stg 1	-	-	-	-	5.42	-							
Critical Hwy Stg 2	-	-	-	-	5.42	-							
Follow-up Hwy	-	-	2.218	-	3.518	3.318							
Pot Cap-1 Maneuver	-	-	1005	-	175	531							
Stage 1	-	-	-	-	574	-							
Stage 2	-	-	-	-	464	-							
Platoon blocked, %	-	-	-	-	-	-							
Mov Cap-1 Maneuver	-	-	1005	-	172	531							
Mov Cap-2 Maneuver	-	-	-	-	172	-							
Stage 1	-	-	-	-	574	-							
Stage 2	-	-	-	-	456	-							
Approach	EB	WB	NB	NB									
HCM Control Delay, s	0	0.1	0.1	11									
HCM LOS			B										
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT								
Capacity (veh/h)	688	-	-	1005	-								
HCM Lane V/C Ratio	0.129	-	-	0.011	-								
HCM Control Delay (s)	11	-	-	8.6	0								
HCM Lane LOS	B	-	-	A	A								
HCM 95th %tile Q(veh)	0.4	-	-	0	-								

Intersection													
Int Delay, s/veh 1.6													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SBR
Lane Configurations													
Traffic Vol, veh/h	23	1	24	20	1	40	3	35	491	60	20	331	12
Future Vol, veh/h	23	1	24	20	1	40	3	35	491	60	20	331	12
Conflicting Peds, #/hr	8	0	8	4	0	4	4	8	0	4	4	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Stop	-	Stop	-	-	Yield	-	-	-	-	None
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0	-
Peak Hour Factor	95	95	95	95	95	92	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	1	25	21	1	42	3	37	517	63	21	348	13
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2	Major2	Major2	Major2	Major2	Major2	Major2	Major2
Conflicting Flow All	1005	1006	371	1032	1044	561	-	369	0	0	521	0	0
Stage 1	405	601	-	627	633	-	-	-	-	-	-	-	-
Stage 2	600	601	-	405	411	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	220	241	675	211	229	527	-	1190	-	-	1045	-	-
Stage 1	622	598	-	471	473	-	-	-	-	-	-	-	-
Stage 2	488	489	-	622	595	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	195	232	665	196	221	521	-	-12	-	-	1041	-	-
Mov Cap-2 Maneuver	195	232	665	196	221	521	-	-12	-	-	1041	-	-
Stage 1	622	578	-	471	471	-	-	-	-	-	-	-	-
Stage 2	444	487	-	578	575	-	-	-	-	-	-	-	-
Approach	EB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	15.5	12.1	12.1	12.1	12.1	12.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
HCM LOS	C	B	B	B	B	B	C	C	C	C	C	C	C
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	NBLn1	SBL	SBT	SBR	SBT	SBR	SBT	SBR
Capacity (veh/h)	-	-	-	383	572	1041	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	0.129	0.112	0.02	-	-	-	-	-	-	-
HCM Control Delay (s)	-	-	-	15.5	12.1	8.5	0	0	0	0	0	0	0
HCM Lane LOS	-	-	-	C	B	A	A	A	A	A	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.4	0.4	0.1	-	-	-	-	-	-	-
Notes	~ Volume exceeds capacity \$ Delay exceeds 300s +- Computation Not Defined *- All major volume in platoon												

Intersection													
Int Delay, s/veh 0.4													
Movement	EBT	EBR	WBT	WBR	NBT	NBR	NBR	NBR	NBR	NBR	NBR	NBR	NBR
Lane Configurations													
Traffic Vol, veh/h	352	12	11	523	12	11							
Future Vol, veh/h	352	12	11	523	12	11							
Conflicting Peds, #/hr	0	2	0	0	0	2	0	0	2	0	0	2	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None	-	None	-	None	-	None	-
Storage Length	-	170	-	-	-	0	-	0	-	-	-	0	-
Veh in Median Storage, #	0	-	-	-	0	0	-	0	-	-	-	0	-
Grade, %	0	-	-	-	0	0	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	378	13	12	562	13	12							
Major/Minor	Major1	Major2	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1
Conflicting Flow All	0	0	393	0	968	380							
Stage 1	-	-	-	-	380	-							
Stage 2	-	-	-	-	588	-							
Critical Hdwy	-	-	-	4.12	-	6.42	6.22						
Critical Hdwy Stg 1	-	-	-	-	-	5.42	-						
Critical Hdwy Stg 2	-	-	-	-	-	5.42	-						
Follow-up Hdwy	-	-	-	2.218	-	3.518	3.318						
Pot Cap-1 Maneuver	-	-	-	1166	-	282	667						
Stage 1	-	-	-	691	-	555	-						
Stage 2	-	-	-	1164	-	277	666						
Platoon blocked, %	-	-	-	-	-	-	-						
Mov Cap-1 Maneuver	-	-	-	1164	-	277	666						
Mov Cap-2 Maneuver	-	-	-	1164	-	277	666						
Stage 1	-	-	-	690	-	546	-						
Stage 2	-	-	-	1166	-	282	667						
Approach	EB	WB	WB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
HCM Control Delay, s	0	0.2	0.2	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
HCM LOS	B	B	B	B	B	B	B	B	B	B	B	B	B
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBT	WBT	WBT	WBT	WBT	WBT	WBT	WBT	WBT
Capacity (veh/h)	531	-	-	1164	-	-	1164	-	-	-	1164	-	-
HCM Lane V/C Ratio	0.047	-	-	0.01	-	-	0.01	-	-	-	0.01	-	-
HCM Control Delay (s)	12.1	-	-	8.1	-	-	8.1	-	-	-	8.1	-	-
HCM Lane LOS	B	-	-	A	-	-	A	-	-	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-	-	0	-	-	-	0	-	-
Notes	~ Volume exceeds capacity \$ Delay exceeds 300s +- Computation Not Defined *- All major volume in platoon												

Intersection													
Int Delay, s/veh													
5													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Vol, veh/h	23	3	71	40	4	50	35	621	70	30	461	12	
Future Vol, veh/h	23	3	71	40	4	50	35	621	70	30	461	12	
Conflicting Peds, #/hr	10	0	10	17	0	17	10	0	17	17	0	10	
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	
RT Channelized	-	-	Stop	-	-	Stop	-	Yield	-	-	-	None	
Storage Length	-	-	-	-	-	-	-	100	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	25	3	77	43	4	54	38	675	76	33	501	13	
Major/Minor	Minor2	Minor1	Minor1	Major1	Major1	Major2							
Conflicting Flow All	1354	1352	535	1398	1396	747	524	0	0	692	0	0	
Stage 1	584	584	-	806	806	-	-	-	-	-	-	-	
Stage 2	770	768	-	592	590	-	-	-	-	-	-	-	
Critical Hwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-	
Critical Hwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Critical Hwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	
Follow-up Hwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-	
Pot Cap-1 Maneuver	127	150	545	118	141	413	1043	-	-	903	-	-	
Stage 1	498	498	-	376	395	-	-	-	-	-	-	-	
Stage 2	393	411	-	493	495	-	-	-	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	97	133	531	89	125	400	1033	-	-	888	-	-	
Mov Cap-2 Maneuver	97	133	-	89	125	-	-	-	-	-	-	-	
Stage 1	475	468	-	356	374	-	-	-	-	-	-	-	
Stage 2	318	390	-	390	465	-	-	-	-	-	-	-	
Approach	EB	WB	WB	NB	NB	SB	SB						
HCM Control Delay, s	18.4	51	51	0.4	0.4	0.5	0.5						
HCM LOS	C	F	F	C	C	C	C						
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1033	-	-	374	175	888	-	-					
HCM Lane V/C Ratio	0.037	-	-	0.282	0.584	0.037	-	-					
HCM Control Delay (s)	8.6	-	-	18.4	51	9.2	0	-					
HCM Lane LOS	A	-	-	C	F	A	A	-					
HCM 95th %tile Q(veh)	0.1	-	-	1.1	3.1	0.1	-	-					

Intersection													
Int Delay, s/veh													
0.4													
Movement	EBT	EBR	WBL	WBT	NBL	NBR							
Lane Configurations	↔	↔	↔	↔	↔	↔							
Traffic Vol, veh/h	502	12	11	673	12	11							
Future Vol, veh/h	502	12	11	673	12	11							
Conflicting Peds, #/hr	0	0	0	0	0	0							
Sign Control	Free	Free	Free	Free	Free	Stop							
RT Channelized	-	None	-	None	-	Stop							
Storage Length	-	170	-	-	-	0							
Veh in Median Storage, #	0	-	-	0	0	0							
Grade, %	0	-	-	0	0	0							
Peak Hour Factor	90	90	90	90	90	90							
Heavy Vehicles, %	2	2	2	2	2	2							
Mvmt Flow	558	13	12	748	13	12							
Major/Minor	Major1	Major2	Minor1										
Conflicting Flow All	0	0	571	0	1330	558							
Stage 1	-	-	-	-	558	-							
Stage 2	-	-	-	-	772	-							
Critical Hwy	-	-	4.12	-	6.42	6.22							
Critical Hwy Stg 1	-	-	-	-	5.42	-							
Critical Hwy Stg 2	-	-	-	-	5.42	-							
Follow-up Hwy	-	-	2.218	-	3.518	3.318							
Pot Cap-1 Maneuver	-	-	1002	-	171	529							
Stage 1	-	-	-	-	573	-							
Stage 2	-	-	-	-	456	-							
Platoon blocked, %	-	-	-	-	-	-							
Mov Cap-1 Maneuver	-	-	1002	-	168	529							
Mov Cap-2 Maneuver	-	-	-	-	168	-							
Stage 1	-	-	-	-	573	-							
Stage 2	-	-	-	-	447	-							
Approach	EB	WB	WB	NB	NB								
HCM Control Delay, s	0	0.1	0.1	17.1	17.1								
HCM LOS	C	C	C	C	C								
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT								
Capacity (veh/h)	322	-	-	1002	-								
HCM Lane V/C Ratio	0.079	-	-	0.012	-								
HCM Control Delay (s)	17.1	-	-	8.6	0								
HCM Lane LOS	C	-	-	A	A								
HCM 95th %tile Q(veh)	0.3	-	-	0	-								



Type **Uncontrolled Intersection**

Input Parameters	Value	Intersection Characteristics	Yes	No
Speed Limit	35	Frequent at-grade transit?	<input type="radio"/>	<input checked="" type="radio"/>
Peak Hour Pedestrian Vol	18	Bicycle lanes?	<input type="radio"/>	<input checked="" type="radio"/>
Major Road Peak Hour Volume Total	1,006	Heavy bicycle traffic?	<input type="radio"/>	<input checked="" type="radio"/>
Major Road Peak Hour Vol Dir 1	475	Major/minor road intersection?	<input checked="" type="radio"/>	<input type="radio"/>
Major Road Peak Hour Vol Dir 2	531	Midblock/off-set intersection?	<input type="radio"/>	<input checked="" type="radio"/>
Avg Pedestrian Walking Speed	3	Heavy truck traffic?	<input type="radio"/>	<input checked="" type="radio"/>
15th Percentile Crossing Speed	3	Existing infrastructure limit treatments?	<input type="radio"/>	<input checked="" type="radio"/>
Ped start-up/end clearance time	5	On-street parking?	<input type="radio"/>	<input checked="" type="radio"/>
Pedestrian Crossing Distance	55	Downtown area?	<input type="radio"/>	<input checked="" type="radio"/>
1st Half Crossing Distance	25	Built-up area of an isolated community?	<input type="radio"/>	<input checked="" type="radio"/>
2nd Half Crossing Distance	30	Median refuge island?	<input type="radio"/>	<input checked="" type="radio"/>
Number of Lanes	3	Sufficient width for a median?	<input type="radio"/>	<input checked="" type="radio"/>
Actual Total Pedestrian Delay	0			
Expected Motorist Compliance	Moderate			

◀ 1 of 2 Recommendations ▶

RRFB

TREATMENT IDENTIFICATION MATRIX FOR UNCONTROLLED LOCATIONS			
PEDESTRIAN LEVEL OF SERVICE	EXPECTED MOTORIST COMPLIANCE		
	LOW (or Speed > 35 MPH)	MODERATE	HIGH
LOS A-D (average delay up to 30 seconds)	LEVEL 3 2 Lane Road: In-Pavement Flashers, Overhead Flashing Beacons Multi-Lane Road: RRFB Plus LEVELS 1 and 2	LEVEL 2 Curb Extensions, Bus Bulb, Reduced Curb Radii, Staggered Pedestrian Refuge Plus LEVEL 1	LEVEL 1 High Visibility Crosswalk Markings, Advanced Yield Lines, Advance Signage
LOS E-F (average delay greater than 30 seconds)	LEVEL 4 PHB*, RRFB, or Direct Pedestrians to Nearest Safe Crossing Plus LEVELS 1, 2, and 3	LEVEL 3 2 Lane Road: In-Pavement Flashers, Overhead Flashing Beacons Multi-Lane Road: RRFB Plus LEVELS 1 and 2	LEVEL 2 Curb Extensions, Bus Bulb, Reduced Curb Radii, Staggered Pedestrian Refuge Plus LEVEL 1

Signalized or Unsignalized Crossing?	Unsignalized Crossing
Pedestrian LOS	F
Candidate Pedestrian Treatment Identified	RRFB
Candidate for Median Refuge Island?	NO
Candidate for Road Diet?	NO
Other Treatments for Consideration**	2 lane road: In-pavement flashers, overhead flashing beacons; Multi-lane road: RRFB
Paired Treatments for Consideration**	Curb Extensions, Bus Bulb, Reduced Curb Radii, Staggered Pedestrian Refuge, High Visibility Crosswalk Markings, Advance Yield Lines, Advance signage

Fehr & Peers is monitoring ongoing discussions re: patent concerns for the RRFB and jurisdictions should consult legal counsel before installing the RRFB at this time.

APPENDIX D: PEDESTRIAN CROSSING TREATMENT ANALYSIS



FEHR PEERS

Project: Sea Life Park Renovation
 Scenario: 2025+P
 Peak Hour: MD Sat

Major Street: Kalanianoʻle Hwy
 Minor Street: Sea Life Dwy

Major Street Direction:

x North/South
 East/West

Turn Movement Volumes

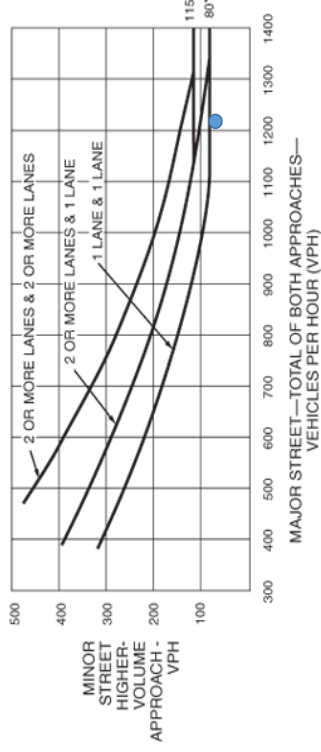
	NB	SB	EB	WB
Left	138	103	28	126
Through	2,488	1,885	6	8
Right	236	62	39	168
Total (vph)	716	513	18	76

	Major Street	Minor Street	Warrant Met
	Kalanianoʻle Hwy	Sea Life Dwy	
Number of Approach Lanes	1	1	No
Traffic Volume (VPH) *	1,228	76	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.

APPENDIX E: SIGNAL WARRANT ANALYSIS

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

