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748836

October 26, 2018

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

Dear Mr. Glenn:

Subject: Draft Environmental Impact Statement for the Waikiki War Memorial Complex

With this letter, the City and County of Honolulu, Department of Design and Construction, hereby transmits the documents package for the Draft Environmental Impact Statement for the Waikiki War Memorial Complex situated at TMKs (1) 3-1-031:003, 009, 010 in the Honolulu District on the Island of O'ahu for publication of a notice of availability for public comment for 45-days in the next available edition of the Environmental Notice. The draft EIS has included copies of all written comments received during the early consultation period and during the 30-day public consultation period for the FEA-EISPN.

Also enclosed is a searchable PDF distribution list for the verification of OEQC under Section 11-200-20, Hawai'i Administrative Rules. Upon receiving verification from OEQC (along with the bulletin proof of the notice containing the pertinent details for commenters), we will make the draft EIS and the bulletin proof available to those so indicated on the distribution list so that they will have the full 45-day statutory period to review and comment on the draft EIS.

Finally, enclosed is a completed OEQC Publication Form, a hard copy of the draft EIS, and three (3) compact disks each containing an Adobe Acrobat searchable PDF file of the draft EIS and an electronic copy of the publication form in MS Word.

If there are any questions, please contact Lansing Sugita at (808) 768-8461.

Sincerely,

Robert Kroning, P.E.
Director

RJK:ln

Enclosures
cc: Office of the Mayor

19-137

AGENCY
PUBLICATION FORM

Project Name:	Draft Environmental Impact Statement for the Waikiki War Memorial Complex
Project Short Name:	Waikiki War Memorial Complex
HRS §343-5 Trigger(s):	Use of State or County lands or funds, proposed use within the shoreline area, proposed use of registered historic site.
Island(s):	O'ahu
Judicial District(s):	Honolulu
TMK(s):	(1) 3-1-031:003, 009, 010
Permit(s)/Approval(s):	National Environmental Policy Act (NEPA); National Historic Preservation Act Section 106 consultation; Rivers and Harbors Act, Section 10 permit; Clean Water Act (CWA) Section 404 permit; CWA Section 402 NPDES permit; CWA Section 401 Water Quality Certification; Endangered Species Act Section 7 consultation; Essential Fish Habitat consultation; Fish and Wildlife Coordination Act consultation; HRS Chapter 6E review; Coastal Zone Management Federal Consistency Certification; Shoreline Setback Variance; SMA Permit (Major); Diamond Head Special District Permit; building, grading-grubbing, and demolition permits.
Proposing/Determining Agency:	City and County of Honolulu – Department of Design and Construction
Contact Name, Email, Telephone, Address	Lansing Sugita 650 South King Street, 11th Floor Honolulu, HI 96813 808-768-8480
Accepting Authority:	Office of the Mayor of the City and County of Honolulu
Contact Name, Email, Telephone, Address	Kirk Caldwell, Mayor 650 South King Street, 11th Floor Honolulu, HI 96813
Consultant:	AECOM Technical Services, Inc.
Contact Name, Email, Telephone, Address	Lesley Matsumoto 1001 Bishop Street, 16th Floor Honolulu, HI 96813 WWMCNatatorium@aecom.com

Status (select one)	**Submittal Requirements**
____ DEA-AFNSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the proposing 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.
_X__DEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication

	in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
FEIS Statutory Acceptance	Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency actions.
____ Supplemental EIS determination	The accepting authority simultaneously transmits its notice to both the proposing agency 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

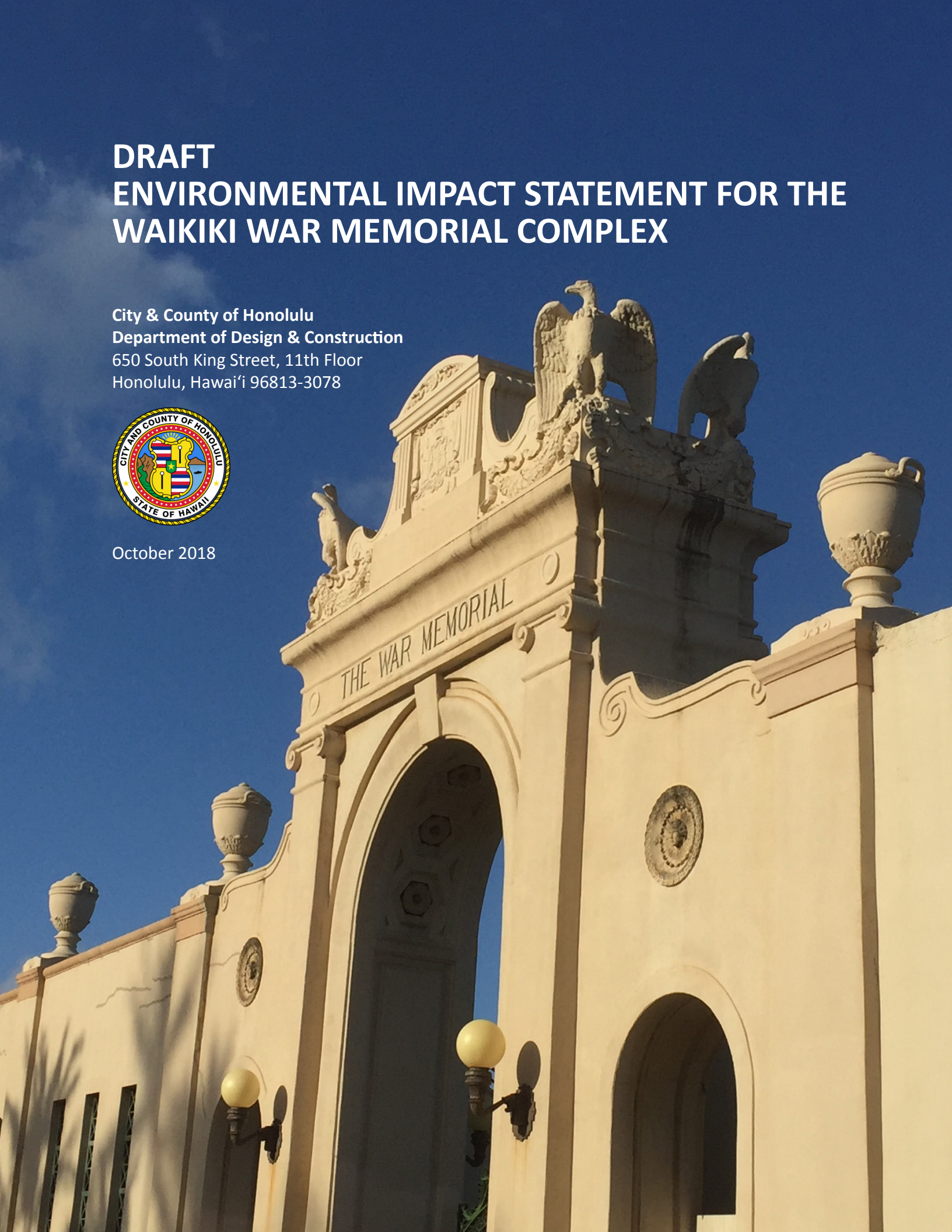
The City and County of Honolulu Department of Design and Construction (City) proposes to remedy the current deteriorated state of the Waikiki War Memorial Complex (WWMC) Natatorium in a manner that renews the memorial to World War I veterans and reestablishes public access to this portion of Kapiʻolani Regional Park. The Natatorium was constructed in 1927 as a monument to Hawaiʻi's men and women that served during World War I. The facility consists of a saltwater swimming pool, bleachers, restrooms, and an area currently used as office space.

The City's proposed action is to construct and operate a rehabilitated WWMC as described by the Perimeter Deck in this EIS. This action would comply with the rehabilitation approach outlined in the United States Secretary of Interior's Standards for the Treatment of Historic Properties. It would retain as much of the physical structure that defines the historic integrity of the Natatorium as possible without subjecting the Natatorium to the State requirements for public swimming pools, Hawaiʻi Administrative Rules Title 11, Chapter 10.

DRAFT
ENVIRONMENTAL IMPACT STATEMENT FOR THE WAIKIKI WAR MEMORIAL COMPLEX

City & County of Honolulu
Department of Design & Construction
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813-3078

October 2018



DRAFT
ENVIRONMENTAL IMPACT STATEMENT FOR THE WAIKIKI WAR MEMORIAL COMPLEX

Prepared for:

City & County of Honolulu
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, Hawai‘i 96813-3078

Prepared by:

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1001 Bishop Street, Suite 1600
Honolulu, Hawai‘i 96813-3698

Under contract to:

WCP, Inc.
99-061 Koaha Way, Suite 208
‘Aiea, Hawai‘i 96701-5626

October 2018

Cover photo by: AECOM Technical Services, Inc.

SUMMARY SHEET

Project Name	Waikiki War Memorial Complex
Proposed Action	The City's proposed action is to construct and operate a rehabilitated WWMC as presented in the Perimeter Deck described in this EIS. This action would comply with the rehabilitation approach outlined in the United States Secretary of Interior's *Standards for the Treatment of Historic Properties*. It would retain as much of the physical structure that defines the historic integrity of the Natatorium as possible without subjecting the Natatorium to the State requirements for public swimming pools, Hawai'i Administrative Rules Title 11, Chapter 10.
Significant Benefits & Adverse Impacts (see Chapter 4 for supporting information)	Significant Benefits: Water quality, historic and cultural resources, visual and aesthetic resources. Significant Adverse Impacts: None identified.
Proposed Mitigation Measures	Water quality and protection of marine and terrestrial biological species: To be determined during the USACE permit process and associated federal consultations, application to DOH for authorization of a Water Quality Certification, and National Pollutant Dispersion Elimination Permit authorization. Additional mitigation has been identified for exceptional trees in Section 4.11.2. Historic and cultural resources: To be determined during the HRS Chapter 6E historic preservation review process with the State Historic Preservation Division and when the lead federal agency is involved (expected to be USACE), under the National Historic Preservation Act Section 106 consultation process.
Alternatives Considered	War Memorial Beach Closed System Pool No Action
Unresolved Issues	Sea Level Rise: Any fixed shoreline structure would need continued management. This issue involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.
Compatibility with Land Use, Plans, & Policies	The proposed action would be consistent with policies/objectives that strive to preserve historic resources, and those that strive to preserve coastal zone uses and protect coastal resources.

List of Permits/Approvals	Federal: • National Environmental Policy Act (NEPA) (Lead Federal Agency, anticipated to be USACE) • National Historic Preservation Act (NHPA) Section 106 consultation (State Historic Preservation Officer) • Rivers and Harbors Act, Section 10 permit (USACE) • Clean Water Act (CWA) Section 404 permit (USACE) • Endangered Species Act (ESA), Section 7 consultation (National Marine Fisheries Service [NMFS] and possibly United States Fish and Wildlife Service [USFWS]) • Essential Fish Habitat (EFH) consultation (NMFS) • Fish and Wildlife Coordination Act of 1980 (USACE) State: • HRS Chapter 343 Environmental Impact Statement (DDC) • HRS Chapter 6E Historic Preservation Review (SHPD) • CWA Section 401 Water Quality Certification (Department of Health [DOH]) • CWA Section 402 National Pollutant Discharge Elimination System (NPDES) permit (DOH) • Coastal Zone Management Act, Federal Consistency Certification (DBEDT OP) County: • Shoreline Setback Variance and Certified Shoreline (DPP) • Revised Ordinances of Honolulu Chapter 21A Flood Hazard Areas Permit (DPP) • Special Management Area Permit (DPP) • Diamond Head Special District Permit (DPP) • Building, demolition, and grading permits (DPP)

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS XI

EXECUTIVE SUMMARY XIII

1.0 INTRODUCTION 1-1

1.1 Project Summary 1-1
1.2 Scope and Authority 1-1
1.3 Project Site, Facilities, and Surrounds 1-1
1.3.1 Project Site 1-1
1.3.2 Facilities 1-2
1.3.3 Surrounds 1-2
1.4 Project History and Background 1-2
1.4.1 Development of the Natatorium 1-2
1.4.2 Chronology Summary of Structure-Maintenance Issues and Past Plans 1-4
1.4.3 Alternative Use Study and Task Force Summary Report of 2009 1-7
1.4.4 2014 Final Environmental Assessment – Environmental Impact Statement Preparation Notice (FEA-EISPN) 1-8
1.4.5 2016 HRS Chapter 6E (Historic Preservation) Consultation 1-8
1.4.6 2017 HRS Chapter 6E (Historic Preservation) Consultation 1-9
1.4.7 Current Conditions 1-12

2.0 PURPOSE AND NEED 2-1

2.1 Purpose 2-1
2.2 Need 2-1

3.0 PROPOSED ACTION AND ALTERNATIVES 3-1

3.1 Proposed Action – Perimeter Deck 3-1
3.1.1 Construction Activities 3-4
3.1.2 Operational Activities 3-8
3.2 2014 FEA-EISPN Alternatives 3-8
3.2.1 War Memorial Beach 3-9
3.2.2 Closed System Pool 3-15
3.2.3 No Action 3-20
3.3 Alternatives Considered but not Further Evaluated in the EIS 3-21
3.3.1 Postponing Action Pending Further Study 3-21
3.3.2 Alternative Location for the Proposed Project 3-21
3.3.3 Other Alternatives Previously Considered 3-22
3.4 Estimated Project Costs and Funding Sources 3-22
3.4.1 Perimeter Deck (Proposed Action) 3-23
3.4.2 War Memorial Beach 3-23
3.4.3 Closed System Pool 3-23
3.4.4 No Action 3-24
3.5 Management Measures 3-24

4.0 AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES (DIRECT, INDIRECT, AND CUMULATIVE) 4-1

4.1 Land Ownership and Management 4-1
4.1.1 Affected Environment 4-1
4.1.2 Potential Environmental Consequences 4-11
4.2 Infrastructure and Utilities 4-15
4.2.1 Affected Environment 4-15
4.2.2 Potential Environmental Consequences 4-16
4.3 Transportation 4-20
4.3.1 Affected Environment 4-20
4.3.2 Potential Environmental Consequences 4-25
4.4 Noise 4-27
4.4.1 Affected Environment 4-27
4.4.2 Potential Environmental Consequences 4-28
4.5 Climate and Air Quality 4-31
4.5.1 Affected Environment 4-31
4.5.2 Potential Environmental Consequences 4-33
4.6 Topography, Geology, and Hydrology 4-37
4.6.1 Affected Environment 4-37
4.6.2 Potential Environmental Consequences 4-39
4.7 Natural Hazards 4-41
4.7.1 Affected Environment 4-41
4.7.2 Potential Environmental Consequences 4-44
4.8 Nearshore Physical Environment and Sea Level Rise 4-46
4.8.1 Affected Environment 4-46
4.8.2 Potential Environmental Consequences 4-51
4.9 Water Quality 4-55
4.9.1 Affected Environment 4-55
4.9.2 Potential Environmental Consequences 4-59
4.10 Marine Biology 4-63
4.10.1 Affected Environment 4-63
4.10.2 Potential Environmental Consequences 4-77
4.11 Terrestrial Biology 4-90
4.11.1 Affected Environment 4-90
4.11.2 Potential Environmental Consequences 4-95
4.12 Historic and Cultural Resources 4-98
4.12.1 Affected Environment 4-98
4.12.2 Potential Environmental Consequences 4-111
4.13 Visual Resources 4-118
4.13.1 Affected Environment 4-118
4.13.2 Potential Environmental Consequences 4-126
4.14 Public Services 4-129
4.14.1 Affected Environment 4-129
4.14.2 Potential Environmental Consequences 4-130
4.15 Socioeconomics and Recreation 4-132
4.15.1 Affected Environment 4-132
4.15.2 Potential Environmental Consequences 4-134
4.16 Cumulative Impacts 4-137

4.16.1 Other Planned or Programmed Projects 4-137
4.16.2 Cumulative Impacts by Resource 4-139

5.0 CONSISTENCY WITH PLANS AND POLICIES 5-1

5.1 State Plans and Policies 5-1
5.1.1 Hawai‘i Environmental Policy Act 5-1
5.1.2 Hawai‘i State Plan 5-1
5.1.3 State Functional Plans 5-6
5.1.4 Coastal Zone Management Act 5-9
5.2 County Plans and Policies 5-14
5.2.1 City and County of Honolulu General Plan 5-14
5.2.2 Primary Urban Center Development Plan 5-17
5.3 Federal, State and County Permits Required for the Proposed Action 5-18
5.3.1 Federal 5-18
5.3.2 State of Hawai‘i 5-19
5.3.3 City and County of Honolulu 5-19

6.0 OTHER CONSIDERATIONS 6-1

6.1 Irreversible and Irretrievable Commitments of Resources 6-1
6.2 Probable Adverse Environmental Effects that Cannot Be Avoided 6-1
6.2.1 Unavoidable Adverse Short-Term Effects 6-1
6.2.2 Unavoidable Adverse Long-Term Impacts 6-2
6.3 Unresolved Issues 6-2

7.0 PUBLIC PARTICIPATION 7-1

7.1 FEA-EISPN 7-1
7.2 HRS Chapter 6E Consultation 7-5

8.0 SUMMARY OF IMPACTS 8-1

9.0 REFERENCES 9-1

FIGURES

2-1 Existing Conditions Showing Deteriorated Conditions 2-2

3-1 Perimeter Deck – Proposed Changes (Plan View) 3-2

3-2 Perimeter Deck – Section A-A 3-2

3-3 Perimeter Deck – Section B-B 3-3

3-4 Perimeter Deck – Section C-C 3-3

3-5 Perimeter Deck – Section D-D 3-4

3-6 War Memorial Beach – Proposed Changes (Plan View) 3-9

3-7 Closed System Pool – Proposed Changes (Plan View) 3-15

4-1 Land Ownership 4-2

4-2 Kapi‘olani Trust Managed Lands 4-3

4-3 State Land Use 4-5

4-4 County Land Use Zoning 4-6

4-5	Special Management Area	4-10
4-6	2018 Transportation Counts	4-22
4-7	Construction Equipment Noise Levels	4-29
4-8	Topography and Bathymetry	4-38
4-9	Flood Map (DFIRM)	4-42
4-10	Sea Level Rise Exposure	4-50
4-11	Water Quality Classifications	4-57
4-12	Water Quality Sample Locations	4-58
4-13	Marine Managed Areas	4-65
4-14	Benthic Habitats	4-68
4-15	Marine Survey Areas	4-69
4-16	Arbor supporting vining hau trees in front of the decorative perimeter wall	4-92
4-17	Coconut trees dotting the lawn and picnic area	4-93
4-18	True kamani tree located in the lawn and picnic area	4-93
4-19	One of the two exceptional banyan trees	4-94
4-20	Natatorium under construction in 1927 off the shoreline at the time, viewed from what is now Sans Souci Beach Park	4-99
4-21	Undated historical photograph of the Natatorium's mauka façade, with clock and diving tower	4-100
4-22	Young swimmers diving in at the Natatorium, undated, c. 1930s	4-100
4-23	Project Area, HRS Chapter 6E	4-103
4-24	Archaeological Site 50-8014-7211	4-105
4-25	Historic Properties – Natatorium and Kapiʻolani Regional Park	4-107
4-26	Paddleboarders at the Natatorium, 1940	4-108
4-27	Kodak Hula Show c. 1950; performers on the lawn near the Natatorium	4-109
4-28	Keiki swimming at the Natatorium, undated (c. 1930s)	4-110
4-29	Keiki learning to swim at the Natatorium in the 1930s, where teachers suspend them in the water by ropes to teach them to coordinate their arm and leg movements	4-111
4-30	Views and Photo Points	4-119

TABLES

1-1	Summary of the structural conditions of the Natatorium, 2004	1-7
3-1	Typical Construction Activities – Perimeter Deck	3-5
3-2	Typical Construction Activities – War Memorial Beach	3-10

3-3	Typical Construction Activities – Closed System Pool	3-16
4-1	Land Use Designations	4-7
4-2	P-2 District Development Standards	4-7
4-3	Existing Weekday Peak Hour Intersection Operations	4-24
4-4	Existing Weekend Midday Peak Hour Intersection Operations	4-24
4-5	Historical water levels (1983–2001) for Honolulu Harbor tide station	4-47
4-6	Design Wave Heights	4-48
4-7	Mean values for water quality parameters sampled around the WWMC	4-58
4-8	Management Unit Species (MUS) for Western Pacific as Established by the WPRFMC FMP	4-66
4-9	Location and size classes of corals observed in the Natatorium's Interior (Area A), October 2010	4-70
4-10	Number of colonies by size class for each coral taxon observed in the Natatorium's exterior	4-70
4-11	Functional hearing groups for species present in the project vicinity	4-75
4-12	TTS and PTS SEL thresholds for marine mammals by functional group (dB)	4-76
4-13	PTS and TTS thresholds for fish based on fish mass for impulsive sounds (dB)	4-77
4-14	Views	4-120
4-15	Visitor Estimates to the Project Area	4-133
7-1	2014 EISPN Comments by Resource/Issue	7-2
8-1	Summary of Potential Impacts	8-1

APPENDIXES

A	Public Involvement/Consultation
B	Transportation Impact Assessment Report
C	Acoustic Study
D	Geotechnical Exploration and Foundation Evaluation Report (Yogi Kwong Engineers, LLC 2011)
E	Coastal Assessment and Basis of Design
F	Marine Biological and Water Quality Surveys
G	Archaeological Inventory Survey
H	Cultural Impact Assessment

PHOTOS

4-1	View from the paved walkway near the northeast corner of the WWMC towards Kapiʻolani Regional Park mauka of Kalakaua Avenue, with Leahi crater visible in the distance	4-121
4-2	View of Leahi crater from the unpaved walkway at WWMC adjacent to Sans Souci Beach, partially obscured by trees	4-122
4-3	View of Sans Souci Beach from the unpaved walkway at WWMC, adjacent to the beach	4-122
4-4	View of the Waikiki shoreline and distant city skyline from the end of the ramp at the north side of the WWMC	4-123
4-5	Natatorium façade from within WWMC in the vicinity of the Roll of Honor plaque	4-123
4-6	Mauka view from the Natatorium deck	4-124
4-7	Makai view from the Natatorium bleachers	4-124
4-8	View of the Natatorium façade and open lawn area of WWMC from Kalakaua Avenue	4-125
4-9	View of the Natatorium façade and open lawn area of WWMC from the mauka side of Kalakaua Avenue	4-125
4-10	View of WWMC from the north, on the shoreline promenade adjacent to the Waikiki Aquarium	4-126
4-11	View of WWMC from the southeast at Sans Souci Beach	4-126

ACRONYMS AND ABBREVIATIONS

˚F	degree Fahrenheit
ACHP	Advisory Council on Historic Preservation
AIS	archaeological inventory survey
BFE	base flood elevation
BMP	best management practice
CEQ	Council on Environmental Quality
City	Department of Design and Construction, City and County of Honolulu
cm	centimeter
CRE	Coral Reef Ecosystem
CWB	Clean Water Branch, Department of Health, State of Hawai‘i
dB	decibel
DLNR	Department of Land and Natural Resources, State of Hawai‘i
DNL	day-night average sound level
DOH	Department of Health, State of Hawai‘i
DPP	Department of Planning and Permitting, City and County of Honolulu
DPR	Department of Parks and Recreation, City and County of Honolulu
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
ENV	Department of Environmental Services, City and County of Honolulu
EPA	Environmental Protection Agency, United States
FEA	Final Environmental Assessment
FEMA	Federal Emergency Management Agency
FMP	Fishery Management Plan
FRP	fiberglass reinforced plastic
ft	foot or feet
FY	fiscal year
HAAQS	Hawai‘i Ambient Air Quality Standards
HAPC	Habitat Areas of Particular Concern
HAR	Hawai‘i Administrative Rules
HECO	Hawaiian Electric
HEPA	Hawai‘i Environmental Policy Act
HESD	Emergency Services Department, City and County of Honolulu
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
HRHP	Hawai‘i Register of Historic Places
HRS	Hawai‘i Revised Statutes
kg/ha	kilogram per hectare
LOS	level of service
MBTA	Migratory Bird Treaty Act
MHHW	mean higher high water
MHI	main Hawaiian Island
MLCD	Marine Life Conservation District
MLLW	mean lower low water

mph	mile per hour
MSL	mean sea level
MUS	Management Unit Species
NAAQS	National Ambient Air Quality Standards
NPDES	National Pollutant Discharge Elimination System
Natatorium	Waikiki War Memorial Natatorium
NHPA	National Historic Preservation Act
NMFS	NOAA National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NTHP	National Trust for Historic Preservation
NWHI	Northwestern Hawaiian Islands
OEQC	Office of Environmental Quality Control
PTS	permanent threshold shift
PUC	Primary Urban Center
rms	root mean square
ROH	Revised Ordinances of Honolulu
SHPD	State Historic Preservation Division
SLR	sea level rise
SOI	Secretary of Interior, United States
SPL	sound pressure level
SSV	Shoreline Setback Variance
st. dev	standard deviation
State	State of Hawai‘i
Territory	Territory of Hawai‘i
TMK	tax map key
TTS	temporary threshold shift
U.S.	United States
USACE	United States Army Corps of Engineers
WCP	Wil Chee Planning & Environmental, Inc.
WOTUS	waters of the United States
WQC	Water Quality Certification
WQS	Water Quality Standard
WWMC	Waikiki War Memorial Complex

EXECUTIVE SUMMARY

This Draft Environmental Impact Statement (EIS) was prepared in accordance with Hawai‘i Revised Statutes (HRS) Chapter 343, as implemented by Hawai‘i Administrative Rules (HAR) Title 11, Chapter 200. It follows the *Final Environmental Assessment-Environmental Impact Statement Preparation Notice (FEA-EISPN) for the Waikīkī War Memorial Complex, Honolulu, O‘ahu Island, Hawai‘i* (WCP 2014), which focused on the development of the War Memorial Beach and involved demolition of the Waikiki War Memorial Complex Natatorium (Natatorium).

Subsequent to the publication of the 2014 FEA-EISPN on July 23, 2014, the City initiated its HRS Chapter 6E consultation. In 2017, the City furthered its consultation by introducing the Perimeter Deck, which addresses some of the concerns from the historic partners without subjecting the Natatorium to the 2002 State of Hawaii Department of Health (DOH) rules for Public Swimming Pools, HAR Title 11, Chapter 10. Compliance with (or avoidance of) these rules became a key consideration, as they include saltwater swimming pool standards for water clarity and quality that have not been demonstrated to be achievable to date. The ocean-fed pool concept developed by Dr. Hans Krock and proposed for consideration to the City by the National Trust for Historic Preservation (NTHP) and supported by the Friends of the Natatorium is one such case.

The Natatorium was constructed in 1927 as a living monument to those persons from Hawai‘i that served during World War I. The Natatorium was listed on the Hawaii Register of Historic Places in 1973, listed on the National Register of Historic Places in 1980, and designated a National Treasure by the NTHP in 2014.

PURPOSE AND NEED

The purpose of the proposed action is to remedy the current deteriorated state of the Natatorium in a manner that renews the memorial to World War I veterans and reestablishes public access to this portion of Kapi‘olani Regional Park.

The proposed action is needed because the Natatorium currently poses a health and safety risk to area users due to the swim basin’s water quality and the facility’s deteriorated structural condition (Figure 1). Structural and water quality issues, attributed to improper initial design decisions and construction techniques, ultimately led to its closure in 1979. Over the years, both State and City funds have been allocated to determine feasible plans and initiate demolition and restoration at different times. Litigation by stakeholder groups has halted both demolition and restoration attempts. Without consensus on the fate of the Natatorium, water quality and structural issues have not been addressed and the facility continues to degrade. The Natatorium’s current condition is such that the City must periodically undertake emergency actions to mitigate imminently hazardous public safety conditions posed by the deteriorated structure. Further, in its current deteriorated state, the living memorial does not bestow the respect and honor due to our World War I veterans.

Figure 1: Existing Conditions

Source: Aerial imagery, Google Earth, January 2013.

PROPOSED ACTION

The City's proposed action is to construct and operate a rehabilitated WWMC as presented in the Perimeter Deck described in this EIS. This action would comply with the rehabilitation approach outlined in the U.S. Secretary of Interior's *Standards for the Treatment of Historic Properties*. It would retain as much of the physical structure that defines the historic integrity of the Natatorium as possible without subjecting the Natatorium to the State requirements for public swimming pools, HAR Title 11, Chapter 10. The Perimeter Deck is illustrated on Figure 2.

This Perimeter Deck would allow for the free flow of water between the ocean and a swim basin, with the demolition of the makai and 'Ewa seawalls of the pool. To retain Sans Souci Beach, the Diamond Head groin and lower portion of seawall would remain and be structurally improved or replaced. The entire dilapidated concrete deck surrounding the pool, including beams, pile caps, and portions of the seawall, would be removed. Existing exposed portions of piles would be removed. The existing rock fill groins below the Diamond Head and 'Ewa seawalls would remain. The deck would be reconstructed on new piles. The shape, configuration, and size of the reconstructed deck would not change, hence, retaining its plan view (as viewed from above). The slope of the deck entrances would be designed in accordance with Americans with Disabilities Act (ADA) Standards for Accessible Design.

A pre-cast concrete bulkhead wall would be installed below the deck along the mauka (toward the mountain) side of the swim basin to protect the bleachers from storm waves. The bleachers, arch, and other existing elements of the Natatorium structure would also remain and be rehabilitated to their original appearance.

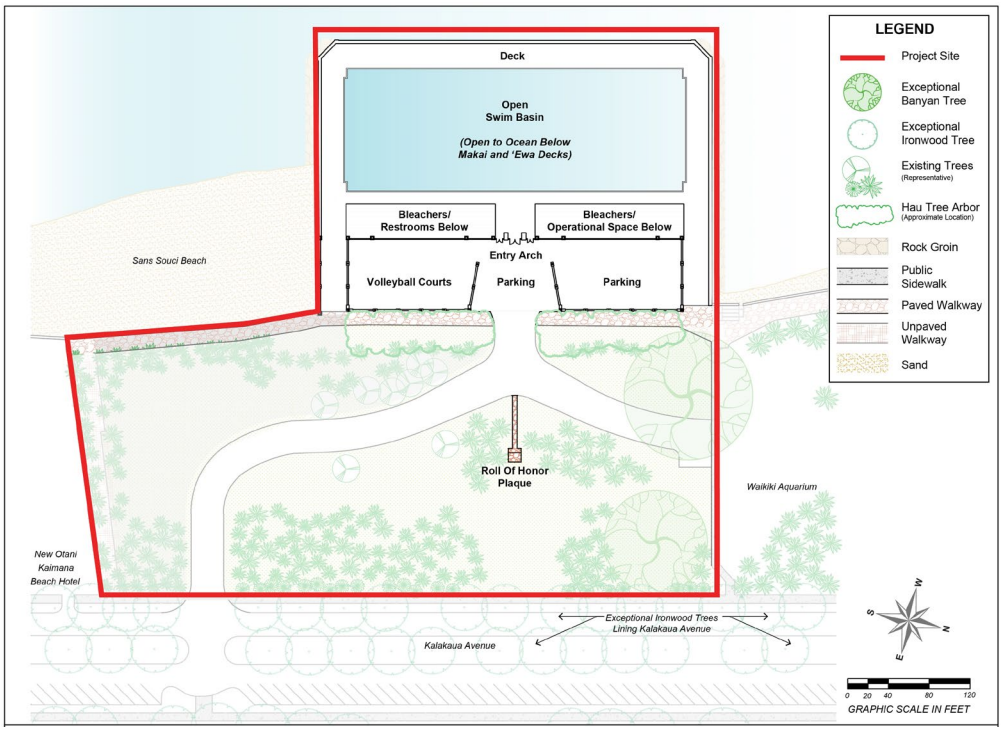


Figure 2: Perimeter Deck

Source: AECOM, August 2018; WCP, June 2014 (base).

Minimal land-side improvement would include:

- Construction of a new paved walkway to extend the existing Kapiʻolani Regional Park shoreline promenade from the Waikiki Aquarium to Sans Souci Beach. The promenade currently ends near the boundary between the Waikiki Aquarium and the project site.
- Restoration of a level, ADA-compliant surface leading to the Roll of Honor plaque.

2014 FEA-EISPN ALTERNATIVES

Recognizing the history of public interest in this project, the alternatives considered in the City's 2014 FEA-EISPN are presented and evaluated in this EIS. These evaluations were used in the City's decision-making process to identify the Perimeter Deck as its proposed action. The 2014 FEA-EISPN alternatives are:

- War Memorial Beach, which resulted from the Mayor's 2009 Task Force.
- Closed System Pool, which addressed the public input for an enclosed swimming pool and complies with the 2002 DOH swimming pool rules.
- No Action, a baseline condition for use in evaluating the effect of these action alternatives. No Action is illustrated in the satellite imagery (no date) on Figure 1.

War Memorial Beach. The War Memorial Beach is illustrated on Figure 3. This alternative would create a beach between constructed groins and would demolish the memorial arch and other elements of the Natatorium. A replica memorial arch would be constructed approximately 80 feet inland of its current location.

The entire concrete deck surrounding the pool, including beams, pile caps, and portions of the seawall would be removed. Existing exposed portions of piles would be removed. The existing rock fill below the Diamond Head and 'Ewa seawalls would remain. New piles would be installed just inside (basin-side) the existing groin/walls.

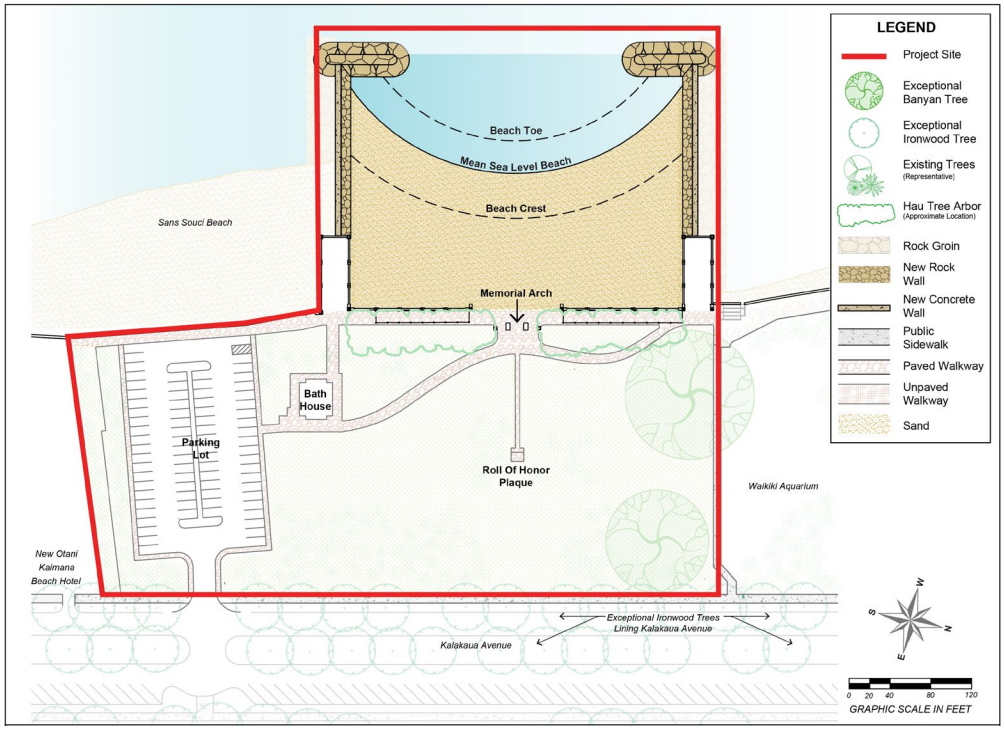


Figure 3: War Memorial Beach

Source: WCP, June 2016, updated November 2017.

Two equal-length L-head riprap groins would be constructed on concrete mat footings. Each groin would be approximately 140 feet long with a 60-foot-long L-head. After the two L-shaped groins are constructed and the existing makai and 'Ewa sea walls are removed, clean beach sand (a minimum depth of 2 feet) to form the new swim area bottom and beach would be brought in. Sand for the new beach

would be reclaimed from an off-shore deposit, matching as closely as possible the size and color of the existing sand at Sans Souci Beach. The reclaimed sand would be placed along the shoreline between the two groins.

In keeping with the Natatorium's originally intended World War I memorial function, a new replica memorial arch (recreating the existing three-arch entranceway) would be constructed and sited to frame the new beach as viewed from the existing Roll of Honor plaque. The new memorial arch would be located approximately 80 feet mauka of the existing Natatorium entrance, in alignment with the existing hau tree arbor. The existing City and County of Honolulu Emergency Services Department Ocean Safety and Lifeguard Services Division office, currently located beneath the bleachers, would need to be relocated.

Landside park improvements would include:

- Construction of a new bath house and outdoor shower facility on City park lands mauka of the Natatorium.
- Replacement of the internal road/parallel parking that bisects the site with a consolidated lot at the park's south side.
- Construction of a new paved walkway that extends the existing Kapiʻolani Regional Park shoreline promenade to Sans Souci Beach. Additional paved walkways would also connect the shoreline promenade to the new bath house and, parking lot, and to the Roll of Honor plaque (which would be maintained in its current location).

  The pedestrian entry would be designed to provide safe and ADA-compliant access to the site and integrate with the existing beach promenade.

New utilities include electrical for illuminating the replica memorial arch and a water line for the new bath house.

Closed System Pool. The Closed System Pool is illustrated on Figure 4. This alternative would rehabilitate the Natatorium and comply with the provisions of HAR Chapter 11-10, which would include a filtered, freshwater, disinfected, closed system pool design. To the monitoring requirements of HAR Chapter 11-10, this alternative involves a concrete-lined freshwater swimming pool. The Diamond Head groin and seawall would be structurally improved or replaced to retain Sans Souci Beach.

The entire dilapidated concrete deck surrounding the pool, including beams, pile caps, and portions of the seawall would be removed. Existing exposed portions of piles would be removed. The existing rock fill groins below the Diamond Head and ʻEwa seawalls would remain. The entire deck would then be reconstructed of pre-cast concrete segments on pre-cast concrete piles to visually match, to the extent practical, the historic appearance of the deck structure from the surface.

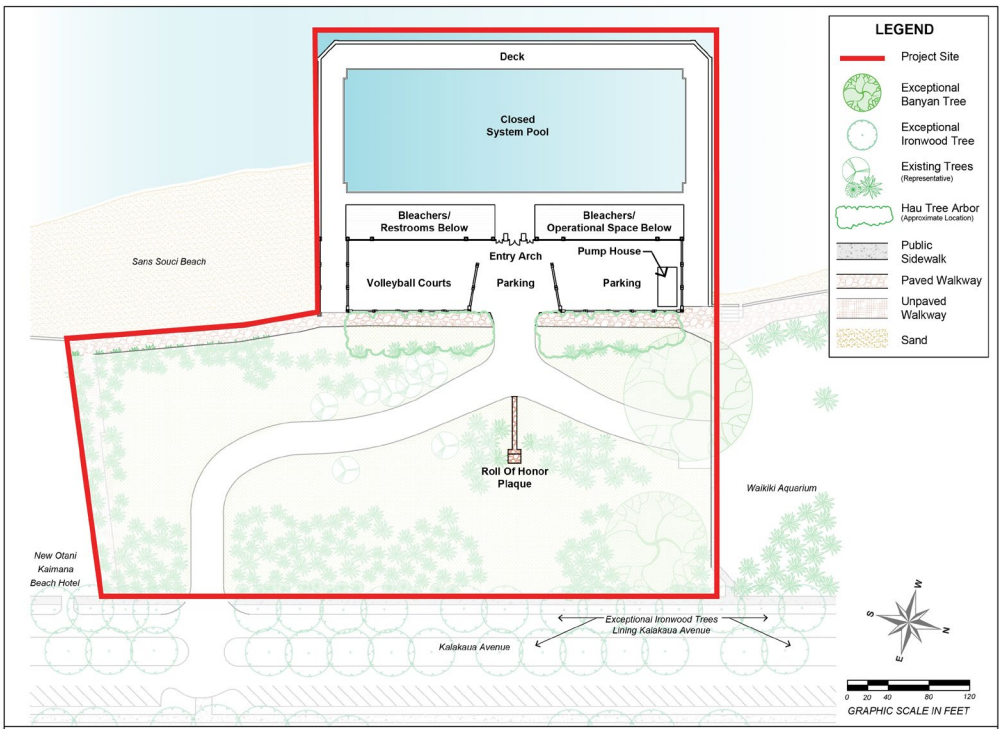


Figure 4: Closed System Pool

Source: WCP, June 2016, updated November 2017.

The final swim area (pool) bottom would be constructed of a tremied concrete sealed slab supported on concrete piles, followed by a cast-in-place finished concrete floor with a final water depth of 4 to 6 feet. The pool walls would be constructed of pre-cast sealed wall segments, with a cast-in-place interior surface. All slab joints would include gaskets to minimize interchange of disinfected pool water with the surrounding ocean and groundwater. All interior pool surfaces would be coated and cleanable using standard public swimming pool materials.

Under this alternative, the Natatorium structure (including the deck, visible portions of the seawalls, bleachers, restrooms, office/operational space, arched arcade and triple-arched entry, and parking lot) would be retained and rehabilitated in their current location.

Minimal landside improvements would include:

- Construction of a new paved walkway that extends the existing Kapiʻolani Regional Park shoreline promenade to Sans Souci Beach.
- Restoration of a level, ADA-compliant surface leading to the Roll of Honor plaque.

The Closed System Pool assumes that fresh pool water would be extracted from a dedicated well (or City potable water supply). Filter backwash would be discharged to the sanitary sewer system. Electrical system upgrades would be required to accommodate the pumps and other mechanical equipment.

ENVIRONMENTAL CONSEQUENCES AND MITIGATION

The evaluations of environmental consequences presume that standard and expected management measures developed through required permit and approval processes would be implemented. Specific management measures will be identified through the federal, state, and city permit and approval processes that will be required for construction. Such permits and processes will include those from the U.S. Army Corps of Engineers (USACE) for work in water, associated consultations with natural resource agencies under the Endangered Species Act (ESA) and Magnuson-Stevens Fishery and Conservation Management Act (MSA), and the DOH for authorization of a Water Quality Certification and permits for stormwater management.

The main environmental concern based on the number of agency and public comments was against demolition of the historic Natatorium. Potential environmental consequences of the proposed action and 2014 FEA-EISPN alternatives are summarized below. Chapter 4 provides supporting information and Chapter 8 provides a relative comparison of potential environmental consequences by alternative.

Land Ownership and Management. No change and no impact (direct, indirect, or cumulative) would occur from the proposed action or any of the alternatives.

Infrastructure and Utilities. No significant impact (direct, indirect, or cumulative) on infrastructure would result from the proposed action or any of the alternatives with required engineering designs. For the Closed System Pool, utility studies are needed to identify how potable water would be supplied, e.g., well siting study, and the demand on the wastewater system during events when the pool would need to be drained for maintenance or other reasons, e.g., natural hazards. Costs and time would also need to be evaluated.

Transportation. No significant impact (direct, indirect, or cumulative) on transportation would result from the proposed action or any of the alternatives as no change in transportation factors, e.g., number of parking stalls and traffic growth in the vicinity, are projected. Existing requirements for operations on State and City roads, along with best construction practices, would be used to minimize temporary construction-related impacts.

Noise. No significant impact (direct, indirect, or cumulative) on noise and the allowable levels based on land use would occur under the proposed action or any of the alternatives. Noise can be temporary, intermittent, and perceived as a nuisance, but no significant impact on the regulated levels of noise, pursuant to HAR Chapter 11-46, would be expected. Noise permits during construction are expected to be required.

Climate and Air Quality. No significant impact (direct, indirect, or cumulative) on climate, as evaluated as relative levels of greenhouse gas emissions (GHGs), or air quality would occur from the proposed action or any of the alternatives. Short-term temporary emissions associated with construction are unlikely to create

elevated pollutant levels of health concerns called "hot spots." Long-term emissions of GHGs and regulated air emissions would not significantly impact any regulatory criteria as existing regulations and controls prohibit such impacts from occurring. GHG and regulated pollutant levels are expected to be the greatest under the Closed System Pool as the continuously running pumps to maintain circulation and water quality within the pool would require a source of electricity. With the regular beach maintenance, i.e., replenishment of sand, needed for the War Memorial Beach, the GHGs associated with this alternative would be a future contributing source of the state's emissions of GHGs.

Topography, Geology, and Hydrology. No significant impact (direct, indirect, or cumulative) on these resources would result from the proposed action or any of alternatives as no substantial topographical features would be removed, the substrate would be able to support the structural changes, and groundwater would not be affected.

Natural Hazards. No significant impact (direct, indirect, or cumulative) from natural hazards or in exacerbating a natural hazard would result from the proposed action or any of the action alternatives. No Action could significantly impact the Natatorium as in its dilapidated state, it would be more vulnerable to natural hazards. The effects of natural hazards would be exacerbated as debris from the Natatorium could increase risk to public safety.

Nearshore Physical Environment and Sea Level Rise. No significant impact on the nearshore physical environment would result from the proposed action, considering that there would be no loss of waters of the United States (WOTUS). Direct significant impacts on the nearshore physical environment would result with the loss of approximately 0.9 acres of WOTUS with the War Memorial Beach and the loss of approximately 1.4 acres of WOTUS with the Closed System Pool. No significant indirect effects are anticipated from the proposed action or any of the action alternatives with the retained function of the Diamond Head groin and wall. Considering the coastal hardening and beach maintenance of Waikiki Beach, there would be a cumulative loss of WOTUS and change in the nearshore physical environment.

The significance from and on sea level rise is unknown and is likely to be dependent of future regional plans. Any fixed shoreline structure would need continued management. This issue involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.

Water Quality. Significant beneficial long-term impacts on water quality would result from the proposed action and War Memorial Beach as circulation and water quality would be improved. No long-term impacts on water quality would occur with the Closed System Pool as it would no longer be a part of marine waters, would be subject to the water quality standards for public swimming pools, and is designed to comply with the water quality standards for public swimming pools. No significant impacts on water quality would occur with construction with the required USACE permit and DOH CWA Section 401 Water Quality Certification authorization for in-water work. No change to existing water quality would occur

with No Action. Cumulative impacts on water quality from future construction projects in nearby nearshore areas would not be expected to be significant, unless they were to occur simultaneously and regulatory controls to protect water quality are not in place.

Elevated turbidity is anticipated during an interim post-construction period until equilibrium is reached. Water quality would be monitored as coordinated with the DOH. Beach closures may be prudent for intermittent periods and as coordinated with neighboring beach stakeholders.

Marine Biology. Significant adverse long-term impacts on marine biology would occur with the anticipated loss of WOTUS with the War Memorial Beach and Closed System Pool. For all action alternatives, the USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305[b]), and compliance with CWA Section 401, which would set forth best management practices (BMPs) to prevent adverse effects on protected marine species and EFH from occurring. Any offsets for EFH loss would be identified in the consultation process. Considering the coastal hardening and beach maintenance of Waikiki Beach, there would be a cumulative loss of WOTUS; however, cumulative impacts on marine biology are not expected to be significant with the required USACE permits and consultations with USFWS and NOAA NMFS.

Marine resources potentially affected by offshore sand harvesting is an unresolved issue.

Terrestrial Biology. No significant impact (direct, indirect, or cumulative) on terrestrial biology would result from the proposed action and any of the alternatives as existing laws and the USACE permit required for in-water construction work would serve to protect regulated species. To avoid impacts to exceptional trees, mitigation measures would be implemented during construction and are identified in Section 4.11.2.

Historic and Cultural Resources. Significant beneficial impacts to historic and cultural resources would result from construction and operation of the proposed action and Closed System Pool, while significant adverse impacts on the same would result with the War Memorial Beach and No Action. The effect on the Natatorium would be mitigated through the process of SHPD review and approval under HRS Chapter 6E, which includes preparation and approval of a detailed mitigation plan. NHPA Section 106 consultation would also be conducted by the lead federal agency, anticipated to be USACE, and any further mitigation would be made part of the project.

The corridors for new electrical duct lines and a new water line to existing main lines along Kalakaua Avenue under the War Memorial Beach and Closed System Pool would need to be identified and reviewed in accordance with HRS Chapter 6E. These are unresolved issues.

For all alternatives, no significant adverse impacts would occur on archaeological resources and burials because of the HRS Chapter 6E historic review process,

consultation, and SHPD concurrence required, and the provisions of HRS Chapter 6E that protect inadvertent discoveries.

Visual and Aesthetic Resources. Significant beneficial impacts to visual resources and aesthetics would result from construction and operation of the proposed action and Closed System Pool, while significant adverse impacts on the same would result with the War Memorial Beach with the loss of the historic Natatorium and its memorial arch. Any loss contributing to past losses of visual resources is considered cumulative, but considering the extent of development along the shoreline, it is not likely to be a significant.

Public Services. No significant impact (direct, indirect, or cumulative) to public services would result from construction and operation of the proposed action and action alternatives. Four additional staff (lifeguards) are estimated to be needed to support the proposed action and Closed System Pool. Five additional lifeguards are estimated to be needed for the War Memorial Beach. No additional fire, police, or other emergency services are anticipated to be needed to support the proposed action or any of the action alternatives.

Socioeconomics and Recreation. No significant impact (direct, indirect, or cumulative) to socioeconomics or recreation resources would result from construction and operation of the proposed action or any of the action alternatives. The additional non-governmental jobs associated with the construction would be a beneficial and temporary impact. The action alternatives may generate additional visits to the area by both residents and visitors. However, the increase in visitors to the WWMC is expected to be relatively minor with the limitation in parking.

CONSISTENCY WITH PLANS AND POLICIES

Applicable sections of land use guidance, policy, and plans at the state, county, and neighborhood levels were reviewed with respect to the proposed action and alternatives. The Perimeter Deck (proposed action) was consistent with all plans and policies evaluated. In general, the War Memorial Beach was found to conflict with the Hawai‘i State Plan and City General Plan to preserve historic resources and the Closed System Pool was found to conflict with these plans to preserve coastal zone uses and to protect coastal resources uniquely suited for recreational activities that cannot be provided in other areas.

1.0 INTRODUCTION

1.1 PROJECT SUMMARY

The City and County of Honolulu Department of Design and Construction (City) proposes to remedy the current deteriorated state of the Waikiki War Memorial Natatorium (Natatorium) in a manner that renews the memorial to World War I veterans and reestablishes public access to this portion of Kapiʻolani Regional Park.

The Natatorium was constructed in 1927 as a monument to Hawaiʻi's men and women that served during World War I. The facility consists of a saltwater swimming pool, bleachers, restrooms, and an area currently used as office space. It is listed on both the National and Hawaiʻi Registers of Historic Places (NRHP and HRHP).

1.2 SCOPE AND AUTHORITY

This Draft Environmental Impact Statement (EIS) was prepared in accordance with Hawaiʻi Revised Statutes (HRS) Chapter 343, as implemented by Hawaiʻi Administrative Rules (HAR) Title 11, Chapter 200. These requirements apply to the City's proposed action as it would use State and County lands and City funds, and the proposed action is not an exempt action as defined in HAR Chapter 11-200-8. The HRS Chapter 343 process for this project was initiated with the publication of the Final Environmental Assessment-Environmental Impact Statement Preparation Notice (FEA-EISPN) on July 23, 2014. Comments from the FEA-EISPN process (Section 7.0) assisted in defining the specific issues and level of analysis in this EIS. This EIS presents the proposed action and a range of recent action alternatives from the 2014 FEA-EISPN and evaluates their potential environmental consequences.

Upon publication in the Office of Environmental Quality Control (OEQC) bulletin, written public comments will be requested and received over a 45-day period.

1.3 PROJECT SITE, FACILITIES, AND SURROUNDS

1.3.1 Project Site

The approximately 6.3-acre area includes most of the Waikiki War Memorial Complex (WWMC), which is 6.7 acres minus the 0.4-acre area comprised of two areas planned for groins in the 1995 EIS plans.

The WWMC is on Oʻahu's southern shoreline, roughly 1 mile south-southeast of the heart of Waikiki. The WWMC is bounded by the Waikiki Aquarium to the north, Kalakaua Avenue to the east, the New Otani Kaimana Beach Hotel to the south, and the Pacific Ocean to the west. The WWMC consists of the Natatorium, the Memorial Park, and Sans Souci Beach (also known as Kaimana Beach) (land portion, not beach and water).

1.3.2 Facilities

Park facilities include outdoor showers, benches, picnic tables, and parking for beach and park users. Located on the lawn towards Kalakaua Avenue, in alignment with the Natatorium's triple-arch entry, is a stone-mounted plaque. Unveiled in 1931, this Roll of Honor memorial names 101 soldiers from Hawai'i who died while in service with the United States or Britain during World War I. Surrounding grounds are either shaded (several exceptional trees are protected under state law and county ordinance) or open grass parkland.

A road bisects the project site, winding in from Kalakaua Avenue at the east/southeast corner with a dead end near the Waikiki Aquarium at the site's north boundary. Parallel parking along both sides of the road is supplemented by additional parking on the sloped access ramp leading to the triple-arch entry, and a parking lot fronting the 'Ewa half of the Natatorium's façade.

1.3.3 Surrounds

Sans Souci Beach begins at the Natatorium's Diamond Head wall and extends south toward the adjacent New Otani Kaimana Beach Hotel property. Sans Souci Beach was created by ocean conditions that generally push sand northward against the Natatorium structure, creating a sandy beach that is more than 150 feet wide. A nearby offshore channel is used by swimmers and surfers seeking a way through the characteristic shallow reef flats that dominate much of the Waikiki nearshore environs. The Waikiki-Diamond Head Shoreline Fisheries Management Area is offshore and extends from the Natatorium's 'Ewa wall to the south at the Diamond Head lighthouse. This regulated fishing area begins from the high water mark along Sans Souci Beach and seaward 500 yards, or to the edge of a fringing reef if one occurs beyond 500 yards. The beach area is managed by the City and County as a beach park, and the offshore area is managed under State Department of Land and Natural Resources (DLNR) Division of Aquatic Resources.

The shoreline north of the Natatorium parallels an 800-foot-long seawall that protects the Waikiki Aquarium and adjacent park lands; this stretch of narrow, sandy beach is submerged at high tide (USACE 2008). Continuing north of the seawall end, the sandy beach widens until the Kapahulu groin (a seawall constructed perpendicular to Kalakaua Avenue where it intersects Kapahulu Avenue). The area from the high water mark along this stretch of beach to 500 yards offshore (approximately to the seaward edge of the fringing reef) constitutes the Waikiki Marine Life Conservation District (MLCD). Its southern boundary is the 'Ewa wall of the Natatorium.

1.4 PROJECT HISTORY AND BACKGROUND

1.4.1 Development of the Natatorium

The area that encompasses the current site of the Natatorium, the Waikiki Aquarium, and Sans Souci Beach was originally Crown Lands and, in 1877, part of the lands designated by King Kalakaua as a public park and "a place of innocent refreshment for all who wish to leave the dust of the town streets" (CJS 1985).

After the overthrow of the Hawaiian monarchy, a large portion of the public park was deeded to the Republic of Hawai'i and then transferred into private ownership. However, in 1919, under Act 191 of the Legislature of the Territory of Hawai'i (Territory), Governor C.J. McCarthy appropriated $200,000 to repurchase 6.4 acres of the park land, transferring it back into public ownership and designating future development of that land for the purposes of a memorial park (CJS 1985).

In 1921, Act 15 of the Legislature of the Territory authorized the construction of a memorial at the property, which was to honor "the men and women of Hawai'i who served during the great war" (Act 15, S.B. No. 5, 1921). Act 15 also specified that the memorial's plans include a swimming course at least 100 meters in length, appropriated $250,000 for the construction of the monument, and authorized and appropriated $10,000 to conduct an architectural competition for the design of the memorial.

The Natatorium was constructed in 1927 as a "living" monument to those persons from Hawai'i that served during World War I. The facility consisted of a 330-foot by 120-foot (100-meter by 36.6-meter) saltwater swimming pool and surrounding pool deck; bleachers; restrooms, locker, and shower facilities; storage space; and office space. To the side of the grand entry, fronting the arched arcades, were two large saltwater reflecting pools. The entire structure was constructed in shallow offshore waters, extending from the shoreline seaward.

In 1980, the Natatorium was listed on both the NRHP and HRHP, and in May 2014, the National Trust for Historic Preservation (NTHP) designated the Natatorium as a National Treasure. The following excerpt from the National Register nomination form describes the physical appearance of the Natatorium.

> "The pool is surrounded on four sides by a twenty-foot wide deck which is enclosed on the three ocean sides by a three-foot high wall. On the fourth, *mauka* (mountain) side, concrete bleachers rise thirteen levels in height and provide seating for approximately 2,500 people. The bleachers are divided into two parts, each with four sections, with a central entry space separating the two parts. The Beaux-Arts inspired main entry, with its triumphal arch flanked by two lesser round arches, is the major architectural feature of the Natatorium. A pair of ionic pilasters support the triumphal arch's entablature which has the words, "The War Memorial" inscribed in its frieze. An elaborate sculpture rises from the entablature. It consists of a garlanded base with an American eagle perched at each corner and the Hawaiian motto and seal in the center. The triumphal arch itself has a paneled ceiling decorated with hexagonal floral designs. Flanking the triumphal arch, and above the two lower arches, is a medallion with floral patterns and a woman's face in the center relief. The ocean and mountain sides of the entry are similar.
>
> To either side of the main entrance, the bleacher's rear walls extend approximately 100 feet. Locker rooms are below the bleachers and inset behind the centered round arched arcades of seven bays each. Round arched windows, which correspond to the arcade openings, provide the

> locker rooms with ventilation and illumination. A pair of simple pilasters flanks the arcade and support large concrete urns, which project above the bleacher walls and demarcate the end sections of each bleacher. A flagpole with a ball finial is located above the second and sixth openings of each arcade. The bays on either side of the arcade contain office and restroom spaces and are distinguished by rectangular windows with grills.
>
> A ramp leads to the main entry; to either side of this ramp are a volleyball and basketball court. A concrete wall with an incised diamond pattern encloses these courts. The end walls are stepped, and two bays long at the main entry end and three bays long at the other end. The front walls are five bays long and a tapered concrete column, which originally supported a light globe, is at each pier. At the corners of the entry ramp, these columns are fluted metal and support spotlights which illuminate the triumphal arch entry. A hau arbor supported by pipes is adjacent to the front walls." (Hibbard and Cummins 1979)

Since this description was written, the ramp leading to the triple arch entry and the court fronting the ʻEwa arched arcade have been converted to parking. Also, in 2000, a partial restoration of the Natatorium was completed. During this landside restoration, the public restroom/shower area beneath the bleachers was reconfigured and portions were converted to office and operations space for the City Ocean Safety and Lifeguard Services Division. The pool and bleachers remain closed to the public.

1.4.2 Chronology Summary of Structure-Maintenance Issues and Past Plans

Constructed in 1927, the Natatorium became a maintenance issue as early as 1929. Basic repairs were made and the deep section of the pool dredged and enlarged to make high diving safe. By 1949, major refurbishing was needed: structural and electrical installations were undertaken for $81,886, including a new diving tower, floodlights for swim meets, a concrete floor around the pool, and a sewer pump (CJS 1985).

The 1949 refurbishment appears to have added only limited life to the structure. Over the succeeding years, the Natatorium continued to deteriorate, ultimately leading to its closure in 1979. In addition to the structural problems, the Natatorium was plagued by water quality concerns, which forced a temporary closure in 1963. Although improper initial design decisions and construction techniques were found to have caused the initial difficulties experienced at the Natatorium, these problems were increased by the general neglect of the structure over the years (CJS 1985).

Both the State of Hawaiʻi (State) and the City have commissioned several studies and reports since the 1960s. The first comprehensive assessment of the Natatorium's physical condition was undertaken in 1964. Inspection of original construction revealed that the depth of concrete over the steel reinforcing was

insufficient to protect the steel from the effects of saltwater infiltration, and the concrete mix itself was determined to be of poor quality (CJS 1985).

The 1964 assessment noted an impending United States (U.S.) Army Corps of Engineers (USACE) project to widen Waikiki Beach would partially block water exchange to the already inadequate pool circulation, and thus recommended the pool area be filled to create a beach (Wolbrink 1965). The USACE Waikiki Beach Widening project took until 1972 to complete environmental documents and align funding for the project, which included demolition of the Natatorium structure and creation of a beach between the Diamond Head and ʻEwa seawalls. The City, as the operating entity, and the State, as the landowner, were supportive of the change as the "…benefits gained by the increased beach land would outweigh the value of saving and rehabilitating the Natatorium" (USACE 1973, p. 8).

Plans for demolition were countered by efforts to restore the deteriorating structure. A lawsuit was brought against USACE's District Engineer and the Director of the cooperating agency, State of Hawaiʻi Department of Transportation. The 1973 ruling by the State Supreme Court halted demolition, determining that the project failed to comply with State statutes by not properly withdrawing the subject land area (including the Natatorium) from a previously issued Governor's executive order, thus the legislature did not have an opportunity to disapprove of the change as requested by law (CJS 1985).

In May 1976, a City Building Department inspection found extensive deterioration of the structure where spalling (peeling) concrete revealed rusting of exposed steel reinforcing bars in the beams and slabs supporting the bleachers. The City's Water Safety Division (Lifeguard headquarters) subsequently was moved out of the space beneath the bleachers (CJS 1985). In 1978, the pool was closed based on further City Building Department inspections, and in June 1979, the Department of Parks and Recreation (DPR) locked the Natatorium structure.

From 1979 to 1982, private and public entities explored proposals and options for the WWMC. The City initiated master planning for Kapiʻolani Regional Park in 1982, creating policy and conceptual designs intended to restore the park to the general intention of King Kalakaua. Specifically, for the Natatorium, the DPR proposed demolition of the structure, with retention of the memorial arch if feasible, with the resultant beachfront area returned to open beach park space (DPR 1982).

During the 1982 state legislative session, a House Concurrent Resolution was passed stating that the overriding public purpose of the land was to serve as a memorial park honoring Hawaiʻi's World War I veterans, and that commercial use was inappropriate. The Resolution went on to state that a subordinate purpose of the Natatorium was to serve as an arena for competitive swimming, though this was no longer a valid purpose due to the number of new pools holding competitive events at that time. The Resolution recommended demolition of the Natatorium structure and open space improvements, with retention of the memorial stone, plaque, and archway, if feasible. The Resolution requested the DLNR to submit another report to the 1983 legislature to address alternate means to remove the Natatorium and improve the park, and to provide design costs for: beach

restoration; conversion of all or part of the makai (toward the ocean) walls to groins for a protected swim area; and conversion of the area into a landscaped peninsula with handicapped access (HCR 173).

Movement toward demolition of the Natatorium spurred efforts by community groups to preserve and restore the structure. The 1986 legislature appropriated funds for planning and design work to restore the Natatorium. Citing the results of a user survey, and DPR's concerns related to liability, public safety, and operations and maintenance costs, DLNR tasked the engineering firm of Leo A Daly with investigating two alternatives: complete and partial restoration. By 1995, an EIS was approved with "complete restoration" as the proposed action (Leo A Daly 1995a).

The 1995 plan called for demolition of the bleacher structure including supporting columns and beams, with repair of the entry arch and arcade wall and reuse of windows where possible. Reconstruction of the bleacher structure on the existing foundation was proposed to use pre-cast concrete, with new supporting beams and columns. Bathroom fixtures were to be added, in keeping with the State of Hawai'i Department of Health (DOH) regulations for swimming pools. Pool restoration plans included demolition of the seawalls above the water line, and removal of pool decks, beams, and 92 supporting piles to below seafloor level, with reconstruction of these elements. Groin extensions of 60 feet and 80 feet parallel to the shoreline (each 35 feet wide at their base and tapering to 10 feet at mean sea level [MSL]) were to be constructed to improve water circulation within the pool, and required dredging and removal of reef and existing substrates outside of the current pool site. "Construction" time for the entire project was estimated at 30 months (Leo A Daly 1995a).

The City accepted the State's plans, allocated funding for restoration, and obtained permits, including those for in-water construction. Restoration work on the land-based (bleacher structure) portion was initiated in 1999, but halted by a lawsuit. A settlement in 2000 allowed the City to complete work on the land-based portion of the structure and prohibited the ocean-based portion of the project until the DOH adopts new swimming pool rules specifically applicable to saltwater pools, and until the City provides sworn declarations by specific individuals that the operation of the ocean-based portion of the project, if constructed as designed, could comply with the applicable DOH swimming pool rules. The former occurred; DOH promulgated Hawai'i Administrative Rules (HAR) Title 11, Chapter 10, Public Swimming Pools in 2002. However, the latter—sworn statements—were not obtained. The area under the bleachers, including public restrooms with showers and space for the City Ocean Safety and Lifeguard Services Division, was re-opened in Memorial Day ceremonies in 2000.

Among other things, the 2002 DOH swimming pool rules include rigorous requirements for water quality, clarity, and exchange rates. Mechanical pumping, filtration systems, and cleanable side and bottom pool surfaces would be required to meet these rules. Under HAR Chapter 11-10, the original open-system saltwater pool is noncompliant and the 1995 EIS plans are unusable.

In May 2004, a section of the pool deck collapsed, leading to closure of the public restrooms. Subsequent to a visual inspection survey that evaluated the Natatorium's structural condition and ascertained any potential safety hazards, the restrooms were reopened in November 2006. Table 1-1 is excerpted from the 2004 inspection report and summarizes the structural conditions noted during the visual inspection survey.

Table 1-1: Summary of the structural conditions of the Natatorium, 2004

Structural Component	Condition Summary
Concrete Deck Slab	Three sections of the concrete deck slab were collapsed with several other sections showing signs of distress
	Extensive cracking, excessive deflection, and obvious signs of corrosion
	Imminent collapse hazard [a]
Perimeter Seawalls	Extensive concrete spalling with numerous segments that have fallen into the ocean
	Sections visibly out of plumb
	Exposed corroded steel reinforcing
	Potential collapse hazard [a]
Bleacher Supports	Beam supports exhibit cracks in the plaster finish
	Potential indicators of corrosion
	Potential indicators of support settlement
Slab-On-Grade	Extensive cracking in areas below the bleacher structure
Entry Arch Support	Stains and cracking on archway finish
	Potential indicators of corrosion
	Potential indicators of support settlement
Bleacher Seating, Slab, and Walls	Deterioration of resurfacing finish exhibited by extensive cracking and spalling
	Potential indicators of corrosion
	Exposes substructure to moisture

[a] Emphasis is from the inspection report (CCH DPP 2004, pg. 2).

Later in 2004, unspent restoration funds were made available for the protection of public health and safety, including proposed stabilization of the structure by driving 80 piles in the inner pool. The City Council debated spending $6 million when the result would not be a re-opened facility, and then mayor-elect Mufi Hannemann stated he was opposed to the restoration effort. As one of his first acts in office, Mayor Hannemann suspended repair work (HA 2005).

1.4.3 Alternative Use Study and Task Force Summary Report of 2009

The City subsequently contracted a planning firm to analyze alternate uses for the WWMC. The City also contracted separately with the USACE to investigate how

various alternatives that include modifying or removing the Natatorium would affect the shoreline.

In 2009, Mayor Hannemann convened a Natatorium Task Force (hereafter referred to as the Task Force) to conduct a series of public meetings and make a recommendation with respect to the future of the Natatorium. The Task Force was presented background information regarding various alternatives for the project site. At the conclusion of the Task Force meetings, the group voted and by majority selected a memorial beach alternative—creation of additional beach space by demolishing the Natatorium structure, and construction of a replica triple-arch entry inland from its current location. While not a unanimous decision (a group of members subsequently submitted a "Dissenting Opinion" to register their desire to stabilize the pool), the City commissioned engineering studies to ensure feasibility of the selected option.

Based on this recommendation from the Task Force, the City made preparations to comply with HRS Chapter 343 EIS.

1.4.4 2014 Final Environmental Assessment – Environmental Impact Statement Preparation Notice (FEA-EISPN)

A FEA-EISPN was prepared in accordance with the HRS Chapter 343 as implemented by HAR Title 11, Chapter 200. The City's proposed use of State and County land and its proposed use of County funds require compliance with HRS Chapter 343.

The filing of the FEA-EISPN initiated the HRS Chapter 343 process. Its purpose was to inform interested parties of the intent to prepare an EIS (because of the anticipated level of impacts that could potentially result from implementing the proposed project) and to obtain input from interested parties such as agencies, stakeholders, and the public. Relevant information gathered through the EISPN process has been used to assist in defining the specific issues and level of analysis to be addressed in the EIS.

The focus of the proposed action was on the War Memorial Beach. The other action alternative included was the Closed System Pool.

On July 23, 2014, the FEA-EISPN was published by the OEQC in *The Environmental Notice*. The FEA-EISPN is provided in Appendix A-1. A 45-day public comment period followed. Written input received is presented in Appendix A-2 and is summarized in Section 7.0.

1.4.5 2016 HRS Chapter 6E (Historic Preservation) Consultation

After completion of the 2014 FEA-EISPN, HRS Chapter 6E Historic Preservation consultations for the Natatorium were initiated in 2016 with the goal of developing feasible and prudent alternatives to the War Memorial Beach within the current legal and regulatory framework. Much of the input resulting from these initial HRS Chapter 6E consultations reflected broad opposition to demolition of the

Natatorium under the War Memorial Beach identified in the FEA-EISPN. Appendix A-3 includes presentations and meeting notes.

1.4.6 2017 HRS Chapter 6E (Historic Preservation) Consultation

In response to the comments received in 2014 and 2016 pertaining to historic preservation interests, a new concept alternative was developed. The *Final Pre-Environmental Impact Statement Alternatives Technical Evaluation, Waikiki War Memorial Complex* (WCP 2018) presented as Appendix A-4 provides details of the process presented herein and meeting notes.

An effort was made in early 2017 to refocus the public engagement process and introduce a concept consistent with the intent of the HRS 6E to various stakeholder groups and agencies. In May 2017, the City re-initiated its HRS Chapter 6E consultation process by conducting a meeting with the State Historic Preservation Division (SHPD). Following SHPD's guidance, a workshop was held in July 2017 with an invited group of knowledgeable parties (constituting the "interested parties" as defined in HRS Chapter 6E). Workshop participants included:

- Friends of the Natatorium
- Historic Hawai'i Foundation
- American Institute of Architects, Honolulu Chapter
- NTHP
- State of Hawai'i DLNR, SHPD

At the July 2017 workshop, historic preservation goals were clarified and confirmed, and an alternative concept was presented with an aim to meet preservation standards while addressing feasibility and functional concerns expressed by the DOH. The meeting attendees agreed that this new concept, the Perimeter Deck, showed promise as an approach to preserving the WWMC and supported its further consideration as a new alternative. This new alternative is intended to align with National Historic Preservation Act (NHPA) standards (e.g., the U.S. Secretary of Interior's [SOI] *Standards for the Treatment of Historic Properties*). Additional information and analysis related to the HRS Chapter 6E process is described in Section 4.12 of this EIS.

In addition to the HRS Chapter 6E consultation discussed above, meetings were held with various agencies during the summer of 2017, as summarized in the following sections. These meetings provided agencies with updates on the project and introduced a conceptual plan that better represents historic preservation interests while meeting all applicable laws, regulations, and rules. Agency meetings are summarized as follows.

1.4.6.1 DOH Environmental Health Administration, Sanitation Branch

On May 10, 2017, AECOM Technical Services, Inc. (AECOM), the city's consultant, and the City Department of Design and Construction (DDC) met with the DOH Environmental Health Administration, Sanitation Branch. This initial meeting

involved presenting the Perimeter Deck to the DOH representatives, and to inquire specifically if the new design would be subject to the pool rules outlined in HAR Chapter 11-10. These rules outline definitions, criteria, and standards for the operation of public swimming pools. These rules also outline the need for "public salt water specialty pools" to demonstrate that water exchange rates ensure compliance with water clarity standards and Water Quality Standards (WQS) (HAR Title 11 Chapter 10).

DOH representatives agreed that the Perimeter Deck design, with the swim basin opened to the ocean on two sides, ensures that the resultant swim basin falls outside of the definition of a public swimming pool. As such, the water quality regulations in HAR Chapter 11-10 are not applicable and water clarity and quality standards of the same need not be met. The swim basin would be open to the ocean in terms of water flow and would have the same general conditions within it that exist in the ocean waters outside of the deck. A letter of concurrence from the Sanitation Branch acknowledged the above statement as correct (Appendix A-4). The following sections provide summaries of the agency consultations completed over the past year.

1.4.6.2 DLNR Office of Conservation and Coastal Lands

On May 11, 2017, AECOM met with Sam Lemmo of the DLNR Office of Conservation and Coastal Lands to present and discuss the three action alternatives. Mr. Lemmo noted the scarcity of beach space in the Waikiki area and that the War Memorial Beach would be a welcome addition in that area. In addition to providing some structural suggestions, Mr. Lemmo acknowledged the long history of the WWMC and that he would primarily like to see some type of improvement to the site.

1.4.6.3 USACE Regulatory Branch

On May 15, 2017, AECOM and DDC met with a representative of the USACE Regulatory Branch. As with the other agencies, the three alternatives were presented and discussed. The USACE representative outlined the USACE regulatory process, permits needed, and the timing of USACE engagement for project review. They noted that the USACE already has a file for the project site from an earlier effort. This file will remain as the USACE's main project file for continuity and historical reference.

1.4.6.4 City Department of Planning and Permitting

On June 13, 2017, AECOM and DDC met with the City's Department of Planning and Permitting (DPP). DPP representatives discussed a 1985 study for the project site that envisioned the WWMC as a destination with wayfinding and placemaking, with the pool area filled in as a "landscape peninsula" (CJS 1985). They also mentioned ideas for income-producing ventures, educational programming, and events at the site. Concerns were noted as to the clearance between the water and the decking. DPP was agreeable to all three alternatives (and the No Action alternative) as presented and their further analysis in the EIS.

1.4.6.5 DLNR SHPD

On June 16, 2017, AECOM and DDC met with DLNR SHPD staff. SHPD representatives noted that the WWMC was originally constructed as a memorial to those who served and died in World War I, and its current condition is seen as a dishonor to veterans. The team explained the Perimeter Deck and the intent to rehabilitate the structure in a way that would exempt it from DOH pool rules, while at the same time maintaining its historic integrity. Questions arose regarding an open-system pool concept commissioned by the NTHP (also referred to as the Krock pool, after its designer, Dr. Hans Krock of the University of Hawaii at Manoa). This concept for a swim basin partially open to the ocean, protected by a series of makai "chevron" structures, had been publicized by NTHP a few months earlier as part of an effort to promote consideration of non-demolition alternatives. It was noted during the meeting that the NTHP pool concept had not been sufficiently detailed to address DOH's concerns that the water clarity and quality regulations in HAR Chapter 11-10 regarding swimming pools could be met.

Meeting attendees also discussed the potential for floating docks and other uses of the pool side of the facility, such as concerts. SHPD staff stated that their priority is to have the WWMC rehabilitated so as to retain as much of the structure as possible, and then reintroduce public uses to the facility in keeping with its historical use. Concerns were expressed regarding possible construction techniques for deck rehabilitation. AECOM outlined the next steps associated with the HRS 6E process, specifically the undertaking of a workshop with knowledgeable historic preservation stakeholders, regarding application of historic preservation standards to the various alternatives to be considered in the EIS.

1.4.6.6 City Department of Parks and Recreation

On August 15, 2017, AECOM and DDC met with staff from the City DPR. The WWMC is and will continue to be managed by DPR; therefore, their comments were sought, especially regarding impacts related to the future maintenance and operational costs of the facility. It was clarified that under the Perimeter Deck alternative, the pool bottom would largely remain in its existing state of sand and rock. The seawall below the deck on two sides would be removed, opening the pool basin to the ocean. The pool would be exposed to the coastal waters and subject to waves impacting the shoreline. A variety of topics were further discussed, including: liability, operational and maintenance requirements (concern that they may be more stringent due to this facility being listed on the NRHP). The team responded that modern, more resilient materials would be used in any rehabilitation work. Engagement with non-profit partners, the potential for user or entrance fees, and the WWMC's long history and importance to island residents were discussed. Finally, it was noted that the Kapiʻolani Regional Park stakeholder groups would be engaged when future phases involving landside improvements are developed. DPR staff supported consideration of the Perimeter Deck in the EIS process.

In January 2018, a Pre-EIS Alternatives Technical Study was completed, incorporating findings from the consultations with HRS Chapter 6E, the

DOH regarding HAR Chapter 11-10, and other agencies, described above. The intent of this document was to analyze and compare the now four alternatives (Perimeter Deck, War Memorial Beach, Closed System Pool, and No Action) from the perspectives of engineering, costing, maintenance, construction techniques, and factors identified from agency and stakeholder meetings. The study demonstrated that the Perimeter Deck met all factors considered, unlike the War Memorial Beach, Closed System Pool, and No Action. The Pre-EIS Alternatives Technical Study is included as Appendix A-4.

1.4.7 Current Conditions

Since the restoration efforts were halted in 2000, no work on the Natatorium has been undertaken, except to address imminently hazardous conditions such as falling concrete. Continued exposure to the ocean environment and weathering is causing continued deterioration of the Natatorium's reinforced concrete. The majority of the reinforced concrete pool deck appears to be structurally unsound with large portions having already collapsed into the water below, the outer corners of the seawall rotating out and are no longer vertical, and, in some areas, the seawall separating from the deck (WCP, Consulting Structural Hawaii, Inc., and EKNA Services, Inc. 2008). The pool deck has deteriorated such that no access is permitted on it, except for inspection and emergency work. Monthly inspections by DDC evaluate visual changes in the structural integrity of the facility in an ongoing effort to minimize risk to public safety.

The City has funded emergency construction contracts to remove spalling concrete and a section of seawall in danger of falling outside of the Natatorium. Plans to contain such debris from the deteriorating structure or from possible catastrophic failure due to natural forces (e.g., tsunami or earthquake) were compiled in the 2008 *Final Waikiki War Memorial Complex (Natatorium) Emergency Preparedness Contingency Plan* (WCP, Consulting Structural Hawaii, Inc., and EKNA Services, Inc. 2008).

2.0 PURPOSE AND NEED

2.1 PURPOSE

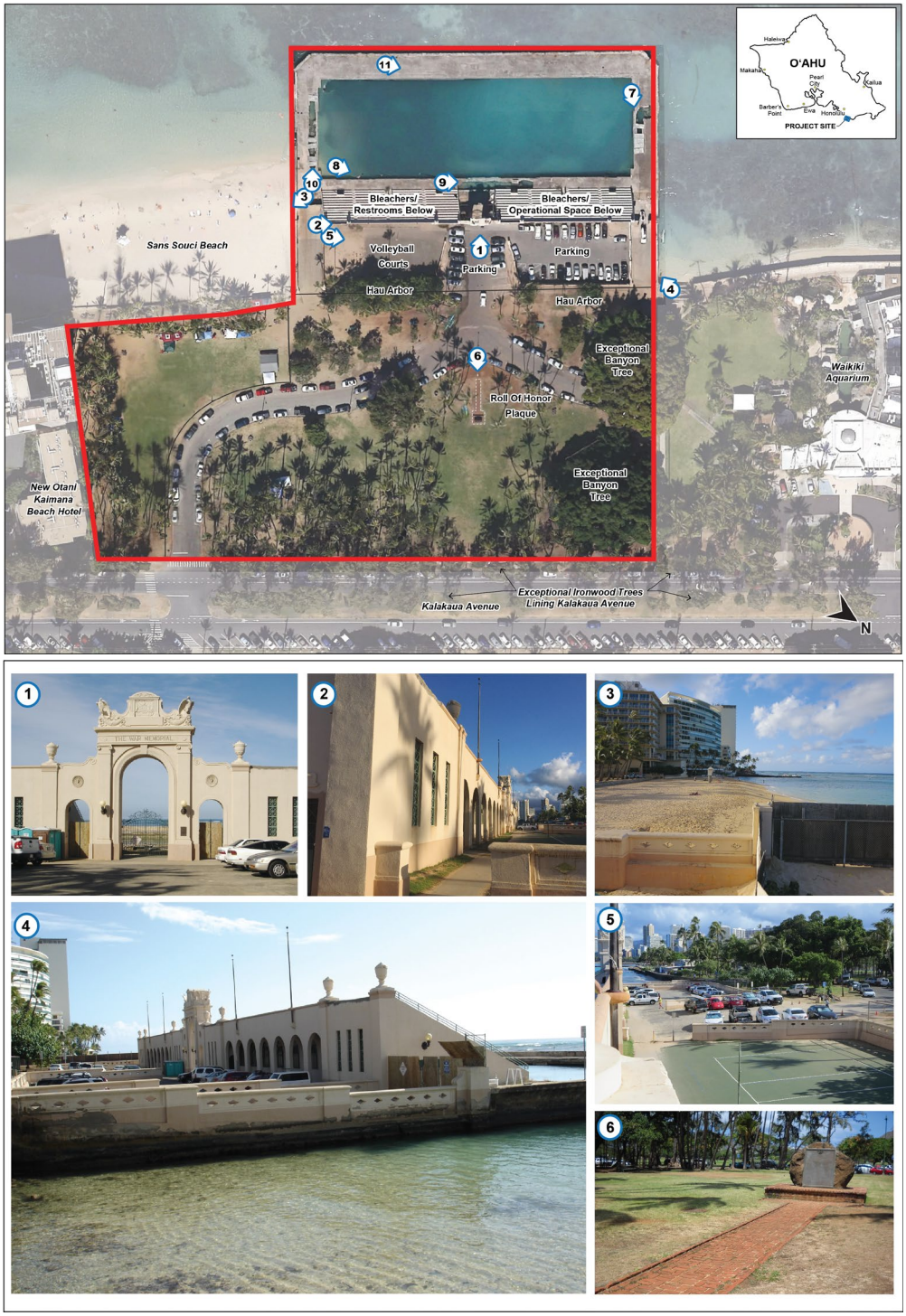
The purpose of the proposed action is to remedy the current deteriorated state of the Natatorium in a manner that renews the memorial to World War I veterans and reestablishes public access to this portion of Kapiʻolani Regional Park.

2.2 NEED

The proposed action is needed because the Natatorium poses a health and safety risk to area users due to the swim basin's water quality and the facility's deteriorated structural condition (Figure 2-1). Improper initial design decisions and construction techniques were found to cause the initial difficulties experienced by the Natatorium (CJS 1985). Insufficient pool water circulation led to water quality issues, including an accumulation of muck at the pool bottom, temporarily closing the Natatorium in 1963 when the DOH declared the pool unfit for swimming. By 1979, structural issues, maintenance concerns, and continued water quality issues led to closure of the Natatorium. Landside restoration efforts completed in 2000 allowed reopening of the public restrooms/showers and the office/storage space beneath the bleachers. The pool and bleacher structure, however, have remained closed for more than 30 years, prohibiting public access to this area of the Waikiki shoreline.

Over the years, both State and City funds have been allocated to determine feasible plans and to initiate both demolition and restoration at different times. Litigation by stakeholder groups has halted both demolition and restoration attempts. Without consensus on the fate of the Natatorium, water quality and structural issues have not been addressed and the facility continues to degrade. The Natatorium's current condition is such that the City must periodically undertake emergency actions to mitigate imminently hazardous public safety conditions posed by the deteriorated structure. Further, in its current deteriorated state, the living memorial does not bestow the respect and honor due to our World War I veterans.

Figure 2-1: Existing Conditions Showing Deteriorated Conditions



Source: Aerial imagery, Google Earth, January 2013.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 PROPOSED ACTION – PERIMETER DECK

In 2014, the City's proposed action was to create a war memorial beach between constructed groins, fronted by a replica memorial arch in alignment with the existing Roll of Honor plaque and hau tree arbor. The entire Natatorium structure—everything built seaward of the 1927 shoreline—would be removed. This alternative—removal of the Natatorium and creation of a new beach—was the recommendation made to the City and County of Honolulu by the Task Force in September 2009.

Subsequent to the publication of the 2014 FEA-EISPN on July 23, 2014, the City initiated its HRS Chapter 6E consultation. In 2017, the City furthered its consultation by introducing the Perimeter Deck, which addresses some of the concerns from the historic partners without subjecting the Natatorium to the 2002 DOH requirements for public swimming pools, HAR Title 11, Chapter 10.

As a result of initial HRS Chapter 6E consultation and considerations presented in this EIS, the City's proposed action is to construct and operate a rehabilitated WWMC as presented in the Perimeter Deck described in this EIS. This action would comply with the rehabilitation approach outlined in the SOI's *Standards for the Treatment of Historic Properties*. It would retain as much of the physical structure that defines the historic integrity of the Natatorium as possible without subjecting the Natatorium to the State requirements for public swimming pools, HAR Chapter 11-10. The Perimeter Deck is illustrated on Figure 3-1 through Figure 3-5.

The Perimeter Deck would include demolition of the less visible submerged structures, including the makai and 'Ewa seawalls of the pool, and would reconstruct the deck on support piles. This alternative would allow for the free flow of water between the ocean and a swim basin and not be subject to the requirements of HAR Chapter 11-10. The shape, configuration, and size of the reconstructed deck would not change, hence emulating the original structure when viewed from above. To retain Sans Souci Beach, the Diamond Head groin and lower portion of seawall would remain and be structurally improved or replaced. The bleachers, arch, and other existing elements of the Natatorium structure would also remain and be rehabilitated to their original appearance.

To provide resiliency against the potential impacts of sea level rise (SLR) over the next few decades, the Perimeter Deck would be designed accordingly. The slope of the deck entrances would be designed in accordance with Americans with Disabilities Act (ADA) Standards for Accessible Design. The existing deck elevation, shown on Figure 3-1 through Figure 3-5, does not reflect such design changes.

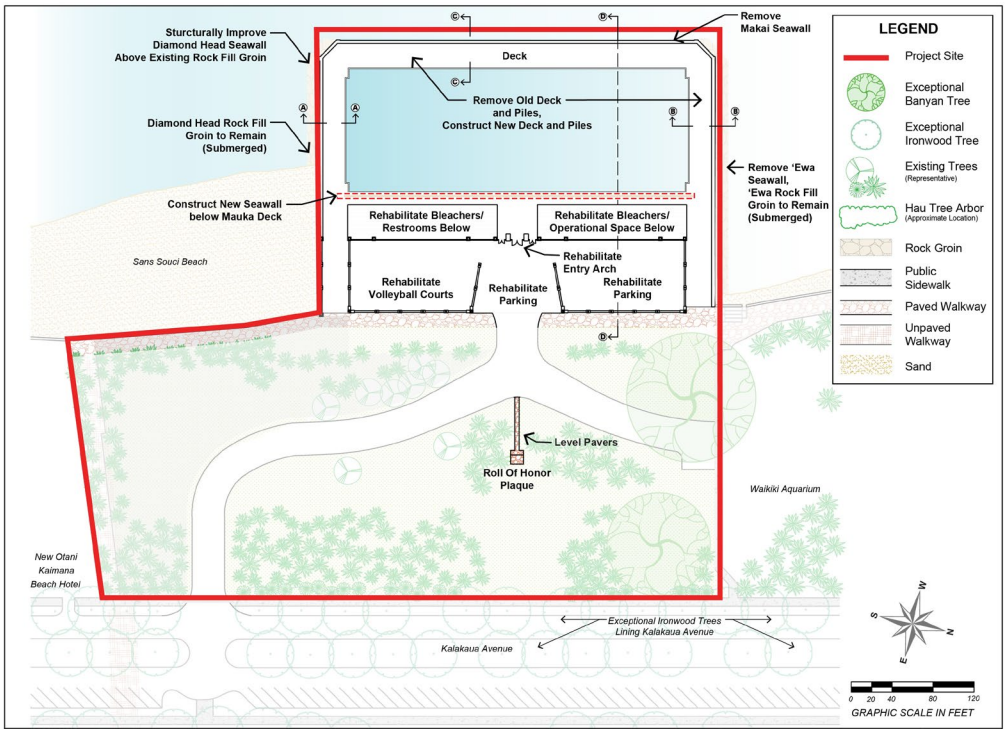


Figure 3-1: Perimeter Deck – Proposed Changes (Plan View)

Source: AECOM, August 2018.

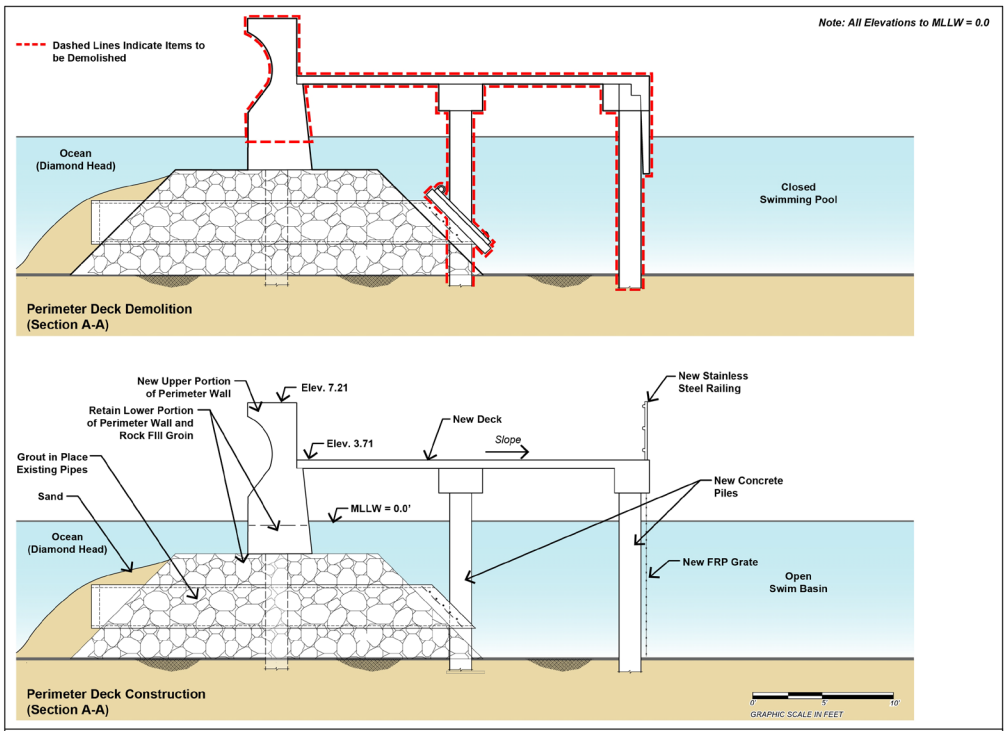


Figure 3-2: Perimeter Deck – Section A-A

Source: AECOM, August 2018.

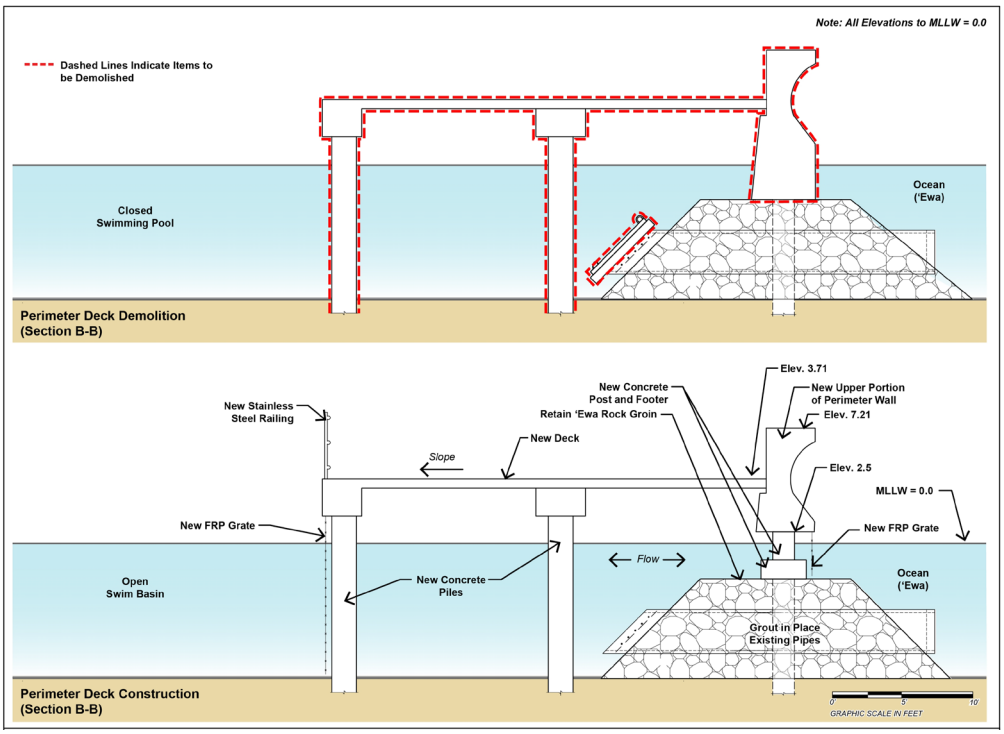


Figure 3-3: Perimeter Deck – Section B-B

Source: AECOM, August 2018.

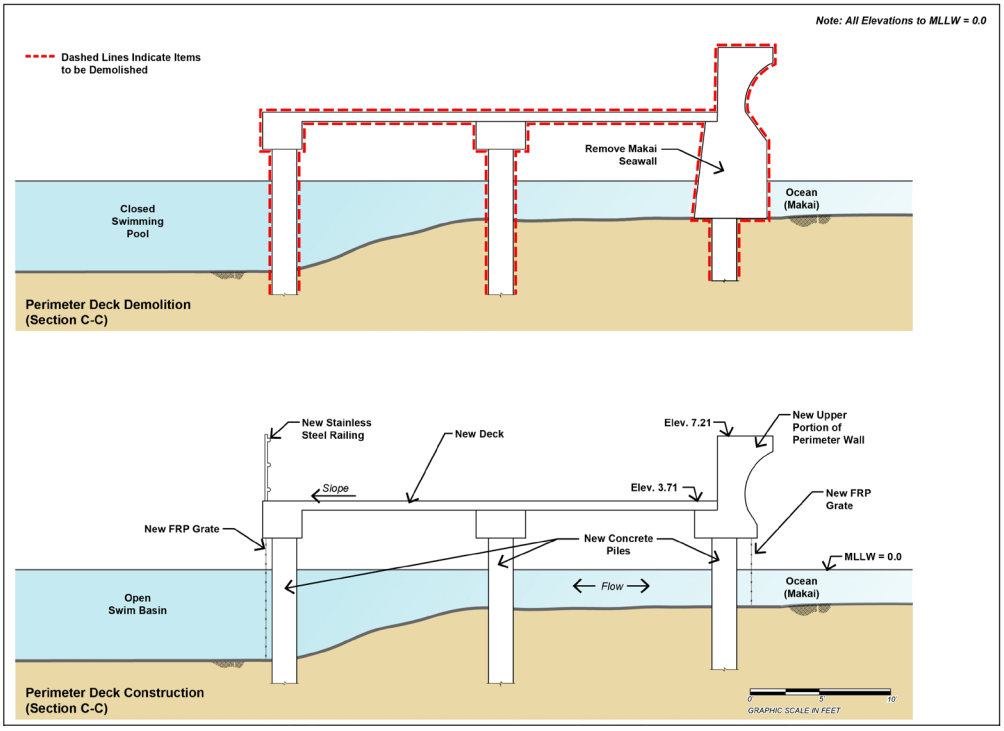


Figure 3-4: Perimeter Deck – Section C-C

Source: AECOM, August 2018.

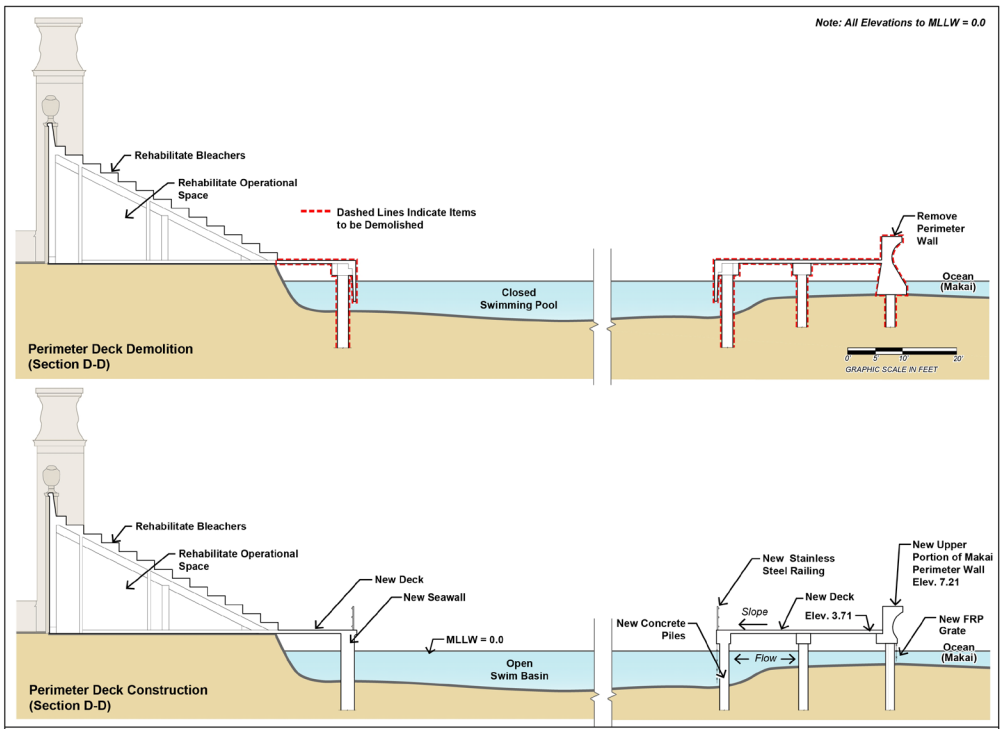


Figure 3-5: Perimeter Deck – Section D-D

Source: AECOM, August 2018.

3.1.1 Construction Activities

Typical construction activities associated with the Perimeter Deck are described below and in Table 3-1. The construction durations for this EIS are estimated from initial contractor mobilization through final site restoration. Actual construction duration would be established with design and construction documents.

Prior to any in-water work, best management practices (BMPs) that will be required to obtain federal permits and approvals will be set in place (standard BMPs are described in Section 3.5). Existing seawalls and temporary barrier walls would contain any resuspended sediment during construction. Reconstruction would occur and be followed by the removal of existing walls and temporary barrier walls. Construction details, including any temporary false piles, would be identified when the designs are developed.

Access for trucks and equipment around the bleachers and memorial arch would be from the mauka half of the ‘Ewa deck, which would be temporarily reinforced with a temporary steel trestle, forming a temporary pier to the swim area. The crane would be stationed on the pier for the duration of the demolition and construction. The mauka ‘Ewa deck would then be the last section of the deck to be demolished and reconstructed.

All demolition and construction makai of the bleachers would be performed from portable sectional barges within the swim area. The barge sections (typically 10 feet wide, 5 feet high, and 40 feet long) would be trucked to the site, hoisted by

crane to the swim area, and assembled into two- or three-section mobile floating platforms from which excavators and other equipment would operate. A minimum of three platforms would likely be necessary. No equipment would be located in waters outside of the Natatorium footprint.

Demolition debris would be loaded into open-top rolloffs on the barges, transported to the pier, and hoisted directly to trucks for off-site disposal. New materials and equipment would be delivered to the site and, as needed, temporarily staged near the volleyball courts, then trucked to the pier, loaded onto the barges and transported within the swim area.

Table 3-1: Typical Construction Activities – Perimeter Deck

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Mobilization	Materials delivery and laydown	Trucks, truck-mounted crane	Continuous
	Install temporary steel trestle for equipment access	Large crane (with pile driver)	2 weeks
	Assemble barge platforms	Large crane	1 week
	Install BMPs	Turbidity curtains, sandbags (in makai seawall gaps), nearshore silt fences	1 week
Demolition	Remove deck (except ‘Ewa access)	Excavators, cutting torches, and rolloffs (on barges); crane and trucks (on ‘Ewa pier)	3 weeks
	Remove interior piles	Excavators and rolloffs (on barges); crane and trucks (on ‘Ewa pier)	2 weeks
	Remove seawalls	Excavators and rolloffs (on barges); crane and trucks (on ‘Ewa pier); concrete saw to remove upper portion of Diamond Head wall	2 weeks

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Reconstruction	Install new piles	Large crane (on barge) and trucks	3 weeks
	Install new beams and deck	Large crane (on barge) and trucks	4 weeks
	Install new upper seawall	Large crane (on barge) and trucks	2 weeks
	Install bulkhead wall at bleachers	Large crane (on barge) and trucks	1 week
	Remove temporary steel trestle, install new 'Ewa piles and deck and upper seawall	Excavator (with grappler claw), dump trucks, large crane	2 weeks
	Install FRP grates	Divers, with hand tools	2 weeks
	Rehabilitate bleachers	Jackhammer, hand tools, paint compressor	8 weeks (concurrent with other work)
	Landscaping/ restoration	Landscaping equipment	2 weeks
Total Estimated Duration (certain activities would be concurrent)			28 weeks (6.5 months)

3.1.1.1 SWIM AREA

Prior to demolition of seawalls and after water quality best management practices (BMPs) are in place (Section 3.5), broken concrete and other debris would be removed, and the beach quality sand that has accumulated in the mauka-Diamond Head area of the pool would be removed for other beach nourishment projects.

The makai and 'Ewa sides of the swim basin would be open to the ocean below the new deck. For the protection of swimmers, designs would incorporate measures to prevent injury to swimmers from entrapment below the perimeter deck, e.g., a fiberglass reinforced plastic (FRP) grate system installed below both the inside and outside edges of the deck, extending to the swim area bottom. On the outside edge of the 'Ewa deck, the grate could extend down to the top of the existing rock fill groin, approximately 2 feet below mean lower low water (MLLW). These safety measures would be developed with input from concerned agencies such as the City and County of Honolulu Emergency Services Department (HESD), DOH, DLNR Division of Aquatic Resources, and NOAA NMFS.

A pre-cast concrete wall would be installed below, and prior to, the deck along the mauka (toward the mountain) side of the swim basin to protect the bleachers from storm waves. The design details of the bulkhead wall would be determined based on future structural analyses. To further improve swimmers' access to the pool, a

pre-fabricated floating dock could be considered, with public safety input from HESD, and installed at a later date.

3.1.1.2 GROINS AND DECK

The entire dilapidated concrete deck surrounding the pool, including beams, pile caps, and portions of the seawall, would be removed. Existing exposed portions of piles would be removed. The existing rock fill groins below the Diamond Head and ‘Ewa seawalls would remain, though some temporary rock removal or relocation may be required during construction. Portions of the existing rock fill groin below the ‘Ewa seawall may also be partially removed, if recommended by further structural analysis during the design phase of the project.

Because the Diamond Head seawall is important for the retention of the neighboring Sans Souci Beach, the lower portion of the wall (below the existing deck) would either remain and be structurally improved or be replaced. If the wall is determined to require full replacement during the design phase, a temporary barrier would be installed just outside the existing Diamond Head seawall prior to its removal. The existing seawater pipes within the rock fill would be grouted in place.

The entire deck would then be reconstructed of pre-cast concrete segments on pre-cast concrete piles to visually match, to the extent practical, the appearance of the original deck structure. Reinstallation of the pile support system presumes use of the existing number of piles. During the design phase of the project, the number of piles and cost may be reduced without diminishing structural stability.

3.1.1.3 BLEACHERS AND MEMORIAL ARCH

The Natatorium structure (including the landside deck, visible portions of the landside seawall, the bleachers, restrooms, office/operational space, arched arcade and triple-arched entry, and parking lot) would be retained and rehabilitated in their current location. Repairs and improvements would be coordinated to provide continued safe use of the bleacher structure and spaces below. Repair work would include, among other things, waterproofing, new plasterwork, and possible localized reconstruction in targeted areas. This alternative assumes that the bleacher structure would be repaired and would then require continual monitoring and maintenance.

3.1.1.4 LANDSCAPING

The Perimeter Deck would involve minimal landside improvements. Existing landside conditions including landscaping, parking, access, and drainage would continue. Minor changes would include:

- Construction of a new paved walkway to extend the existing Kapiʻolani Regional Park shoreline promenade from the Waikiki Aquarium to Sans Souci Beach. The promenade currently ends near the boundary between the Waikiki Aquarium and the project site.
- Restore a level, ADA-compliant surface leading to the Roll of Honor plaque.

The existing landscape character of open spaces and tree clusters would be retained and enhanced with additional plantings. The existing hau trees, trellises, coconut trees, and three large trees on-site would be maintained, as well as the exceptional and historic trees along Kalakaua Avenue. Any landscaping or irrigation upgrades would be done in accordance with existing authorizations. No new landscaping is proposed under this proposed action.

3.1.1.5 UTILITIES

The Perimeter Deck does not include any substantial utility upgrades. Minor upgrades are likely to occur for security lighting.

3.1.2 Operational Activities

Operational activities associated with the Perimeter Deck would include swimming (open ocean), viewing (of the memorial and of the scenic views), participating in tributes such as memorial services, and unspecified planned gatherings that would require a City permit.

Without an identified comparable to represent the Perimeter Deck, the anticipated number of users is not known. The 2013 Recreational Capacity Study identified an estimated 633 daily visits to an 11.7-acre area that includes the WWMC, Sans Souci Beach Park, and Sans Souci nearshore ocean area. Without local recreational use densities (the study used out-of-state densities), one-half of the daily visits in the 11.7-acre area or 317 visits are assumed to be generated and use the approximately 2.4-acre Natatorium area. The number of additional users in the WWMC area would be constrained by the lack of increase in parking.

3.2 2014 FEA-EISPN ALTERNATIVES

Recognizing the history of public interest in this project, the alternatives considered in the City's 2014 FEA-EISPN are presented herein and are evaluated in this EIS. These evaluations were used in the City's decision-making process to identify the Perimeter Deck as its proposed action. The 2014 FEA-EISPN alternatives presented herein are:

- War Memorial Beach, which resulted from the Mayor's 2009 Task Force.
- Closed System Pool, which addressed the public input for an enclosed swimming pool and complies with the 2002 DOH swimming pool rules.
- No Action, a baseline condition for use in evaluating the effect of these action alternatives.

3.2.1 War Memorial Beach

The War Memorial Beach is illustrated on Figure 3-6. This alternative would create a beach between constructed groins.

The War Memorial Beach would include demolition of the memorial arch and other elements of the Natatorium, and construction of a beach and lagoon in place of the existing saltwater pool. Portions of the existing seawalls, combined with new rock fill, concrete walls, and groins, would be used to create a protected beach and swimming area within the Natatorium footprint that would remain stable while still providing for active flushing of the water. The Diamond Head seawall would be designed to retain Sans Souci Beach. A replica memorial arch would be constructed approximately 80 feet inland of its current location.

To provide resiliency against the potential impacts of SLR over the next few decades, the War Memorial Beach would be designed accordingly.

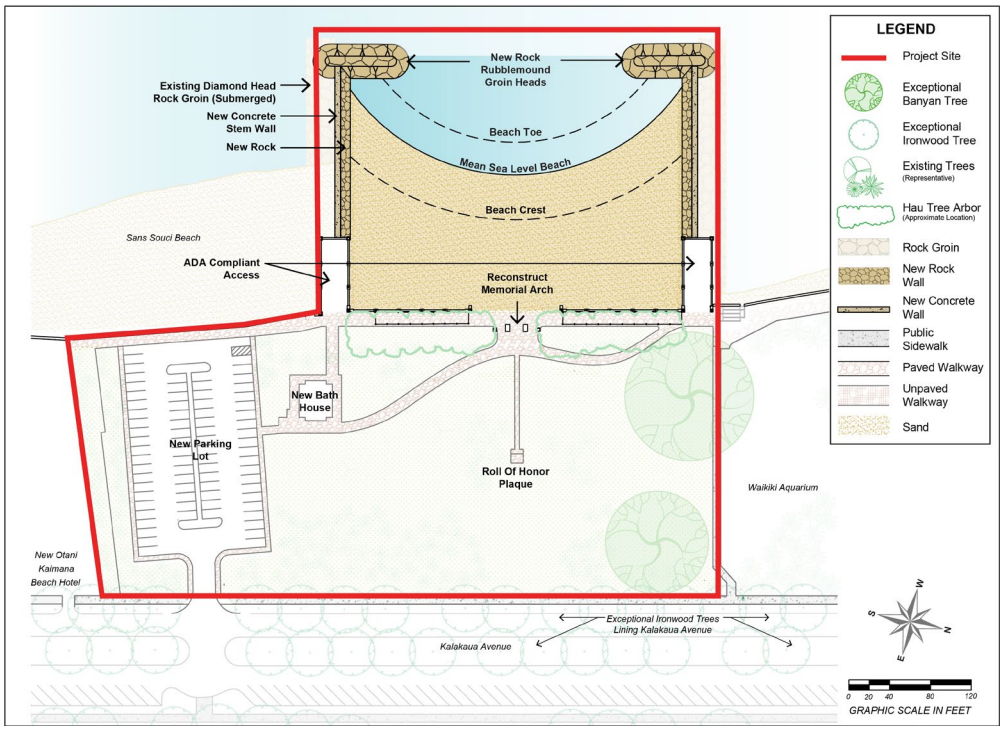


Figure 3-6: War Memorial Beach – Proposed Changes (Plan View)

Source: WCP, June 2016, updated November 2017.

3.2.1.1 CONSTRUCTION ACTIVITIES

Typical construction activities associated with the War Memorial Beach are described below and in Table 3-2. The construction durations for this EIS are estimated from initial contractor mobilization through final site restoration. Actual construction duration would be established with design and construction documents.

Prior to any in-water work, BMPs that will be required to obtain federal permits and approvals will be set in place (standard BMPs are described in Section 3.5). Existing seawalls and temporary barrier walls would contain any resuspended sediment while the basin is regraded and possibly capped. Reconstruction would occur and be followed by the installation of beach sand and the removal of existing walls and temporary barrier walls. Construction details would be identified when the designs are developed.

Sand for this alternative would be harvested from offshore. Offshore activities would include sand harvesting, barging, and truck hauling for direct in-water placement. Approximately 525 to 700 truckloads over 20 days or 4 to 6 truckloads per 10-hour day work be needed for the beach sand (Sea Engineering, Inc. 2018).

Demolition of the Memorial would begin from the mauka side. The arch, bleachers, and adjacent structures would be removed. Access for trucks and equipment would then be directly to the existing swim basin.

All demolition and construction makai of the existing bleachers would be performed from portable sectional barges within the swim area. The barge sections (typically 10 feet wide, 5 feet high, and 40 feet long) would be trucked to the site, hoisted by crane to the swim area, and assembled into two- or three-section mobile floating platforms from which excavators and other equipment would operate. A minimum of three platforms would likely be necessary. No equipment would be located in waters outside of the Natatorium footprint.

Demolition debris would be loaded into open-top rolloffs on the barges, transported to the new shoreline, and hoisted directly to trucks for off-site disposal. New materials and equipment would be delivered to the site and, as needed, temporarily staged near the former volleyball courts, then loaded onto the barges and transported within the swim area.

Table 3-2: Typical Construction Activities – War Memorial Beach

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Near-shore Mobilization	Materials delivery and laydown	Trucks, truck-mounted crane	Continuous
	Install BMPs	Turbidity curtains/nearshore silt fences	1 week

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Off-shore Mobilization (concurrent with other work)	Move dredge to sand source	Boat	1 week
	Dredge and dewater sand	Boat	3 weeks
	Install BMPs	Turbidity curtains, nearshore silt fences	1 week
Demolition	Remove arch and bleachers	Excavators, cutting torches, rolloffs, crane, and trucks	3 weeks
	Assemble barge platforms	Large crane	1 week
	Remove deck	Excavators, cutting torches, and rolloffs (on barges); crane and trucks (on shore)	3 weeks
	Remove interior piles	Excavators and rolloffs (on barges); crane and trucks (on shore).	2 weeks
	Regrade sediments	Excavator (on barge)	½ week
	Remove seawalls	Excavators and rolloffs (on barges); crane and trucks (on shore); concrete saw to remove upper portion of Diamond Head wall	2 weeks
Reconstruction	Install new L-head groin piles	Crane (on barge) and trucks	2 weeks
	Install new L-head groin pile caps	Concrete pump and trucks	4 weeks (including initial cure)
	Install new L-head groin rock	Large excavator (on barge) and trucks	4 weeks
	Install new groin stems	Large crane (on barge) and trucks	2 weeks
	Remove ‘Ewa pier, deck and piles; install new seawall	Excavator, dump trucks, large crane	3 weeks
	Place sand	Excavator, bulldozer, trucks	3 weeks
	Install new bath house	Hand tools, small crane, small excavator	4 weeks (concurrent with other work)
	Install new parking lot	Bulldozer, roller, trucks, paving equipment, paint compressor	2 weeks

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
	Install new electric/lighting	Hand tools, small crane	2 weeks
	Landscaping/ restoration	Landscaping equipment	2 weeks
Total Estimated Duration (certain activities would be concurrent)			36 weeks (8.5 months)

Swim Area

Prior to demolition of seawalls and after water quality BMPs are in place, sediments within the swimming area would be regraded to remove high spots of windblown sand, particularly near the Diamond Head groin. Broken concrete and other debris would be removed, but no dredging or sediment removal would be required. The regraded bottom would be overlain with clean gravel or rock.

A minimum of 2 feet of clean beach sand to form the new swim area bottom and beach would be brought in after the two L-shaped groins are constructed and the existing makai and ‘Ewa seawalls are removed (as described in Groins and Deck, below). Additional sand for the new beach would be reclaimed from an offshore deposit, matching as closely as possible the size and color of the existing sand at Sans Souci Beach. The reclaimed sand would be placed along the shoreline between the two groins. Placement of approximately 10,000 to 14,000 cubic yards of sand fill would result in approximately 40,000 to 50,000 square feet of new beach area.

The resulting swimming area bottom would be composed of light-colored, medium- to coarse-sized sand. This would promote bottom stability and good visibility to a natural bottom. The beach would occupy about half of the current Natatorium interior (as a function of tidal level), primarily in the current footprint of the bleachers. There would be no enclosing walls or deck except for the Diamond Head and ‘Ewa groins.

Groins and Deck

The entire concrete deck surrounding the pool, including beams, pile caps, and portions of the seawall would be removed. Existing exposed portions of piles would be removed. The existing rock fill below the Diamond Head and ‘Ewa seawalls would remain. New piles would be installed just inside (basin-side) the existing groin/walls. Because the Diamond Head seawall is important for the retention of the neighboring Sans Souci Beach, the existing Diamond Head seawall would remain and the new groin stem would help to retain the neighboring Sans Souci Beach.

Two equal-length L-head riprap groins would be constructed on concrete mat footings. Each groin would be approximately 140 feet long with a 60-foot-long L-head. The Diamond Head and ‘Ewa groin stems would include vertical pre-cast concrete walls that would replace the existing walls and limit the lateral extent of the structure. The stems would have a crest elevation of 7.5 feet above MSL and

would be faced with sloping riprap on the interior (swim area) side. The short L-heads would have crest elevations of +6.0 feet MSL and extend into the swim area, parallel to the shore. The completed groins would fall within the existing Natatorium footprint.

Existing geotechnical information indicates poor foundation conditions, with loose sandy soil and silty lagoonal deposits to a depth of about 30 to 50 feet below sea level. This material is moderately to highly compressible, with potential settlement under load. Therefore, due to the soft sediments in the area, the new groins would be constructed on pile-supported concrete footings. The supporting piles would be of pre-cast concrete. The L-heads would be of rubble-mound construction and require only a concrete mat foundation without pile support, as they would be supported by the fossil reef along the perimeter of the existing swimming area.

After groin and deck installation, the remainder of the existing seawalls would be removed.

Bleachers and Memorial Arch

Creation of a new beach would require that the entire Natatorium structure be demolished and removed. In keeping with the Natatorium's originally intended World War I memorial function, a new replica memorial arch (recreating the existing three-arch entranceway) would be constructed and sited to frame the new beach as viewed from the existing Roll of Honor plaque. The new memorial arch would be located approximately 80 feet mauka of the existing Natatorium entrance, in alignment with the existing hau tree arbor. The existing Ocean Safety and Lifeguard Services Division office, below the bleachers, would need to be relocated to a site 'Ewa of the Waikiki Aquarium. The future site was identified in the Ocean Safety Substation District Replacement Project.

Landscaping

The War Memorial Beach landside park improvements would include:

- Construction of a new bath house and outdoor shower facility on City park lands mauka of the Natatorium. The bath house would be ADA-compliant.
- Replacement of the internal road/parallel parking that bisects the site with a consolidated lot at the park's south side. The capacity of the new parking lot would be sufficient to retain the same number of stalls (77) currently at the project site. The existing curb cut on Kalakaua Avenue would be reused to access the new parking lot.
- Construction of a new paved walkway that extends the existing Kapiʻolani Regional Park shoreline promenade to Sans Souci Beach. The promenade currently ends near the boundary between the Waikiki Aquarium and the project site. Additional paved walkways would also connect the shoreline promenade to the new bath house, parking lot, and Roll of Honor plaque (which would be maintained in its current location).

The pedestrian entry would be designed to provide safe and ADA-compliant access to the site and integrate with the existing beach promenade. Paved surfaces (e.g., sidewalks) would be minimized with the intent of maximizing open green areas and passive recreational activities.

The existing landscape character of open spaces and tree clusters would be retained and enhanced with additional plantings. The existing hau trees, trellises, coconut trees, and three large trees on-site would be maintained, as well as the exceptional and historic trees along Kalakaua Avenue. Any landscaping or irrigation upgrades would be done in accordance with existing authorizations. No new landscaping is proposed under this alternative.

Utilities

Lighting could include new lamp posts within the new beach and the park. The replica memorial arch would be illuminated with lighting connected to timers. Site lighting would provide illumination for safety and security in addition to illuminating the replica memorial arch. To the degree possible, materials from demolition would be recycled for the construction of the new bath house, walkways, parking lot, and memorial arch.

The existing electrical system at the WWMC, including a switchboard, panelboards, luminaries, wiring devices, junction boxes, raceways, and wires would be completely dismantled and removed. A new pad-mounted transformer would be installed by Hawaiian Electric (HECO) (to be confirmed, as needed, and location to be determined). New duct lines from Kalakaua Avenue to the transformer location would be required. From the transformer, 120/240 volts, 1 phase, and 3-wire service would be installed to new electric equipment and would include metering, panelboard, and lighting controls.

A new water line would be installed to service the new bath house. The new water system would be connected to an existing 8-inch waterline located within Kalakaua Avenue, fronting the WWMC. Site sanitary sewer systems would be upgraded as needed.

3.2.1.2 Operational Activities

Operational activities associated with the War Memorial Beach would include swimming (open ocean), sunbathing on the beach, and viewing (of the replica memorial and of the scenic views). Other uses including participating in tributes such as memorial services and unspecified planned gatherings that would require a City permit would occur outside of the existing Natatorium in areas of the WWMC that are currently accessible to the public.

Without an identified comparable to represent the War Memorial Beach, the anticipated number of users is not known. The 2013 Recreational Capacity Study identified an estimated 633 daily visits to a 11.7-acre area that includes the WWMC, Sans Souci Beach Park, and Sans Souci nearshore ocean area. Without local recreational use densities (the study used out-of-state densities), one-half of the daily visits in the 11.7-acre area or 317 visits are assumed to be generated and

use the approximately 2.4-acre Natatorium area. The number of additional users in the WWMC area would be constrained by the lack of increase in parking.

3.2.2 Closed System Pool

The Closed System Pool is illustrated on Figure 3-7. This alternative would include a filtered, freshwater, disinfected, closed system pool designed to comply with provisions of HAR Chapter 11-10, specifically with those provisions related to water quality requirements and maintainability, including exchange rates and turbidity. An open-cycle saltwater pool concept has not been demonstrated to meet the stringent requirements of HAR Chapter 11-20. To avoid further discussions that are unlikely to lead to a resolution, a closed system pool is evaluated.

The intent of the Closed System Pool is to rehabilitate the Natatorium to its historic character while also meeting the requirements of HAR Chapter 11-10. This alternative involves maintaining the Natatorium structures while constructing a concrete-lined freshwater swimming pool in place of the saltwater pool. The Diamond Head groin and seawall would be structurally improved or replaced to retain Sans Souci Beach.

To provide resiliency against the potential impacts of SLR over the next few decades, the Closed System Pool would be designed accordingly.

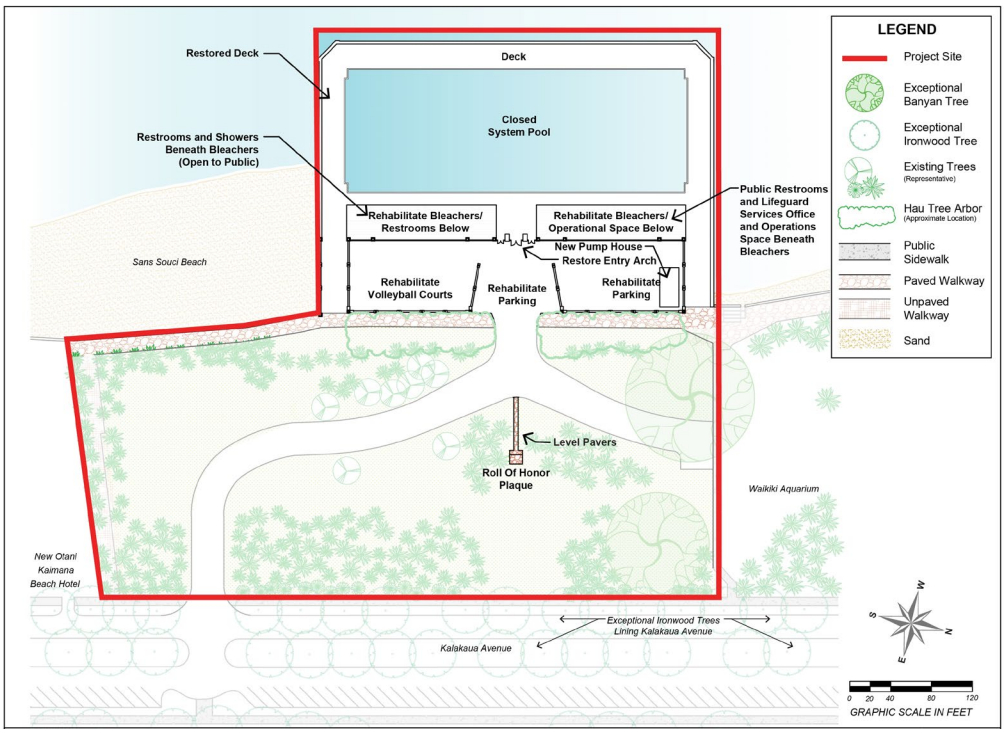


Figure 3-7: Closed System Pool – Proposed Changes (Plan View)

Source: WCP, June 2016, updated November 2017.

3.2.2.1 CONSTRUCTION ACTIVITIES

Typical construction activities associated with the Closed System Pool are described below and in Table 3-3. The construction durations for this EIS are estimated from initial contractor mobilization through final site restoration. Actual construction duration would be established with design and construction documents.

Prior to any in-water work, BMPs that will be required to obtain federal permits and approvals will be set in place (standard BMPs are described in Section 3.5). Existing seawalls and temporary barrier walls would contain any resuspended sediment while the basin is regraded. Reconstruction would occur and be followed by the removal of existing walls and temporary barrier walls. Construction details would be identified when the designs are developed.

Access for trucks and equipment around the bleachers and memorial arch would be from the mauka half of the ‘Ewa deck, which would be temporarily reinforced with driven steel piles, wooden cribbing, and steel plates, forming a temporary steel trestle to the swim area. The crane would be stationed on the pier for the duration of the demolition and construction. The mauka ‘Ewa deck would then be the last section of the deck to be demolished and reconstructed.

All demolition and construction makai of the existing bleachers would be performed from portable sectional barges within the swim area. The barge sections (typically 10 feet wide, 5 feet high, and 40 feet long) would be trucked to the site, hoisted by crane to the swim area, and assembled into two- or three-section mobile floating platforms from which excavators and other equipment would operate. A minimum of three platforms would likely be necessary. No equipment would be located in waters outside of the Natatorium footprint.

Demolition debris would be loaded into open-top rolloffs on the barges, transported to the pier, and hoisted directly to trucks for off-site disposal. New materials and equipment would be delivered to the site and, as needed, temporarily staged near the volleyball courts, then trucked to the pier, loaded onto the barges, and transported within the swim area.

Table 3-3: Typical Construction Activities – Closed System Pool

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Mobilization	Materials delivery and laydown	Trucks, truck-mounted crane	Continuous
	Install temporary steel trestle for equipment access	Large crane (with pile driver)	2 week
	Assemble barge platforms	Large crane	1 week
	Install BMPs	Turbidity curtains, nearshore silt fences	1 week

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Demolition	Remove deck (except ‘Ewa access)	Excavators, cutting torches, and rolloffs (on barges); crane and trucks (on ‘Ewa pier)	3 weeks
	Remove interior piles	Excavators and rolloffs (on barges), with crane and trucks (on ‘Ewa pier)	2 weeks
	Regrade sediments	Excavator (on barge)	½ week
	Remove seawalls	Excavators and rolloffs (on barges); crane and trucks (on ‘Ewa pier); concrete saw to remove upper portion of Diamond Head wall	2 weeks
Reconstruction	Install new seawalls	Large crane (on barge) and trucks	3 weeks
	Install new deck piles	Large crane (on barge) and trucks	3 weeks
	Install new beams and deck	Large crane (on barge) and trucks	4 weeks
	Install pool floor piles	Large crane (on barge) and trucks	2 weeks
	Install pool floor seal slab	Concrete pump and trucks	2 weeks (including initial cure)
	Install pool floor finished slab	Concrete pump and trucks	2 weeks (including initial cure)
	Install pool wall seal slabs	Large crane (on barge) and trucks	3 weeks
	Install pool wall finished slabs	Concrete pump and trucks	4 weeks (including initial cure)
	Remove temporary steel trestle; install new ‘Ewa piles and deck and upper seawall	Excavator, dump trucks, large crane	2 weeks
	Install pool finish coating	Hand tools, paint compressor	2 weeks
	Install new pump house	Hand tools, small crane	4 weeks (concurrent with other work)
	Install pumps/filters/tanks	Hand tools, small crane	4 weeks

Construction Phase	Typical Activities	Typical Equipment Used	Possible Duration
Reconstruction (cont'd.)	Install water supply well	Large drill rig, small excavator	2 weeks
	Install finished plumbing	Hand tools	2 week
	Install electric systems	Hand tools	2 week
	Rehabilitate bleachers	Jackhammer, hand tools, paint compressor	8 weeks (concurrent with other work)
	Landscaping/restoration	Landscaping equipment	2 weeks
Total Estimated Duration (certain activities would be concurrent)			49 weeks (11.5 months)

Swim Area

Prior to demolition of seawalls and after water quality BMPs are in place, broken concrete and other debris within the swim area would be removed, but no dredging or sediment removal would be required. The swim area bottom would be regraded and then topped with clean rock and gravel up to a design elevation. The final swim area (pool) bottom would be constructed of a tremied concrete seal slab supported on concrete piles, followed by a cast-in-place finished concrete floor with a final water depth of 4 to 6 feet. The pool walls would be constructed of pre-cast seal slabs, with a cast-in-place finished surface. All slab joints would include gaskets to minimize interchange of disinfected pool water with the surrounding ocean and groundwater. All interior pool surfaces would be coated and cleanable using standard public swimming pool materials.

Design and construction of the proposed pool as described in this alternative poses logistical and structural challenges. The pool seals would be critical, because draining the pool for cleaning and maintenance would create buoyancy and tension on the underlying piles. Any future design would account for these considerations.

In addition to the pool, landside mechanical facility considerations include:

- The spaces beneath the bleachers may not be able to accommodate the required mechanical equipment, the office space currently used by the Ocean Safety and Lifeguard Services Division office, and the existing restroom facilities.
- Due to its historic status, and to avoid compromising its historic integrity, a new adjacent building to house the mechanical equipment (e.g., pumps, filters, and surge tanks) would need to be carefully accommodated within the site, possibly in the parking area.
- Based on a draft analysis (Pacific Aquatech, Inc. 2016), the new pool would require: a complete filtration and sanitation system, a six-hour minimum turnover rate, variable frequency drive pumps, floor and wall jets for water inlets, surface skimmers at 25-foot intervals, multiple grated drains for dirt and

debris collection, an offline disinfectant generation system, an automated pH/oxidant control and metering pump, and ancillary plumbing and piping.

- Overflow from the pool would return to the filtration and recirculation system. Overflow water would not be discharged to the ocean. Filter backwash would be discharged to the sanitary sewer system.
- A source of fresh pool water might involve a new supply well installed nearby within Kapiʻolani Regional Park.
- Access to the pool would be ADA-compliant. A floating dock could also be designed, with public safety input from HESD, and installed in the swim basin in the future for swimmers to use.

Groins and Deck

The entire dilapidated concrete deck surrounding the pool, including beams, pile caps, and portions of the seawall would be removed. Existing exposed portions of piles would be removed. The existing rock fill groins below the Diamond Head and ʻEwa seawalls would remain, though some temporary rock removal or relocation may be required during construction. Because the Diamond Head seawall is important for the retention of the neighboring Sans Souci Beach, the lower portion of the wall (below the existing deck) would either remain and be structurally improved or be replaced. The existing seawater pipes within the rock fill groins would be grouted in place.

The entire deck would then be reconstructed of pre-cast concrete segments on pre-cast concrete piles to visually match, to the extent practical, the historic appearance of the deck structure from the surface.

Demolition and reconstruction of the deck and piles for the Closed System Pool would be performed in the same manner as that described under the Perimeter Deck (Section 3.1.1). No equipment or materials would be placed in waters outside of the existing Natatorium footprint.

Bleachers and Memorial Arch

Under this alternative, the Natatorium structure (including the deck, visible portions of the seawalls, the bleachers, restrooms, office/operational space, arched arcade and triple-arched entry, and parking lot) would be retained and rehabilitated in their current location. Repairs and improvements would have to be implemented to ensure continued safe use of the bleacher structure and spaces below. Repair work would include, among other things, waterproofing, new plasterwork, and possible localized reconstruction in targeted areas. This alternative assumes that the bleacher structure would be repaired and would then require continual monitoring and maintenance.

Landscaping

The Closed System Pool would include minimal landside improvements. Existing landside conditions including landscaping, parking, access, and drainage would generally remain as they currently exist at the site. Minor changes would include:

- Construction of a new paved walkway that extends the existing Kapiʻolani Regional Park shoreline promenade to Sans Souci Beach. The promenade currently ends near the boundary between the Waikiki Aquarium and the project site.
- Restore a level, ADA-compliant surface leading to the Roll of Honor plaque.

The existing landscape character of open spaces and tree clusters would be retained and enhanced with additional plantings. The existing hau trees, trellises, coconut trees, and three large trees on-site would be maintained, as well as the exceptional trees along Kalakaua Avenue. Any landscaping or irrigation upgrades would be done in accordance with existing authorizations. No new landscaping is proposed under this proposed action.

Utilities

The Closed System Pool assumes that fresh pool water would be extracted from a dedicated well (or City potable water supply). Filter backwash would be discharged to the sanitary sewer system. Electrical system upgrades would be required to accommodate the pumps and other mechanical equipment. Piping and power supply between the well and the pump house would be buried in a shallow trench.

3.2.2.2 Operational Activities

Operational activities associated with the Closed System Pool could include swimming (disinfected potable water), swim meets, viewing (of the memorial and of the scenic views), participating in tributes such as memorial services, and unspecified planned gatherings that would require a City permit.

Without an identified comparable to represent the Closed System Pool, the anticipated number of users is not known. The 2013 Recreational Capacity Study identified an estimated 633 daily visits to a 11.7-acre area that includes the WWMC, Sans Souci Beach Park, and Sans Souci nearshore ocean area. Without local recreational use densities (the study used out-of-state densities), one-half of the daily visits in the 11.7-acre area or 317 visits are assumed to be generated and use the approximately 2.4-acre Natatorium area. The number of additional users in the WWMC area would be constrained by the lack of increase in parking.

3.2.3 No Action

No Action is illustrated on Figure 2-1 and represents the baseline conditions for which the action alternatives are evaluated. Under No Action, the WWMC would remain in its current dilapidated condition and the pool and bleachers would remain closed to the public. There would be no change to the land use or facilities that currently exist at the site. The existing landscape character of open spaces and tree clusters would be retained. This alternative would maintain the status quo and all structures would remain in place and continue to deteriorate.

Due to the public safety hazards presented by the current condition of the Natatorium and related liability borne by the City, monitoring of the structural condition would continue and, if warranted, imminent hazards would be mitigated

in accordance with the recommendations of the Emergency Preparedness Contingency Plan (WCP, Consulting Structural Hawaii, Inc., and EKNA Services, Inc. 2008). These actions are not evaluated in this EIS as none was identified as an obligation to undertake by the City. Costs will continue to accrue with the deteriorating structure under No Action.

3.3 ALTERNATIVES CONSIDERED BUT NOT FURTHER EVALUATED IN THE EIS

3.3.1 Postponing Action Pending Further Study

Since the closure of the Natatorium structure in 1980, various legislative initiatives, appropriations for studies, and analyses have been done for the WWMC. Some relevant studies for the WWMC completed to date include a 1995 EIS analyzing the complete and partial restoration of the Natatorium facility (Leo A Daly 1995b), a 2008 Emergency Preparedness Contingency Plan (WCP, Consulting Structural Hawaii, Inc., and EKNA Services, Inc. 2008), a 2008 Shoreline Restoration Study (Sea Engineering, Inc. 2008), a 2009 Task Force Summary Report (WCP 2009), a 2018 Natatorium Coastal Assessment and Basis of Design (Sea Engineering, Inc. 2018), and various structural, biological, and technical impact reports. The need for additional studies has not been established, nor have specific study topics been identified as a prerequisite to moving the proposed action forward.

The postponement of action pending further study at WWMC is not consistent with the purpose of the proposed action to remedy the current deteriorated state of the facility in an appropriate manner and the need to address the health and safety risk to area users.

3.3.2 Alternative Location for the Proposed Project

The 2009 Waikiki War Memorial Natatorium Task Force Summary made various recommendations for the future of the WWMC. Scenario 3b of that summary proposed demolishing the pool and bleachers and reconstructing the triple archway Natatorium feature at the Veterans Memorial Aquatic Center at the Central Oʻahu Regional Park (WCP 2009). This proposed relocation and reconstruction of the archway feature in central Oʻahu is not consistent with the project purpose to renew the memorial to World War I veterans and reestablish public access to this portion of Kapiʻolani Regional Park. This alternative also does not fulfill the project need to address the health and safety risk to area users due to the water quality and deteriorated structural condition of the Natatorium.

Alternative locations for the Natatorium are constrained by the intent to keep the facility within its current, general shoreline area. This locational intent is outlined in Act 15 of the Legislature which authorized the construction of the memorial at the 6.4-acre property purchased in 1919. Act 15 also specified the memorial's plan to include a swimming course.

3.3.3 Other Alternatives Previously Considered

3.3.3.1 COMPLETE RESTORATION

The 1995 EIS for the Natatorium was approved with "complete restoration" as the proposed action (Leo A Daly 1995b). This complete restoration proposal would meet the purpose and need as defined in this EIS. The restoration would remedy the current deteriorated state of the Natatorium, renew the memorial to World War I veterans, and restore public access to this area of the shoreline.

However, as described in Section 1.4.2, *Chronology Summary of Structure-Maintenance Issue and Past Plans,* DOH implemented HAR Chapter 11-10, *Public Swimming Pools,* in 2002. HAR Chapter 11-10 requires "public salt water specialty pools" to demonstrate that water exchange rates ensure compliance with water clarity and water quality standards. These new rules require a mechanical pumping system for circulation as well as pool surfaces (walls, bottom, and deck) that are easy to clean. The 1995 plans did not comply with these new rules and therefore were not lawful.

Subsequent attempts to comply with the 2002 pool rules have not been successful. In 2016, Dr. Hans Krock proposed to the City an ocean-fed pool concept on behalf of the NTHP. This concept involved staggered rows of concrete chevrons below the makai deck and enhanced water flow out of the swim basin. This design was intended to result in a swim basin water exchange of up to six times per day. However, the design was never confirmed by the DOH to meet the HAR Chapter 11-10 water clarity and quality standards.

3.3.3.2 2008 RECREATIONAL BEACH CONCEPTS

The *Waikiki Beach War Memorial Natatorium Honolulu, Hawai'i: Shoreline Restoration Study Conceptual Design Review Report* (Sea Engineering, Inc. 2008) evaluated the shoreline response through computer wave modeling for seven concept designs. The concept designs were developed by representatives from the USACE Honolulu District, DLNR Office of Conservation and Coastal Lands, City, and City's consultants. The factors considered included projected beach stability, usable beach area, and stability of Sans Souci Beach. Findings are summarized in Appendix E and were used to develop the War Memorial Beach (Section 3.2.1).

3.4 ESTIMATED PROJECT COSTS AND FUNDING SOURCES

The preliminary capital and operations and maintenance (O&M) costs for the proposed action and 2014 FEA-EISPN alternatives are presented below with backup costing materials in the Pre-EIS Alternatives Technical Evaluation (WCP 2018) provided in Appendix A-4. Operational costs were adjusted as noted below, based on input provided by HESD, DPR, and DDC. These costs are to be considered rough orders of magnitude for comparison of alternatives and are subject to change.

3.4.1 Perimeter Deck (Proposed Action)

Construction

The capital cost for the Perimeter Deck is approximately $25.6 million. This estimate includes allowances for construction management, engineering, and contingency. It does not include structural adjustments for SLR.

Operation

The total annual O&M cost for the proposed action is approximately $341,805 per year. It is based on the O&M cost for the Perimeter Deck in the Pre-EIS Alternatives Technical Evaluation (WCP 2018) of approximately $174,000 per year, and includes the cost of additional City lifeguards. Based on HESD, DPR, and DDC input for this EIS, the number of City lifeguards to support the proposed action was adjusted upward by three staff (for a total of four lifeguards) at an annual salary of $55,935 per staff or $167,805 per year. This estimate includes the cost for periodic maintenance, minor repairs, a groundskeeper, lifeguards, utilities, and miscellaneous supplies.

3.4.2 War Memorial Beach

Construction

The capital cost for the War Memorial Beach is approximately $28.8 million. This estimate includes construction of a new parking area, site-wide utility upgrades, and relocation of the Ocean Safety and Lifeguard Services Division office (items not included in the City's previous estimates), as well as allowances for construction management, engineering, and contingency. It does not include adjustments for SLR.

Operation

The total annual O&M cost for the War Memorial Beach is approximately $345,740 per year. It is based on the O&M cost in the Pre-EIS Alternatives Technical Evaluation (WCP 2018) of approximately $122,000 per year and cost for additional City lifeguards. Based on HESD, DPR, and DDC input for this EIS, the number of City lifeguards to support the War Memorial Beach was adjusted upward by four staff (for a total of five lifeguards) at an annual salary of $55,935 per staff or $223,740 per year. This estimate includes the cost for periodic maintenance, minor repairs, a groundskeeper, lifeguards, utilities, and miscellaneous supplies, as well as an allowance for periodic beach re-nourishment.

3.4.3 Closed System Pool

Construction

The capital cost for the Closed System Pool is approximately $42.7 million. This estimate includes site-wide utility upgrades and allowances for construction management, engineering, and contingency. It does not include structural adjustments for SLR.

Operation

The total annual O&M cost for the Closed System Pool is approximately $406,870 per year. It is based on the O&M cost in the Pre-EIS Alternatives Technical Evaluation (WCP 2018) of approximately $295,000 per year and cost for additional City lifeguards. Based on HESD, DPR, and DDC input for this EIS, the number of City lifeguards to support the Closed System Pool was adjusted upward by two staff (for a total of four lifeguards) at an annual salary of $55,935 per staff or $111,870 per year. This estimate includes the cost for periodic maintenance, minor repairs, a groundskeeper, lifeguard, utilities, and miscellaneous supplies.

3.4.4 No Action

No change and therefore no costs are associated with No Action for purposes of this EIS. However, the costs could be approximately $1.4 million, based in part on the Emergency Preparedness Contingency Plan (WCP, Consulting Structural Hawaii, Inc., and EKNA Services, Inc. 2008).

3.5 MANAGEMENT MEASURES

This section describes management measures that are made as part of the proposed action and alternatives that serve to avoid and minimize impacts to the environment. The measures are presumed in the analysis of resources/issue in this EIS. Specific management measures will be identified through the federal, state, and city permit and approval processes that will be required for construction. Management measures include standard BMPs, standard operating procedures, and conservation measures.

Transportation. Best construction practices such as avoiding major truck activity during the peak traffic hours and preparing required traffic control plans and obtaining required permits for State and City roads for appropriate and safe construction management of vehicular, bicycle, pedestrian, and public transit modes in the area would be implemented.

Noise Control. Construction vehicles and equipment would use mufflers to minimize construction noise to the extent practical. Construction activities would be limited to daytime hours.

Fugitive Dust Control. As required under HAR Chapter 11-60.1-33, fugitive dusts will be controlled, e.g., dust control measures for material stockpiles and any truck transfer of sand/materials.

Water Quality, Marine Biology, and Terrestrial Biology. To control erosion and sediment runoff during construction, BMPs will be implemented as required by the NPDES permit and the 401 Water Quality Certification (WQC), to include but are not limited to (1) construction phasing to reduce soil exposure duration, (2) preservation of existing vegetation, (3) stockpile protection, (4) runoff diversion techniques, and (5) perimeter barriers around staging, storage, and work areas.

Based on standard work in water practices and requirements, in-water BMPs would include use of floating turbidity barriers to prevent undue turbidity in adjacent water; water quality monitoring; regular equipment inspection, maintenance, and cleaning; and appropriate construction scheduling and sequencing BMPs. The use of sectional barges would minimize disturbance to the seafloor. Use of pre-cast concrete structures, when feasible, would prevent potential degradation of water quality. Limiting work to the existing Natatorium footprint would prevent impacts to adjacent coral communities.

For protected marine resources such as turtles and marine mammals, appropriate monitoring and stop-work procedures would be implemented during in-water construction. Monitoring could include pre-construction visual monitoring for any special status species swimming and/or hauled out in the vicinity 30 minutes prior to construction. Ramp-up or slow-start procedures for pile-driving could be implemented.

Additional appropriate measures will be developed during the USACE permit application process, WQC authorization, and associated federal consultations, such as those with USFWS and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) pursuant to 305(b) of the MSA and Section 7 of the ESA.

Solid Waste Disposal. Recycling and reuse of demolition and construction materials would occur to the extent practicable. Designated waste collection areas would include covered containers, as appropriate.

Hazardous Substances or Wastes. Hazardous substances or wastes that may be encountered or used at the project site could include paints and solvents, and petroleum products such as oils and fuels. Spill prevention and response measures would be implemented to prevent the accidental release of petroleum products into the environment. Any hazardous wastes from demolition would be disposed of in accordance with applicable federal, state, and county regulations.

4.0 AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES (DIRECT, INDIRECT, AND CUMULATIVE)

This section describes the affected environment and presents the potential environmental consequences of each alternative.

Cumulative impacts consider other projects and are discussed in Section 4.16.

4.1 LAND OWNERSHIP AND MANAGEMENT

Land use is defined as the actual physical development on a site and its surrounding area. Zoning regulations encompass the regulatory regime which governs the types of uses, intensity, physical development parameters of the built environment, and on occasion, the operations of land uses on property. Land uses of property are not always consistent, complementary, or in compliance with zoning regulations. The WWMC falls into this category. Its construction predates modern land use zoning regulations at the federal, state, and county levels. Its status is one of a legal non-conforming structure and operation. Under this status, its operation, along with its physical maintenance can continue, provided that both are not intensified or expanded. Additional land use plans, policies, and controls are presented in Section 5.0.

4.1.1 Affected Environment

4.1.1.1 LAND OWNERSHIP AND STATUS

As described in the Kapiʻolani Regional Park Master Plan Update of 2011:

> "Title to portions of Kapiʻolani Regional Park is held by the State of Hawaiʻi in trust for the maintenance of a public park. By Executive Order No. 22 dated July 1, 1913, the State of Hawaiʻi transferred operational management of the Park to the City and County of Honolulu." (Miyabara Associates LLC 2011)

The City DPR is currently responsible for Park operations and maintenance. While WWMC is owned by the State of Hawaiʻi, it is managed by the City and County of Honolulu (Figure 4-1). Kapiʻolani Regional Park is shown on Figure 4-2.

Figure 4-1: Land Ownership

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

The project site for all three alternatives consists of the following three separate parcels. Tax map keys (TMKs) for the project site and acreage per each are described below:

- TMK 3-1-031:003 – 2.358 acres (total for parcel 3 is 2.765 acres, but the project site excludes the 0.407-acre area comprised of two areas planned for groins in the 1995 EIS plans). This area is owned by the State of Hawai‘i and is not part of the Kapi‘olani Trust Managed Lands.

  This parcel encompasses the entirety of the Natatorium structure, including most of the volleyball court, entry area, and courtyard parking area.

- TMK 3-1-031:009 – 0.987 acres. This area is owned by the City and County of Honolulu and is part of the Kapi‘olani Trust Managed Lands.

  This parcel encompasses the southern portion of the Sans Souci Park area extending from the Kalakaua Avenue right of way to the seawall dividing the beach from the park grounds.

- TMK 3-1-031:010 – 2.988 acres. This area is owned by the State of Hawai‘i and is part of the Kapi‘olani Trust Managed Lands.

  This large parcel encompasses the driveway, the remaining Sans Souci Park area, and all the way to the Waikiki Aquarium property.

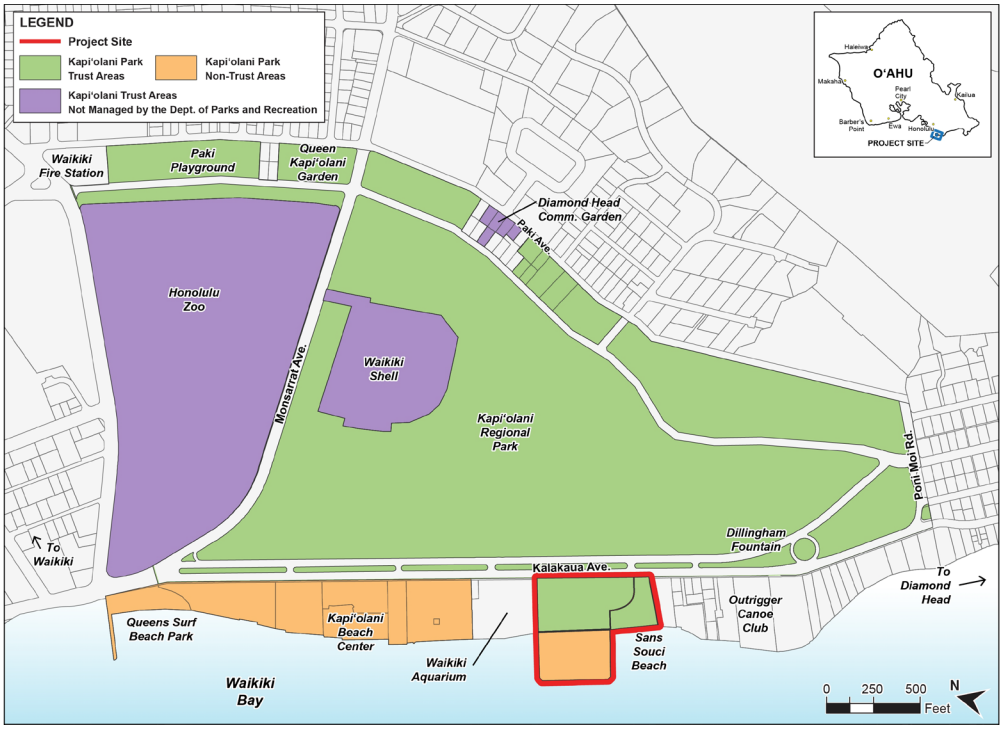


Figure 4-2: Kapi‘olani Trust Managed Lands

Source: Trust Data, CCH, HI-DEBT, PBR, AECOM, 2012. Aerial imagery from DigitalGlobe Version 3, October 2015.

4.1.1.2 HISTORICAL AND EXISTING LAND USES

The existing surrounding land uses have been historically related to recreation and tied to activities in the ocean and the contiguous Kapiʻolani Regional Park areas mauka of Kalakaua Avenue. At the start of the 20th century, this area was rural in nature, with some elegant residential homes located along the shoreline extending towards Waikiki and a polo field and horse racing track in the park, drawing wealthy spectators. In the 1910s, a streetcar line was constructed from downtown Honolulu extending down Kalakaua Avenue and terminating near the current Waikiki Aquarium. The aquarium itself was constructed by a private streetcar operator to build ridership on the line. The WWMC was subsequently constructed in 1927, adding to the area attractions.

With the rapid growth of Waikiki into an international tourist destination starting after World War II and continuing through the early statehood years, the area surrounding the WWMC experienced growth of its own. The result was the development of a line of residential mid- and high-rise buildings along the shoreline extending to the base of Diamond Head. For more information on the history of the area, see Section 4.12, Cultural Resources and Appendix H, Cultural Impact Assessment.

Today, the area south of the WWMC contains hotels, restaurants, private clubs, retail establishments, large condominium buildings, and some single-family homes, with the Dillingham Fountain on Kalakaua Avenue at the center. Areas to the north of the WWMC consist of the Waikiki Aquarium, park and beach user facilities, and further north, the Honolulu Zoo.

4.1.1.3 LAND USE AND ZONING

Of the four State of Hawaiʻi land use districts, only the Urban District encompasses the project site (Figure 4-3). The Natatorium structure, although makai of the high tide line, has a designation of Urban District. Under State law, State Urban Districts are subject to County zoning designations. The City and County of Honolulu has designated the project site as P-2 (General Preservation) (Figure 4-4).

Table 4-1 below outlines the various land use designations applicable to the project site at the State and County levels. Compliance with various policy and guidance documents is discussed in detail in Section 5.0. Compliance with provisions and development standards of the County Land Use Ordinance (LUO), shoreline regulations, and required County-issued land use permits is discussed below.

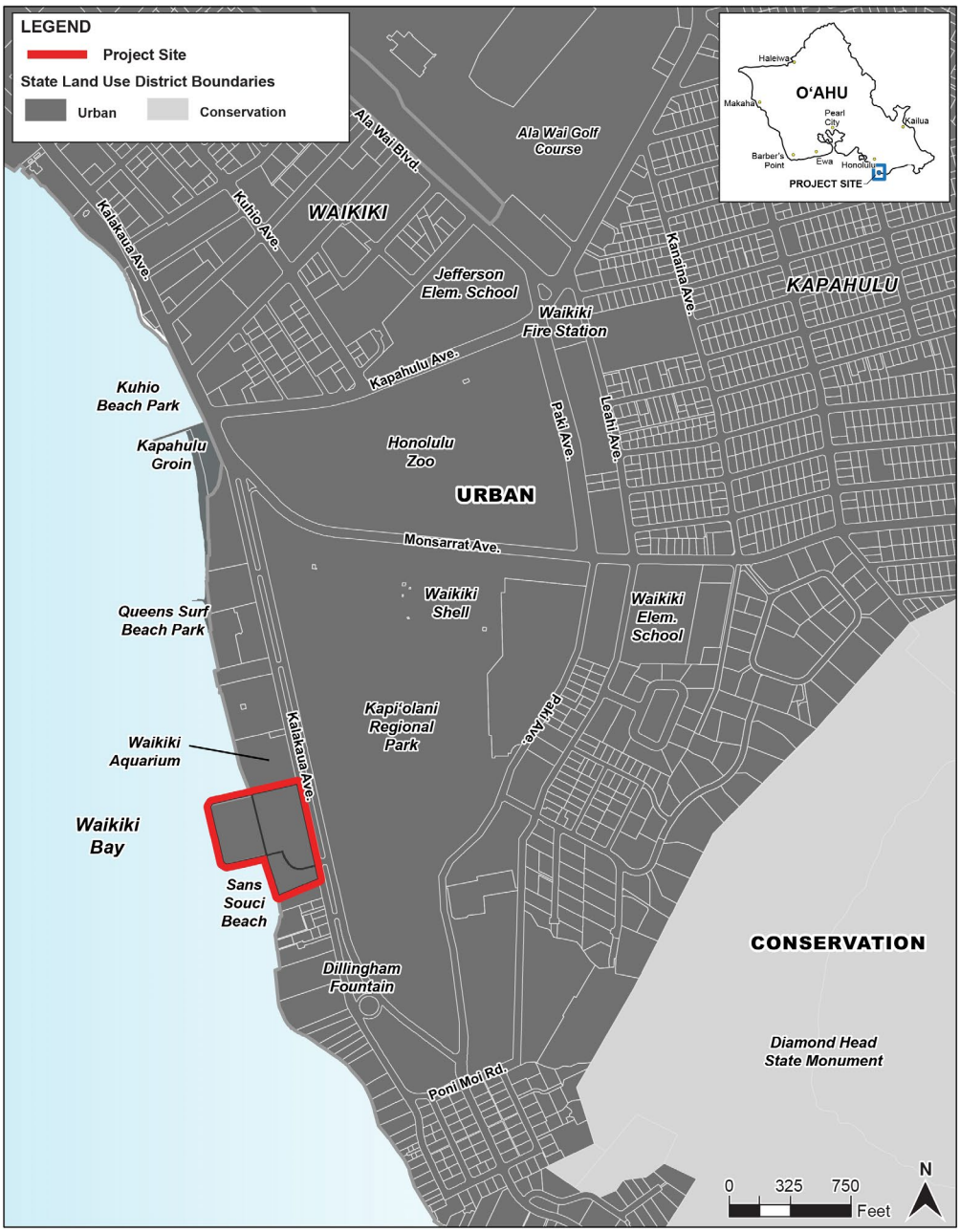


Figure 4-3: State Land Use

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

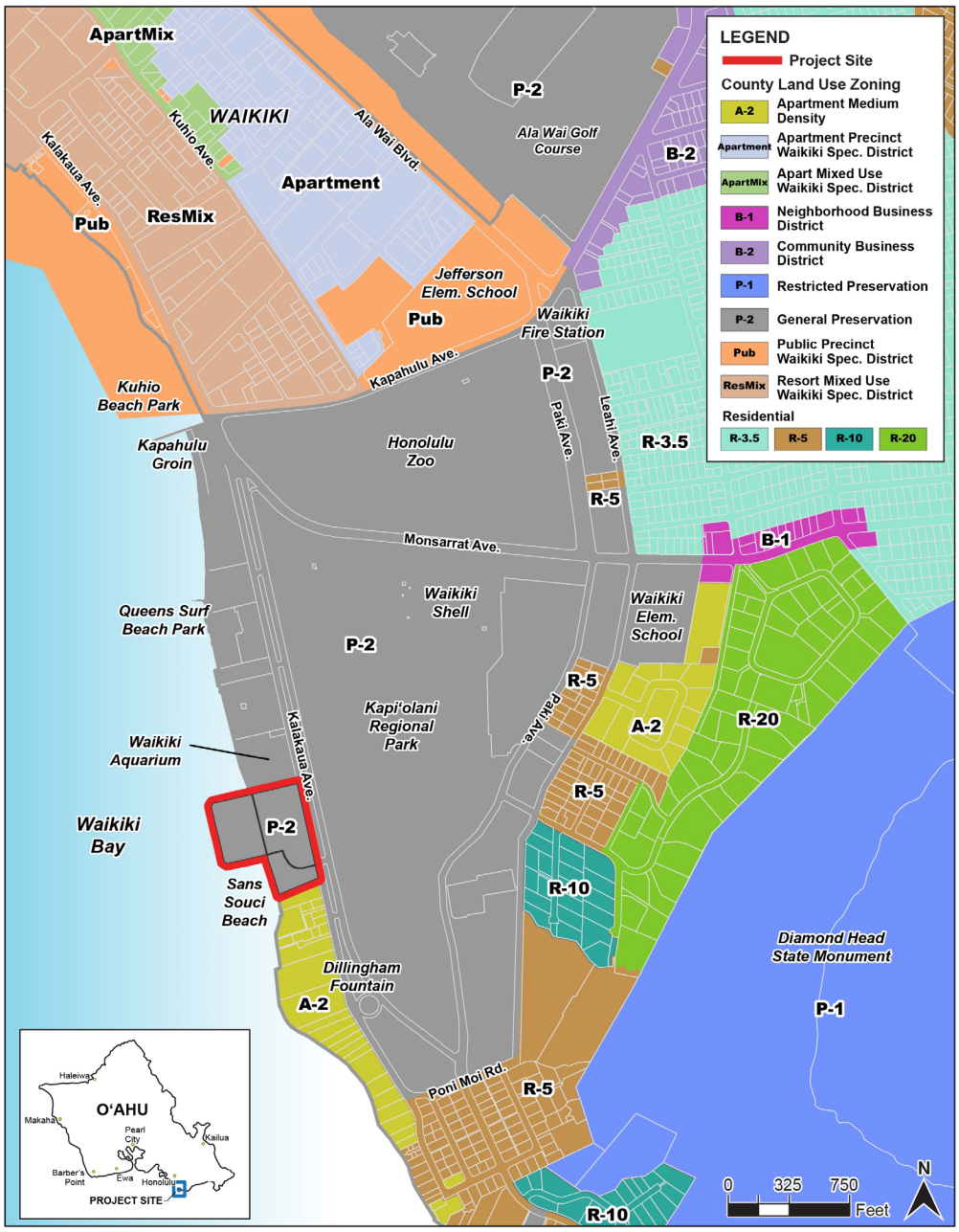


Figure 4-4: County Land Use Zoning

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

Table 4-1: Land Use Designations

State Land Use District	Urban
O'ahu General Plan	Primary Urban Center
Development Plan Area	Primary Urban Center
Development Plan Public Facilities Map	Government Building
County Zoning	P-2 General Preservation
Special Flood Hazard Areas	Coastal High Hazard Area and Floodway Area
Special District	Diamond Head Special District
Special Management Area	Inside Special Management Area
Shoreline Setback Area	Within Shoreline Setback Area

P-2 General Preservation

Land uses within the City jurisdiction are regulated under Revised Ordinances of Honolulu (ROH), Chapter 21, LUO. The purpose of the LUO, as stated in Section 21.1.20, is to "…regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the O'ahu general plan and development plans, and to promote and protect the public health, safety and welfare." Section 21.3.10 of the LUO lists the latest land use zoning districts classifications.

The zoning district associated with this project site consists of the P-2 General Preservation zone. Section 21-3.40 of the LUO describes the purpose and intent of the P-2 zone as follows:

- The purpose of the preservation districts is to preserve and manage major open space and recreation lands and lands of scenic and other natural resource value.
- It is also the intent that lands designated urban by the State, but well-suited to the functions of providing visual relief and contrast to the city's built environment or serving as outdoor space for the public's use and enjoyment, be zoned P-2 General Preservation District.

The table below (ROH Chapter 21-3.1) outlines the standards applicable to new development in the P-2 General Preservation District (Table 4-2).

Table 4-2: P-2 District Development Standards

Development Standard		P-2
Minimum lot area (acres)		5
Minimum lot width and depth (feet)		200
Yards (feet):	Front	30
	Side and rear	15
Maximum building area (percent of zoning lot)		5

Development Standard	P-2
Maximum height (feet) [1]	15–25
Height setbacks [2]	per Sec. 21-3.40-1(e)

Notes: Section 21-3.40-1 Additional Development Standards.
(1) Height. The maximum height may be increased from 15 to 25 feet if height setbacks are provided.
(2) Height Setbacks. Any portion of a structure exceeding 15 feet shall be set back from every side and rear buildable area boundary line by 1 foot for each 2 feet of additional height above 15 feet.

Flood Hazard Areas

Section 21-9.10 of the LUO provides for development in flood hazard areas when development is reviewed for compliance with ROH Chapter 21A – Flood Hazard Areas ordinance. These flood hazard areas are identified in the Federal Emergency Management Agency's Flood Insurance Rate Maps (FIRM) (Figure 4-9). The WWMC is in zones VE and AE, which are subject to provisions of ROH Chapter 21A.

For zone VE (most of the Natatorium area and an area defined by the City as being in a Coastal High Hazard District), Section 21-9.10-7 states, "Within the coastal high hazard district, the uses permitted in the underlying zoning district shall be permitted, provided such uses, improvements, structures and utilities are in compliance with the provisions of Sections 21-9.10 through 21-9.10-14." It also provides additional standards to Section 21-9.10-4, e.g., "a registered professional architect or engineer shall develop or review the design, specifications and plans and certify that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of Sections 21-9.10 through 21-9.10-14, and that any development in the coastal high hazard district, including structures and improvements, would not affect the regulatory flood nor aggravate existing flood-related erosion hazards."

For zone AE (most of the landside area and an area defined by the City as in a Floodway District), Section 21-9.10-5(b) states, "Any temporary or permanent encroachment, including fill, structures, storage of material or equipment, or other development within the floodway, shall be prohibited unless certification and supporting data, including hydrologic and hydraulic analyses performed in accordance with standard engineering practice, are provided by a licensed engineer demonstrating that the proposed encroachment will not cause any increase in regulatory flood elevations during the occurrence of the regulatory flood."

Special Management Area

The project site lies within the County-delineated Special Management Area (SMA) (Figure 4-5). Pursuant to the State's Coastal Zone Management Program outlined in HRS 205A, the provisions of ROH Section 25 have been established and are applied to all lands within the SMA of the City and County of Honolulu. ROH Section 25-1.2 states,

> "It is the City and County of Honolulu's policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawaii. Special controls on development within an area along the shoreline are necessary to avoid permanent loss of valuable resources and foreclosure of management options, and to insure that adequate public access is provided to public owned or used beaches, recreation areas, and natural reserves, by dedication or other means. It is also the policy of the city and county to avoid or minimize damage to natural or historic special management area wetlands wherever prudent or feasible; to require that activities not dependent upon a wetland location be located at upland sites; to allow wetland losses only where all practicable measures have been applied to reduce those losses that are unavoidable and in the public interest."

According to ROH Section 25-6.1, "no development or structure shall be constructed within the special management area without first obtaining a special management area use permit, a minor permit or being exempted pursuant to the provisions of this chapter". Based on the valuation of the work associated with each of the alternatives estimated to be in excess of $500,000, a SMA Use Permit application would need to be pursued and a Use Permit issued for the proposed action or any of the action alternatives.

In addition to compliance with the objectives and policies of the Hawai'i Coastal Zone Management Program outlined in HRS Section 205A (Section 5.0 of this EIS), the guidelines in ROH Section 25 for the review by the City Council when considering a SMA Use Permit include the following:

- 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 would minimize adverse effects on SMA resources.
- Alterations to existing land forms and vegetation, except crops; and construction of structures shall cause minimum adverse effect to water resources, scenic and recreational amenities, and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

Shoreline Setback Variance

ROH, Chapter 23-1.2 states,

> It is a primary policy of the city to protect and preserve the natural shoreline, especially sandy beaches; to protect and preserve public pedestrian access laterally along the shoreline and to the sea; and to protect and preserve open space along the shoreline.

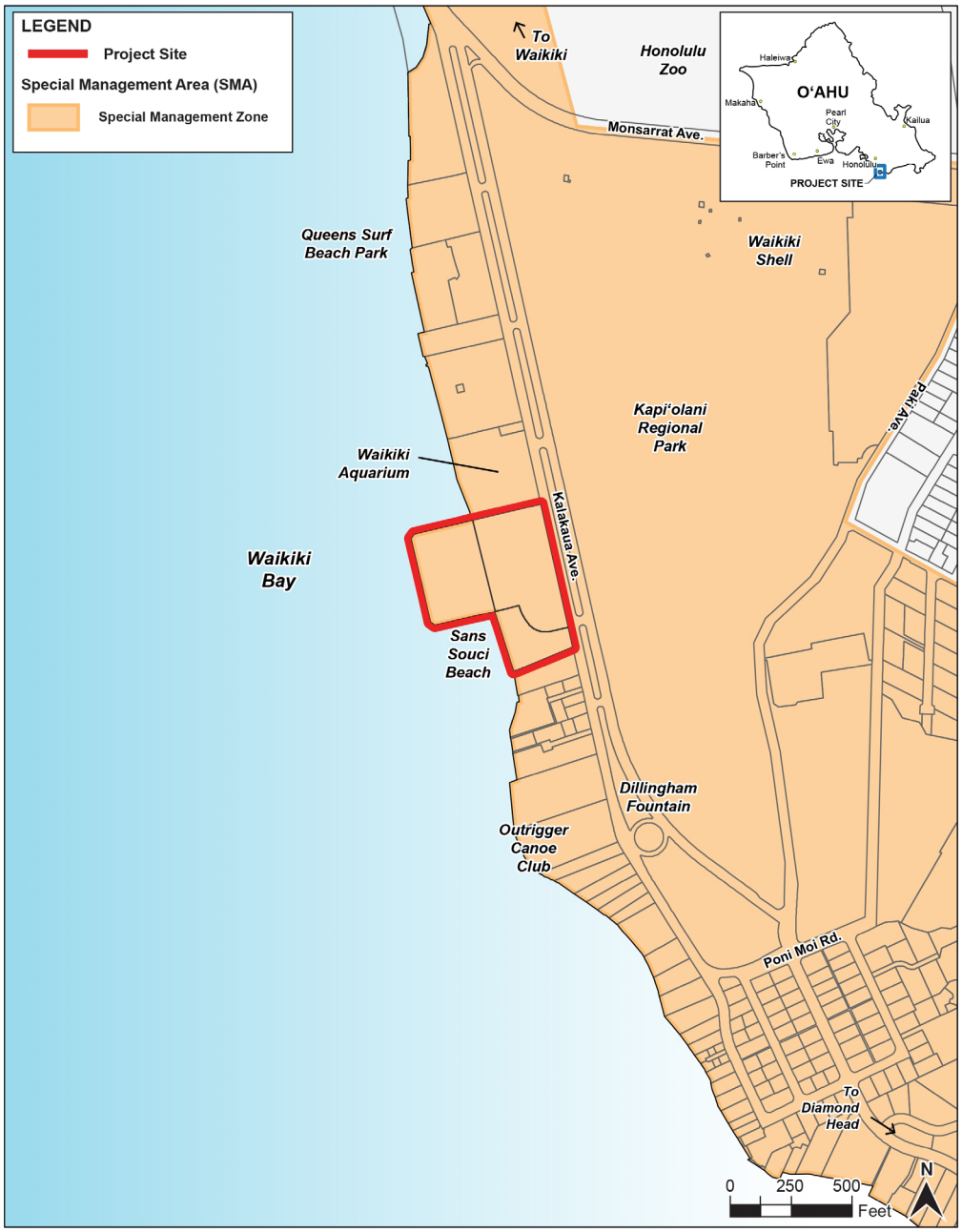


Figure 4-5: Special Management Area

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

ROH Chapter 23-1.2 further defines requirements for activities within the Shoreline Setback Area (40 feet from the certified shoreline). Activities or structures within the setback area, including grading or stockpiling of earth, may require a Shoreline Setback Variance (SSV), which is administered by the DPP. SSVs can be approved by the Director of DPP when the activity meets one or more of the standards outlined in the ROH, including the *Shoreline Dependent Facility Standard* or *Public Interest Standard*. An approval of a SSV is predicated on the imposition of various conditions designed to minimize risks to property, safety, public views, and beach

processes. The SSV application would be submitted with the SMA application (discussed above). This package of applications would be submitted after the EIS process nears its finalization.

Diamond Head Special District

The City has designated various areas around O‘ahu as Special Districts to guide development and protect and/or enhance the physical and visual aspects of an area for the benefit of the community as a whole. The WWMC and surrounding area are located within the Diamond Head Special District. LUO Section 21-9.40 describes Diamond Head as “a volcanic crater that has been declared a state and national monument. Its natural appearance and prominent public view have special values of local, state, national, and international significance, and are in danger of being lost or seriously diminished through changes in land use and accompanying land development”.

The LUO outlines prominent public vantage points and design controls for development within the district. The beachfront extending from Ala Wai Harbor to Sans Souci Beach, Kapi‘olani Regional Park, and Kalakaua Avenue from Kapahulu Avenue to Coconut Avenue are identified as prominent public vantage points from which to view Diamond Head. The WWMC is located within the Diamond Head Special District Core Area in an area with a height limit of 0 feet.

4.1.2 Potential Environmental Consequences

A significant impact on land ownership or management would occur if a proposed use would be in conflict with allowable uses and could not be permitted or approved.

4.1.2.1 Perimeter Deck (Proposed Action)

No significant impacts to land ownership and management would result from construction or operation of the proposed action. Land would remain under control of the City and County, and access to the site and surrounding area would be opened to the public following construction commencement. Supporting information follows.

Historical and Existing Land Uses. The rehabilitation of the WWMC would result in the reintroduction of a previously existing, legal, public recreational use at the project site and is consistent with current land uses in the area.

P-2 Preservation Zoning District. The WWMC has been at this location since 1927 and predates current zoning and land use regulations. The WWMC was constructed in compliance with land use regulations and building codes applicable at the time of construction. Subsequent renovations were also completed in compliance with codes and regulations, with the last rehabilitations to the site-issued permits in 2001.

The WWMC remains a legal if non-conforming facility. ROH Section 21-3.40(b)(3) notes that "any non-conforming structure may be repaired, expanded or altered in any manner that does not increase its non-conformity".

The LUO outlines permitted uses and development standards in the P-2 zone. The Perimeter Deck meets the definition of "Recreational Facilities, Outdoor". Table 21-3.1 of the LUO lists "Recreational Facilities, Outdoor as a use requiring approval of a "Conditional Use Permit-minor".

The existing WWMC structures do not meet the current development standards of the P-2 zoning district such as height limits and setbacks. However, as noted above, the facility is categorized as a legal non-conforming structure and therefore does not need a variance from the development standards, provided that the non-conforming conditions of the structure are not amplified or intensified.

Flood Hazard Areas. The proposed action would be developed in compliance with the provisions of Section 21-9.10 to protect life and property, and to reduce public costs for flood control and rescue and relief efforts. A permit from DPP would be required.

Special Management Area. For this alternative, in-water construction is proposed to primarily occur from two or three mobile platforms placed within the swim basin. No equipment would be located in waters outside of the Natatorium footprint. The specific construction techniques, staging areas, procedures, and specific information to be submitted in the construction management plan would be reviewed as part of the SMA permit process to ensure they are consistent with the objectives and policies of the Hawai'i Coastal Zone Management Program outlined in HRS Section 205A and the guidelines in ROH Section 25.

Shoreline Setback Variance. Construction activities associated with the proposed action, and within the Shoreline Setback area (40 feet), including grading or stockpiling of earth, may require a Shoreline Setback Variance (SSV), which is administered by the DPP under the provisions of ROH 23. The City would first have to complete a survey to establish the certified shoreline at the project site. SSVs can be approved by the Director of DPP when the activity meets one or more of the standards outlined in ROH 23, including the *Shoreline Dependent Facility Standard* or *Public Interest Standard*.

Under ROH 23-1.6 as a legal, non-conforming structure in the Shoreline Setback Area, the WWMC may be repaired, provided that its repair does not increase its non-conformity. In addition, ROH 23-1.5 permits maintenance, repair, reconstruction, and minor additions to legal, publicly owned ocean sports recreation facilities under whose definition the WWMC falls.

Diamond Head Special District. While the WWMC is an existing facility and the structures associated with the proposed action predate zoning regulations and Special District regulations, a Special District Permit would still be required as part of the implementation of Perimeter Deck. As defined in ROH 21-9.40-6, Table 21-9.2, "major exterior repair, alteration or addition to all structures"

requires the issuance of a Minor Special District Permit and the review of the project against the Diamond Head Special District Design Guidelines and development standards. This minor permit would be processed by the DPP and approved by the DPP Director.

4.1.2.2 WAR MEMORIAL BEACH

No significant impacts to land ownership and management would result from construction or operation of the War Memorial Beach. This alternative would require greater effort than the Perimeter Deck because the executive order for the area would need to be amended. Supporting information follows.

Historical and Existing Land Uses. The War Memorial Beach represents the most significant change in land use of any of the alternatives being considered in this EIS. The demolition of the Natatorium facility would result in the permanent loss of a historic landmark along the Waikiki shoreline. It would also result in the removal of a memorial to those who served in World War I. The resultant War Memorial Beach would significantly increase beachfront along the crowded Sans Souci Beach. The existing public restrooms and lifeguard office would be relocated to a freestanding building, adding a new land use to a site that is currently open space. While the War Memorial Beach would require an amendment to the existing executive order for the area and would change land use at this site, it does not constitute a new type of use in the area and would be consistent with other uses in the area.

P-2 Preservation Zoning District. This alternative involves the removal of existing facilities and construction of new ones, including a surface parking lot. Under the P-2 zoning regulations, Table 21-3.1 of the LUO lists “Recreation facilities, outdoor” as a use requiring approval of a Conditional Use Permit-minor.

Unlike the Perimeter Deck, the War Memorial Beach would introduce beach use and remove an existing structure. The new beach and its accessory structures would be designed to be consistent with the purpose and intent of the P-2 zone as well as the development standards of the P-2 zone.

Flood Hazard Areas. The War Memorial Beach would be developed in compliance with the provisions of Section 21-9.10 to protect life and property and reduce public costs for flood control and rescue and relief efforts.

Special Management Area. For the War Memorial Beach, the entire concrete deck would be removed and replaced by two parallel groins. Like the Perimeter Deck, this alternative would require review and issuance of a SMA permit to ensure the project construction activities area is consistent with the objectives and policies of the Hawai‘i Coastal Zone Management Program outlined in HRS Section 205A and ROH Chapter 25.

The War Memorial Beach, while resulting in increased access to a newly created publicly owned beach, would be inconsistent with other goals and polices of HRS 205A and the provisions of ROH Section 25. The demolition of the

WWMC would result in the destruction of a scenic, historic, cultural, and recreational amenity.

Shoreline Setback Variance. The War Memorial Beach would require the issuance of a SSV as there are numerous facilities and structures that may be proposed within the Shoreline Setback Area. These include portions of the new parking lot, the reconstructed Memorial Arch, and portions of the proposed beach and paved walkways. A SSV for this alternative can be approved, if the Director of DPP can find it consistent with the Public Interest Standard of ROH 23 which states, "A variance may be granted for an activity or structure that is necessary for or ancillary to facilities or improvements by a public agency or by a public utility regulated under HRS Chapter 269, or necessary for or ancillary to private facilities or improvements that are clearly in the public interest; provided that the proposal is the practicable alternative which best conforms to the purpose of this chapter and the shoreline setback rules".

Diamond Head Special District. With the War Memorial Beach, there would be substantial changes including demolition and new construction of structures within the core area of the district. This alternative also involves major infrastructure improvements primarily in the form of the new parking lot, reconstructed memorial arch, revised walkways, and possible removal of trees over 6 inches in diameter. As defined in ROH 21-9.40-6, Table 21-9.2, these actions are considered "major" in the Core Area, and would trigger the application and approval of a Major Special District Permit involving public notification, presentation before the appropriate Neighborhood Board, and review and approval by the design review committee.

4.1.2.3 Closed System Pool

The land ownership and management impacts during construction and operations of the Closed System Pool would be similar to those of the Perimeter Deck. Supporting information follows.

Historical and Existing Land Uses. No change in land use is proposed as part of the Closed System Pool. The rehabilitation of the WWMC would result in the reintroduction of a previously existing, legal, public recreational use at the project site, and is consistent with current land uses in the area.

P-2 Preservation Zoning District. Consistency with zoning and land use designations are the same as the Perimeter Deck.

Flood Hazard Districts. The Closed System Pool would be developed in compliance with the provisions of Section 21-9.10 to protect life and property and reduce public costs for flood control and rescue and relief efforts. A permit from the DPP would be required.

Special Management Area. Consistency with the provisions of the State's Coastal Zone Management Program outlined in HRS 205A and the provisions of ROH Section 25 are the same as the Perimeter Deck.

Shoreline Setback Variance. The construction phase process is the same as the Perimeter Deck and War Memorial Beach construction phase process.

Diamond Head Special District. The permitting process associated with the operational phase of the Closed System Pool would be the same as the Perimeter Deck permitting process.

4.1.2.4 NO ACTION

No change and therefore no impact to land ownership and management would result from No Action. Supporting information follows.

The No Action alternative would result in no changes to existing land uses, permitting, or zoning district provisions.

With No Action, the existing deteriorating structure in the flood hazard districts would continue to be a concern for the City. This alternative would not allow compliance with the provisions of Section 21-9.10 to protect life and property and reduce public costs for flood control and rescue and relief efforts.

4.2 INFRASTRUCTURE AND UTILITIES

4.2.1 Affected Environment

Utility services are provided on O‘ahu by various public and private entities. These services include potable water supply, wastewater collection and treatment, telecommunications systems, electricity, and storm drainage infrastructure and maintenance.

4.2.1.1 WATER

The City Board of Water Supply provides water and water infrastructure to the project area, specifically to the public restrooms located under the bleachers. Water is available through an 8-inch line extending from the Kalakaua Avenue right of way. This line extends underground makai and enters the WWMC near the main entrance to the facility. A 2-inch water line branches off to the south for a water supply to the outdoor shower (CCH DDC 1998; Miyabara Associates LLC 2011).

4.2.1.2 WASTEWATER

The City provides wastewater collection via a municipal sewer system managed by the Department of Environmental Services (ENV). From the public restrooms under the bleachers, 8-inch sewer lines extend and connect to a 10-inch gravity sewer line along the Kalakaua Avenue right of way serving the project area.

Wastewater from this line discharges into the Public Baths Wastewater Pump Station along Kalakaua Avenue near the Waikiki Aquarium and is pumped through a 12-inch force main to the Beach Walk Wastewater Pump Station near the center of Waikiki. From the Beach Walk Wastewater Pump Station, wastewater is pumped by

force main to the Sand Island Wastewater Treatment Plant for treatment and disposal (CCH DDC 1998; Miyabara Associates LLC 2011).

4.2.1.3 STORM DRAINAGE

Storm runoff is primarily detained on-site and allowed to percolate into the ground. Storm drain infrastructure in the form of curbs, culverts, inlets, and underground drain pipes are provided along Kalakaua Avenue for roadway storm drainage runoff (CCH DDC 1998).There are four existing storm drain inlets along the paved driveway accessway, as well as storm drains in both the volleyball court and parking area at the base of the bleachers. Maintenance may be needed on this system, but no design changes are anticipated.

4.2.1.4 ELECTRICITY AND TELECOMMUNICATIONS

HECO provides electrical services through overhead lines and underground conduits to the project area. Hawaiian Telcom provides telecommunications infrastructure and services to the project site and the surrounding area. Power and communications systems are strung on overhead lines along the streets adjoining Kapiʻolani Regional Park. The project area is served by overhead lines along the Kalakaua Avenue right of way on the mauka side (WCP 2014).

4.2.1.5 FUEL AND GAS

There are no fuel storage facilities at or near the project site. There are also no known underground gas lines traversing the project site area.

4.2.2 Potential Environmental Consequences

A significant impact would occur if the proposed demand is anticipated to exceed the projected capacity of any utility services.

4.2.2.1 PERIMETER DECK (PROPOSED ACTION)

No significant impact to infrastructure and utilities would result from construction or operation of the Perimeter Deck. Designs would identify existing infrastructure and utilities and would therefore not be impacted. No substantial utility upgrades are planned. On-site fire protection water requirements would need to be met through coordination with the Honolulu Fire Department and the BWS. The Honolulu Fire Department has identified the need for a BWS cross connection and backflow prevention system. The BWS would construct the new facilities; however, the costs would be borne by the City.

Operational utilities demand would be similar to the No Action alternative.

Supporting information follows.

Construction

While some potable water supplies may be required for the actual construction procedures associated with Perimeter Deck, the amount of water used for the

temporary construction phase is expected to be minimal and not likely to impact supplies or water infrastructure at or near the project site. If large quantities of water are required at certain times during the construction process, a water truck would be brought to the construction site to accommodate this. The construction contractor would work with the City to develop a work plan outlining potable water needs during the construction phase once a design for the approved alternative is developed. Wastewater facilities or infrastructure would not be impacted during the construction phase.

Electrical service would likely be required for the completion of some of the construction tasks associated with the rehabilitation of the WWMC. The City or the contractor would work with HECO to ensure appropriate power sources can be used from the existing electrical infrastructure on the site. If upgrades, enhancements, or additional, temporary sources of power such as generators are required, the contractor and/or City would work with HECO to ensure these sources are provided and installed appropriately. Telecommunications and electrical service and facilities would not be impacted although the movement of heavy equipment to the site may require avoidance of contact with overhead lines along Kalakaua Avenue, depending on the height of the equipment. Both HECO and Hawaiian Telcom would be consulted to avoid impacts during the construction phase.

Storm water and drainage on and around the site and associated with the construction phase would be regulated under a National Pollutant Discharge Elimination System (NPDES) permit issued by the Clean Water Branch (CWB) of the DOH and in compliance with HAR Chapter 11-55 Water Pollution Control. A construction plan with associated BMPs BMP and controls would be created by the construction contractor as part of the permit process and prior to the commencement of construction on the project site.

Operation

If the existing water infrastructure is determined to be inadequate, out of compliance with modern regulations, or degraded, the City may be required to upgrade the water supply infrastructure to meet current codes and requirements. The final design would need to incorporate fire flow requirements for fire protection. The contractor/City would work with the Board of Water Supply and the Department of Environmental Services to complete any upgrades as required as part of the building permit process.

After completion of the construction process, the rehabilitated WWMC would be reconnected to the HECO electrical system and Hawaiian Telcom communications system, incorporating modern infrastructure, equipment, and safety provisions. If it is determined that any additional capacity or upgrades are required for the facility, the City would work with HECO and Hawaiian Telcom to implement them.

The site would be designed with storm drainage infrastructure that is compliant with current regulations, including those for water quality. The four existing storm drain inlets along the paved may be silted, while the drainage system in the existing

volleyball court area may be plugged and abandoned. This system may need to be cleaned and restored.

4.2.2.2 WAR MEMORIAL BEACH

No significant impact from construction or operation of the War Memorial Beach would occur. Designs would identify existing infrastructure and utilities, and would therefore not impact existing systems. The War Memorial Beach would include improvements to on-site water, wastewater, electrical/telecommunication systems, and storm drainage systems. Improvements would include a new pad-mounted transformer (location to be determined). New duct lines for electrical and a new water line to main lines along Kalakaua Avenue would be needed. Similar to the Perimeter Deck, fire protection water requirements would need to be met.

Operational utilities demand from the bath house and lighting would not represent a significant increase in demand and would be comparable to other beach use, but would include lighting on the reconstructed memorial arch.

Supporting information follows.

Construction

The impacts on infrastructure from the construction phase of the War Memorial Beach are the same as from the construction phase of the Perimeter Deck.

Operation

Due to the significant proposed changes to the site with the War Memorial Beach, the water and wastewater infrastructure would need to be created to serve the proposed new bath house. The contractor/City would work with the Board of Water Supply and the Department of Environmental Services to complete any upgrades as required as part of the building permit process.

As with water and wastewater infrastructure, the electrical and communications systems for this alternative would be required to serve the newly constructed bath house. After completion of the construction process, the rehabilitated WWMC would be connected to the HECO electrical system and Hawaiian Telcom communications system, incorporating modern infrastructure, equipment, and safety provisions. These new lines would connect with HECO and Hawaiian Telcom lines along Kalakaua Avenue.

Once operational, the site would need to be graded and new underground storm drainage infrastructure installed, if appropriate, around the bath house and Memorial Arch area. A new storm drainage system would be needed as part of the new parking lot. The parking lot would likely be graded to allow drainage back to Kalakaua Avenue connecting with existing storm infrastructure.

4.2.2.3 CLOSED SYSTEM POOL

The process to plan, design, and implement infrastructure and utilities involve professional engineers and would, therefore, be done in a manner that would not

significantly impact infrastructure and utilities. Any impacts would instead be expressed in costs and time.

Utility studies are needed to identify anticipated demand, infrastructure, routing, costs, and time for installation. For example, the Closed System Pool assumes that fresh pool water could be extracted from a dedicated well (or City potable water system); however, a well location has not been identified and a well siting study was not conducted for this EIS. Additionally, substantial discussion with professional engineers would be needed to plan for the possible demand on the wastewater system during events when the pool would need to be drained for maintenance or other reasons, e.g., natural hazards.

The need for a continuously running pump to maintain circulation and water quality in the Closed System Pool would create the greatest long-term demand on potable water, electricity, and wastewater systems over all other action alternatives.

Supporting information follows.

Construction

The Closed System Pool, in the preliminary design stages, could include a dedicated well for pool source water (or from the City potable water system). The filter backwash drain would be discharged to the sanitary sewer system. Plumbing systems would require updates on-site. The digging and operation of the well would require the approval of the DOH, while the City's Department of Facilities Maintenance Storm Water Quality Branch would review and approve any backwash discharge plan into the sanitary sewer system. New mechanical equipment, including pumps, filters, and salt generation systems, would require electrical systems upgrades on-site.

Operation

The impacts from the operational phase of the Closed System Pool include the increased need for potable water. It is anticipated that a dedicated non-potable well could supply the source water for the pool and sufficient water quantity for 6-hour filtration turnover. New mechanical equipment would likely increase electrical power demand, supplied by HECO. Telecommunication systems would not be impacted by the proposed project. A utility study would be conducted should the Closed System Pool be selected as the preferred alternative. With a dedicated well system providing potable source water to the pool, the BWS would not be burdened by the increased demand for potable water. It is anticipated that the increased electrical demand required by the Closed System Pool would not be significant compared to the total electrical demand and electricity supplied by HECO.

4.2.2.4 No Action

No change and therefore no impact to infrastructure and utilities would result from the No Action alternative.

4.3 TRANSPORTATION

This transportation analysis considers facilities and volumes for vehicular, bicycle, pedestrian, and public transit modes. Traffic operations are also evaluated. Details are presented in the Transportation Impact Assessment Report, September 2018 (Appendix B).

4.3.1 Affected Environment

4.3.1.1 TRANSPORTATION FACILITIES

Roadway Facilities

Vehicular access to the WWMC is provided by a single driveway that intersects Kalakaua Avenue. The WWMC driveway is an undivided two-lane roadway, with one lane in each direction. Free parallel parking is provided along both sides of the driveway. Two parking stalls along the makai side of the road are reserved for the on-duty lifeguards from 7:00 a.m. to 6:00 p.m. Egress from the site is controlled at its intersection with Kalakaua Avenue by a stop sign.

Kalakaua Avenue is an ‘Ewa-Koko Head arterial roadway that runs from the Makiki area, through Waikiki, and to Diamond Head. In the vicinity of the site, Kalakaua Avenue serves more as a collector roadway providing traffic circulation and access to properties. In this area, Kalakaua Avenue has one lane in each direction, separated by a raised median.

At the WWMC driveway, a break in the median allows traffic access into and out of the WWMC driveway. The median break is also used by vehicles on Kalakaua Avenue to execute U-turns to access other properties whose driveways are blocked by the raised median. Bicycle lanes serve both directions of Kalakaua Avenue.

Koko Head-bound Kalakaua Avenue adjacent to the site is under the jurisdiction of the City Department of Transportation Services. Free parallel parking is provided on the makai side of Kalakaua Avenue. From 7:00 a.m. to 6:00 p.m., these parking stalls have a 2-hour duration limit except on Sundays and state holidays. The posted speed limit is 25 miles per hour (mph).

‘Ewa-bound Kalakaua Avenue adjacent to Kapi‘olani Regional Park is under the jurisdiction of the City DPR. Metered, angled parking stalls are provided adjacent to the park. The metered stalls allow 4-hour parking from 10:00 a.m. to 6:00 p.m. during the week. At other times, the parking is free and there is no limit on parking duration. The posted speed limit is 15 mph on this segment of the road.

Bicycle Facilities

Bicycle facilities, in this case lanes, are located along both sides of Kalakaua Avenue in the vicinity of WWMC. On the makai side of Kalakaua Avenue, the bicycle lane is located between the on-street parallel parking stalls and the driving lane. On the mauka side of Kalakaua Avenue, the bicycle lane is located on the makai side of the driving lane, adjacent to the median.

Pedestrian Facilities

Sidewalks are provided on both sides of Kalakaua Avenue. At the intersection of Kalakaua Avenue and the WWMC driveway, a crosswalk is located across the WWMC driveway and across Kalakaua Avenue on the Koko Head-side of the intersection. No crosswalk is provided across Kalakaua Avenue on the ʻEwa-side of the intersection. No existing pedestrian facilities provide access to WWMC from Kalakaua Avenue. Pedestrians entering the WWMC site walk through the lawn areas away from the WWMC driveway.

Public Transit Service

No City bus stops are located immediately adjacent to the site. The closest City bus stops are located near the Waikiki Aquarium (Stop #159) and near the Outrigger Canoe Club (Stop #161). Bus service is only provided in the Koko Head-bound direction in this segment of Kalakaua Avenue.

City bus routes that travel along Kalakaua Avenue that pass the site are Routes 14, 19, 20, and 22.

Route 14 (Maunalani Heights via Kapahulu) runs from around 5 a.m. to 10 p.m. (span of 17 hours), Route 19 (Waikiki Beach and Hotels) runs from around 4 a.m. to 2 a.m. (span of 22 hours), Route 20 (Waikiki Beach) runs from around 5 a.m. to 8 p.m. (span of 15 hours), and Route 22 (The Beach Bus Hawaiʻi Kai-Hanauma Bay-Sea Life Park) runs from around 6 a.m. to 5 p.m. (span of 11 hours).

4.3.1.2 VOLUMES (VEHICULAR, BICYCLE, AND PEDESTRIAN)

A previous *Traffic Impact Assessment Report, Waikiki War Memorial, Honolulu, Hawaii* was completed by Phillip Rowell and Associates and dated December 8, 2011 (Phillip Rowell and Associates 2011). As part of that Traffic Impact Assessment Report, traffic turning movement and pedestrian counts were conducted for the a.m. and p.m. peak periods on Thursday, October 27, 2011 and for the midday peak period on Saturday, November 5, 2011.

Although the study area is not viewed as a high traffic growth area, the 2011 traffic counts are almost 7 years old. For this reason, traffic and pedestrian counts were updated as part of this study effort.

Figure 4-6 illustrates peak period transportation turning movement counts collected at the intersection of Kalakaua Avenue and the WWMC driveway. Counts for vehicular turning movements, pedestrians, and bicycles are included. Counts were conducted on Thursday, August 9, 2018, during the a.m. (6:15 a.m. to 8:45 a.m.) and p.m. (3:30 p.m. to 5:30 p.m.) peak periods, and on Saturday, August 11, 2018 during the weekend midday (11:30 p.m. to 1:30 p.m.) peak period. Based on these counts, the weekday a.m. peak hour was determined to occur from 7:45 a.m. to 8:45 a.m., the weekday p.m. peak hour was found to occur from 4:15 p.m. to 5:15 p.m., and the weekend midday peak hour was found to occur from 12:15 p.m. to 1:15 p.m.

Vehicular Volumes

Peak hour vehicular volumes on Kalakaua Avenue are more than twice as large in the Koko Head-bound direction as in the ‘Ewa-bound direction. This is attributable to the street network in this area that tends to direct ‘Ewa-bound through traffic onto Paki Avenue, a street that is roughly parallel to and mauka of Kalakaua Avenue. The ‘Ewa-bound traffic on Kalakaua Avenue in this area tends to be traffic accessing properties with entrances on Kalakaua Avenue, or traffic directly associated with Kapi‘olani Regional Park.

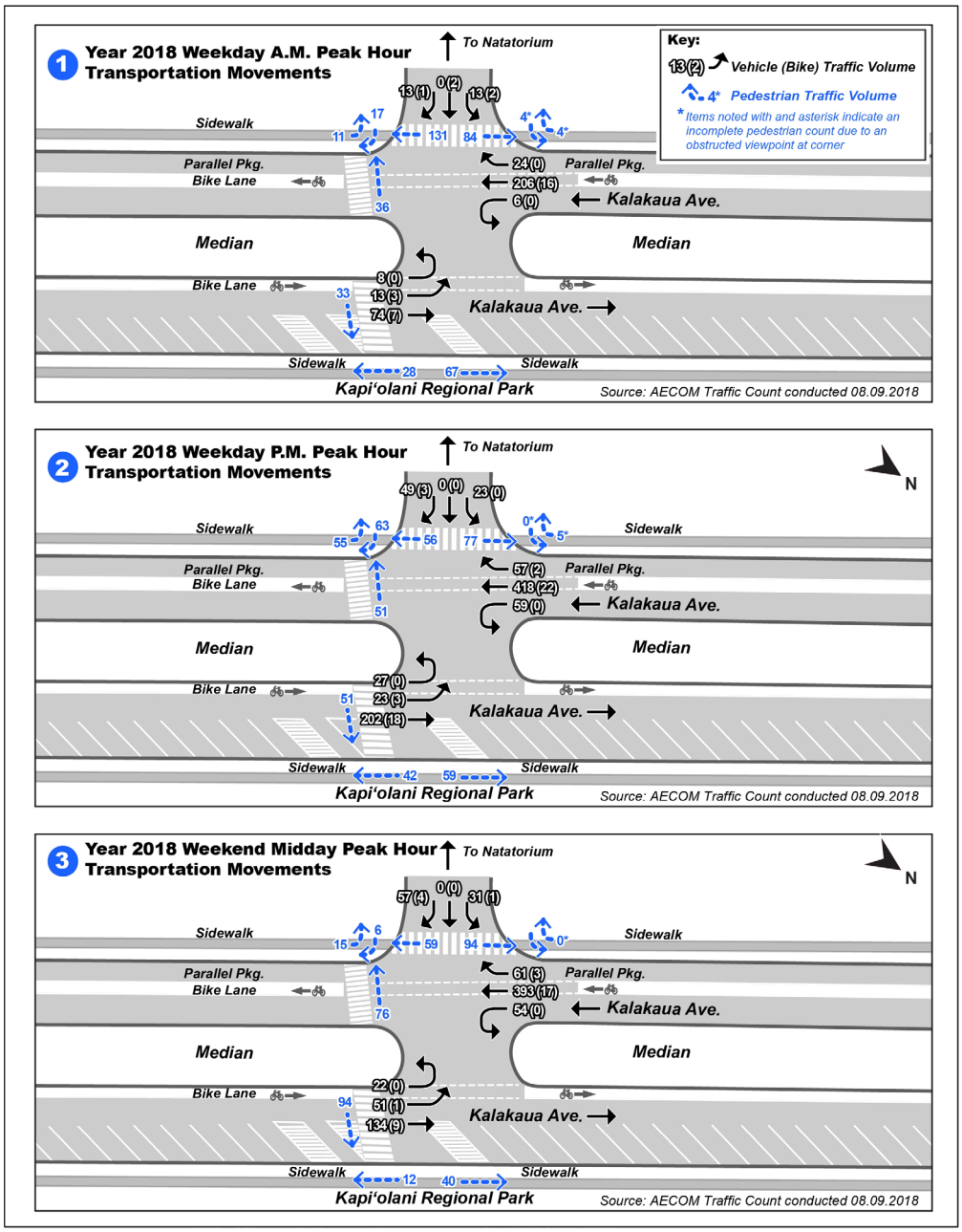


Figure 4-6: 2018 Transportation Counts

Source: AECOM, 2018.

The through traffic volumes on Kalakaua Avenue collected in 2018 are approximately 50 percent larger than those collected in 2011. However, this difference is attributed to fluctuation in visitor and resident activity rather than growth in through traffic. Data documented in the Hawai'i Tourism Authority *2011 Monthly Final* spreadsheet and *2017 – Preliminary, Table 1. Total Visitors by Air*, distributed by the State of Hawai'i Department of Business, Economic Development & Tourism (DBEDT 2018), shows that visitor activity is between 44 and 51 percent greater during the month of August (when the 2018 counts were conducted) and the months of October and November (when the 2011 counts were conducted. Additionally, summer months such as August usually see more resident recreational activity as all public schools are not in session yet. The area served by this segment of Kalakaua Avenue contains mature development that has not significantly changed since 2011. Therefore, the difference in traffic volumes counted on Kalakaua Avenue in the vicinity of the WWMC between the 2011 study and the current 2018 study is due mainly to normal variations in traffic volumes by month. The conclusion is that growth in traffic volumes is almost negligible along this segment of Kalakaua Avenue, and that this trend is likely to remain for the foreseeable future.

Bicycle Volumes

During the data collection periods, bicycle volumes were found to be low to moderate. Bicycle volumes on Kalakaua Avenue ranged from 26 bicycles/hour during the weekday a.m. peak hour to 30 bicycles/hour during the weekend midday peak hour. The bicycle lanes appeared to be sufficient and operating well during the observed peak hour conditions.

Pedestrian Volumes

During the data collection periods, large volumes of pedestrian activity were observed. The pedestrian activity included park and beach users, joggers, and dog walkers.

The two existing crosswalks at the intersection are very active during the peak hours. Pedestrians crossing Kalakaua Avenue ranged from 69 pedestrians/hour during the weekday a.m. peak hour to 170 pedestrian/hour during the weekend midday peak hour. Pedestrians crossing the WWMC driveway ranged from 215 pedestrian/hour during the weekday a.m. peak hour to 153 pedestrian/hour during the weekend midday peak hour.

The large number of pedestrians that cross at the Kalakaua Avenue/WWMC driveway intersection were observed to create numerous pedestrian-vehicle conflicts. The low speed of the vehicles traveling on Kalakaua Avenue help to manage these conflicts, but opportunities to enhance pedestrian safety at this location remain.

4.3.1.3 TRAFFIC OPERATIONS

Table 4-3 summarizes the weekday a.m. and p.m. commuter peak hour operations at the intersection of Kalakaua Avenue and the access driveway on Thursday, August 9, 2018.

The intersections were analyzed using the unsignalized methods described in Chapter 16 of the 2010 Highway Capacity Manual (HCM) through the Highway Capacity Software (HCS) 2010 (Transportation Research Board of the National Academies 2010). Using this method, individual delays and levels of service (LOS) were calculated for the following traffic movements: Koko Head-bound Kalakaua U-turn, ‘Ewa-bound Kalakaua U-turn and left-turn into WWMC driveway, and shared left and right turns out of the WWMC driveway.

Table 4-3: Existing Weekday Peak Hour Intersection Operations

	a.m. Peak Hour		p.m. Peak Hour	
Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Kalakaua Avenue/WWMC Driveway	7.0/8.6/14.9	A/A/B	7.1/8.6/19.9	A/A/C

Notes: Based on counts conducted on Thursday, 8/9/18.
a.m. Peak Hour: 7:45 a.m.–8:45 a.m., p.m. Peak Hour: 4:15 p.m.–5:15 p.m.
Kalakaua Avenue/WWMC Driveway is unsignalized: KKHD-bound U-turn/‘Ewa-bound U-turn and left into WWMC driveway/shared right and left out of WWMC driveway
sec/veh seconds per vehicle
LOS level of service

As shown in Table 4-3, the intersection operates well with LOS C or better for the key turning movements during the peak hours. LOS for unsignalized intersections is a qualitative index that references a performance measure such as intersection delay to express the quality of traffic services.

The intersection operations for the key turning movements are acceptable for peak hour conditions. The delays for each of the key movements that were calculated using HCS appear to be similar to the delays observed during the data collection process.

Table 4-4 summarizes the weekend midday peak hour operations of the intersection of Kalakaua Avenue and the access driveway on Saturday, August 11, 2018.

As shown in Table 4-4, the key movements of the intersection operate well during the weekend midday peak with an LOS C or better, which is similar to the operations observed during the data collection process.

Table 4-4: Existing Weekend Midday Peak Hour Intersection Operations

	Weekend Midday Peak Hour	
Intersection	Delay (sec/veh)	LOS
Kalakaua Avenue/WWMC Driveway	7.1/8.5/21.8	A/A/C

Notes: Based on counts conducted on Saturday, 8/11/18.
Weekend Midday Peak Hour: 12:15 p.m.–1:15 p.m.
Kalakaua Avenue/WWMC Driveway is unsignalized: KKHD-bound U-turn/'Ewa-bound U-turn and left into WWMC driveway/shared right and left out of WWMC driveway.
sec/veh seconds per vehicle
LOS level of service

4.3.2 Potential Environmental Consequences

A significant impact on transportation would occur if the projected number of vehicles would degrade traffic at the project site's intersection over the long term.

4.3.2.1 Perimeter Deck (Proposed Action)

No significant impact to transportation would occur from construction or operation of the Perimeter Deck. Best construction practices such as avoiding major truck activity during peak traffic hours and preparing required traffic control plans would be used to minimize temporary construction-related impacts.

No significant impacts to transportation during operations of the Perimeter Deck would occur. There would be no change in transportation factors, e.g., no change in parking stalls or growth on this segment of Kalakaua Avenue.

Supporting information follows.

Construction

Periods of significant large truck activity during construction are anticipated. There may be periods when the sidewalks, bicycle lanes, or roadway need to be partially or completely closed. Best construction practices such as avoiding major truck activity during the peak traffic hours and preparing required traffic control plans for appropriate and safe construction management of vehicular, bicycle, pedestrian, and public transit modes in the area would be implemented.

Operation

Figure 3-1 illustrates the schematic plans for the Perimeter Deck. This alternative retains the existing location of the WWMC driveway and maintains the existing parking count within the WWMC site at 77 stalls.

Moreover, as discussed in Section 4.3.1.2, traffic volumes on this segment of Kalakaua Avenue have been and are projected to remain stable with negligible growth in the foreseeable future. Therefore, future traffic conditions with the Perimeter Deck would be similar to the traffic conditions observed in 2018.

4.3.2.2 WAR MEMORIAL BEACH

No significant impact to transportation would occur from construction or operation of the War Memorial Beach. The transportation impacts would be similar to those described in the Perimeter Deck. The additional construction vehicular trips for beach sand (4 to 6 truckloads per hour over the course of 20 days in 10-hour work days) would also be managed with best construction practices.

Supporting information follows.

Construction

Periods of significant large truck activity during construction are anticipated. There may be periods when the sidewalks, bicycle lanes, or roadway need to be partially or completely closed. This includes the period for sand hauling that could include approximately 4 to 6 trucks per hour, 10 hours per day, over 20 days, as allowed by the City. Best construction practices such as avoiding major truck activity during the peak traffic hours and preparing required traffic control plans for appropriate and safe construction management of vehicular, bicycle, pedestrian, and public transit modes in the area would be implemented.

Operation

Figure 3-6 illustrates the schematic plans for the War Memorial Beach. This alternative retains the existing location of the WWMC driveway and maintains the existing parking count within the WWMC site at 77 stalls.

Moreover, as discussed in Section 4.3.1.2, traffic volumes on this segment of Kalakaua Avenue have been and are projected to remain stable with negligible growth in the foreseeable future. Therefore, future traffic conditions with the War Memorial Beach would be similar to the traffic conditions observed in 2018.

4.3.2.3 CLOSED SYSTEM POOL

No significant impact to transportation would occur from construction or operation of the Closed System Pool. The transportation impacts would be similar to those described in the Perimeter Deck. Supporting information follows.

Construction

Periods of significant large truck activity during construction are anticipated. There may be periods when the sidewalks, bicycle lanes, or roadway need to be partially or completely closed. Best construction practices such as avoiding major truck activity during the peak traffic hours and preparing required traffic control plans for appropriate and safe construction management of vehicular, bicycle, pedestrian, and public transit modes in the area would be implemented.

Operation

Figure 3-7 illustrates the schematic plans for the Closed System Pool. This alternative retains the existing location of the WWMC driveway and maintains the existing parking count within the WWMC site at 77 stalls.

As discussed in Section 4.3.1.2, traffic volumes on this segment of Kalakaua Avenue have been and are projected to remain stable with negligible growth in the foreseeable future. Therefore, future traffic conditions with the Closed System Pool would be similar to the traffic conditions observed in 2018.

4.3.2.4 NO ACTION

No change and therefore no impact to transportation would result from No Action. Supporting information follows.

Construction

No change in transportation factors would occur with No Action; therefore, no impacts on transportation would occur.

Operation

No change in the transportation factors described above at the Kalakaua Avenue/WWMC driveway intersection would occur under No Action.

As discussed in Section 4.3.1.2, traffic volumes on this segment of Kalakaua Avenue have been and are projected to remain stable with negligible growth in the foreseeable future. Therefore, future traffic conditions with No Action would be similar to the traffic conditions observed in 2018.

4.4 NOISE

4.4.1 Affected Environment

For the purposes of this analysis, this section discusses aboveground terrestrial noise impacts only. For an analysis of underwater noise and associated impacts to biological resources, see Section 4.10, *Marine* Biological Environment.

An acoustic study was completed in 2012 by Y. Ebisu and Associates as part of the preparations for this EIS (Appendix C) (Y. Ebisu & Associates 2012). In the vicinity of the project site, ambient sound levels are influenced primarily by vehicular traffic along Kalakaua Avenue including cars, motorcycles, mopeds, buses, and intermittent emergency vehicles. In addition, ocean surf, residential, recreational park, and beach goer activities comprise the background noise environment in the project area.

Noise analyses by federal agencies use a day-night average sound level (DNL) descriptor as opposed to the more common decibel (dB) level. In urbanized areas shielded from high volume streets, DNLs generally range from 55 to 65 DNL. A DNL less than 65 is generally considered the threshold acceptable standard for residential areas (Y. Ebisu & Associates 2012).

Generally, the acoustic study concluded that, when all sources of noise (traffic and residual background) are considered, total background noise 60 feet from the centerline of Kalakaua Avenue is approximately 67 DNL.

At approximately 80 feet from the centerline of Kalakaua Avenue, total (traffic plus residual background) noise levels diminish to less than 65 DNL and are in the "Moderate Exposure, Acceptable" category. At greater setback distances of 200 feet from the centerline of Kalakaua Avenue, other sources (e.g., birds, people, local traffic, and surf) become the more dominant noise sources that control the total background level (Y. Ebisu & Associates 2012).

4.4.2 Potential Environmental Consequences

A significant impact on noise would occur when noise levels are anticipated to exceed allowable levels in accordance with HAR 11-46, Community Noise Control, over the long term.

4.4.2.1 Perimeter Deck (Proposed Action)

No significant impact from construction or operation noise under the Perimeter Deck would occur. Construction would be temporary (approximately 7 months), limited to daytime, and would operate under a State permit in accordance with HAR Chapter 11-46 that would control noise.

Operational impacts could include voices from the Perimeter Deck basin and bleachers being audible from neighboring beaches. Such voices are not expected to exceed allowable levels in accordance with HAR Chapter 11-46 and would therefore not be significant. Any large planned gatherings would require a City permit, which would serve to control noise.

Supporting information follows.

Construction

Unavoidable, but temporary, noise impacts may occur during demolition and construction activities on the proposed project site. Because construction activities would be audible within the project site and at adjoining properties, the quality of the acoustic environment may be degraded during periods of construction. These impacts would be greatest at Sans Souci Beach, the New Otani Kaimana Beach Hotel, and the Waikiki Aquarium. Figure 4-7 shows typical levels of exterior aboveground noise from construction equipment at a 50-foot distance from the equipment.

On O‘ahu, the DOH regulates noise from construction activities through the issuance of permits through its Indoor and Radiological Health Branch. These permits regulate hours when construction can occur (7:00 a.m. to 6:00 p.m. on weekdays, 9:00 a.m. to 6:00 p.m. on Saturdays, and no work on Sundays or holidays), the acceptable audible criteria it can exceed and the acceptable frequency, and the proper use of muffled construction equipment. Noise impacts resulting from construction and demolition is inevitable; however, these impacts would be temporary, limited to daytime, and would occur in compliance with DOH regulations for Community Noise Control (HAR 11-46), including obtaining a noise permit or variance if required. Based on estimated construction phasing

(Section 3.1), the most audible noise is likely to occur from demolition and pile/deck/seawall installation, which could occur over 2 and 3 months, respectively.

Operations

Because future traffic volumes in the project environs are not expected to change as a result of the Perimeter Deck, future noise level changes along the roadways in the project environs are not expected to be linked to the project. No significant changes in traffic noise levels are predicted to occur as a result of the project following project completion. With the rehabilitation of the WWMC, it can be assumed that more patrons would visit the area, especially those waterfront areas currently closed to visitors. The passive types of uses would not significantly impact allowable noise levels. Special large gatherings would require a permit from the City, in accordance with *Amended Rules and Regulations Governing Use of City Beach Parks and Other Beach Properties Under The Control of The Department of Parks and Recreation to Provide Access to Conduct Shore Water Events.* For these reasons, no significant noise impacts would occur.

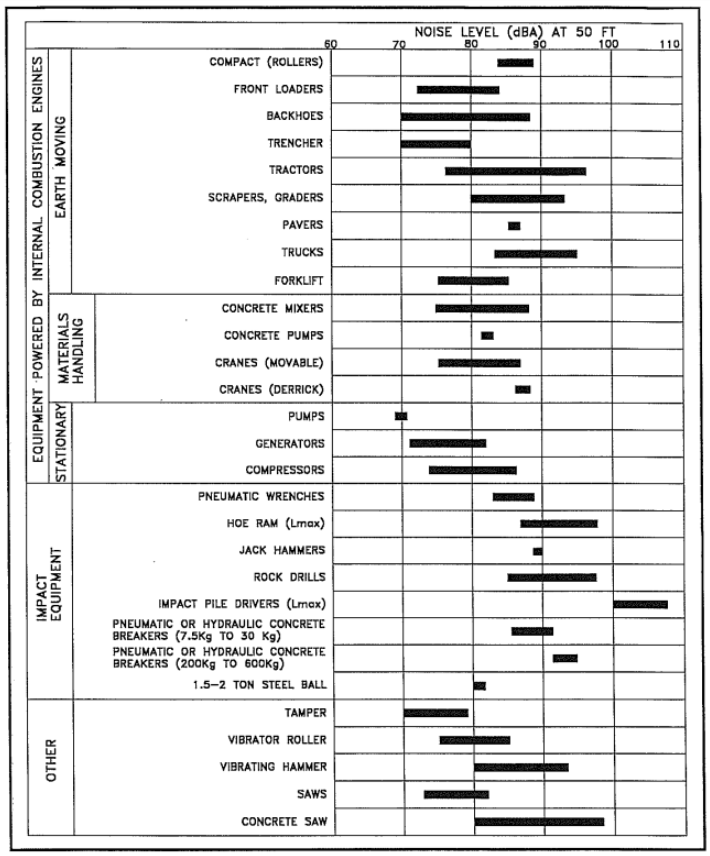


Figure 4-7: Construction Equipment Noise Levels

Source: Y. Ebisu & Associates 2012.

4.4.2.2 War Memorial Beach

No significant impact from construction or operation noise under the War Memorial Beach would occur. The noise impacts of the War Memorial Beach would

be similar to those of the Perimeter Deck. Duration of construction would be longer than the Perimeter Deck construction by approximately 2 months, at approximately 9 months, and would involve greater landside activities. These noise impacts are not expected to be significant as they would be temporary, be limited to daytime, and occur under a State permit in accordance with HAR Chapter 11-46 that would control noise.

Supporting information follows.

Construction

The impacts from the construction phase of the War Memorial Beach would be similar to those of the Perimeter Deck. However, since the War Memorial Beach has more intensive demolition and land alteration activities planned landside (parking lot, new bath house, and reconstructed memorial arch) the noise impacts to the New Otani Kaimana Beach Hotel and Waikiki Aquarium would likely be greater during the construction phase.

Operation

The acoustic study of February 2012 concluded that for the War Memorial Beach potential changes in intermittent background noise levels are possible due to the planned location of a new parking lot at the south end of the project site (Y. Ebisu & Associates 2012). The potential changes could occur due to the concentration of intermittent noise sources (e.g., talking, car doors slamming, and vehicle alarms) closer to the adjacent residences and resort units along the south property boundary. Estimates of the increased risk of noise impacts from intrusive noise events from the new (77-stall) parking lot were made. No significant increase in noise would be likely from the parking lot because very loud noise events, e.g., vehicle alarms, would need to occur frequently to be significant, and such conditions would be uncharacteristic for these types of parking lots.

4.4.2.3 CLOSED SYSTEM POOL

No significant impact from construction or operation noise under the Closed System Pool would occur. The noise impacts of the Closed System Pool would be greater than those of the Perimeter Deck and War Memorial Beach. Duration of construction would be the longest of all of the action alternatives at approximately 12 months, and longer in duration than the Perimeter Deck by approximately 5 months. These noise impacts are not expected to be significant as they would be temporary, be limited to daytime, and occur under a State permit in accordance with HAR Chapter 11-46 that would control noise.

The pool pump would be a source of continuous noise. With acoustic treatment, noise would be minimized, but would contribute to the new background noise.

Supporting information follows.

Construction

The noise impacts from the construction phase of the Closed System Pool would be similar to those of the Perimeter Deck.

Operation

The noise impacts from the operational phase of the Closed System Pool would be similar to those of the Perimeter Deck. However, the Closed System Pool would require pumps to circulate the water and maintain water quality. This proposed pump house would likely be located within the volleyball court or parking area of WWMC. While specific noise levels from the pumps are not known at this time, a typical residential swimming pool pump runs in the range of 65-90 dB (Premier Innovations Inc. 2017). Acoustical treatments would be part of the pump house design to attenuate anticipated noise to acceptable levels.

4.4.2.4 NO ACTION

No change and therefore no impact to and from noise would result from No Action.

4.5 CLIMATE AND AIR QUALITY

4.5.1 Affected Environment

4.5.1.1 CLIMATE

The climate in the project area is characterized by relatively constant temperature, infrequent storms, moderate humidity, and prevailing northeasterly trade winds. Generally, summer months are warmer (averaging 81.4 degrees Fahrenheit [˚F]), while winter months are cooler (averaging 72.9˚F). There are two dominant seasons—summer from May to October, and winter from November to April. The site has an average annual rainfall of 23 inches per year, with highest rainfall occurring in the winter months between October and March (Giambelluca et al. 2013). The relative humidity averages 69%. Average wind speeds range from 0.8 to 15.5 mph throughout the year (Giambelluca et al. 2013). The prevailing northeasterly trade winds bring relatively cool air from the north Pacific most of the year. The occasional exception of Kona, or southerly, winds bring warm and humid weather primarily during winter months.

While changes to climate would not occur as a direct result of this proposed action, incremental activities contribute to the cumulative emissions of greenhouse gases (GHGs), which are a primary concern in the discussion of climate change and are addressed herein and in Section 4.15.1.1, Cumulative Impacts. GHGs are gases that trap heat in the atmosphere by absorbing and emitting radiant energy. GHGs differ from criteria air pollutants, described below, as impacts from GHGs are not localized but rather are global and cumulative, due to rapid dispersion into the atmosphere. GHG emissions are attributable to human activities associated with the transportation, industrial/manufacturing, electrical utility, and residential, commercial, and agricultural categories. GHG emissions are generally monitored and reported in CO_2e, or CO_2 equivalent, typically reported in metric tons. The OEQC has yet to incorporate guidance on how to address climate change and

greenhouse gases in EAs and EISs; however, the OEQC plans to consider the Council on Environmental Quality's (CEQ) guidance.

The CEQ interprets that under the Procedural Provisions of NEPA, 40 CFR parts 1500–1508, Environmental Impact Statements should "consider the effects of greenhouse gas emissions and the effects of climate change" (81 FR 51866). Further, in 2009, the EPA signed two distinct findings regarding GHGs under Section 202(a) of the CAA. Under the *Endangerment Finding*: The EPA administrator declared that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations. In addition, under the *Cause or Contribute Finding*, the EPA administrator declared that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

4.5.1.2 AIR QUALITY

Air quality is a function of human-induced and natural sources. Examples include industrial sources (power plants and refineries), mobile sources (cars and trucks), agricultural sources (cane burning), and natural sources (windblown dust and volcanic activity). Most commercial, industrial, and transportation activities generate air pollution; however, due to wind circulation and prevailing trade winds, most criteria air pollutants are swept away prior to concentrating to levels of concern for most areas in the State of Hawai'i.

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has established the National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), lead (Pb), sulfur dioxide (SO_2) (40 CFR part 50). The primary standards set limits to protect public health, including the health of sensitive populations, such as asthmatics, children, and the elderly. The secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. The DOH has also established the Hawai'i Ambient Air Quality Standards (HAAQS) to regulate these pollutants.

The DOH is responsible for monitoring ambient air quality conditions throughout the State. According to the most recent DOH-published monitoring data, no exceedances of the NAAQS or HAAQS for all criteria pollutants were recorded in the past three years, except SO2 (DOH CAB 2018). SO2 exceedances are a result of volcanic activity on the island of Hawai'i. The SO2 produced by the volcano is considered a "natural excluded event pollutant". SO2 pollution, also known as volcanic fog or vog, is generally a concern during slow wind speeds or Kona wind conditions. Areas where measured ambient levels of a criteria pollutant concentration are below the NAAQS are designated by EPA as being "in attainment," per the Clean Air Act. Areas where a criteria pollutant level equals or

exceeds the NAAQS are designated as being in "non-attainment." The State of Hawai'i has been designated as an attainment area for all criteria pollutants.

4.5.2 Potential Environmental Consequences

A significant impact on air quality would occur if emissions are likely to exceed state or NAAQS. Because GHGs are considered in the context of a larger region and the project related emissions would therefore be small, GHG emissions are qualitatively discussed in a relative manner amongst the alternatives without a determination of significance.

4.5.2.1 Perimeter Deck (Proposed Action)

No significant impacts to the climate (as considered through GHGs) or air quality would occur from construction and operation of the Perimeter Deck.

Construction-related GHG pollutants would be temporary, controlled, and insignificant compared to statewide emissions. Emissions of regulated air pollutants would also be temporary and, in addition, controlled as required under HAR Chapter 11-60.1-33 (fugitive dust). Construction-related vehicular emissions would not significantly impact air quality as they would be temporary, relatively low volume (compared to the volume needed to generate a pollutant "hot spot"), and unlikely to be concentrated with frequent trade wind conditions.

Operational emissions of GHG and regulated air pollutants would not be significant. Perimeter Deck users would need to compete for existing parking stalls and use other forms of transportation, e.g., mass transit. Vehicular emissions of GHGs and regulated air pollutants could therefore occur from the use of any additional mass transit that would be needed to support this growth, but would not significantly impact State GHG emissions or air quality.

Supporting information follows.

Construction

Climate

Construction-related GHG exhaust emissions would be generated by sources such as heavy-duty off-road equipment, trucks hauling materials to the site, and construction worker commutes. GHG emissions generated by construction would be primarily in the form of CO_2. A quantitative GHG analysis would not provide value to this EIS; however, relative comparisons between the alternatives can be inferred and considered.

Air Quality

The ambient air quality in the project area may be impacted by two types of short-term air pollution: fugitive dust and exhaust emissions. Fugitive dust would be generated from construction vehicle movements and construction activities, including demolition. Both would be controlled as required by HAR Chapter 11-60.1-33, which prohibits the generation of fugitive dust without taking reasonable

precautions to limit such emissions. Another source of short-term air pollution is exhaust emissions generated by construction vehicles both on-site and off-site. However, these localized emission-generating activities would not concentrate to levels of concern, considering their low volume and intermittent presence, and the frequency of winds at the project site. Per CFR 93.123(c)(5), CO, PM_{10}, and $PM_{2.5}$ localized hot spot analyses are not required to consider construction-related activities that cause temporary increases in emissions.

The application of the BMPs, such as watering down the construction site, reducing truck idling time, and equipment maintenance can reduce the impacts from temporary construction activities. The proposed action would implement these measures to the maximum extent practicable, thus resulting in minor impacts to air quality in the short term. Impacts to air quality are minor as they would be low in intensity, their extent would be primarily local (e.g., fugitive dust, exhaust fumes), and unique or important resources would not be impacted.

Operation

Climate

The operation of the WWMC under the Perimeter Deck would not substantially increase GHG emissions in the region. The most likely increase in GHG emissions would be indirect and a result of increased vehicle emissions caused by higher vehicle volume from visitors visiting the WWMC. However, as identified in Section 4.3, Transportation, no additional parking would be provided, so increases in GHG emissions would be from other modes of transportation including mass transit, i.e., bus.

Air Quality

Operations of the WWMC under the Perimeter Deck would not significantly impact air quality. This alternative does not add additional parking capacity; therefore, impacts to vehicular volume would not increase. Any additional users would need to compete with existing park users, which may increase the use of the existing mass transit and could therefore increase vehicular emissions.

While the distribution of the modes of transportation, e.g., walking, biking, vehicle, bus, is not known, it is likely that the number using fossil-fuel sources of transportation would be substantially less than 317 (the presumed additional users estimated in Section 3.1.2), these emissions sources would be spread out, and would, therefore, not significantly impact air quality.

4.5.2.2 War Memorial Beach

No significant impact from construction or operation of the War Memorial Beach would occur. Climate and air quality impacts during construction and operations of the War Memorial Beach would be greater than those of the Perimeter Deck. Additional construction-related GHG and regulated air pollutant emissions would occur from offshore sand recovery and truck hauling from the sand barge to the project site. For the same reasons discussed in the Perimeter Deck, these additional emissions would not significantly impact the State GHG emissions or air quality.

Operational maintenance of the beach is expected to involve regular sand replenishment. While these impacts would not significantly impact State GHG emissions and air quality, they represent an additional source of GHG emissions that would indefinitely contribute to the State's GHG emissions.

Using mid-size (15-cubic-yard) or larger (20-cubic-yard) dump trucks to haul the sand would require between 525 and 700 truckloads for the 10,500 cubic yards required for the beach. An estimated 20 days of trucking would then result in approximately 45 to 60 dump truck loads delivered to the project site each day. Based on a 10-hour work day, this would mean 4 to 6 dump truck deliveries per hour.

The approximately 525 to 700 truckloads over an estimated 20 days, or 4 to 6 truckloads per hour over a 10-hour work day, would not significantly impact air quality.

Supporting information follows.

Construction

Climate

GHG emissions generated by construction activities include all GHGs from equipment operation, similar to those discussed in Section 4.5.2.1. In addition, GHG emissions would be generated from sand harvesting and transport (barging, shipping, and truck transport to the site). A quantitative GHG analysis is outside of the scope of this analysis.

Air Quality

Construction-related activities and associated impacts to air quality under the War Memorial Beach would be similar to those discussed under the Perimeter Deck. However, fugitive dust and exhaust fume production may be higher under this alternative, particularly on the landside portion of the project site due to the landscaping improvements associated with the War Memorial Beach.

Operation

Climate

GHG emissions associated with the War Memorial Beach would be similar to the Perimeter Deck for most of the annual operations. However, this alternative is expected to generate greater GHG emissions due to emissions associated with beach maintenance, e.g., sand replenishment.

Air Quality

Impacts to air quality from the War Memorial Beach operations generally would be similar to those from the Perimeter Deck operations. The primary difference would be in the emissions resulting from sand replenishment needed to maintain the beach. These emissions, however, would not significantly impact air quality.

4.5.2.3 CLOSED SYSTEM POOL

No significant impact from construction or operation of the Closed System Pool would occur. Climate and air quality impacts during construction and operations would be greater than those of the Perimeter Deck and War Memorial Beach.

Operational activities would include the use of a continuously running pool pump to maintain circulation and water quality, along with regular maintenance. While these emissions would occur where electrical generation is occurring, e.g., Kahe power plant, and would be indirect effects, they would not significantly impact State GHG emissions and air quality. These emissions would represent an additional source of GHG emissions that would indefinitely contribute to the State's GHG emissions.

Supporting information follows.

Construction

Impacts from the construction phase of the Closed System Pool are anticipated to be similar to those of the Perimeter Deck.

Operation

Climate

Increased energy consumption would be required to operate the Closed System Pool. Increased GHG emissions would result from the energy consumption required to operate the landside mechanical facilities, including the filtration and sanitation system, drive pumps, surface skimmers, and floor and wall jet system. The continuously running pumps would indirectly increase GHG emissions at the point of electrical generation, e.g., HECO Kahe Power Plant.

Air Quality

Impacts to air quality from the Closed System Pool operations would be generally similar to those of the Perimeter Deck operations. In addition, the pool would have an indirect effect on air quality at the point of electrical generation, e.g., the fossil fuel-powered Kahe Power Plant. These impacts would not be significant as such facilities apply emissions controls to comply with federal and state ambient air quality standards.

4.5.2.4 NO ACTION

No change and therefore no impacts to the climate and air quality would result from No Action.

4.6 TOPOGRAPHY, GEOLOGY, AND HYDROLOGY

4.6.1 Affected Environment

Topography and Bathymetry. Topography in the project area is relatively flat sloping from mauka to makai, with ground surface elevation averaging approximately 7 feet above MSL. The parking lot and volleyball courts are approximately 3 feet above MSL. Bathymetry (underwater topography) of the area surrounding the perimeter walls of the Natatorium ranges from MSL to depths of about 7 feet below MSL. The area directly makai of the Natatorium exterior perimeter walls exhibit depths below MLLW ranging from 2 to 4 feet. Bottom slopes are generally mild, consisting of flat reefs and sand pockets (Yogi Kwong Engineers, LLC 2011; Sea Engineering, Inc. 2016b). The pool depth ranges from 4 feet to about 14 feet in the deepest areas, with typical pool depth ranging from 4 to 8 feet (Figure 4-8).

Geology. The WWMC is located on the southwestern slopes of Leahi crater (Diamond Head), a volcanic vent formed during the rejuvenated stage of Hawaiian volcanism. Geology in the project vicinity is characterized by alluvial deposits, Honolulu volcanic tuff cone deposits, and coralline sandy beach deposits that were formed by the erosion of coral reefs, produced approximately 1,500–4,000 years ago (Miller and Fletcher 2003). Offshore geology is characterized by a fringing and patch reef extending offshore about one mile, intersected by paleostream channels with some alteration from dredging activities.

Subsurface conditions can be generalized into four soil or geologic units, encountered during geotechnical exploration of the project site. These units include (1) fill consisting of medium stiff to stiff brown elastic silt with sand and roots; (2) beach deposits consisting of very loose to medium dense, tan to off-white coralline sand and silty coralline sand; (3) lagoonal deposits consisting of very loose, off-white to gray silt coralline gravel and sand with abundant shell fragments, and lower lagoonal deposits consisting of very soft gray sandy silt with shells; and (4) coral reef limestone and coralline deposits consisting of loose to dense, off-white to tan silty, well graded coralline gravel with sand (Yogi Kwong Engineers, LLC 2011). Additionally, cobbles, boulders, and cemented zones are scattered throughout the project area, particularly in areas directly under or adjacent to the Natatorium pool and bleachers. Sediment thickness within the Natatorium pool ranged from 1 to 8 feet, and consisted of soft, hard, and compacted sediment scattered haphazardly along the pool bottom.

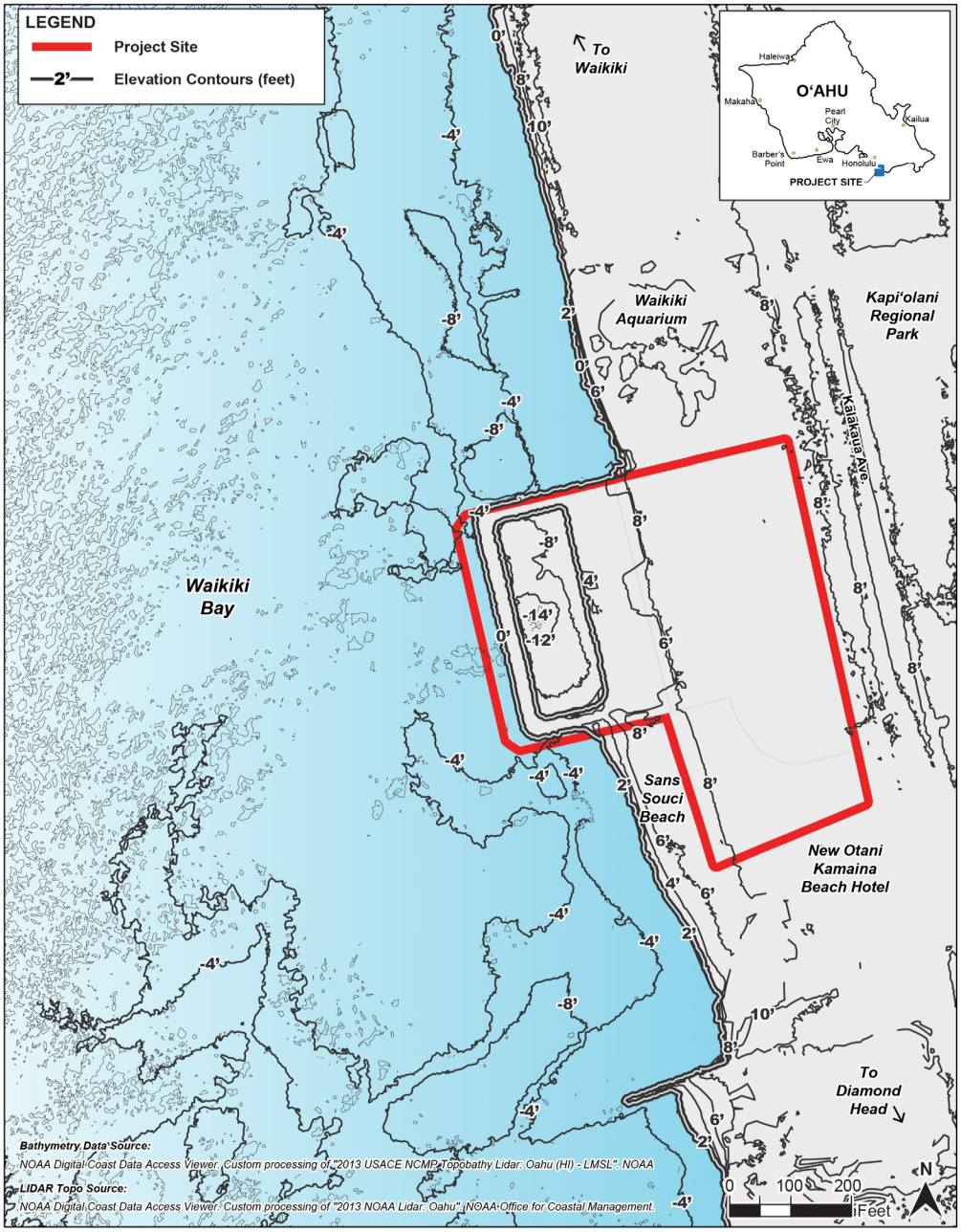


Figure 4-8: Topography and Bathymetry

Today, Waikiki's beaches are a combination of natural sand and imported fill, and are largely a result of engineering efforts to maintain them from extensive erosion. Adjacent to the WWMC is Sans Souci Beach on the Diamond Head side and Queen's Surf Beach on the 'Ewa side. Sans Souci Beach is one of the few beaches on O'ahu that has exhibited long-term accretion (growth) rates; conversely, Queen's Surf Beach has exhibited one of the highest long-term erosion rates along O'ahu's south shore (Fletcher et al. 2011). The Natatorium ultimately acts as a groin, disrupting the westerly longshore transport of sediment, and resulting in accretion on the Diamond Head sides and erosion on the 'Ewa sides. Sans Souci Beach has exhibited

accretion rates averaging 0.8 ± 0.2 meters/yr (2.62±0.66 feet/yr), while Queen's Surf Beach has exhibited erosion rates averaging -1.6 ± 0.4 meters/yr (5.25 ± 1.31 feet/yr) (Fletcher et al. 2011). Generally, sand loss occurs during the winter months at Sans Souci Beach, indicating that summer waves help to deposit sand at Sans Souci Beach from offshore. SLR is likely to increase shoreline erosion rates throughout the Hawaiian Islands into the mid part of the century and beyond. Further. F analysis of SLR and the impacts from SLR on the project area is included in Section 4.8.

As a response to ongoing coastal erosion and other coastal hazards, the Waikiki shoreline features an extensive complex of shoreline protection measures, including groins, seawalls, and revetments, all of which protect the densely developed coast.

Hydrology (groundwater and surface water). Groundwater conditions in the region are influenced by ocean tides, swells, storm surges, and rainfall in the surrounding area. During geotechnical exploration of the project site, groundwater was encountered at approximately 7 feet below the ground surface. Groundwater within the project area is not a drinking or potable water source. No inland surface waters exist in the project vicinity; surface waters include the Pacific Ocean surrounding the project site.

4.6.2 Potential Environmental Consequences

A significant impact on topography, geology, or hydrology would occur if topographical features were removed, the substrate would be unable to support the proposed alternative, or groundwater would be affected.

4.6.2.1 Perimeter Deck (Proposed Action)

No significant impacts to topography, geology, or hydrology would occur from construction and operation of the Perimeter Deck. Supporting information follows.

Construction

No impacts to inland topography would occur as a result of the Perimeter Deck. Impacts to bathymetry and geology would be limited to removal of beach quality sand in the mauka-Diamond Head area.

Impacts to hydrology would be minor and would include impacts to surface water quality (Pacific Ocean) with minimal impacts to groundwater. No substantial utility upgrades are required. This would involve some excavation and possible trenching, a NPDES permit would be required for work, and permit requirements outlined in the NPDES permit would be followed to minimize impacts to groundwater and surface water.

Operation

No impacts to inland topography would occur. Minimal impacts to bathymetry and geological processes are anticipated, as sand shifting patterns may exhibit minimal

change resulting from the open circulation system. The groin on the Diamond Head side of the perimeter wall would be retained to maintain current sand accretion patterns at Sans Souci Beach, and to minimize the impacts. Engineering design would incorporate wave circulation, as well as associated sand accretion and erosion patterns to ensure current coastal geological processes, would be maintained. Details on wave circulation and engineering design are discussed in Section 4.8 and Appendix E. The design would incorporate geotechnical exploration results to ensure structural integrity of the new features, particularly the new pool deck.

4.6.2.2 War Memorial Beach

No significant impacts to topography, geology, or hydrology would occur from construction and operation of the War Memorial Beach. Impacts to underwater topography (bathymetry) and geology would be limited to the footprint of the Natatorium pool. Supporting information follows.

Construction

Construction activities would not impact topography. Electrical system upgrades would be required to accommodate the pumps and other mechanical equipment, the existing stormwater collection system in the vicinity of the entry arch would be improved, and groundwater elevations would be considered during the design phase. Long-term impacts to the bathymetry and sea floor would be limited to the Natatorium footprint, with possible minor sand movement shifts in areas directly adjacent to the opening of the L-groin.

Operation

No impacts to inland topography would occur as a result of the Perimeter Deck. Impacts to bathymetry and geology would include regraded areas and be limited to the Natatorium facility. Current coastal geological processes would be altered as a result of this alternative. However, engineering considerations to ensure the continued accretion of sand on Sans Souci Beach have been an important part of the planning process; as a result, the L-groin design maintains the current sand accretion at Sans Souci Beach (Sea Engineering, Inc. 2008). The design would incorporate geotechnical exploration results to ensure structural integrity and stability of the new features, particularly the L-groin and new memorial arches.

4.6.2.3 Closed System Pool

No significant impacts to topography, geology, or hydrology would occur from construction and operation of the Closed System Pool. Impacts to underwater topography (bathymetry) and geology would be limited to the footprint of the Natatorium pool. Supporting information follows.

Construction

The Closed System Pool requires substantial upgrades to utility infrastructure, which would require excavation and trenching with impacts limited to the project site. Impacts to bathymetry would be limited to the existing Natatorium footprint,

where fill would change the pool depth. Impacts to coastal geological processes, including sand erosion and accretion, would be negligible.

Operation

No long-term impacts to topography would occur as a result of the Closed System Pool. This alternative would maintain current sand deposition processes, as perimeter walls would maintain the current closed perimeter design. Under the closed system pool, freshwater would be pumped from a dedicated well. Information. I regarding water utilities is in Section 4.2. The design would incorporate geotechnical exploration results to ensure the structural integrity of the new pool.

4.6.2.4 NO ACTION

No change and therefore no impacts to topography, geology, and hydrology would occur with no action.

4.7 NATURAL HAZARDS

4.7.1 Affected Environment

The Waikiki, Honolulu coastal zone has been assigned a moderate to high (5) overall hazard assessment score by USGS, due to the low coastal slope that makes it particularly vulnerable to damage from tsunamis, hurricanes, and storm surge, stream flooding, and seasonal high wave flooding. Natural hazards that could potentially impact the project site include flooding, tsunami, hurricanes, and seismic hazards (earthquakes) (USGS 2002). Ongoing impacts from SLR are expected to affect the area into the next century and beyond; SLR impacts and warming ocean temperatures are expected to intensify effects felt by natural hazards into the next century (Webster et al. 2005; USGS 2002).

Floods. Coastal areas throughout all of the Hawaiian Islands are vulnerable to large waves, storm surge, and flooding risk. These risks are further exacerbated by SLR. Flooding is most likely to occur in the nearshore area during storm surges and during king tides, or very high tide events that generally occur a few times per year. Tidal flooding may also occur when tides are high in combination with high waves. Flash flooding may also occur in the area during heavy rains, which are most likely in the winter months, or during tropical storms and hurricanes. Hazards associated with heavy flooding in the area could include power outages, road overwash, and road closures. No rivers or streams that could overflow are in the WWMC area.

As determined by the Federal Emergency Management Agency (FEMA) 2014 Flood Insurance Rate Map (FIRM), the Natatorium is located in Zone VE, which is the coastal flood zone with velocity hazard. The base flood elevation (BFE) is 12, where BFE is the water surface elevation of the 1% chance annual flood. The area directly mauka of the Natatorium is located in flood Zone AE, BFE 8. Flood zones are shown on Figure 4-9.

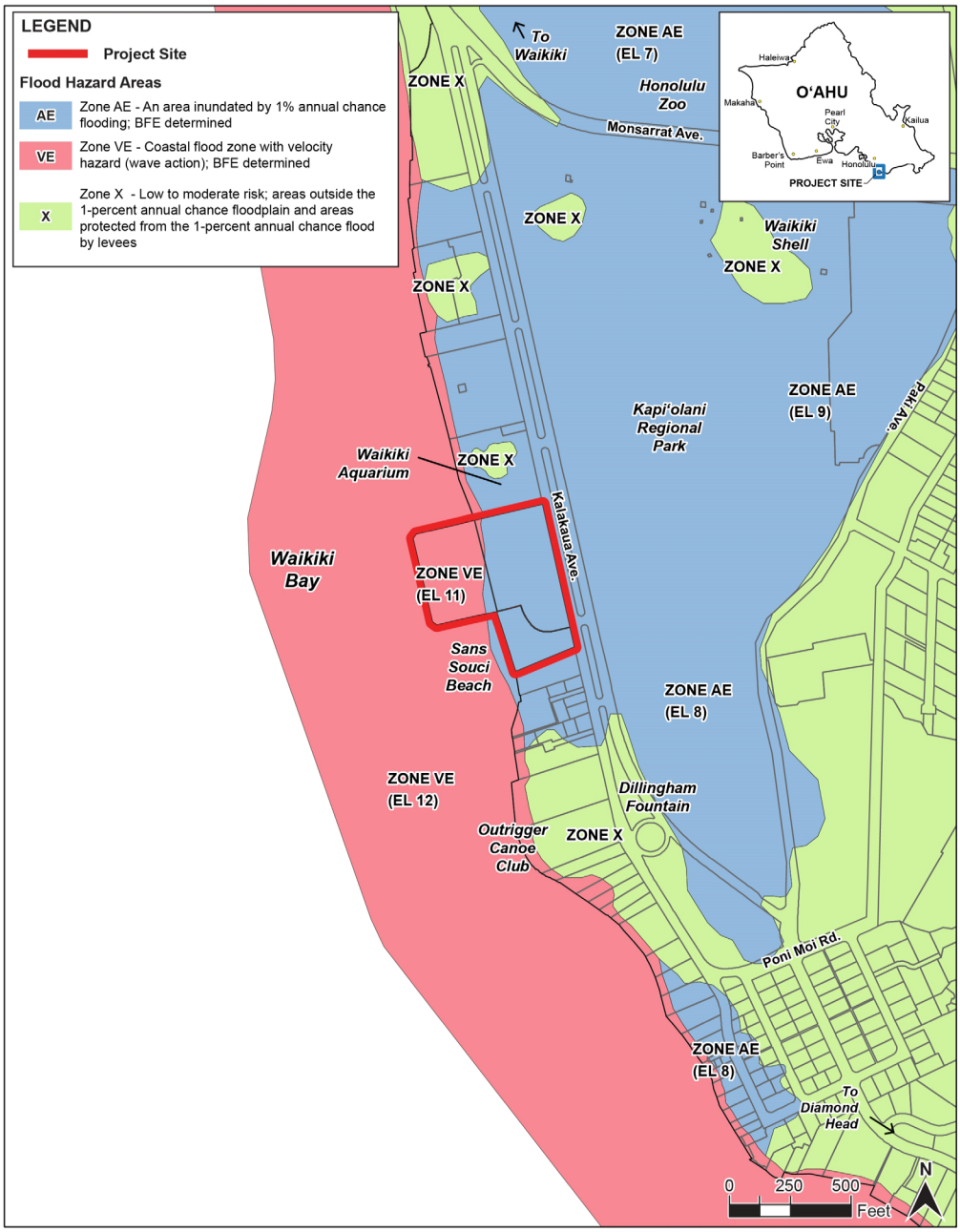


Figure 4-9: Flood Map (DFIRM)

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

Tsunamis. A tsunami is a long, high wave generated by an earthquake, coastal landslide, or a volcanic eruption. An extreme tsunami can flood inland areas hundreds of feet or more from the shoreline and can lead to serious property damage and loss of life. The impact a tsunami has on Honolulu and Waikiki depends largely on where the tsunami is generated and where it connects landside. Locally generated tsunamis can arrive at the coast within minutes, while distant source tsunamis can take hours to arrive, allowing for adequate evacuation time. If a tsunami were to occur, the Natatorium would likely face severe structural

damage, including possible complete loss of perimeter walls and deck and possible damage to the bleachers and entry arch.

The Natatorium is located within the State's designated tsunami evacuation zone; in the event of a tsunami (or tsunami warning), the area would be evacuated to the nearest safe zone. In the event of a tsunami, the nearest safe zone is located mauka of Paki Avenue, located north of the project site. Designated evacuation centers include Waikiki Elementary School and La Pietra – Hawai'i School for Girls. Vertical evacuation, or evacuation to higher floors in hotels and condominiums, is also an option in the Waikiki area.

Hurricanes. A hurricane is a rotating low-pressure tropical wind storm with wind speeds greater than or equal to 74 mph. Hurricane season in the Hawaiian Islands generally occurs between June 1 and December 1; however, with warming ocean temperatures, the length of hurricane season is increasing globally (USGS 2002; Webster et al. 2005). The immediate impacts associated with a hurricane include impacts from extreme winds and flying debris, flooding from heavy rains, and coastal flooding from storm surge. Hazards associated with high waves and flooding from hurricanes include debris overwash, flooding, erosion, turbulence in the nearshore zone, and strong currents (including rip currents). A large hurricane could generate shoreline storm surge as high as 40 feet in the Hawaiian Islands (USGS 2002). The project site could experience all of the above effects of a hurricane even if the island is not directly hit by the storm. Structural damage and further deterioration of the existing Natatorium facility is likely in the event of a hurricane.

Storm waves. Hurricanes, tropical storms, and Kona storm fronts can generate wave heights as high as 9 to 17 feet. Kona storm fronts, also known as Kona storms, are relatively infrequent and only occur about 10 percent of the time in a given year (Miller and Fletcher 2003; Sea Engineering, Inc. 2016b). Hazards associated with high waves and flooding include debris overwash, flooding, increased erosion, turbulence in the nearshore zone, and strong currents (including rip currents), which endanger public safety.

Earthquakes (seismic hazards). On O'ahu, earthquakes can occur as a result of slippage of minor faults or bending in earth's mantle; this type of earthquake is very rare. The island of O'ahu is located in Seismic Zone 2A, which is characterized as being susceptible to earthquakes that may cause minor damage to structures since there is a relatively low probability of damaging seismic conditions. Zone 2A is not associated with a particular fault zone. The threat of an earthquake occurring in the project area is no greater than most other areas around O'ahu (USGS 2002). If an earthquake were to occur, structural damage to the entire Natatorium structure, including bleachers and entry arch could occur; the extent of the damage would be dependent on the epicenter, depth, location, and magnitude of the earthquake.

4.7.2 Potential Environmental Consequences

4.7.2.1 PERIMETER DECK (PROPOSED ACTION)

No significant impact from or to natural hazards from construction or operation of the Perimeter Deck would occur. The Perimeter Deck would not exacerbate effects of natural hazards with BMPs for the project construction site in the event of natural hazards. The Perimeter Deck would improve the structural integrity of the Natatorium, potentially minimizing impacts from natural hazards. Supporting information follows.

Construction

Floods. To the extent practical, construction would be avoided during flooding events. Should heavy rains or flash floods occur, equipment and material stockpiles would be covered, and appropriate BMPs would be implemented to avoid secondary impacts to water quality (Section 4.9). In the event of extremely high tides, large south swells, storm surges, or Kona storm fronts, all in-water equipment would be either removed from the Natatorium (if practicable and necessary), or secured to avoid structural impacts to the Natatorium itself and impacts to the surrounding marine environment.

Tsunami. The impact on the Natatorium incurred from a tsunami is largely dependent on the source of the tsunami and the advance warning time allotted. Should adequate evacuation time allow, and only if practical, all in-water equipment would be removed and properly secured. Construction equipment, machinery, and excavated or building materials present on the construction site could exacerbate the impact of a tsunami should one occur while construction activities are taking place due to the additional floatable debris.

Hurricanes. Construction activities could exacerbate the effect of hurricanes if loose materials are not secured prior to the event of a storm and become flying debris. Loose materials present during construction could become floatable debris, which could exacerbate the effects and damages of a hurricane. To minimize this hazard, construction materials and equipment would be stored properly when not in use; storage should be consistent with construction BMPs. The BMPs prepared by the contractor may include provisions requiring the tie-down of heavy equipment in the event of a predicted pending storm event. Appropriate stockpiling procedures for excavated materials would be established prior to start of construction. If evacuation time allows, equipment and loose materials would be removed from the project vicinity prior to impact.

Storm waves. Construction activities could exacerbate the effect of storm waves if loose materials are not secured, and debris (particularly excavated material) would become floating debris. Work should be avoided if large storm waves or Kona swells are predicted. Appropriate construction BMPs to address loose materials, described above, would be implemented to prevent impact from storm waves.

Earthquakes. While the threat of an earthquake is unlikely, an earthquake could result in further structural damage if one were to occur during construction.

Operation

The new design would strengthen the structural integrity of the Natatorium, decreasing the associated impact and extent of structural damage associated with all natural hazards. In the event of any natural hazard, the facility would be evacuated promptly due to its vicinity to the ocean. Should storm waves begin to overtop the structure or endanger swimmers and the public, City and County lifeguards would close the area to swimmers. The Perimeter Deck would be designed and constructed in accordance with site-specific geotechnical and structural engineering investigations, and would comply with applicable design codes to prevent structural damage from occurring in the event of a natural hazard.

4.7.2.2 War Memorial Beach

No significant impact from or to natural hazards from construction or operation of the War Memorial Beach would occur. Impacts associated with the War Memorial Beach would be similar to those of the Perimeter Deck. Supporting information follows.

Construction

The War Memorial Beach would include plans for natural hazards during construction; therefore, its impacts from natural hazards, and possibly its potential contributing effects of such hazards, would be similar to the Perimeter Deck.

Operation

The War Memorial Beach design would strengthen the structural integrity of the WWMC, decreasing the associated impact and extent of structural damage associated with all natural hazards. In the event of any natural hazard, the facility would be evacuated promptly due to its vicinity to the ocean and hazards associated with the WWMC's proximity to shore. Should storm waves begin to overtop the L-groins, or directly inundate the beach area in a manner that endangers swimmers and the public, City and County lifeguards would close the area to swimmers and the public.

4.7.2.3 Closed System Pool

No significant impact from or to natural hazards from construction or operation of the War Memorial Beach would occur. Impacts associated with the Closed System Pool would be similar to those of the Perimeter Deck. Additionally, during operations, natural hazards could cause waves to overtop the perimeter wall and alter the pool water quality. Supporting information follows.

Construction

The Closed System Pool would include plans for natural hazards during construction; therefore, its impacts from natural hazards, and possibly its potential contributing effects of such hazards, would be similar to those of the Perimeter Deck.

Operation

The Closed System Pool would strengthen the structural integrity of the WWMC, which would decrease the associated impact and extent of structural damage associated with all natural hazards. Similar to the other action alternatives, in the event of any natural hazard, the facility should be evacuated promptly due to its vicinity to the ocean. Should storm waves begin to overtop the structure or endanger swimmers and the public, City and County lifeguards would close the area to swimmers.

If waves overtop the perimeter walls, water quality subject to provisions set forth by HAR Chapter 11-10, would likely be altered. Regular monitoring and chemical treatment (including chemicals used for treatment of algae growth and bacteria) would be implemented in accordance with HAR Chapter 11-10 to maintain chemical balance in the pool.

4.7.2.4 NO ACTION

Under No Action, the Natatorium would be more vulnerable to the impacts of natural hazards in its dilapidated state. Significant impact to the facility could result from coastal hazards including hurricanes, tsunamis, and storm waves. Impacts resulting in Natatorium debris could also exacerbate the effects of natural hazards with the loose debris, increasing risk to public safety. Supporting information follows.

Construction

Under No Action, impacts from natural hazards, and possibly from the materials used during maintenance as contributing effects of such hazards, would not be significant. Fencing and netting over the deck and seawall would be done when the threat of natural hazards are not present.

Operation

Under No Action, the WWMC would remain closed to the public, reducing impacts on public health and safety associated with natural hazards. Galvanized steel netting would reduce the potential debris flow in the water in the event of a hurricane or storm surge.

4.8 NEARSHORE PHYSICAL ENVIRONMENT AND SEA LEVEL RISE

4.8.1 Affected Environment

The water inside the Natatorium and all nearshore and offshore waters are considered waters of the United States (WOTUS). Specific activities proposed within the WOTUS would be regulated pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA). Such requirements are also addressed in other section of this EIS, including Section 4.10, Marine Biological Environment.

Factors used to characterize the nearshore physical environment, including SLR, are described below.

Tidal conditions. Hawai‘i tides exhibit two tide cycles in one 24-hour period (semi-diurnal); two high tides and two low tides occur within one day. The highest water levels generally occur during spring tides, when there is the greatest difference between high and low tides, approximately twice per month. Conversely, the least difference between high and low water sea level and water levels are steadier occurs during neap tides. King tides, which result from large scale oceanic eddies, have generated local sea levels 0.5 to 1 foot higher than normal for several weeks. High tides during these events can generate sea levels as high as 2.5 feet above MSL, under current sea level conditions. Sea level elevations relative to the MSL datum for the 1983–2001 tidal epoch measured at the nearest tide station, Honolulu Harbor, are shown in Table 4-5 (NOAA 2018).

Table 4-5: Historical water levels (1983–2001) for Honolulu Harbor tide station

Datum	Description	Water level (ft)
MHHW	Mean Higher-High Water	1.1
MHW	Mean High Water	0.7
MTL	Mean Tide Level	0.0
MLW	Mean Low Water	-0.6
MLLW	Mean Lower Low Water	-0.8

Note: Levels based on MSL datum.
Source: (NOAA 2018).
ft foot or feet

Waves. In Waikiki, the wave climate is characterized by four general wave types including southern swells, Kona wind waves, northeast trade wind waves, and waves generated by tropical storms and hurricanes. Waves from winter North Pacific swells do not generally impact the southern shores. Increased wave heights along the south shore generally occur between May and October, as a result of southern swells and northeast trades. These waves generally range between 3 to 8 feet in deepwater wave height. Tropical storms and Kona storm fronts can generate deepwater wave heights ranging from 9 to 10 feet, with heights documented as high as 17 feet. Kona storm fronts resulting from low-pressure storm systems are relatively infrequent, and only occur about 10 percent of the time in a given year (Miller and Fletcher 2003; Sea Engineering, Inc. 2016b). Effects and hazards associated with large storm waves are discussed further in Section 4.7, Natural Hazards.

Waves are depth-limited in nature; the energy and height of a wave is dependent on the depth of the water. If the water is shallow, a wave will break, causing the wave to dissipate and lose energy before reaching the shoreline or the shoreline structure. The WWMC is protected from the direct impact of large waves by the fringing shallow reef nearshore. Consequently, waves reaching the Natatorium perimeter walls and adjacent beaches are significantly smaller than the deepwater waves measured offshore. Waves generally approach from the southwest or

south-southwest direction. Waves approaching from the south-southwest direction experience the least refraction due to bathymetric conditions of the site. These waves therefore have the greatest impact on the perimeter walls of the Natatorium structure. Further, design consideration would use the height of the waves reaching the structure itself (design waves). Sea Engineering, Inc. modeled wave conditions to determine design wave height under different wave scenarios (Sea Engineering, Inc. 2018). Results are summarized in Table 4-6.

Table 4-6: Design Wave Heights

Scenario	Prevailing Wave (ft)	1-year wave (ft)	50-year wave (ft)	Model Hurricane (ft)
Deepwater wave height	4	9	18.6	30.8
Still Water Level Rise				
Astronomical tide	0.7	1.1	1.1	1.1
Large-scale eddy	0	0.5	0.5	0.5
Wave setup	0	0.5	1.0	4.4 [a]
Sea level rise	N/A	0.7	0.7	0.7
Total SWL Rise	0.7	2.8	3.3	6.7
Nominal Water Depth	3.5	3.5	3.5	3.5
Design Water Depth	4.2	6.3	6.8	10.2
Design Wave Height	2.7	4.1	4.4	6.6

Source: Sea Engineering Inc. 2018.
N/A not applicable
[a] Combined wave setup and storm surge.

Notably, during high tides and storm surges, waves reaching the shoreline contain more energy, as the extent of wave energy dissipation by the shallow reef is lessened when water is deeper. Large waves can and do overtop the current structure if water levels are deep enough and wave faces are large enough. The WWMC is closed to the public; therefore, waves overtopping the structure are not currently a public safety concern.

The current structural integrity and deteriorated condition of the WWMC, particularly along the perimeter walls, is likely inadequate to withstand wave energy. Structural investigation has indicated that the current design did not adequately protect the reinforced steel from the effects of saltwater intrusion. Wave action and saltwater intrusion continues to deteriorate the concrete under current conditions.

Circulation. Tidal driven current in Waikiki typically flow in the ‘Ewa direction, north-northwest during high tide, and in the Diamond Head direction during low tide. Tidal driven current is generally weaker nearshore, when compared to offshore currents due to predominant wave-induced currents. Wave-induced currents include both longshore currents (parallel to shore) and onshore/offshore rip currents. General circulation involves onshore movement of waves, particularly prominent in the summer months (Fletcher et al. 2011; Sea Engineering, Inc.

2016b). Current circulation patterns drive sand movement; the movement of sand in the ʻEwa direction has resulted in sand accumulation at Sans Souci Beach, due to the sand entrapment along the Diamond Head groin of the Natatorium (Sea Engineering, Inc. 2018).

Sea level rise. SLR, or increase in global MSL, is an ongoing effect of warming global temperatures. Global warming is, in part, a result of increased GHG emissions (Section 4.5, Climate and Air Quality), which has resulted in melting glacial ice caps and thermal expansion of ocean waters. SLR exacerbates the effects of natural hazards unique to the coastal zone (Section 4.7).

The WWMC is located within the SLR exposure area (Figure 4-10). The Hawaiʻi Climate Change Mitigation and Adaptation Commission has recommended that all projects plan for 3.2 feet of SLR (Hawaii Climate Change Mitigation and Adaptation Commission 2017). SLR projections used in the *2017 Hawaiʻi SLR Vulnerability and Adaption Report* were based on the IPCC global SLR projections from the "business-as-usual" scenario. Under this scenario, it is predicted that MSL will rise by 0.5 feet in 2030, 1.1 feet in 2050, 2.0 feet by 2075, and 3.2 feet by 2100. However, more recent SLR models and scientific literature suggest that a 3.2-foot rise in MSL could occur as early as 2060 and, under the most extreme scenario, global MSL could rise 8.2 feet by 2100 (Sweet et al. 2017; Hawaii Climate Change Mitigation and Adaptation Commission 2017). Furthermore, local projections of SLR that incorporate regional and local factors suggest even higher ranges for SLR, when compared to global SLR predictions.

To spatially model the impacts of SLR on land, the University of Hawaiʻi Coastal Geology Group and Tetra Tech, Inc. have developed SLR maps. SLR exposure areas are collectively comprised of areas exposed to passive flooding, annual high wave flooding, and coastal erosion. Passive flooding includes the initial assessment of low-lying areas susceptible to flooding from marine and groundwater inundation (without accounting for flooding through storm drains). Annual high wave flooding includes impact from shoreline wave run-up during large wave events, under higher ocean conditions. The spatial models do not account for increasing wave energy, changes in reef accretion/reef loss associated with rising ocean temperatures, or changes to sediment supply from future shoreline development and engineering. Additionally, the spatial models do not incorporate any future adaption measures and management strategies, which include but are not limited to coastal restoration and retreat, shoreline softening, flood proofing, land raising/elevated development, and coastal armoring (Hawaii Climate Change Mitigation and Adaptation Commission 2017).

Under the current 3.2-foot SLR scenario, present loss of land in the area includes the Waikiki Aquarium extending to Kalakaua Avenue and into Kapiʻolani Regional Park, the WWMC, Sans Souci Beach, and the New Otani Kaimana Beach Hotel property. Erosion rates of Queen's Beach would likely increase into the future with SLR scenarios, and the accretion of Sans Souci Beach would likely slow or start to erode with rising sea levels. Given the back-of-beach armoring present at both beaches, neither beach would retreat inland and total beach area would decrease with time. Overtopping of the 6-foot-high (crest elevation) concrete perimeter wall

on the makai side of the Natatorium would become more frequent, likely increasing the rate and extent of structural damage and deterioration.

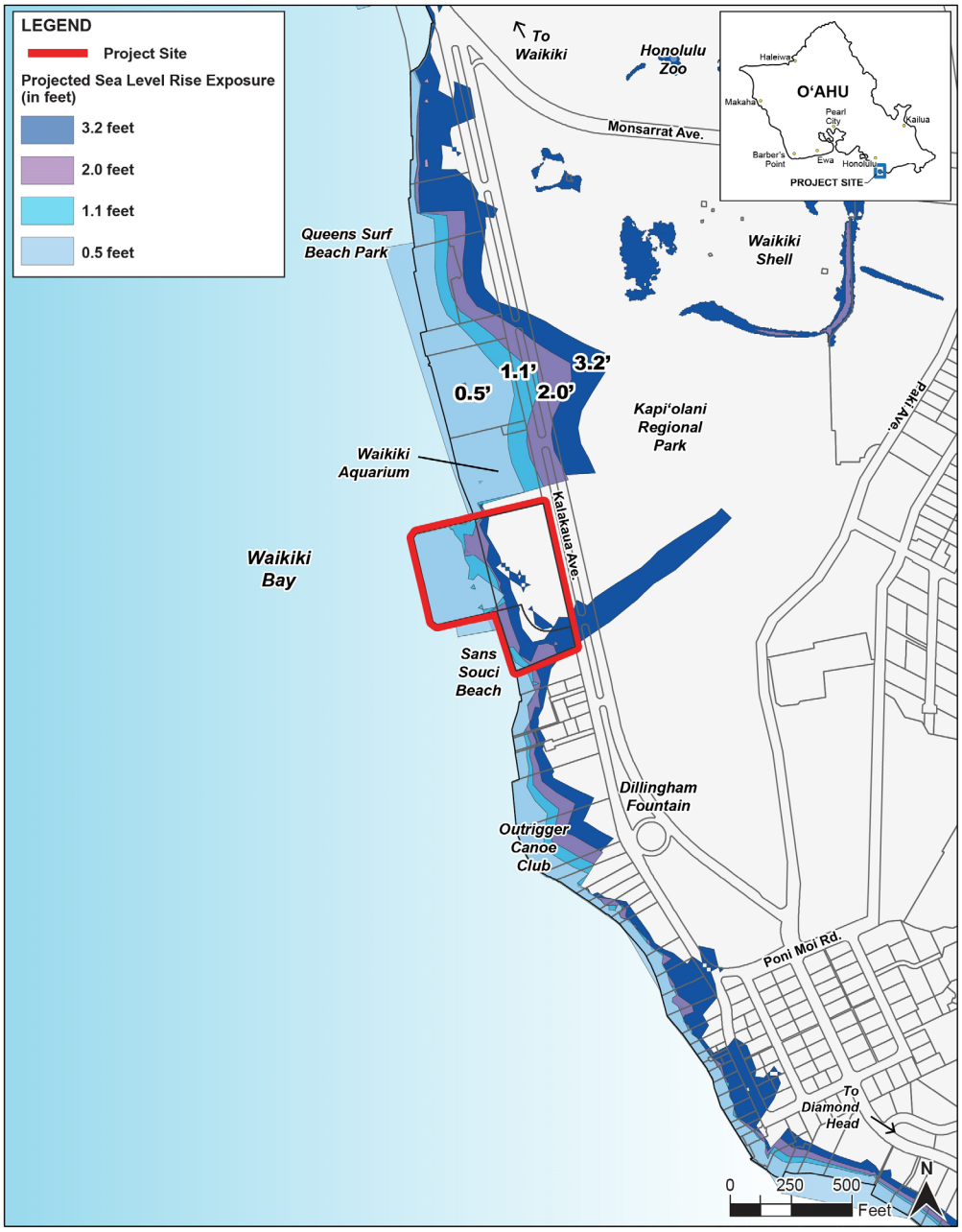


Figure 4-10: Sea Level Rise Exposure

Source: University of Hawai'i, Coastal Geology Group, Tetra Tech, Inc. 2017, State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

Note: Floods maps generated are in the range of 80% probability and do not include future land use changes or adaption measures.

4.8.2 Potential Environmental Consequences

A significant impact on the nearshore physical environment would occur if WOTUS is affected. A significant impact from SLR would occur if designs would not account for the projected change.

4.8.2.1 Perimeter Deck (Proposed Action)

No significant impact to the nearshore physical environment is anticipated from construction or operation of the Perimeter Deck. The function of the Diamond Head groin—preserving Sans Souci Beach—would be maintained throughout construction and operation. The Perimeter Deck would not result in loss of WOTUS.

Designs would consider SLR, structural concerns, historic preservation interest, and costs. Decisions would be made to avoid significant impacts on the nearshore environment.

Supporting information follows.

Construction

The Perimeter Deck would not result in the loss of WOTUS. The interior basin would remain as marine water and would be regulated as such.

Construction activities would occur within the existing basin of the Natatorium and are anticipated to minimally influence nearshore environmental conditions. However, any changes in circulation or nearshore wave pattern would be limited to waters directly adjacent to the perimeter deck, on the interior landward edge of the shallow reef. Wave energy reflection is anticipated to be reduced following the removal of the makai and ‘Ewa seawalls.

In general, construction activities would be planned in the following order: install BMPs and contain in-water construction area, e.g., temporary barrier walls; perform demolition; remove obstructions, e.g., fallen debris in substrate; reconstruct, e.g., install piles, deck, seawalls; and remove temporary containment walls and BMPs.

The existing Diamond Head groin would not be removed at any point during construction under the Perimeter Deck, and a temporary barrier wall adjacent to the existing Diamond Head groin is planned. These measures would preserve the adjacent Sans Souci Beach and maintain the general wave patterns and nearshore conditions on the beach. Further, this would prevent the movement of sand from Sans Souci Beach into the pool area. After the perimeter walls are removed, the interior portions would be more exposed to wave action present in the nearshore environment.

Construction sequencing and timing would take into account oceanic and weather conditions. BMPs and SOPs would be implemented to avoid high ocean conditions (e.g., large swells, extreme high tides, and large storm waves). Work windows with

calm waters are anticipated to be sufficient to complete construction activities in a timely manner.

SLR would not be a significant factor with a construction duration of approximately 7 months.

Operation

Under the Perimeter Deck, seaward wave energy reflection would be minimized given the removal of the ‘Ewa and makai walls, and much of the wave energy that would have been previously reflected would disseminate into the new pool area. According to wave models, when waves are present, the swimming area could have a complex and possibly choppy water surface. More wave energy is anticipated to be present in the pool area when compared to the original closed-structure design (Sea Engineering, Inc. 2018). Wave energy would also impact the ‘Ewa side the Natatorium, particularly the beach fronting the Waikiki Aquarium, where wave energy is anticipated to be greater than the current conditions. The removal of these walls may result in the transport of sand further in the ‘Ewa direction toward Kuhio Beach. Sans Souci Beach would be maintained, given the preservation of the Diamond Head groin and wall above it.

The existing concave curvature of the perimeter wall should continue to be considered in the perimeter wall design; this feature dissipates incoming waves, prevents waves from overtopping the wall, redirects incident energy, and reduces turbulence.

A great deal of scientific uncertainty is associated with the extent and timing of SLR. Final design considerations could include 3.2-foot SLR scenarios into the design wave calculations. With higher still water sea levels anticipated with SLR, greater wave energy is anticipated to reach the project site as depth-limited waves could reach the structure with less shallow reef dissipation. Design decisions related to SLR would consider costs, structural design, and historic preservation design. Such decisions would need to be made in a manner that avoids premature loss of the reconstructed deck to SLR. The significance from and on SLR is unknown and likely to be dependent on future regional plans. Any fixed shoreline structure would need continued management. This issue involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.

Surf sites can be impacted by both coastal hardening and coastal softening, due to changes in wave energy reflection. The removal of the makai and ‘Ewa seawall would change the reflected wave energy; however, surf sites offshore of the WWMC including “Old Mans”, “No Place”, and “Publics”, are not anticipated to be impacted by the removal of the makai and ‘Ewa walls (Section 4.15, Socioeconomics and Demographic Setting). The surf sites are located far enough offshore from the perimeter walls, and existing wave energy reflection does not affect these sites.

4.8.2.2 WAR MEMORIAL BEACH

Significant impacts to the nearshore physical environment are anticipated from construction and operation of the War Memorial Beach. The function of the Diamond Head groin–preserving Sans Souci Beach—would be maintained throughout construction and operation. The War Memorial Beach would include loss of approximately 0.9 acres of WOTUS.

Long-term impacts from SLR would result in beach loss and increased long-term maintenance requirements.

Supporting information follows.

Construction

The War Memorial Beach would permanently change the coastal and nearshore conditions. Loss of WOTUS is anticipated to be approximately 38,000 square feet (0.9 acres), resulting from the sand placement below the mean higher high water (MHHW) mark (Sea Engineering, Inc. 2018).

Construction sequencing and timing of activities that would affect nearshore conditions would be similar to those in the Perimeter Deck. As a result, potential impacts on the nearshore environment would be similar and not significant.

Operation

Design engineering and planning for the War Memorial Beach has incorporated several wave and coastal flow models to ensure the integrity, safety, and sustainability of the selected design when compared to other groin and beach design alternatives (Sea Engineering, Inc. 2018). Engineering studies resulted in the L-groin design concept. This design would result in no long-term change in current patterns outside of the Natatorium footprint. Return flow from the swimming area along the groin heads could produce a mild rip current; the design of the groin heads would ease the strength of the current.

Sans Souci Beach would not be impacted by the War Memorial Beach, because the Diamond Head groin would maintain current and general flow conditions. The beach fronting the Waikiki Aquarium would not likely experience long-term change resulting from the installation of the L-groin.

Given the back-of-beach armoring present under the War Memorial Beach, the new constructed beach would not retreat inland and the total beach area would decrease with time as sea level rises. As sea level rises, water would likely overtop the groins and inundate the beach more frequently. Greater wave heights would be expected as sea level rises. SLR would intensify the need for more maintenance of the beach and groins (Sea Engineering, Inc. 2018). The significance from and on SLR is unknown and is likely to be dependent of future regional plans. Any fixed shoreline structure would need continued management. This issue involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.

Surf sites are not anticipated to be impacted by the War Memorial Beach, due to their distance from the current structure.

4.8.2.3 Closed System Pool

Significant impacts to the nearshore physical environment are anticipated from construction and operation of the Closed System Pool. The function of the Diamond Head groin—preserving Sans Souci Beach—would be maintained throughout construction and operation. The Closed System Pool would include loss of WOTUS, as the entire pool area (approximately 1.4 acres) would be lost.

Long-term impacts from SLR would result in increased overtopping of the perimeter deck and potential inundation of the pool. Design of the Closed System Pool would incorporate future SLR scenarios.

Supporting information follows.

Construction

Loss of WOTUS would be the greatest under the Closed System Pool. The total loss would be approximately 62,000 square feet (1.4 acres), resulting from the fill of the entire pool area. The Closed System Pool would no longer be classified as marine water.

Construction sequencing and timing of activities that would affect nearshore conditions would be similar to those of the Perimeter Deck. As a result, potential impacts on the nearshore environment would be similar and not significant.

Operation

The Closed System Pool would not alter current circulation conditions. SLR scenarios, and wave and tidal conditions under higher sea levels, would be considered in the final design. The existing concave curvature of the perimeter wall should continue to be considered in the perimeter wall design; this feature dissipates incoming waves, prevents waves from overtopping the wall, redirects incident energy, and reduces turbulence. Design decisions related to SLR would consider costs, structural design, and historic preservation design. Such decisions would need to be made in a manner that avoids premature loss of the reconstructed deck to SLR. The significance from and on SLR is unknown and is likely to be dependent of future regional plans. Any fixed shoreline structure would need continued management. This issue involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.

Surf sites would not be impacted by the Closed System Pool, as wave, current, and general circulation conditions would not change.

4.8.2.4 No Action

No change and therefore no impact to the nearshore physical environment would occur with no action.

The effects of SLR are expected to be evident soonest on the WWMC under this alternative. It is anticipated that SLR would result in more frequent overtopping of perimeter walls, further dilapidation of the structure, and eventual full or partial inundation of the current perimeter deck.

Supporting information follows.

Construction

Construction activities are limited to fencing and netting around the sea walls and deck. These activities would not affect the nearshore environment.

Operation

While No Action would generally not affect the nearshore environment, the Natatorium would be more vulnerable to impacts from SLR, as deterioration and destruction of walls would be exacerbated under higher sea levels. Galvanized netting would not prevent the inundation of seawater from rising sea levels, tides, and waves; the deterioration of the perimeter walls and deck would continue.

4.9 WATER QUALITY

4.9.1 Affected Environment

In the State of Hawai'i, marine waters are divided into Class AA and Class A waters. Pursuant of HAR Chapter 11-54-3, the objective of Class AA waters is to preserve them "in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected". The objective of Class A waters is to ensure "their use for recreational purposes and aesthetic enjoyment be protected" (HAR Chapter 11-54-3). The majority of marine waters off Waikiki are classified as Class A waters; however, the area encompassing the Waikiki MLCD (north of the project site) is classified as Class AA water (Figure 4-11). Therefore, the project area encompasses both water classifications. Waters adjacent to the WWMC are classified by HAR Chapter 11-54 as an open coastal marine waters with a class II marine bottom ecosystem.

Under Section 303(d) and 305(b) of the CWA, states are required to develop lists of impaired waters that do not meet state WQS. Water bodies monitored by the CWB pursuant of in the CWA §303(d) and §305(b) vicinity include the War Memorial Natatorium (HI624259), Sans Souci Beach (HI617815), Kuhio Beach (Public Bath) (HI851298), and Outrigger Canoe Club Beach (HI943325) (DOH CWB 2017). All water bodies adjacent to the site are evaluated under the "dry criteria", meaning the average freshwater inflow does not exceed 3 million gallons per day per shoreline mile (HAR §11-54-6). Sans Souci Beach was determined to be in attainment for two out of the seven criteria pollutants—enterococci and total phosphorus (TP). It was out of attainment for five out of seven of the pollutants—total nitrogen (TN), nitrate + nitrite, ammonia, turbidity, and chlorophyll a. Kuhio Beach at Public Bath, located north of the project site, was deemed to be in

attainment for all criteria pollutants except for turbidity and chlorophyll a. Both Sans Souci Beach and Kuhio Beach at Public Bath were deemed low priorities for initiating TMDL development within the current monitoring and assessment cycle; no TMDLs are established for either beach. Monitoring at the Natatorium and the Outrigger Canoe Club Beach was not sufficient to determine attainment status (DOH CWB 2017).

Marine water quality in the project vicinity is generally impacted by surface water runoff from the adjacent beach and recreational areas. Surface runoff sheet flows directly into the interior pool, and runoff outside of the Natatorium generally sheet flows into the ocean. Impervious surfaces and lawns have relatively high runoff coefficients, increasing runoff and decreasing water quality in the area.

Baseline water quality conditions were evaluated during water quality surveys conducted by AECOS, Inc. in 2011 (AECOS, Inc. 2012). To determine water quality conditions, samples were gathered from five sampling stations (Figure 4-12). In situ field measurements for temperature, salinity, pH, and dissolved oxygen (DO) were taken at each station. Water samples were collected and analyzed for turbidity, total suspended solids (TSS), nitrate + nitrite (NO_3+NO_2), ammonia (NH4), total nitrogen (TN), total phosphorus (TP), and chlorophyll a. During water quality monitoring, temperature, salinity, and pH were similar across all five stations. Mean temperatures ranged from 77.36 to 78.44 degrees Fahrenheit, salinity ranged from 35.6 to 35.8 parts per thousand, and pH ranged from 8.7 to 8.19. Dissolved oxygen saturation levels were lowest within the interior of the Natatorium pool (82%), and highest off the ‘Ewa corner (107%). Turbidity and TSS was elevated at all stations, and exceeded levels set forth by the State WQS (HAR §11-54). Mean turbidity ranges from a low of 1.56 NTU at the offshore sampling station to a high of 2.32 NTU at the Sans Souci Beach sampling station. A summary of water quality sampling results is presented in Table 4-7. The survey report is provided in Appendix F.

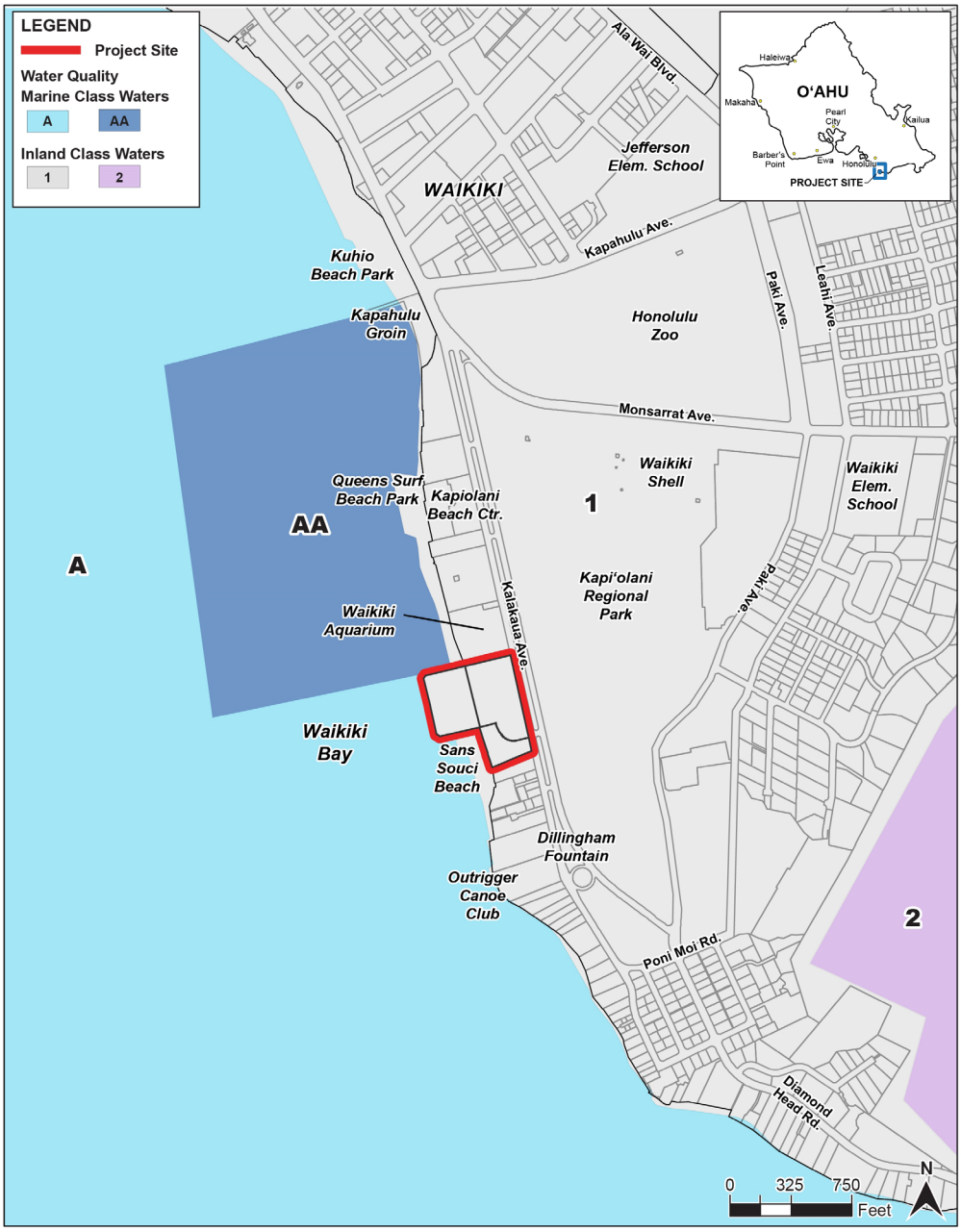


Figure 4-11: Water Quality Classifications

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/

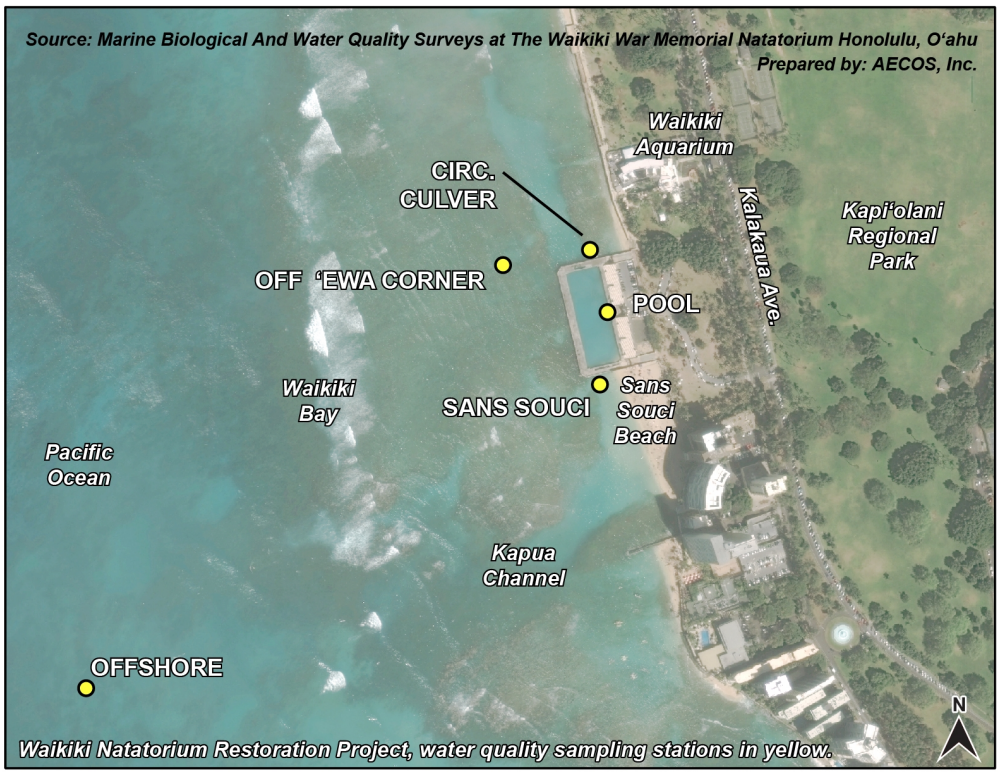


Figure 4-12: Water Quality Sample Locations

Table 4-7: Mean values for water quality parameters sampled around the WWMC

Parameter	Pool	Circ. Culvert	'Ewa Corner	Offshore	Sans Souci
Temperature (ºF)	78.26	78.26	77.9	77.36	78.44
Salinity (ppt)	35.6	35.8	35.8	35.8	35.8
DO sat (%)	82	83	107	91	90
pH	8.07	8.1	8.16	8.19	8.14
Turbidity (NTU) [a]	2.09	2.29	2.07	1.56	2.32
TSS (mg/L) [a]	8.4	10.0	9.6	8.4	8.7
Ammonia (µg N/L) [a]	35.6	17.7	19.6	18.9	19.8
Nitrate + Nitrite (µg N/L) [a]	13.3	3.6	<1	<1	3.6
Total N (µg N/L) [a]	221.9	191.3	173.2	174.1	201.3
Total P (µg P/L) [a]	5	5.4	5.4	4.0	5.6
Chlorophyll a (µg/L) [a]	0.39	0.33	0.30	0.26	0.32

Note: n = 3 for all samples.
µg/L microgram per liter
µg N/L
ppt part per thousand
mg/L milligram per liter
Source: AECOS, Inc. 2012.
[a] Geometric mean.

4.9.2 Potential Environmental Consequences

Work in WOTUS may be subject to CWA Section 404 should regulated actions—dredge or fill—occur.

All action alternatives would be subject to the requirement of CWA Section 401. CWA Section 401 requires that an applicant for a federal license or permit obtain a WQC authorization to demonstrate discharges to navigable waters will not violate applicable WQS, including those of the state and its antidegradation policies. In Hawaii, the DOH CWB is responsible for WQC authorizations. A WQC authorization includes project-specific conditions and BMPs to protect water quality. HAR Chapter 11-54 sets forth WQS for various water body classifications in the State of Hawai‘i. WQS set forth in HAR Chapter 11-54-6 are applicable to all marine waters in the State. Antidegradation considers the existing use, and the level of water quality necessary to protect existing use, to be maintained and protected (HAR Chapter 11-54-1).

In addition to a Section 401 WQC, an Individual National Pollutant Discharge Elimination System (NPDES) Construction Permit under Section 402 of the CWA, as authorized to the DOH, would be required for all action alternatives as the actions involve activities that disturb more than 1 acre of total land area [40 CFR 122.26(b)(15)]. Provisions set forth by HAR Chapter 11-55 pertaining to the NPDES permit and water pollution control would be followed under all action alternatives.

The required permits would include project specific conditions and BMPs, along with enforcement provisions, that serve to protect water quality.

4.9.2.1 Perimeter Deck (Proposed Action)

No significant impacts to water quality would occur from construction and operation of the Perimeter Deck. The USACE permit needed for in-water construction activities would require compliance with CWA Section 401 that requires BMPs to prevent adverse effects on water quality from occurring. Long-term beneficial and significant impacts on the water quality within the existing basin would occur. However, elevated turbidity is anticipated during an interim post-construction period until equilibrium is reached. Water quality would be monitored, as coordinated with the DOH. Beach closures may be prudent for intermittent periods and as coordinated with neighboring beach stakeholders.

No significant impacts on water quality from the anticipated uses, such as swimming, are anticipated.

Supporting information follows.

Construction

Impacts from construction activities on water quality could include increased turbidity and total suspended solids (TSS) from construction activities resulting from excavation and installation, and the associated physical disturbance of the bottom and sediments. Additionally, concrete pouring activities are associated with

increased water pH. Typical pH of seawater is slightly alkaline, with pH averaging approximately 8.1 for seawater, which was consistent with measurements taken during water quality sampling. pH should not deviate more than 0.5 units from the value of 8.1, per HAR Chapter 11-54. Water quality exceedances are anticipated to be temporary during and for some time after construction, but would reach a state of equilibrium thereafter. Sand removed for other beach nourishment projects would be tested for compatibility and suitability for placement.

To prevent impacts to water quality during construction, BMPs would be established during the USACE permit application process and, in greater detail, when obtaining the WQC authorization required for the permit. These could include, but are not limited to, installation of turbidity containment and other perimeter barriers around landside work areas; avoiding in-water stockpiling; stockpile perimeter barriers; and inspections of equipment for leaks or malfunctions.

Operation

Long-term water quality conditions within the basin are expected to improve with increased circulation. However, elevated turbidity is anticipated during an interim post-construction period until equilibrium is reached. Water quality would be monitored, as coordinated with the DOH. Beach closures may be prudent for intermittent periods and as coordinated with neighboring beach stakeholders.

Short-term, intermittent periods of decreased water quality may occur as a result of in-water recreation. Criteria water quality parameters that have the potential to be impacted by increased recreation include increased turbidity and TSS with any physical disturbance of the bottom associated with these activities. Turbidity and TSS may also increase as a result of slightly increased wave action and water movement in the pool area (Sea Engineering, Inc. 2018). No adverse impacts to nearshore marine waters as regulated by HAR Chapter 11-54 and Chapter 11-55 would be anticipated following the post-construction period.

In addition to increased TSS and turbidity resulting from increased recreation, the total concentrations of oxybenzone and octinoxate, sourced from sunscreen, in the water column will also likely increase with increased recreation and swimmers in the water. Both chemicals are linked to mortality in developing coral, increased coral bleaching, and genetic damage to corals. The statewide ban on the sale of sunscreens containing the reef-harming chemicals takes effect in January 2021 (SB 2571, Act 104). However, out-of-state visitors may bring the sunscreens from out of state, and swim in Hawaiian waters. Education and awareness programs can minimize this impact, which is anticipated to be minor as it would be low in intensity and local in extent.

4.9.2.2 War Memorial Beach

No significant impacts to water quality would occur from construction and operation of the War Memorial Beach. The water quality impacts of the War Memorial Beach would be similar to those of the Perimeter Deck. Supporting information follows.

Construction

Potential impacts on water quality from construction activities would include those described with the Perimeter Deck, except for those associated with concrete. Additional potential impacts would occur from construction of the new L-groin, sand recovery, and sand dewatering and placement.

Water quality impacts associated with construction of the new L-groin include increased turbidity and TSS. The appropriate BMP measures discussed in Section 4.9.2.1 would also be identified during the USACE permit application process as a condition of approval and implemented under the War Memorial Beach.

Water quality impacts associated with sand recovery operations are also anticipated at the offshore sand recovery location. Methods of sand recovery planned for the WWMC could differ from the recent Kuhio Beach maintenance project; however, monitoring during recovery operations for the Kuhio Beach project revealed water quality impacts that would be comparable to impacts anticipated from the War Memorial Beach. Maintenance monitoring revealed that in the immediate vicinity of the recovery area, slightly increased dissolved oxygen, nutrient levels (nitrogen and phosphorus), and pH resulted from sand disturbance (Sea Engineering, Inc. 2010). It is likely that similar water quality impacts would also occur as a result of sand recovery for the War Memorial Beach. Water quality impacts would be temporary, only occur during the sand recovery operation, and likely return to ambient conditions after sand recovery activities conclude.

Water quality impacts associated with sand dewatering and placement would include increased turbidity and TSS. Monitoring during Kuhio Beach maintenance indicated that sand placement also resulted in slightly increased turbidity and TSS. However, monitoring observations suggested that fluctuations in temperature, salinity, dissolved oxygen, and turbidity were a result of natural fluctuations, and were well within natural ranges during sand placement activities at Kuhio Beach (Sea Engineering, Inc. 2010).

To prevent impacts to water quality during construction, BMPs would be established during the USACE permit application process and, in greater detail, when obtaining the WQC authorization required for the permit. These could include, but are not limited to, installation of turbidity containment and other perimeter barriers around landside work areas; avoidance of in-water stockpiling; stockpile perimeter barriers; and inspections of equipment for leaks or malfunctions.

Operation

Water quality conditions within the basin are expected to improve with the containment of sediment and increased circulation. Similar to the Perimeter Deck, intermittent periods of decreased water quality may occur post-construction and with recreational activities.

The War Memorial Beach would increase the impervious surface in the inland area, with the addition of the parking lot and paved walkways. The additional sheet flow and increased surface runoff landside would be controlled through design and would therefore not impact water quality. The rules relating to storm drainage standards set forth by the DPP relating to parking lots would be followed (CCH DPP 2012).

4.9.2.3 CLOSED SYSTEM POOL

No significant impacts to water quality would occur from construction and operation of the Closed System Pool. The USACE permit needed for in-water construction activities would require compliance with CWA Section 401 that requires BMPs to prevent adverse effects on water quality from occurring.

The water and operations of the Closed System Pool would no longer be part of marine waters; rather, the water quality would be subject to the WQS set forth in HAR Chapter 11-10, Public Swimming Pools. Treated pool water could spill out into adjacent marine waters during unusual natural hazards such as hurricanes. The impacts would be dependent on the event, but would be considered finite, temporary, and therefore not significant to marine water quality for the purpose of this EIS.

Supporting information follows.

Construction

Water quality impacts related to construction would be similar to those described in the Perimeter Deck. Additional potential water quality impacts would occur during pool dewatering, as seawater would need to be drained from the pool prior to installation of the pool finish coating. It is anticipated that the seawater would be pumped from the pool and into the ocean, which would likely lead to increased turbidity, increased nutrients (ammonia, nitrogen, phosphorus, and chlorophyll a), and the potential for decreased dissolved oxygen in the receiving area. Impacts are anticipated to be low in intensity and temporary in duration, as water quality samples indicate that the seawater from the Natatorium has parameter values comparable to samples taken in nearshore and offshore water and existing sediment in the basin would be capped. Dewatering would not likely impact temperature, as ambient ocean temperatures would likely be similar. A NPDES dewatering permit would be required to dewater the pool construction water into the ocean, pursuant of HAR Chapter 11-55, Appendix G. Permit requirements set forth in the NPDES dewatering permit would be followed during dewatering to prevent major impact to receiving waters. An appropriate discharge location would be identified prior to any dewatering.

To prevent impacts to water quality during construction, BMPs would be established during the USACE permit application process and, in greater detail, when obtaining the WQC authorization required for the permit. These could include, but are not limited to, installation of turbidity containment and other perimeter barriers around landside work areas; avoidance of in-water stockpiling;

stockpile perimeter barriers; and inspections of equipment for leaks or malfunctions.

Operation

Water within the Natatorium would no longer fall under the jurisdiction of the HAR Chapter 11-54 WQS, as the water would no longer be a marine water. Rather, water quality within the Natatorium pool would be regularly monitored and treated in accordance with HAR Chapter 11-10, Public Swimming Pools. To assure water quality meets swimming pool standards, design features would include a filtration and sanitation system with a 6-hour minimum turnover rate to be regularly maintained, surface skimmers, disinfectant generation system, and floor and wall jets for water inlets (as described in Section 3.2.2). Monitoring and reporting methods consistent with HAR Chapter 11-10 would be followed.

The infrequent occurrence of natural hazards, e.g., hurricanes, could result in chemically-treated potable water spilling into adjacent marine waters. The degree of impact would be dependent on the severity of the event but would be finite (limited by the volume of water in the pool), temporary, subject to open ocean mixing and dispersal, and therefore not likely to be significant.

4.9.2.4 No Action

No change and therefore no impact to water quality would result from No Action. Supporting information follows.

Construction

No new actions would be performed under No Action; therefore, there would be no impact on water quality.

Operation

There are no impacts to water quality associated with No Action.

4.10 Marine Biology

This section discusses the existing marine biological resources in the waters offshore of the WWMC, applicable federal designations and state laws, marine species, and potential impacts. Related resources include the nearshore physical environment (Section 4.8), water quality (Section 4.9), and seabirds (Section 4.11).

4.10.1 Affected Environment

The waters surrounding the Waikiki Natatorium include the Waikiki MLCD (HAR §13-36) and the Waikiki-Diamond Head Shoreline Fisheries Management Area (FMA) (HAR §13-48). The Waikiki MLCD extends from the Kapahulu groin, to the ‘Ewa edge of the Natatorium perimeter wall, and out to the edge of the fringing reef or 500 yards seaward (whichever is greater) (Figure 4-13). Provisions set forth by the Waikiki MLCD prohibit the catch, take, injury, kill, possession, or removal of any marine life from the within the MLCD, and further prohibit the alteration of any

geological features or rocks within the boundaries of the MLCD, unless a permit is issued by the DLNR. The Waikiki-Diamond Head Shoreline FMA extends from the ʻEwa wall of the Natatorium to the Diamond Head Lighthouse, seaward from the shoreline to a minimum distance of 500 yards, or to the seaward edge of the fringing reef, if one occurs beyond 500 yards. Provisions set forth by the Waikiki-Diamond Head Shoreline FMA prohibit fishing during the "closed to fishing" period, and the "take" of any coral at any time (HAR §13-48). Closed to fishing periods include all odd-numbered years.

In addition to the MLCD and FMA, established in the surrounding area, the south Oʻahu area of the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) is located adjacent to the project site. The south Oʻahu area of the HIHWNMS begins at the Kapahulu Groin (Sans Souci Beach jetty), located ʻEwa of the Natatorium, and ends at Makapuʻu Point; the sanctuary extends seaward from the shoreline to the 100-fathom isobath (600 feet or 183 meters) (Figure 4-13). The sanctuary was established in 1992 to protect humpback whales and their habitat, and is jointly managed by NOAA's Office of National Marine Sanctuaries and the SOH DLNR. The National Marine Sanctuaries' program regulations are set forth in 15 CFR §922, Subpart Q.

4.10.1.1 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined by the Magnuson-Stevens Fishery and Conservation Management Act, commonly referred to as the Magnuson-Stevens Act (MSA), as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The Fishery Management Plan (FMP) for Coral Reef Ecosystems (CREs) of the Western Pacific Region designates EFH according to Management Unit Species (MUS). MUS are groups linked to "specific habitat composites (e.g., sand, live coral, seagrass beds, mangrove, open ocean) for each life history stage, consistent with the depth of the ecosystem to 50 fathoms (300 feet) and to the limit of the U.S. Exclusive Economic Zone (EEZ)" (WPRFMC 2001, 2009). Table 4-8 summarizes the MUS designated in the Hawaiian Islands.

Designated MUS in the Natatorium project vicinity include:

- The Hawaiʻi CRE Management Unit
- The Bottomfish Management Unit
- Pelagic Management Unit
- Crustacean Management Unit (lobsters and crabs only)

No EFH has been designated for the Precious Coral MUS in waters surrounding the project area.

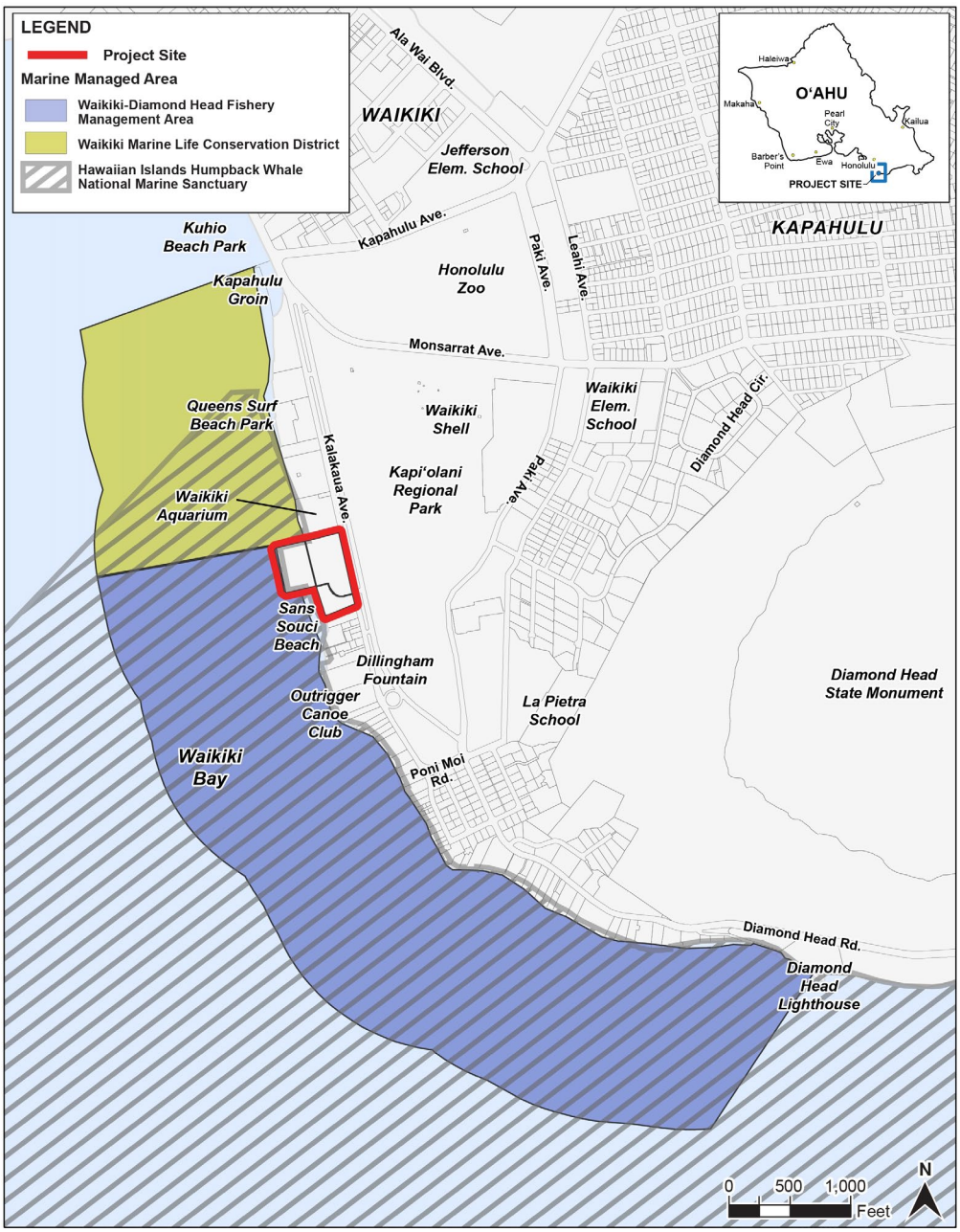


Figure 4-13: Marine Managed Areas

Source: Department of Commerce, NOAA.

Table 4-8: Management Unit Species (MUS) for Western Pacific as Established by the WPRFMC FMP

Management Unit Species	EFH Designation for Eggs and Larvae	EFH Designation for Juveniles and Adults
Coral Reef Ecosystem (CRE)	Water column and all bottoms down to 100 meters depth from shoreline out to EEZ boundary.	
Precious Corals	Known precious coral beds in the Hawaiian Islands located at: Keahole Point, between Miloli‘i and South Point, the ‘Au‘au Channel, Makapu‘u, Ka‘ena Point, the southern border of Kauai, Wespac bed, Brooks bank bed, and 180 Fathom Ban.	
Bottomfish and Seamount Groundfish	Water column down to 400 meters depth from shoreline out to the 200-mile U.S. EEZ boundary. Water column down to 200 meters depth of all EEZ waters bounded by 29°– 35° N and 171° E – 179° W.	Water column and all bottom from shoreline down to 400m depth. Water column and bottom from 200 meters to 600 meters depth, bounded by 29°–35° N and 171° E –179° W.
Crustacean	Lobsters/crab: Water column down to 150 meters depth from shoreline out to EEZ boundary. Deepwater shrimp: The outer reef slopes between 300-700 meters depth.	Lobsters/crab: Bottom from shoreline down to 100 meters depth. Deepwater shrimp: Outer reef slopes between 550-700 meters depth.
Pelagic	Water column down to 200 meters depth from shoreline out to EEZ boundary.	Water column down to 1000 meters depth from shoreline out to EEZ boundary.

Source: NOAA Fisheries 2013.

In addition to MUS, the FMP also establishes Habitat Areas of Particular Concern (HAPC) for the CRE MUS. HAPC are subsets of EFHs that are afforded the same regulatory protections as EFH because they meet one or more of the following criteria: (1) provides an important ecological function; (2) the habitat is sensitive to human-induced environmental degradation; (3) development activities are, or will be, stressing to the habitat type; or (4) the habitat type is rare. Within the vicinity of the project area, the Waikiki MLCD has been designated as a HAPC for CRE MUS, based on criteria numbers two (2) and three (3) (WPRFMC 2001).

4.10.1.2 BENTHIC BIOTA

The reef offshore of the project site is a platform fringing and patch reef consisting primarily of eroded uncolonized limestone platform (AECOS, Inc. 2012; Williams et al. 2006). The habitat surrounding the WWMC can be categorized into two habitat types: (1) a high energy reef flat, and (2) sand, located to the south of the Natatorium (Figure 4-14).

The Natatorium pool consists of dredged remnant reef with a substratum of fine sand and macroalgae, and a water depth ranging from 0 to 14 feet. The exterior area surrounding the Natatorium pool is dominated by limestone reef, with patches of sand, rubble, and wave cuts perpendicular to shore (AECOS, Inc. 2012). Further, poor reef condition has been documented throughout the adjacent Waikiki MLCD, particularly in areas closer to shore. Low coral cover and diminished habitat quality are linked to the overgrowth of available hard substrate with alien algae *Gracilaria salicornia* (Williams et al. 2006). The seaward edge of the fringing reef within the Waikiki and Diamond Head shoreline is in notably better condition, with lower macroalgal cover and higher coral cover (Williams et al. 2006).

The conditions described in the following subsections were determined by the Marine and Water Quality Assessment completed by AECOS, Inc. in 2012 (AECOS, Inc. 2012). None of the benthic species identified in or surrounding the Natatorium pool are listed as threatened or endangered under the ESA. Survey areas are shown on Figure 4-15.

Benthic Community Composition

Community composition was determined in seven distinct areas using 10-meter transects with randomly selected start points. For the interior areas of the Natatorium, 50 quadrats (5-transects) were used to calculate the benthic community composition, or percent cover. Benthic cover on the interior Natatorium wall was dominated by algae with mean macroalgae and turf algae cover estimated to be 72% ± 27 standard deviation (st. dev). Encrusting algae cover was estimated to be 15% ± 23 st. dev., and bare concrete was estimated to cover 12% ± 19 st. dev. On the Natatorium pool bottom, benthic cover was dominated by sand with mean cover estimated to be 62% ± 42 st. dev.; macro and turf algae cover was estimated to be 38% ± 42 st. dev. During transect surveys, no corals were observed; therefore, coral cover was not included in composition estimates for the interior portions of the Natatorium. The interior survey took place in October 2010.

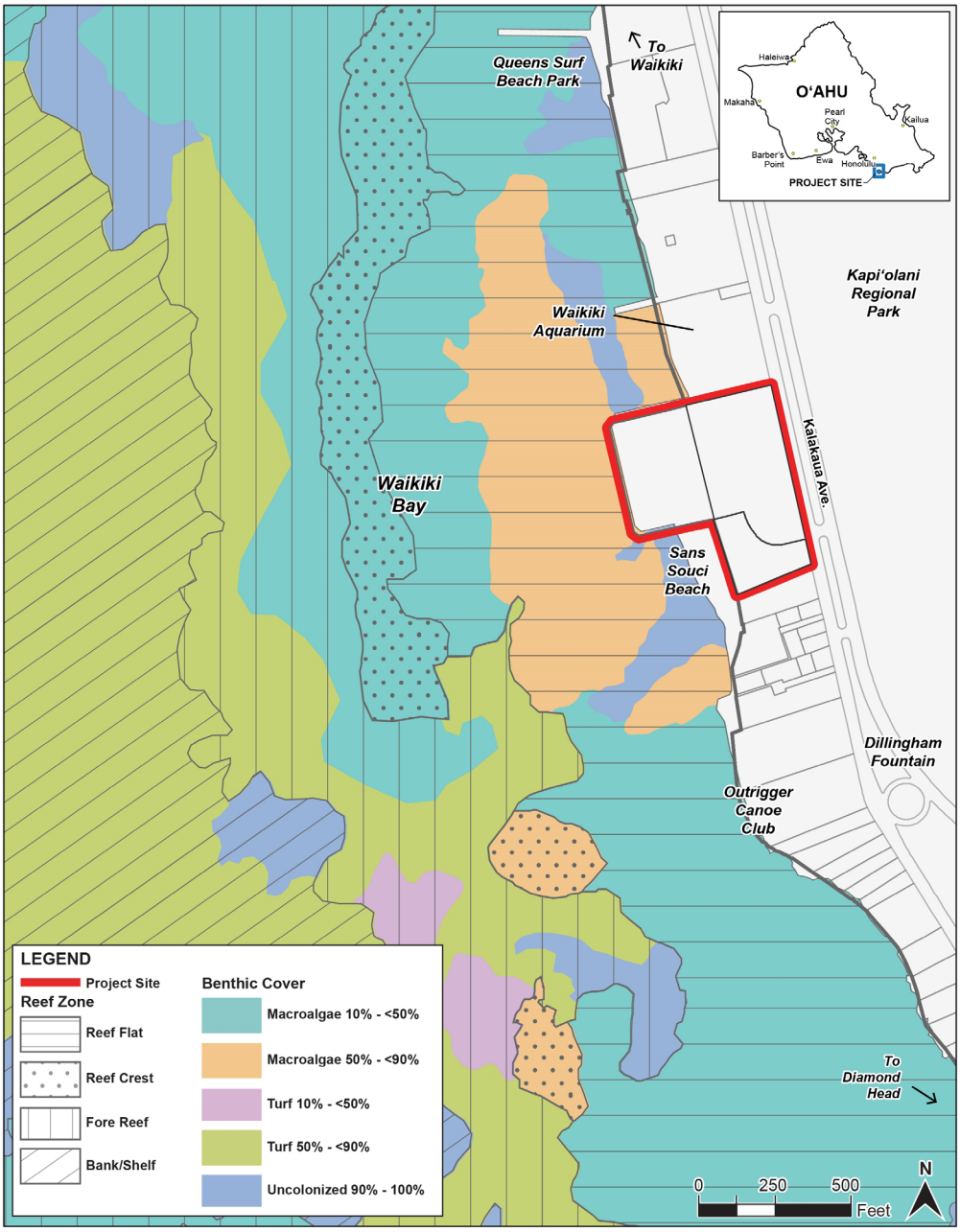
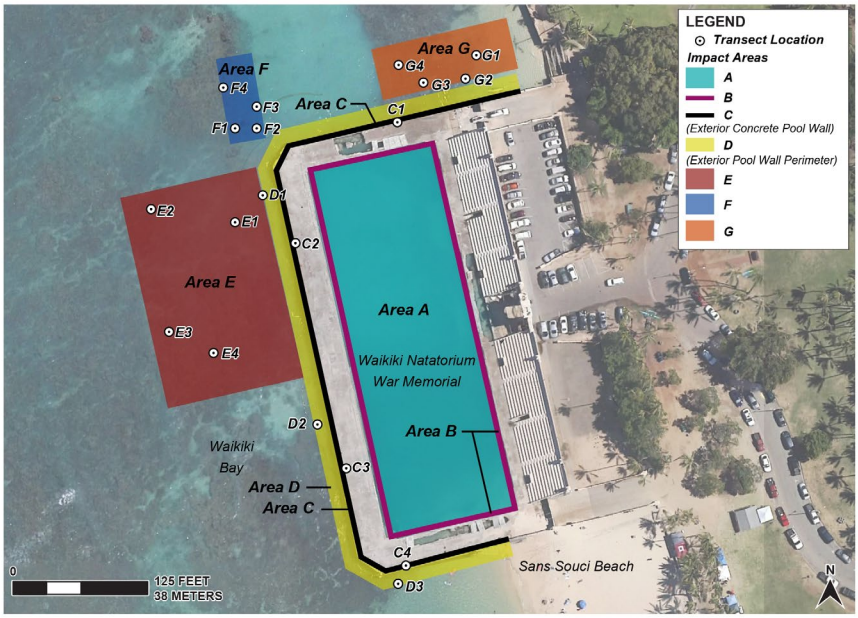


Figure 4-14: Benthic Habitats

Source: Department of Commerce, NOAA, National Ocean Service, National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, Biogeography Program.



Five Natatorium exterior areas surveyed shown with locations of February 2011 benthic community survey points.

Figure 4-15: Marine Survey Areas

A total of 200 quadrats (20-transects) were used to determine benthic cover for the exterior areas surrounding the Natatorium. Benthic cover on the exterior walls consisted of 45% ±27 st. dev. macroalgae, 19% ±19 CCA, 27% ± 25 st. dev. turf algae, <1% ± 1 st. dev. coral cover, and the remaining cover was bare concrete. The immediate area surrounding the exterior wall, based on surveys in 5-meter-wide perimeter, was dominated by macroalgae and sand. In the 5-meter-wide perimeter area, macroalgae cover was 55% ± 36 st. dev.; sand cover was 30% ± 42 st. dev.; CCA cover was 7% ± 8 st. dev.; consolidated limestone and rubble was 7% ± 15 st. dev.; and turf algae cover was 1% ± 4 st. dev. In the reef flats surrounding the Natatorium, transect surveys revealed that coral cover is very low, with cover <1% ± 1 st. dev. when combined for all survey areas. However, the surveys were conducted in 2010 (interior) and 2011 (exterior), and it is therefore likely that community composition has changed since the survey was conducted, with recent Pacific-wide bleaching events occurring from 2014 to 2017 (NOAA NESDIS 2018).

Benthic habitat data generated from remote sensing and aerial surveys indicate that the benthic cover includes both uncolonized substrate and reef flat dominated by macroalgae cover (50-90%) (NOAA NOS 2007) (Figure 4-14).

Coral Assemblages

Despite low coral cover, coral colonies within the Natatorium's interior and exterior impact areas were identified and individually measured to determine maximum diameter. Though uncommon on the interior portions of the Natatorium, coral species present during the surveys included cauliflower coral (*Pocillopora*

damicornis) and bewick coral (*Leptastrea bewickensis*) on the walls, and lobe coral (*Porites lobata*) on the bottom. A total of 16 colonies were observed within the Natatorium's interior; Table 4-9 lists the locations and size classes of corals documented (AECOS, Inc. 2012).

Table 4-9: Location and size classes of corals observed in the Natatorium's Interior (Area A), October 2010

Species	General Location	Size Class (cm)	Number of Colonies
Porites lobata	Pool bottom, north side	>40	3
P. damicornis	Seaward wall	<5	2
P. damicornis	Seaward wall	>5-10	1
P. damicornis	Seaward wall	>10-20	1
P. damicornis	Northern wall	<5	2
P. damicornis	Northern wall	>5-10	3
P. damicornis	Northern wall	>10-20	1
P. damicornis	Shoreline wall	>20-40	1
L. bewickensis	Southern wall	<5	1

Source: AECOS, Inc. 2012.
cm centimeter

In the exterior survey areas, 53 coral colonies were observed consisting of stony (*Scleractinian*) coral species from three genera—*Porites*, *Pocillopora*, and *Cyphastrea*. *Porites lobata* was the most frequently encountered species during the 2011 surveys and all colonies observed were <20 centimeters (cm) in diameter. The majority, 93%, of the coral colonies measured <10 cm in diameter; 57% measured <5 cm in diameter. *Porites lobata* is a reef-building coral, common throughout the Pacific, and acts as a trophic base for reefs; it is considered a more robust species and is often well-established in disturbed areas such as Waikiki. Coral colonies were found predominantly along the Natatorium's exterior wall (28 colonies); details shown in Table 4-10. A total of 11 colonies were observed in Area F, 10 colonies were observed in area E, and 2 colonies were observed in Area G and Area D (Figure 4-14). The survey noted existing mechanical damage to colonies of *Poc. meandrina* and *Poc. damicornis*, particularly along the exterior wall of the Natatorium itself.

Table 4-10: Number of colonies by size class for each coral taxon observed in the Natatorium's exterior

	Size Class (cm)			
Taxon	>1 - 5	>5 - 10	>10- 20	Total Count
P. lobata	12	10	1	23
Cyphastrea ocellina	10	8	0	18
Poc. meandrina	4	0	3	7
Poc. damicornis	4	1	0	5

Taxon	Size Class (cm)			Total Count
	>1 - 5	>5 - 10	>10- 20	
Total Count	30	19	4	53
Percent of Total (%)	57	36	7	

Source: AECOS, Inc. 2012.

Algal Assemblages

At the time of the 2012 AECOS survey, interior portions of the Natatorium were dominated with macroalgae cover; nearly all exposed hard surfaces that were not buried or scoured by shifting sand were covered with macroalgae. *Gracilaria salicornia* and *Acanthophora spicifera,* both of which are widespread invasive red algae (family *Rhodophyta*), were dominant on the walls and the pool bottom of the Natatorium's interior, as well as on the reef areas surrounding the Natatorium. Other species that were common or abundant included *Amansia glomerata*, *Dichotomeria marginata, Tricleocarpa cylindrica*, and the coralline red algal species *Hydrolithon reinboldii*. Areas surrounding the Natatorium were dominated by various macroalgae species: *Gracilaria salicornia*, *Acanthophora spicifera*, and *Amansia glomerata*. *Pterocladiella sp.* was an abundant species within exterior survey areas and along the exterior walls of the Natatorium. Indigenous sea lettuce or palahalaha (*Ulva fasciata*) was common in Area G, likely due to fresh/brackish water input. Filamentous cyanobacteria, *Lyngbya majuscula*, were also abundant in the exterior survey area. This species of algae is notable as it is linked to stinging seaweed disease, or lyngbya dermatitis, which causes itching, irritation, and skin rash when exposed to skin.

Non-coral Macroinvertebrates

Boring urchins (*Echinometra mathaei* and *E. oblonga*) were the most abundant invertebrate species observed species on the Natatorium pool walls; other species included sea frost (*Salmacina dysteri*), false opihi (*Siphonaria normalis*), and barnacles (*Amphibalanus amphitrite*).

Macroinvertebrates that are generally common in the vicinity include a'ama crab (*Grapsus grapsus*) and snails (*Nerita picea*, *Gonodactylus sp*., and *Stenopus hispidus*). Macroinvertebrates that were rare or uncommon in abundance at the time of the AECOS survey include indigenous sea cucumbers: black sea cucumber or loli okuhi kuhi (*Holothuria atra*) and stubborn sea cucumber *(H. pervicax*) (AECOS, Inc. 2012).

While not encountered during the biological survey completed for the project, two endemic species of macroinvertebrates are known to live in sandy habitat throughout the Waikiki and Diamond Head area: white spotted auger (*Terebra gouldi*) and cone shell (*Conus abbreviates*) (AECOS, Inc. 2012; Miller and Fletcher 2003).

4.10.1.3 FISH

Fish biomass calculated from surveys conducted from 2000 to 2005 for all fish sizes within the Waikiki MLCD ranged from 56 kilograms per hectare (kg/ha) to 200 kg/ha. Notably, fish abundance and biomass have substantially declined for all fish families substantially in the Waikiki MLCD in the last 30–40 years (Williams et al. 2006).

Fish Biomass

Fish biomass (W) from the site survey was calculated using the allometric length-weight conversion, $W = aTL^b$, as standardized by NOAA. Fish biomass was determined for two size classes: small fish (<25cm) and large fish (>25cm). Fish biomass for small fish ranged between 31 kg/ha to 161 kg/ha in the area northeast of the Natatorium; mean small fish biomass was 86 kg/ha. For large fish, biomass ranged between 0 kg/ha in the 5-meter perimeter surrounding the Natatorium and 216 kg/ha in the northwest corner adjacent to the Natatorium (Area E, Figure 4-14). Mean fish biomass for large fish was 62 kg/ha all survey exterior survey areas. Mean fish biomass for all survey areas for all fish types was 143 kg/ha.

In comparison to other area surveys with similar methods around O‘ahu, fish biomass in the survey area was relatively low. For example, fish biomass combined for the O‘ahu was estimated to be 209 kg/ha (Friedlander et al. 2005), while off of Waikiki, fish biomass was estimated to be 154 kg/ha (AECOS, Inc. 2012). Fish biomass in the MLCD was estimated to be 373 kg/ha, which is notably higher than the island average (Friedlander and Cesar 2004; AECOS, Inc. 2012).

Fish Assemblages

Fish surveys were not conducted in the interior portion of the Natatorium, although 18 species were observed during reconnaissance level surveys. Species observed in the interior portion of the Natatorium included: convict tang (*Acanthurus triostegus*), blacktail snapper (*Lutjanus fulvus*), bluespotted cornetfish (*Fistularia commersonii*), squarespot goat fish (*Mulloidichthys flavolineatus*), juvenile great barracuda (*Sphyraena barracuda*), juvenile cardinalfish (unknown sp.), Hawaiian sergeant (*Abudefduf abdominalis*), black spot sergeant (*Abudefduf sordidus*), Hawaiian dascyllus (*Dascyllus albisella*), Hawaiian cleaner wrasse (*Labroides phthirophagus*), juvenile parrotfish (unknown sp.), Hawaiian shrimp goby (*Psilogobius mainlandi*), Hawaiian flagtail (*Kuhlia xenura*), spotted boxfish (*Ostracion meleagris*), Hawaiian whitespotted toby (*Canthigaster jactator*), stripebelly puffer (*Arothron hispidus*), blackchin tilapia (*Sarotherodon melanotheron*), and whitetip reef shark (*Triaenodon obesus*).

AECOS surveyed the exterior portion of the Natatorium in February 2011. Fish surveys were conducted using the belt transect survey method and 5-minute stationary point count method. During the survey, 32 species were identified; the most abundant species were the saddle wrasse (*Thalassoma duperrey*) and convict tang or manini (*Acanthurus triostegus*). Other species sited with common or occasional abundance included the Hawaiian sergeant (*Abudefduf abdominalis*),

black spot sergeant (*Abudefduf sordidus*), juvenile parrotfish (unknown sp.), and Hawaiian whitespotted toby (*Canthigaster jactator*); for more information regarding the survey methods or approach, see Appendix F for the Marine Biological and Water Quality Surveys (AECOS, Inc. 2012).

A USACE Permit would be required for this in-water project and consultation under the MSA §305(b) would be carried out by the USACE. Should additional studies be appropriate to evaluate benthic conditions, they will be conducted at that time.

4.10.1.4 MARINE MAMMALS

The following species are protected under the Marine Mammal Protection Act (MMPA) and are anticipated to be present in waters adjacent to the Natatorium.

Hawaiian Monk Seal

The Hawaiian monk seal (*Neomonachus schauinslandi*) or ʻilio holo i ka uaua, regularly occurs in waters throughout the Waikiki-Diamond Head shoreline. The Hawaiian monk seal is listed as endangered and is protected under the Endangered Species Act (ESA). Monk seals regularly haul-out on Sans Souci Beach, with most common haul-outs occurring in the spring and summer months from March to September (NMFS 2007).

In June 2017, a monk seal pupping event occurred on Sans Souci Beach adjacent to the Natatorium (Bohlander 2017). During the monk seal pup's nursing period, the pup became trapped in the Natatorium three times, requiring several rescue efforts by NOAA's Marine Mammal response team. After weaning from the mother, the monk seal pup was relocated to a more isolated beach, due to the entrapment hazard, as well as the danger associated with potential human interaction during the seal's development. Despite the 2017 pupping event, monk seal pupping in Waikiki is rare, likely due to the large number of visitors and crowds typical along Oʻahu's south shore.

Critical habitat for the Hawaiian monk seal includes terrestrial habitat between designated boundary points extending from 5 meters inland to the shoreline, as well as marine habitat, which extends from the shoreline to the 200 meter depth contour but only includes the seafloor up to 10 meters in height (NOAA 2015). While marine critical habitat is designated in the vicinity of the proposed project, there is no designated terrestrial critical habitat for the monk seal in the project site. The nearest terrestrial critical habitat for monk seals along Oʻahu's south shore is the beach area surrounding Diamond Head (NMFS 2014, 2007).

Humpback whale

The endangered humpback whale (*Megaptera novaeangliae*) is present in offshore Hawaiian waters from October to May, with peak populations present between January and March. The warm, shallow waters of the Hawaiian Islands are essential breeding, calving, and nursing grounds for Pacific populations of the whale. The whales are often visible from the shoreline, but rarely approach shore. The HIHWNMS is directly adjacent to the project site.

Short-finned pilot whale

The short-finned pilot whale (*Globicephala macrorhynchus*) is commonly observed around the Hawaiian Islands.

Spinner dolphin

Spinner dolphins (*Stenella longirostris*) are a frequently encountered species in waters surrounding the main Hawaiian Islands (MHI). The species is commonly observed on the outer edge of the fringing reef off of the Waikiki coast.

Bottlenose dolphin

Bottlenose dolphins (*Tursiops truncatus*) are widely distributed worldwide in tropical and warm-temperate waters, and are common throughout the Hawaiian Islands.

The marine mammals listed above are all well-known and likely present near the project site. However, 25 cetacean species are documented in Hawaiian waters. The following species are all protected by the MMPA and may also be present in waters offshore of the WWMC: dolphins including the pantropical spotted dolphin (*Stenella attenuata*), striped dolphin (*Stenella coeruleoalba*), rough-toothed dolphin (*Steno bredanensis*), Risso's dolphin (*Grampus griseus*), Fraser's dolphin (*Lagenodelphis hosei*), melon-headed whale (*Peponocephala electra*), pygmy killer whale (*Feresa attenuata*), false killer whale* (*Pseudorca crassidens*), and killer whale (*Orcinus orca*); deep-diving whales including the sperm whale* (*Physeter macrocephalus*), dwarf sperm whale (*Kogia sima*), pygmy sperm whale (*Kogia breviceps*), Blainville's beaked whale (*Mesoplodon densirostris*), Cuvier's beaked whale (*Ziphius cavirostris*), and Longman's beaked whale (*Indopacetus pacificus*); baleen whales including the minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), sei whale* (*Balaenoptera borealis),* fin whale* (*Balaenoptera physalus*), blue whale* (*Balaenoptera musculus*), and North Pacific right whale* (*Eubalaena japonica*) (NMFS 2017). Baleen whales are most likely to be present in Hawaiian waters in the winter months during their migration to tropical winter breeding grounds.

* Indicates the species is listed as endangered under the ESA.

4.10.1.5 SEA TURTLES

The threatened green sea turtle (*Chelonia mydas*) is likely to occur in waters adjacent to the project area, and the endangered hawksbill sea turtle (*Eretmochelys imbricata*) may also occur in waters adjacent to the project area, although its occurrence is less likely. The nearshore waters surrounding the WWMC contain substantial algae and grazing habitat for marine turtles. Turtle nesting activity is unlikely in the project vicinity, and nesting activity has not been recorded from Diamond Head to Pearl Harbor. Despite the presence of the turtles, no critical habitat has been designated in the Hawaiian Islands for either species.

4.10.1.6 IN-WATER NOISE AND ACOUSTICS

Anthropogenic, or human-sourced, sound can affect the hearing of marine mammals, sea turtles, and fish. Sound is defined as a small disturbance in a fluid from ambient conditions through which energy is transferred away from a source by fluctuations of pressure (or sound waves). Sounds are produced by vibrating objects, and are expressed in dB (a unit of sound volume) based on the root mean square (rms) level (Caltrans 2015). Marine mammals, fish, and turtles are susceptible to auditory injury and can exhibit behavioral changes when underwater noise levels exceed threshold levels. Injury and disturbance thresholds have been established for specific species based on their functional hearing group. Functional hearing groups are determined based on best available data (direct behavioral and electrophysiological measurements) and predictions (based on inner ear morphology, modeling, behavior, vocalizations, or taxonomy). Functional hearing groups in Hawaiian waters and the associated generalized hearing range for each species is presented in Table 4-11 (Caltrans 2015; NMFS 2018; Ketten and Bartol 2005). Hearing ranges are expressed in hertz, a measurement of sound frequency.

Table 4-11: Functional hearing groups for species present in the project vicinity

Functional Hearing Group	Species Present in Project Vicinity	Generalized Hearing Range
Low frequency cetaceans	Humpback whale, other baleen whales	7 to 35 kHz*
Mid-frequency cetaceans	Spinner dolphin, bottlenose dolphin, pilot whale; other dolphin species, toothed whales and deep divers	150 Hz to 160 kHz*
High frequency cetacean	Dwarf sperm whale	275 Hz to 160 kHz*
Phocid pinnipeds	Hawaiian monk seal	50 Hz to 86 kHz*
Sea turtles	Green sea turtle and hawksbill	100 to 800 Hz**

Sources: *NMFS 2018, **Ketten and Bartol 2005.
Hz hertz
kHz kilohertz

Exposure to sound with sufficient duration and sound pressure level (SPL) may result in an elevated hearing threshold (i.e., a loss of hearing sensitivity), called a noise-induced threshold shift (NMFS 2018). Marine mammals, sea turtles, and fish can suffer either permanent hearing loss, referred to as permanent threshold shifts (PTSs) or temporary hearing loss referred to as temporary threshold shifts (TTSs). Recovery from TTS exposure usually occurs within minutes to within hours, depending on exposure levels. In-water acoustic thresholds are used to determine potential impact from in-water activities, such as vibratory pile driving (non-impulsive) and impulse pile driving (impulsive). Based on an assessment of the effects of anthropogenic noise on marine mammal hearing, NMFS has set thresholds to predict various marine mammals' responses to sound exposure under NOAA NMFS jurisdiction (NMFS 2018). Thresholds for marine mammals are shown in Table 4-12.

Table 4-12: TTS and PTS SEL thresholds for marine mammals by functional group (dB)

Functional Hearing Group	Impulse Onset Thresholds				Non-Impulsive	
	TTS Threshold		PTS Threshold		TTS Threshold	PTS Threshold
	SEL (weighted)	Peak SPL (unweighted)	SEL (weighted)	Peak SPL (unweighted)	SEL (weighted)	SEL (weighted)
Low-frequency cetaceans	168	213	183	219	179	199
Mid-frequency cetaceans	170	224	185	230	178	198
High-frequency cetaceans	140	196	155	202	153	173
Phocid pinnipeds	170	212	185	218	181	201

Source: NMFS 2018.

Thresholds are presented as sound exposure level (SEL) thresholds. For impulsive noises, thresholds are dual metrics, which include weighted cumulative SEL and peak SPL. For non-impulsive sounds, thresholds are presented as weighted cumulative SEL. SELs are presented in dB, a unit used to measure the intensity of a sound.

Thresholds for fish are dependent on the mass of the fish. Like marine mammals, thresholds include those for onset of permanent physical injury (PTS) and thresholds for adverse behavioral effects (TTS) (Caltrans 2015). Adverse behavioral effects can include startling and stress, and can decrease a fish's ability to avoid predators. The thresholds for onset of physical injury and adverse behavioral effects are listed in Table 4-13. Fish less than 2 grams are likely present in the vicinity; therefore, threshold levels for fish less than 2 grams should be used when determining if anticipated underwater sound levels exceed thresholds during construction. These thresholds should not be used for vibratory pile driving, as the thresholds for impact pile driving are likely to be much lower for non-impulsive continuous sounds from vibratory drivers (Caltrans 2015). Impact pile driving is anticipated to be implemented under all three action alternatives.

Table 4-13: PTS and TTS thresholds for fish based on fish mass for impulsive sounds (dB)

	PTS Threshold		TTS Threshold
Fish mass	Peak SPL (unweighted)	Accumulated SEL	Adverse behavioral effects dBrms
<2 g	206	183	150
≥ 2 g	206	187	150

Source: Caltrans 2015.

Sound thresholds have not been developed by NOAA for the impact of noise on sea turtles. However, literature suggests that for impulse sounds, sea turtles begin to exhibit a behavioral response to sound at sound levels of around 166 dB, with noticeable behavioral response at levels of around 175 dB (McCauley et al. 2000; Waring, Wood, and Josephson 2012).

In addition to PTS and TTS threshold, behavioral in-water acoustic thresholds are also defined by the NMFS. Behavioral disruption for all marine mammals for impulsive noise is set at 160 dBrms, and for continuous noise at 120 dBrms. The in-air acoustic threshold for behavioral disruption of phocid pinnipeds (Hawaiian monk seal) is set at 100 dBrms.

Background Ambient Sound Levels

A hydroacoustic study has not been performed for this EIS to determine background ambient in-water sound levels. Ambient noise results from both natural and anthropogenic sources. Based on the water activities in the surrounding area, background in-water anthropogenic sound sources likely include: low-frequency noise emanating from various size ships passing by; mid-frequency noise from recreational boats; and sonar-generated noise at various intensities from Navy, commercial, fishing, and research activities (Peng, Zhao, and Liu 2015; Bailey et al. 2010; Williams et al. 2006). Modern powered vessels typically produce low-frequency sound from hydrodynamic flow, onboard machinery, and propeller cavitation (Southall et al. 2017).

4.10.2 Potential Environmental Consequences

All action alternatives would be subject to USACE permitting requirements that include ESA Section 7 consultation, EFH consultation, and coordination as required by the Fish and Wildlife Coordination Act. The USACE permit and associated federal consultations would include project-specific conditions and BMPs that would serve to protect marine biological resources. A take of a protected species or permanent loss of WOTUS is considered a significant impact.

4.10.2.1 Perimeter Deck (Proposed Action)

No significant impacts to marine biological resources are anticipated from construction and operation of the Perimeter Deck. The USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305(b)), and compliance with CWA Section

401, which would set forth BMPs to prevent adverse effects on protected marine species and EFH from occurring. Further, with the containment of sediment and use of appropriate perimeter barriers during construction, impacts from increased turbidity to the surrounding reefs are not anticipated. Any offsets for EFH loss would be identified in the consultation process.

No significant impacts on marine biological resources from the anticipated operational uses, such as swimming, are anticipated. Beneficial effects would include the loss of an existing marine mammal entrapment hazard.

Supporting information follows.

Construction

No loss or gain of WOTUS would occur with the Perimeter Deck.

Essential Fish Habitat

Adverse effects are defined as "any impact that reduces the quality and/or quantity of EFH" and may include "site-specific or habitat wide impacts including individual, cumulative, or synergistic consequences of actions" (50 CFR §600.810(a)). The 2009 Fishery Ecosystem Plan for the Hawai'i Archipelago identifies seven non-fishing activities that can directly or indirectly affect habitat used by MUS (WPRFMC 2009). Of the activities linked to direct and indirect effects, those applicable to the proposed action are:

1. Habitat loss and degradation
2. Pollution and contamination

The Perimeter Deck would include in-water work and release of material into navigable waters, which would affect the quality and quantity of the designated EFH adjacent to the Natatorium. Adverse effects to EFH may include the displacement of fish from the area of effect, disturbance of the seabed, and water quality impacts related to turbidity, construction materials, and construction contaminants (e.g., concrete curing compounds). These impacts are anticipated to be temporary and local.

Some loss of EFH is anticipated with the development of the Perimeter Deck and would be offset as determined during the EFH consultation, as appropriate, with the anticipated lead federal agency, USACE, and resource agencies. Such consultation, if appropriate, would be pursuant to the MSA §305(b), undertaken for the selected action alternative, and made part of the USACE permit. Specific BMPs and offsets could include but are not limited to: avoiding work during peak coral spawning season from June to September (if feasible), pre-casting all major concrete structures, and minimizing work area to the existing Natatorium footprint. BMPs and offsets would be developed during final design and permitting.

Benthic Biota. The Perimeter Deck is likely to impact benthic biota during construction as follows:

- Removal of existing hard substrate habitat and possible removal of live coral during demolition
- Physical damage from excavation and removal of existing perimeter walls
- Changes in water quality during construction

The Perimeter Deck would result in the demolition of the walls on the makai and ‘Ewa sides. Unavoidable loss to macroinvertebrate species (coral and non-coral) that use the walls as hard substrate for colonization would occur. Live coral species present on the walls during demolition would be lost as a result of the wall removal, unless it is feasible to transplant the species, as determined during EFH consultation.

During demolition and perimeter wall dismantling, pieces of the wall would be removed in a manner that limits the total disturbance of the site. Bulk pieces of concrete would be lifted out of the pool. Floating barges would be placed in the Natatorium pool for large equipment to be placed on to minimize the impact to surrounding areas. The area of impact for construction activities would be limited to the existing Natatorium footprint and therefore would be local in extent.

In-water work including excavation and construction would increase turbidity in the immediate project area. Turbidity can affect coral as follows: (1) elevated turbidity levels decreases the amount of light reaching the coral and other shallow benthic systems, reducing photosynthesis/coral feeding; and (2) the deposition of sediment buries corals or causes the corals to expend large amounts of energy to keep their surfaces clean. Increased turbidity further leads to abrasion and smothering of reefs. Further, turbidity or increased sedimentation in the water stresses corals and exacerbates the effects of coral bleaching (Rogers 1990).

The accidental release of concrete into marine environments can temporarily increase the pH of the effected waters. Corals rely on a specific pH balance to extract calcium from seawater, necessary for coral development. The placement of grout and concrete underwater could cause pH levels to exceed 11 under certain flow conditions (Fitch 2003). This change in pH caused by the accidental release of concrete could affect corals. However, elevated pH levels typically return to baseline values within 4 to 6 hours after release (Fitch 2003). Therefore, this effect would be temporary and localized, as pH levels would return to existing conditions shortly after any accidental releases.

A comprehensive BMP would be prepared to prevent impacts to benthic and coral communities in the project vicinity, as discussed in Section 3.5. Implementation of BMPs and appropriate water quality protection measures identified in required in-water permit and WQC processes would ensure that impacts to corals are minimized.

Sectional barges would be placed within the Natatorium pool to provide a docking mechanism for heavy equipment, avoid impacts to the pool bottom, and keep construction activities within the existing footprint of the Natatorium. No heavy

equipment would be placed outside of the perimeter walls during construction activities.

An unavoidable loss to corals would occur during the construction phase; however, after completion of construction, coral colonies may be able to reestablish on the new in-water concrete piles, although the total hard substrate available for reestablishment is reduced. Measures that can be taken to minimize the loss to corals during construction include locating and marking significant corals in the vicinity of the areas to be excavated, transplanting corals as necessary, and, if practicable, relocating them from the construction site prior to the start of construction. Ongoing water quality monitoring and an associated water quality monitoring plan would be implemented under all action alternatives, as required by the Section 401 WQC.

Fish. The Perimeter Deck is likely to impact fish during construction as follows:

- Removal of hard substrate habitat (see Benthic Biota above)
- Turbidity and decreased water quality
- Removal and degradation of suitable spawning habitat for reef fish and pelagic species
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics)

Impacts to fish are associated with the removal of hard substrate habitat and turbidity and decreased water quality during construction; these impacts are unavoidable and would be mitigated to the extent practicable. BMPs to address water quality impacts are further discussed in Section 4.9, Water Quality. Impacts and mitigation measures to minimize impacts to habitat are discussed in Section 4.10.2.1, *Perimeter Deck – Benthic Biota*. Most reef habitat within the Waikiki MLCD and Waikiki-Diamond Head FMA would not be impacted, and the non-impacted reefs provide adequate habitat and spawning habitat for fish and juveniles in the project vicinity. Impact to fish communities is anticipated to be minor, as it would be localized in extent.

Marine Mammals

The Perimeter Deck could impact marine mammals during construction as follows:

- Disturbance of monk seals hauled-out on adjacent Sans Souci Beach during construction activities.
- Physical injury of monk seals resulting from excavation and removal of existing perimeter walls (unlikely for other marine mammals). Physical injury could also occur if a monk seal enters the project site at night during construction and becomes entrapped.
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics) (all marine mammals)

Monk seal physical injury could occur if a monk seal swims into the area during demolition or excavation activities; however, physical injury is unlikely with

appropriate stop-work procedures and BMPs that would be developed during the USACE permit process.

BMPs could include visual monitoring to be performed by trained observers and stop-work procedures to be developed in coordination with NMFS to prevent physical injury of Hawaiian monk seals, should one swim within 100 feet of the project site during excavation and construction operations. ESA Section 7 consultation would be conducted by the USACE as a part of the required USACE permit process. Any BMPs, avoidance, and minimization measures identified during the Section 7 consultation and made part of the DA permit would prevent adverse impacts to marine species.

Potential impacts on marine mammals associated with pile driving are discussed in Section 4.10.1.6, In-Water Noise and Acoustics.

Sea Turtles

Impacts to sea turtles could include:

- Physical injury from excavation and removal of existing perimeter walls
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics)
- Alteration of grazing habitat

Impacts would be unlikely with the BMPs that would be developed during the USACE permit process. BMPS could include visual monitoring by trained observers to ensure sea turtles do not approach the project site during excavation. Appropriate stop-work procedures would be developed to ensure work is stopped, should a sea turtle enter the project vicinity (e.g., a turtle swims within the established buffer zone during construction).

In-water Noise and Acoustics

In-water pile driving would be required to construct the in-water elements for the Perimeter Deck to support the deck. As a result, marine or underwater noise and vibrations would be generated, which could have potential unavoidable adverse effects on marine mammals, fish, and sea turtles in the area. Sound generated by pile driving has the potential to affect marine mammals, fish, and sea turtles in different ways, ranging from alteration of behavior, to physical injury (e.g., hearing loss, damage to air-containing organs, and cellular molecular effects), to mortality (Caltrans 2015). The effects depend on the intensity, duration, and frequency of the sound itself, as well as the morphology and physiology of the species affected. The environmental/physical characteristics of the project area (e.g., marine bottom type, water depth, and tidal conditions) further impact the intensity of the sound and the way sound travels.

The process to determine whether acoustic thresholds, shown in Table 4-12 and Table 4-13, would be exceeded involves determining the SPL produced by the pile driving. SPL should be estimated based on the pile type, pile driver, site conditions, number of piles to be driven, and estimated number of strikes per pile.

Additionally, the impact area should also be determined. The impact area includes all areas that are predicted to be affected directly and indirectly by the sound, as defined by the distance needed for SPL generated by pile driving activities to attenuate to a level equal to ambient sound (Caltrans 2015).

With the Perimeter Deck (proposed action), an estimated 120 pre-cast concrete piles would be driven into ground.

Hydroacoustic testing and monitoring, and assessment of SLP and SEL from pile driving and associated effects to fish, marine mammal, and turtles, may be required as part of future consultation and permitting associated with the USACE, USFWS, and NMFS. Those agencies would review hydroacoustic impacts, construction techniques proposed, and possible mitigations to address impacts from pile driving. Additional mitigation measures identified in the USACE permit application review and approval process would be followed for the Perimeter Deck.

Construction methodology for the project would be evaluated to determine appropriate mitigation measures for minimizing underwater noise impacts. One procedure being considered is pre-drilling the pile holes, thereby significantly reducing the driving energy and noise needed for installation. Other alternatives include the use of vibratory hammers, push or press-in pile installation, oscillating pile installation, or use of smaller piles (Caltrans 2015). The type of pile driving installation techniques used to drive piles for the perimeter deck should allow for minimal acoustic impacts to species without compromising the structural integrity or bearing capacity of the piles. If the alternative installation measures compromise structural integrity, they cannot be used.

Pursuant to the ESA Section 7 and Section 305(b) of the MSA, the USACE must consult with USFWS and NOAA NMFS to address the potential effects of the proposed project on endangered species, marine mammals, and fish present in the project area. The USACE permit would identify SOPs and BMPS to be implemented at the project site to protect endangered species, marine mammals, and fish.

Operation

Essential Fish Habitat

Operational impacts to EFH would primarily impact the CRE MUS, and are discussed in Benthic Biota below. No operational impacts to other MUS identified in the project vicinity are anticipated.

Benthic Biota. The Perimeter Deck could result in minor impacts to benthic and coral communities, including:

- A change in the total hard substrate available for coral colony establishment
- Increased recreational activity impacting the adjacent reef and water quality

While the Perimeter Deck would result in the permanent loss of hard substrate habitat, coral and other benthic organisms may reestablish on concrete piles and

the fiberglass-reinforced grate systems. Long-term water quality conditions are expected to improve with increased circulation in the basin area.

Fish. Impacts to fish as a result of the Perimeter Deck would result from the loss of total available hard substrate habitat. These impacts would not be significant as fish would use other habitat ecosystems near the project site.

Marine Mammals

No impacts on marine mammals would occur with the operations of the Perimeter Deck. Existing laws to protect marine mammals would apply to Perimeter Deck users. Beneficial effects would occur, as the Natatorium would no longer be an entrapment hazard for marine mammals in the project vicinity.

Sea Turtles

No impacts to sea turtles would occur from operational uses, such as swimming, with the Perimeter Deck.

In-water Noise and Acoustics

No significant impacts to in-water noise and hydroacoustics would occur with operational uses, such as swimming, of the Perimeter Deck.

4.10.2.2 War Memorial Beach

Significant impacts to aquatic resources would occur from construction of the War Memorial Beach with the loss of 0.9 acres of WOTUS. The USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305(b)), and compliance with CWA Section 401, which would set forth BMPs to prevent adverse effects on protected marine species and EFH from occurring during construction. Any offsets for EFH loss would be identified in the consultation process. Additional studies would be needed to evaluate the marine resources potentially affected by offshore sand harvesting and is an unresolved issue.

No significant impacts on marine biological resources from operational uses, such as swimming, are anticipated. Beneficial effects would include the loss of an existing marine mammal entrapment hazard.

Supporting information follows.

Construction

The War Memorial Beach would result in the loss of approximately 0.9 acres of WOTUS.

Essential Fish Habitat

The loss of EFH would be greater with the War Memorial Beach than that with the Perimeter Deck. Identified activities that can directly or indirectly affect habitat used by MUS are relevant to this action alternative include:

- Habitat loss and degradation
- Pollution and contamination

Habitat loss and degradation to EFH are anticipated to be greater than that of the Perimeter Deck, as the total loss of hard substrate available for coral establishment is greater under the War Memorial Beach. Further, sand placement over the hard limestone substrate present in the pool area could permanently smother potential coral habitat. Impacts to EFH would primarily affect the CRE MUS, as discussed below.

Benthic Biota. Impacts to benthic and coral communities are anticipated to be similar to that of the Perimeter Deck, as they involve the following impacts:

- Removal of existing hard substrate habitat and possible removal of live coral during demolition
- Removal of hard reef substrate, coral heads, and seabed disturbance during swim area re-grading
- Physical damage from excavation and removal of existing perimeter walls
- Changes in water quality during construction and re-grading

Excavation and demolition/dismantling impacts (removal of substrate, physical damage, and changes in water quality) are described in Section 4.10.2.1, Potential Environmental Consequences – Perimeter Deck, and would be similar for the War Memorial Beach.

Additionally, under the War Memorial Beach, sand for the new beach would be sourced from an offshore deposit. While the reclaimed sand would match the size and color of existing sand at Sans Souci Beach as closely as possible, the introduction of sand leads to more extensive increases in turbidity in the immediate area. This could result in the smothering of corals and limestone reef, permanently preventing reestablishment.

Water quality monitoring would be required during dredging and sand recovery operations. Sea Engineering, Inc. (2018) evaluated several offshore sand recovery locations and methods for the War Memorial Beach (Sea Engineering, Inc. 2018). Methods for sand recovery included clamshell dredging and submersible slurry pump, both of which can deliver sand to the project site via onshore pumping or delivery to a harbor. All sites evaluated would require that sand is delivered via boat to a harbor and trucked in, as viable recovery site locations are too distant from the Natatorium for pumping to be feasible. The barging and truck hauling option minimizes impact to the seafloor because delivery pipes are not required. Locations for sand recovery included locations used for other nourishment projects, including the Kuhio Beach Site, the Hilton Site, Halekulani Channel, Halekulani 2, and Waikiki Site A (Sea Engineering, Inc. 2018). Sites directly offshore from the Natatorium were also investigated; however, suitable sand sources were not found at any of these sites. The preferred sand sourcing option is within the Halekulani Channel on the seaward edge of the fringing reef offshore of the Sheraton Hotel

(Sea Engineering, Inc. 2018). Fish and benthic surveys have not been conducted at this site.

Appropriate BMPs would be determined prior to project implementation and would be similar to those discussed for the Perimeter Deck. Additionally, BMPs for sand placement below the MHHW line could include tidal and wave condition timing considerations, and physical perimeter BMPs (such as sand berms) to be placed in the perimeter of the sand placement area. Any additional surveys of the benthic habitat and fish composition in the sand recovery area would be completed prior to sand recovery efforts. BMPs would be dependent on the selected recovery method.

Fish. Impacts to fish under the War Memorial Beach would be similar to the impacts discussed in Section 4.10.2.1, as they would involve:

- Removal of hard substrate habitat (see Benthic Biota above)
- Turbidity and decreased water quality
- Removal and degradation of suitable spawning habitat for reef fish and pelagic species
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics)

Impacts to fish associated with offshore sand collection are anticipated to be minor. Fish are unlikely to be picked up if sand-grabbing methods are used to dredge the sand (Sea Engineering, Inc. 2010).

Marine Mammals

Potential impacts to marine mammals under the War Memorial Beach would be similar to the impacts described under the Perimeter Deck, as they include:

- Disturbance of monk seals hauled-out on adjacent Sans Souci Beach during construction activities.
- Physical injury of monk seals resulting from excavation and removal of existing perimeter walls (unlikely for other marine mammals). Physical injury could also occur if a monk seal enters the project site at night during construction and becomes entrapped.
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics).

BMPs discussed in the Perimeter Deck could be implemented under the War Memorial Beach during excavation and demolition activities. Similar BMPs would also be used during installation of the L-groin. Disturbance would be minimized to the existing Natatorium footprint.

Monk seal physical injury could occur if a monk seal swims into the area during demolition or excavation activities; however, physical injury is unlikely with appropriate stop-work procedures and mitigation measures in place. Potential impacts from in-water pile driving on marine mammals are discussed in Section 4.10.1.6, In-Water Noise and Acoustics. Additional disturbance to marine

mammals may result from offshore sand retrieval. Appropriate vessel operating procedures required by the USCG would be implemented at all times during sand retrieval and barging operations to minimize and prevent impacts to marine mammals.

Sea Turtles

Potential impacts to sea turtles for the War Memorial Beach would be similar to those discussed under the Perimeter Deck:

- Physical injury from excavation and removal of existing perimeter walls
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics)
- Alteration of grazing habitat

Appropriate BMPs and stop-work procedures would be implemented to ensure sea turtles are not physically injured during construction. Appropriate vessel operating procedures required by the USCG would be implemented at all times during sand retrieval and barging operations to minimize and prevent impacts to sea turtles.

In-water Noise and Acoustics

Under the War Memorial Beach, new concrete seawalls would be constructed on pile-supported concrete footings. Pile driving impacts would be similar to those described under the Perimeter Deck, presuming similar pile type, pile driver, site conditions, number of piles to be driven, and number of strikes per pile. The specific design and construction methodology would be evaluated during the USACE permit process and measures would be developed to prevent adverse effects on protected marine resources from occurring.

Operation

Essential Fish Habitat

Operational impacts to EFH would be limited to the CRE MUS, see benthic and coral communities below. No operational impacts to other MUS identified in the project vicinity are anticipated.

Benthic Biota. Following the completion of construction, impacts to benthic and coral communities are similar to those discussed in Section 4.10.2.1, as minor operational impacts to benthic and coral communities include:

- Changes in total hard substrate available for coral colony establishment
- Increased recreational activity impacting the adjacent reef and water quality

While the War Memorial Beach would result in a permanent loss of hard substrate habitat, coral, and other benthic organisms may reestablish on the underwater portions of the L-groin structures, once in place. Water quality conditions are expected to improve with the containment of sediment and increased circulation.

Implementation of appropriate water quality protection measures would ensure that impacts to corals associated with sand placement would be minimized. Sand to be placed on the War Memorial Beach would be of comparable "size, shape, and quality" to that of the sand at Sans Souci Beach, ensuring the operational impacts to benthic and coral communities are minor.

Fish. Impacts to fish as a result of the War Memorial Beach would result from the loss of total available hard substrate habitat. These impacts would not be significant as fish would use other habitat ecosystems near the project site.

Marine Mammals

No operational impacts on marine mammals would occur with the operations of the War Memorial Beach. Existing laws to protect marine mammals would apply to beach users. Beneficial effects would occur, as the Natatorium would no longer be an entrapment hazard for marine mammals in the project vicinity.

Sea Turtles

No impacts to sea turtles would occur from the operational uses, such as swimming, with the War Memorial Beach.

In-water Noise and Acoustics

No significant impacts to in-water noise and hydroacoustics would occur with operational uses, such as swimming, of the War Memorial Beach.

4.10.2.3 CLOSED SYSTEM POOL

Significant impacts to aquatic resources would occur from construction of the Closed System Pool with the loss of 1.4 acres of WOTUS. The USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305(b)), and compliance with CWA Section 401, which would set forth BMPs to prevent adverse effects on protected marine species and EFH from occurring during construction. With the containment of sediment and use of appropriate perimeter barriers during construction, impacts to surrounding reefs from increased turbidity are not anticipated. Any offsets for EFH loss would be identified in the consultation process.

No significant impacts on adjacent marine biological resources from the anticipated operational uses within the enclosed pool, such as swimming, are anticipated. Rather, beneficial effects would include the loss of an existing marine mammal entrapment hazard.

Supporting information follows.

Construction

The Closed System Pool would result in the loss of approximately 1.4 acres of WOTUS.

Essential Fish Habitat

Impacts on EFH under the Closed System Pool would be greater than those on the Perimeter Deck and the War Memorial Beach. Construction would involve the installation of a fully-lined concrete pool system that would permanently remove the current Natatorium pool from marine waters. The total amount of hard substrate habitat specific to the CRE MUS is substantially reduced as no corals would be able to reestablish in the Closed System Pool. Furthermore, because the pool area encompasses all of the MUS described in Table 4-8, with the exception of precious corals, the total loss of EFH includes the entire 1.4-acre footprint of the site. Impacts on marine resources would be significant with the approximately 1 acre of EFH that would likely involve offsets to address the loss during USACE permit processing.

Benthic Biota. The entire pool area would no longer be available for any of the benthic organisms identified to be present in the Natatorium pool interior. Coral colonies present within the pool interior and hard substrate would be lost as a result of the Closed System Pool. Coral colonies and non-coral macroinvertebrates would be able to reestablish on the exterior walls of the new Closed System Pool.

Fish. The entire pool area would no longer be available for fish. This represents a loss in fish habitat of approximately one acre. Fish would use other habitat ecosystems in the surrounding area.

Marine Mammals

Impacts to marine mammals under the Closed System Pool would be similar to those described under the Perimeter Deck. Potential impacts could include:

- Disturbance of monk seals hauled-out on adjacent Sans Souci Beach during construction activities.
- Physical injury of monk seals resulting from excavation and removal of existing perimeter walls (unlikely for other marine mammals). Physical injury could also occur if a monk seal enters the project site at night during construction and becomes entrapped.
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics)

BMPs discussed in the Perimeter Deck could be implemented under the Closed System Pool during excavation and demolition activities. Similar BMPs would also be used during installation of the L-groin. Disturbance would be minimized to the existing Natatorium footprint.

Monk seal physical injury could occur if a monk seal swims into the area during demolition or excavation activities; however, physical injury is unlikely with appropriate stop-work procedures and mitigation measures in place. Potential impacts from in-water pile driving on marine mammals are discussed in Section 4.10.1.6, In-Water Noise and Acoustics. Additional disturbance to marine mammals may result from offshore sand retrieval. Appropriate vessel operating procedures required by the USCG would be implemented at all times during sand

retrieval and barging operations to minimize and prevent impacts to marine mammals.

Sea Turtles

Impacts to sea turtles for the Closed System Pool are similar to those discussed under the Perimeter Deck:

- Physical injury from excavation and removal of existing perimeter walls
- Noise (Section 4.10.1.6, In-Water Noise and Acoustics)
- Alteration of grazing habitat

Appropriate BMPs and stop-work procedures would be implemented to ensure sea turtles are not physically injured during construction. Appropriate vessel operating procedures required by the USCG would be implemented at all times during sand retrieval and barging operations to minimize and prevent impacts to sea turtles.

In-water Noise and Acoustics

In-water work would be longer in duration under the Closed System Pool, but the underwater noise of most concern, generated by pile driving, would be similar to that of the Perimeter Deck. For these reasons, the impacts on potential marine species outside of the project site would be similar and managed through the measures, developed during the USACE permit process, to levels that would not significantly impact protected marine species.

Operation

Essential Fish Habitat

Impacts on marine biological resources under the Closed System Pool would be greater than those on the Perimeter Deck and the War Memorial Beach. Operations under the Closed System Pool represent a permanent use of a fully-lined concrete pool system that would permanently remove the current Natatorium pool from marine waters. The total amount of hard substrate habitat specific to the CRE MUS is substantially reduced as no corals would be able to reestablish in the closed system pool. Furthermore, because the pool area encompasses all of the MUS described in Table 4-8, with the exception of precious corals, the total loss of EFH includes the entire 1.4-acre footprint of the site. Impacts on marine resources would be significant with the approximately 1 acre of EFH that would likely involve offsets to address the loss during USACE permit processing.

Benthic Biota. The entire pool area would no longer be available for any of the benthic organisms identified to be present in the Natatorium pool interior. Coral colonies present within the pool interior and hard substrate would be lost as a result of the Closed System Pool. Coral colonies and non-coral macroinvertebrates would be able to reestablish on the exterior walls of the new Closed System Pool.

Fish. The entire pool area would no longer be available for fish. This represents a loss in fish habitat of approximately one acre. Fish would use other habitat ecosystems in the surrounding area.

Marine Mammals

No impacts to marine mammals would occur from the operations of the Closed System Pool. Marine mammals would be unable to enter the pool. Beneficial effects would occur, as the WWMC would no longer be an entrapment hazard for the endangered monk seal.

Sea Turtles

No impacts to sea turtles in the open ocean would occur from the users within the Closed System Pool. Sea turtles would be unable to enter the pool.

In-water Noise and Acoustics

No significant impacts on in-water noise and hydroacoustics would occur from users, e.g., swimmers, within the Closed System Pool. Marine resources would be unable to enter the pool.

4.10.2.4 NO ACTION

No change and therefore no impact to marine biological resources would result from No Action. However, the entrapment hazard for monk seals would remain an issue.

4.11 TERRESTRIAL BIOLOGY

This section presents the terrestrial biological resources in the project site: applicable federal, state, and city requirements, and potential impacts.

4.11.1 Affected Environment

Native Wildlife

Hawaiian hoary bats or ʻopeʻapeʻa (*Lasiurus cinereus semotus*) may forage for insects over the open lawn areas of Kapiʻolani Regional Park, and may roost and rear young in the surrounding trees. The bats generally roost and rear young in woody vegetation over 15 feet in height. The bat birthing and pupping season is from June 1 to September 15 (USFWS 2011).

White terns or manu-o-Ku (*Gygis alba*), also known as fairy terns, may use trees at the site for roosting, nesting, and rearing young. This native Hawaiian seabird is found throughout tropical and subtropical areas of the Pacific, Southern Atlantic, and Indian Oceans. While most of Hawaiʻi's white tern population is located in the Northwestern Hawaiian Islands (NWHI), Oʻahu is the only MHI where these birds are found (Mitchell et al. 2005). The birds specifically nest in urban and suburban areas of the city of Honolulu. In 2007, Mayor Hannemann designated the white tern the Official Bird of the City and County of Honolulu (Morgan 2007). White terns breed year round, but the most active part of their breeding season is from

January through June, with a major peak in March. These birds do not construct traditional nests; instead they lay a single egg directly onto a tree branch. Some of their preferred nesting trees include, but are not limited to, kukui (*Aleurites moluccanus*), monkeypod (*Samanea saman*), shower tree (*Cassia* sp.), mahogany (*Swietenia* sp.), and banyan (*Ficus* sp.).

Pacific golden-plover or kolea (*Plivialis fulva*) may forage in the open lawn areas of Kapiʻolani Regional Park. This migratory species winters in the MHI and breeds in Siberia and westernmost Alaska (Munro 1971). While this species may be found year-round in the NWHI, they are most commonly seen in the MHI between August and May (Mitchell et al. 2005). They are generally observed foraging for insects, such as cockroaches, moths, caterpillars, and earwigs, in crop fields, pastures, coastal salt marshes, mudflats, beaches, mangroves, grassy areas at airports, cemeteries, athletic fields, parks, residential lawns, golf courses, and roadsides.

Other seabird species, including but not limited to great frigate birds (*Fregata minor palmerstoni*), red-tailed tropicbirds (*Phaethon rubricauda rothschildi*), white-tailed tropicbirds (*Phaethon lepturus dorotheae*), and wedged-tailed shearwaters (*Ardenna pacifica*), may fly over the project site. There are no reports of these or other seabird species nesting or roosting in the project site, with the exception of white terns as discussed above. Frigate birds do not nest in the MHI (Pyle and Pyle 2017). In the MHI, red- and white-tailed tropicbirds generally nest in crevices on cliff faces (Harrison 1990). Wedged-tailed shearwaters nest in colonies, in burrows, in discrete locations throughout the NWHI and MHI (Pyle and Pyle 2017).

Hawaiian petrels, banded-rump storm-petrels, and Newell's shearwaters nest in colonies in the mountains and cliff faces of Kauaʻi, Maui, Lanaʻi, and the island of Hawaiʻi (USFWS 1983, 2005). These birds have been observed flying over and may nest in the mountains of Oʻahu (personal communication, Johnathon Kraska, USFWS, August 28, 2018). Wedged-tailed shearwaters nest at low elevation, primarily in coastal dunes, on Oʻahu. However, there are no known nesting sites within or near urban Honolulu, and the project site is not within these birds' flight paths to known nesting sites.

Sea turtles, including the endangered hawksbill sea turtle (*Eretmochelys imbricate*) and threatened green sea turtle (*Chelonia mydas*), may haul-out or nest at Sans Souci Beach. When sea turtles hatch, they find their way to the ocean with guidance from the light of the moon reflecting off of the water.

Non-Native Wildlife

Numerous common non-native, introduced bird species are regularly observed in Kapiʻolani Regional Park. These include but are not limited to: rock dove (*Columba livia*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), red-vented bulbul (*Picnonotus cafer*), common mynah (*Acridotheres tristis*), red-crested cardinal (*Paroaria coronate*), house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), and common waxbill (*Estrilda astrild*). None of these introduced bird species are protected under the Migratory Bird Treaty Act (MBTA) or state law.

Other non-native, feral animals likely present in the project area include cats (*Felix domesticus*), rats (*Rattus* spp.), and Indian mongoose (*Herpestes javanicus*). Uncovered trash receptacles and food waste left by park users' support and foster populations of these invasive mammals.

Plants

Two arbors supporting three vining hau trees (*Hibiscus tiliaceus*) run along the mauka side of the decorative perimeter wall surrounding the existing parking lot and volleyball court (Figure 4-16). The lawn and picnic area is dotted with numerous trees consisting primarily of coconut trees (*Cocos nucifera*) (Figure 4-17) and several milo trees (*Thespesia populnea*), as well as ironwood trees (*Casuarina equisetifolia*), a few kou trees (*Cordia subcordata*), a true kamani tree (*Calophyllum inophyllum*) (Figure 4-18), and two large Indian banyan trees (*Ficus benghalensis*). The only indigenous plant species within the project site are the hau, milo, and kou trees. All other tree species listed above are introduced.

Figure 4-16: Arbor supporting vining hau trees in front of the decorative perimeter wall

Figure 4-17: Coconut trees dotting the lawn and picnic area

Figure 4-18: True kamani tree located in the lawn and picnic area

Exceptional Trees

A number of the trees at the project site are listed and protected as exceptional trees by the City and County of Honolulu. In 1975, the Hawai‘i State Legislature passed Act 105, the Exceptional Tree Act, to protect designated trees on public and private property from unnecessary removal and improper pruning. An exceptional tree is defined in ROH Chapter 41, Article 13 as “a tree or stand or grove of trees

with historic or cultural value, or which by reason of its age, rarity, location, size, esthetic quality, or endemic status has been designated by the county committee as worthy of preservation."

Exceptional trees within and directly adjacent to the project site include the two large Indian banyan trees and a grove of ironwood trees. The two large banyan trees are located within the northern portion of the project site (Figure 4-19). The grove of ironwood trees includes those along the makai side of Kalakaua Avenue within the project site, and those in the median along Kalakaua Avenue outside of the project site. The large banyan trees have been evaluated by the Outdoor Circle as being in good condition. Approximately 60–70 feet tall, the trees have multiple trunks typical of the species, the smaller with an approximate trunk diameter of 90 inches, the larger at nearly 150 inches in diameter.

Figure 4-19: One of the two exceptional banyan trees

Protected Species

Projected species include those that are regulated under the ESA and HRS Chapter 195D Endangered Species Law as threatened or endangered, and species protected under the MBTA. Such species potentially occurring on the project site include the federally endangered Hawaiian hoary bat, federally endangered hawksbill sea turtle, federally threatened green sea turtle, white terns (MBTA), and Pacific golden-plover or kolea (MBTA).

White terns and Pacific golden-plover or kolea are also recognized by the State as indigenous and are protected under HAR Chapter 13-124, which states, "no person shall remove, damage, or disturb the nest of any indigenous, endangered, or threatened species…"

4.11.2 Potential Environmental Consequences

A take of a protected species or loss of an Exceptional Tree would be considered a significant adverse impact. "Take" as defined under the ESA means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

4.11.2.1 Perimeter Deck (Proposed Action)

No significant impact to terrestrial biological resources would result from construction and operation of the Perimeter Deck. Existing laws and the USACE permit required for in-water construction work would serve to protect regulated species. Supporting information follows.

Construction

During construction, some trees may need to be trimmed or removed to facilitate access for construction. The trimming and removal of trees could result in impacts to exceptional trees, as well as Hawaiian hoary bats and white terns that may roost and rear young in these and other trees at the project site. Young bats and terns that cannot yet fly would be at greatest risk or injury or mortality from the trimming and removal of trees.

Impacts to Pacific golden-plover from construction activities are not anticipated. Golden plovers do not nest in Hawai'i and would therefore avoid the active construction area, use neighboring habitats, and not be affected.

Seabirds, such as frigate birds, tropicbirds, petrels, and shearwaters, are not known to nest or roost within or near the project site; therefore, impacts to these species are not anticipated. Any security lighting for construction activities would not be expected to affect seabirds because of the existing light pollution in this area.

Sea turtles use both marine and terrestrial habitats. NMFS is responsible for their protection in water, and USFWS is responsible for their protection in the terrestrial habitat. Artificial lighting can disorient sea turtle hatchlings, impeding them from finding the ocean, and leaving them susceptible to predation. While no nighttime construction would occur, any security lighting from construction activities should not affect the beach.

Construction activities, specifically the movement of construction equipment and materials between sites can result in the spread of invasive species. However, because the project site is located within in a landscaped and maintained park, there are no native plants communities or habitat at this site that would be susceptible to the introduction or spread of invasive plant species. Food waste, trash, and debris left uncontained at construction sites can support and foster the expansion and spread of invasive mammal populations, such as rats, cats, and mongoose. However, this effect would be negligible given the presence of uncovered trash receptacles and food waste left by park users throughout the park.

Mitigation

To avoid impacts to exceptional trees, the following mitigation measures would be implemented during construction:

1. No exceptional trees will be removed. High-visibility fencing will be installed around all exceptional trees and their critical root zone to avoid impacts.
2. Should exceptional trees need to be trimmed, both Outdoor Circle and a licensed arborist will be consulted. The trimming of exceptional trees will be overseen by a licensed arborist.

To prevent construction impacts on protected terrestrial biological resources, avoidance and minimization measures will be identified during the USACE permit process, including ESA Section 7 consultation. Avoidance and minimization measures could include:

1. To avoid inadvertent harm or mortality to young bats that cannot yet fly, woody plants greater than 15 feet tall will not be removed or trimmed during the Hawaiian hoary bat breeding season (June 1 to September 15).
2. To avoid inadvertent harm or mortality to white tern eggs and young that cannot yet fly, trees will be surveyed by a biologist prior to trimming or removal. Should a white tern egg or chick be discovered, the tree trimming or removal will be delayed, and a biologist will monitor the nest periodically until the young have fledged.
3. To avoid disorienting and associated harm to seabirds and sea turtles, no construction activities will be performed at night. Any nighttime security lighting for the project site will be downward-facing and fully shielded.
4. To avoid the introduction and spread of invasive species, the following mitigation measures will be implemented during construction:
    a. All construction equipment shall be cleaned prior to mobilization to the site.
    b. All food waste, trash, and refuse from the project site shall be contained in sealed receptacles to prevent access by vermin and mammalian predators that may impact native species.
5. With the implementation of mitigation measure listed above, effects to terrestrial biological resources will be avoided; therefore, impacts would be minor.

A USACE permit would be required for this in-water project and consultation under Section 7 of the ESA would be carried out by the USACE. Should additional mitigation be identified in that process, it would be made part of the City's proposed action.

Operation

The operational activities, e.g., swimming and visitors to the Natatorium, are not anticipated to affect terrestrial biological resources.

4.11.2.2 WAR MEMORIAL BEACH

No significant impact to terrestrial biological resources would result from construction and operation of the War Memorial Beach. The potential impacts to the terrestrial biological resources during construction and operation could be greater than those of the Perimeter Deck because of the larger land-side area that would be affected by the War Memorial Beach; however, existing laws and the USACE permit required for in-water construction work would serve to protect regulated species. Supporting information follows.

Construction

Impacts on terrestrial biological resources and associated mitigation resulting from the construction of the War Memorial Beach would be similar to those of the Perimeter Deck. Greater land disturbance would occur with the War Memorial Beach, but potential impacts would be avoided or minimized to avoid a significant impact.

Operation

The operations and maintenance of the War Memorial Beach would not significantly impact terrestrial biological resources. Existing laws would serve to prevent impacts on protected species.

4.11.2.3 CLOSED SYSTEM POOL

No significant impact to terrestrial biological resources would result from construction and operation of the Closed System Pool. The impacts to the terrestrial biological resources during construction and operations of the Closed System Pool would be similar to those of the Perimeter Deck. Supporting information follows.

Construction

Impacts on terrestrial biological resources and associated mitigation resulting from the construction of the Closed System Pool would be similar to those of the Perimeter Deck.

Operation

The operations and maintenance of the Closed System Pool would not significantly impact terrestrial biological resources. The closed system pool would segregate turtles from pool users. Existing laws would serve to prevent impacts on protected species.

4.11.2.4 NO ACTION

No change and therefore no impact to terrestrial biological resources would result from No Action. Supporting information follows.

Construction

No new actions would be performed under No Action; therefore, there would be no impact on terrestrial biological resources.

Operation

No new actions would be performed under No Action; therefore, there would be no impact on terrestrial biological resources.

4.12 HISTORIC AND CULTURAL RESOURCES

Historic and cultural resources include a broad range of resources that tell the story of Hawai‘i over time. These can be archaeological sites, historic buildings and structures, places of cultural and architectural importance, and sites associated with cultural practices.

4.12.1 Affected Environment

The regional area of the project site is presented to provide context for the affected environment. Also presented are applicable statutes and requirements that protect historic and cultural resources, which are factors in determining whether potential environmental consequences are likely to be significant in this evaluation. Finally, historic properties and cultural practices are identified.

The HRS Chapter 6E Historic Preservation Project Area is identified in Section 4.12.1.2.

4.12.1.1 REGIONAL CONTEXT

The waterfront of Waikiki has been inhabited intensively since approximately 1000–1200 AD. The vicinity of the WWMC, once known as Kapua, has been the site for many cultural practices over time (Mooney, McIntosh, and Cleghorn 2018). In early European accounts, it was described as a highly developed area with large groves of coconut palms, intensive agriculture including crop fields, gardens, and fishponds, and many dwellings.

The area of the WWMC was a part of the Crown Lands and adjacent waters after the Mahele ‘Aina, or “Great Mahele,” redistribution of Hawaiian lands that was carried out under Kamehameha III starting in 1848. The Mahele ‘Aina served as the transition to a system of Western-style land ownership, with all land divided between the Crown, the government, and the chiefs (ali‘i). By 1850, additional laws permitted both foreigners and commoners to gain title to land. King David Kalakaua established Kapi‘olani Regional Park as a charitable trust in 1896, providing the Crown Lands for public recreational use (Weyeneth 1991). After the overthrow of the Hawaiian monarchy, the trust deeded most of the park land to the Republic but also sold portions of it as fee-simple parcels. The area of the present WWMC was purchased by a park trustee, W.G. Irwin, who constructed a dwelling on it.

While Hawai‘i seems remote from the major fronts in World War I, the Territory’s citizens made significant contributions to the war effort. More than 10,000 Hawai‘i

men and women served in active duty, and 101 members of the U.S. Armed Services from Hawai‘i lost their lives in the war. At home, Queen Lili‘uokalani led a major effort to contribute to the Red Cross and war relief efforts, both financially and in volunteer initiatives such as “citizen knitters” who made more than 50,000 items of warm clothing for soldiers. Among these, Duke Kahanamoku publicly knit and encouraged young men to join in the effort (Kuykendall 1928; United States Foundation for the Commemoration of the World Wars 2018).

After the conclusion of World War I in 1919, the Territorial Legislature purchased 6.4 acres of Irwin’s property makai of the Kapi‘olani Regional Park boundary and designated it as a new “Memorial Park” (Territorial Legislature, 1919) commemorating the men and women of Hawai‘i who served in World War I.

In 1921, the Territorial Government appointed a Territorial War Memorial Commission to oversee a competition for the design of the memorial to “include a swimming course at least 100 meters in length” (Territorial Legislature, 1921). The winning design by architect Lewis Parsons Hobart, FAIA (a graduate of University of California at Berkeley and the Ecole des Beaux-Arts in Paris) was constructed under the direction of T. L. Cliff and completed in 1927 (Figure 4-20). The opening ceremony of the memorial took place on August 24, 1927, the birthday of Duke Kahanamoku, who had the honor of performing the inaugural dive into the swim basin before a large crowd.

Figure 4-20: Natatorium under construction in 1927 off the shoreline at the time, viewed from what is now Sans Souci Beach Park

Source: City and County of Honolulu. File: Nat_Construction_Photo_CCH_1927.jpg.

The WWMC quickly became a significant recreational and social center on O‘ahu (CJS 1985). The Natatorium structure’s distinctive arch and symmetrical, arcaded façade (hereafter referred to as the Beaux-Arts structure or Beaux-Arts design) (Figure 4-21) became a landmark along the Waikiki shoreline and Kalakaua Avenue, framed originally by reflecting pools and coconut palms, and later by courtyards and an arbor supporting a row of flowering hau trees.

Figure 4-21: Undated historical photograph of the Natatorium's mauka façade, with clock and diving tower

Source: Honolulu Star-Bulletin File Photo. File: StarBulletin_natatorium.jpg.

A popular venue for local, national, and international swimming competitions and exhibitions, the Natatorium was also in use on a daily basis as the place where many local youth learned to swim (Figure 4-22). Nationally renowned athletes including Duke Kahanamoku, Buster Crabbe, and Johnny Weissmuller swam there. The adjacent park was also a popular public amenity. From 1937 to 1969, the popular Kodak Hula Show took place in the grassy areas of the WWMC and adjacent to Sans Souci Beach Park. The Army also used the WWMC for training during World War II.

Figure 4-22: Young swimmers diving in at the Natatorium, undated, c. 1930s

Source: Hawai'i State Archives. File: waikiki-natatorium-memorial-2691530-h.jpg.

However, as early as 1929, concerns arose about the conditions of the facility and a lack of proper maintenance. Improper maintenance appears to have been exacerbated due to complex layers of jurisdiction and responsibility making it unclear whether responsibility lay with the Territory or with the City. The land on which the WWMC was constructed was owned by the Territory (and later the State); through a series of executive orders, the Territory transferred management and maintenance to the City and County in 1949. A structural assessment in 1949 revealed deficiencies with some of the original construction techniques on the water side of the structure, such as the concrete mix, which had resulted in premature deterioration (CJS 1985). Repair and partial refurbishment were undertaken in 1929 and 1949.

In the 1960s, many freshwater recreational swimming pools were constructed on O‘ahu, providing new public and private venues for swim meets and competitions. In 1965, demolition of the Natatorium structure was endorsed by City Council, citing its condition and an interest in additional beach space close to the burgeoning visitor areas of Waikiki. However, proponents of retaining the memorial and renovating it succeeded in gaining a court injunction against demolition in 1972. This initial series of legal actions and political decisions precipitated decades of seesawing between plans for demolition and plans for restoration, which stalled efforts to effectively address the problems of the facility. The Natatorium has remained officially closed to the public since 1979.

Since the 1970s, the importance of the property to veterans’ groups has been evident in annual Memorial Day and Veterans Day events, and other memorial activities that currently take place at the WWMC.

4.12.1.2 Applicable Requirements

Hawai‘i Revised Statutes (HRS) Chapter 6E-8

HRS Chapter 6E, Historic Preservation, provides “a comprehensive program of historic preservation of all levels of government to promote the use and conservation of such property for the education, inspiration, pleasure, and enrichment of its citizens.” HRS Chapter 6E directs state and county agencies to consult with the SHPD on projects that may affect historic properties (including archaeological, architectural, and aviation artifacts, culturally significant sites, and burial sites). The SHPD administers the program and provides the review. Written concurrence from SHPD is required prior to project commencement.

HRS Chapter 6E is implemented with the HAR Chapter 13-275 and Chapter 13-284. HAR Chapter 13-198 defines historic properties and the criteria used in determining their eligibility for listing on the HRHP and NRHP. Historic properties are defined in HAR Chapter 13-198 as “any building, structure, object, district, area, or site, including underwater site that is significant in the history, architecture, archaeology, or culture of this State, its communities, or the nation.” The eligibility for properties for listing on the NRHP is further defined in 36 CFR 60, which is incorporated by reference into HAR Chapter 13-198. Both the HRHP and NRHP use the same criteria for significance, including:

A. Association with events that contributed to our history;

B. Association with the lives of people important in our past;

C. Embodying the characteristics of a type, period, or method of construction, or the work of a master, or high artistic value;

D. Yielding information about history or prehistory.

The HRHP also has one additional criterion:

E. Importance to the Native Hawaiian people or any other ethnic group of the state through association with cultural beliefs, practices, events or accounts important to the group's history and cultural identity (per HAR Chapter 13-275-6).

Significance evaluations are submitted to SHPD for concurrence. If a property is found to be significant under Criterion E, consultation must occur with the appropriate ethnic organizations or persons, including the Office of Hawaiian Affairs (OHA) for Native Hawaiians (per HAR Chapter 13-275-8).

In addition to significance, eligibility for the NRHP and HRHP is determined through an assessment of the historic property's integrity, based on the national standards defined by the NRHP (National Register Bulletin 15) and incorporated into HAR Chapter 13-198. Integrity is defined as "the ability of a property to convey its significance." Historic properties either retain integrity, or do not. Integrity is measured using seven aspects or qualities that, combined, define integrity: location, design, setting, materials, workmanship, feeling, and association.

The project area eligibility evaluations to determine whether the site is historic, and effect determinations are submitted to SHPD for review and concurrence. Eligible property affected by a project requires a detailed mitigation plan. Mitigation is ultimately determined through the historic preservation review and concurrence processes defined under HAR Chapter 13-275.

As defined in HAR Chapter 13-275-2, the Project Area means the area that the proposed project may potentially affect, either directly or indirectly. It includes not only the area where the project would take place, but also the proposed project's area of potential effect. See Figure 4-23 for the Project Area.

Section 106 of the NHPA (36 CFR 800) requires each federal agency to identify and assess the effects of their actions on historic resource, and determines the review process for doing so. The goal of the Section 106 process is to identify historic properties potentially affected by an undertaking, assess effects, and assure that federal project proponents have made an effort to avoid, minimize, or mitigate any adverse effects on the historic properties.

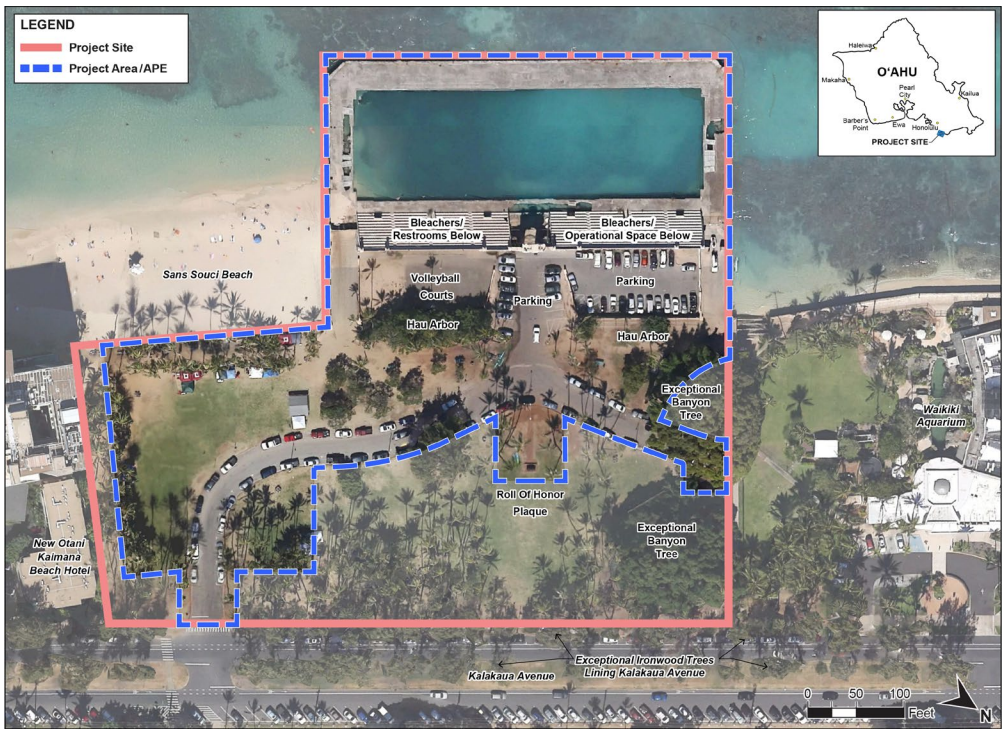


Figure 4-23: Project Area, HRS Chapter 6E

Source: Aerial imagery, Google Earth, January 2013.

Because any project affecting the water side of the Natatorium structure would require work in water, a USACE permit is required. The application for a federal agency permit triggers the Section 106 review and consultation process, which would be led by the USACE as the permitting agency. Due to agency policy, this is not anticipated to occur until the permitting phase of the project, and is expected to involve similar consultation to that performed under HRS Chapter 6E. The Section 106 process includes consultation and a finding of one of the following: no historic properties affected, no adverse effect, or adverse effect. Criteria for adverse effects are identified in 36 CFR 800.5. Resolution of an adverse effect determination is implemented through continued consultation and a Memorandum of Agreement (MOA) that stipulates terms for the mitigation of the adverse effect.

4.12.1.3 Historic Properties and Cultural Practices

Pacific Legacy Inc., under contract to Wil Chee-Planning & Environmental, Inc. (WCP), conducted an archaeological inventory survey (AIS) of the WWMC project area in 2011 (McIntosh and Cleghorn 2018), updated with additional field investigations in 2018 (McIntosh and Cleghorn 2018). The 2011 AIS and the 2018 post-field report are presented in Appendix G. Information from these documents is being integrated into one AIS for submittal to SHPD for review and concurrence, in accordance with HRS Chapter 6E.

Archaeological Sites

There is one known subsurface site (artifact scatter) in the project area (Site 50-80-14-7211) (Figure 4-24). While human burials have been uncovered during construction projects in Waikiki, no significant excavation is proposed as part of this project.

Based on previous archaeological investigations in the project area vicinity, and the location of the WWMC adjacent to ocean resources and inland marshes and streams, the archaeological survey concluded that this area likely would have been traditionally inhabited and used. Typical habitation features that the archaeological survey expected could be found include living floors, hearths, ovens, activity areas where traditional artifacts were made, and potential areas for human burials (McIntosh and Cleghorn 2018).

An archaeological survey in the project area, conducted in 2011 and expanded with additional investigations in 2018, included 22 shovel test pits and 12 backhoe trenches. Seven subsurface features and a discontinuous cultural layer were identified. Ground-penetrating radar and subsurface testing within the project area did not identify any burial sites or potential human remains. The survey recovered several artifacts, most notably a single marine shell fishhook dated to 1460–1650 AD. This artifact and associated features were designated as Site 50-80-14-7211. This site is recommended as significant under Hawai‘i State Criterion D, because it has the potential to yield information regarding traditional use of the area and coastal settlement in Waikiki. No other significant cultural features were identified in the project area (McIntosh and Cleghorn 2018).

The archaeological investigations focused on the landside area of the WWMC. In-water archaeology was not performed.

Historic Structures

The Natatorium was completed in 1927 as the first “living” war memorial in the United States. The Beaux-Arts structure commemorates the men and women of Hawai‘i who served and sacrificed their lives in World War I (1914-1919). It has been listed as a historic building in the HRHP since 1973 (SIHP #84-14-9701) and the NRHP since 1980 (NRHP #80001283). It was also designated a National Treasure by the NTHP in 2014. The Natatorium has been determined significant under National Register Criterion A for its memorial importance and its role as an important swimming venue for the Honolulu community and for national and international swimming competitions; and Criterion C for its Beaux-Arts architectural design. It may also have significance under Criterion B and possibly Criterion E for its association with the famed Duke Kahanamoku and other well-known swimmers (see Cultural Practices below).

Figure 4-24: Archaeological Site 50-8014-7211

Source: McIntosh and Cleghorn 2018.

Character-defining features of the Natatorium's design include the following:

- Grand Beaux-Arts style arch, flanked by smaller round arches
- Sculpture and inscribed entablature atop arch frieze
- Façade with arcades of seven bays extending symmetrically
- Round arched windows and rectangular grille windows
- Concrete walls with incised diamond pattern enclosing courtyards
- Lighting: Tapered columns on walls formerly topped with globe luminaires; fluted metal columns with spotlights illuminating arch entry
- Landscape features: Coconut grove, mature banyans (two listed exceptional trees)
- Large urns flanking the arcade and projecting above bleacher walls
- Flagpoles with ball finials
- Stadium seating structure (bleachers), 13 levels, facing swim basin
- 20-foot-wide concrete deck enclosed by a 3-foot-high concrete wall
- 100-by-36-meter rectangular swimming basin

Aside from its increasingly dilapidated condition, very few changes to the facility have been made over the past 91 years. For example, the two concrete courtyard

areas enclosed by a wall along the front façade area were originally reflecting pools, although they were modified within a few years after construction and appear to have had their current concrete paving in place by the late 1930s. Additionally, a diving platform and clock that were originally installed on the swim basin side are no longer present (Figure 4-21). The hau tree arbor, while mentioned in the NRHP nomination, has recently been identified as a later addition post-1940s and is not a part of the original Beaux-Arts design. This was determined based on review of historic plans and photographs. Because it is a much later addition not connected to the property's original design intent, the hau tree arbor falls outside of the definition of character-defining features.

Other Historic Properties

Kapiʻolani Regional Park is a recreational open space listed on the HRHP (SIHP# 80-14-9758) in 1992 as a historic site. Kapiʻolani Regional Park has been determined significant under NRHP and HRHP Criterion A, for events that have made a significant contribution to the broad patterns of our history. In addition to its individual listing on the HRHP and NRHP as a building, the entirety of the Natatorium project area lies within Kapiʻolani Regional Park's listed historic site boundary (Figure 4-25).

According to the NRHP nomination statement of significance, "Kapiʻolani Park is historically significant for its past association with indigenous Hawaiian culture and royalty. Hawaiian King Kalakaua envisioned the park as a place of recreation for all and named it after his famous Queen, Kapiʻolani. Since its dedication in 1877 it has been in continuous use as a location for recreational activities valued by local residents and visitors alike. It provides a sense of place to a special part of Honolulu and is identified with the world famous image of Hawaiʻi as a recreational resort. Over the years it has been the scene of a variety of sports and leisure time activities that reflects the recreational development of Honolulu and Hawaiʻi into the modern world." The Kapiʻolani Park Preservation Society has also noted that the driveway to the Natatorium is a portion of a former park carriageway and is considered historic (June 2016, 6E pre-consultation meeting comments, Appendix A-2).

Cultural Practices

Cultural practices are activities imbued with cultural or spiritual meaning; they can be traditional or modern; past, recent, or present. They may include traditional Hawaiian practices, but also the cultural practices of other communities and ethnic groups.

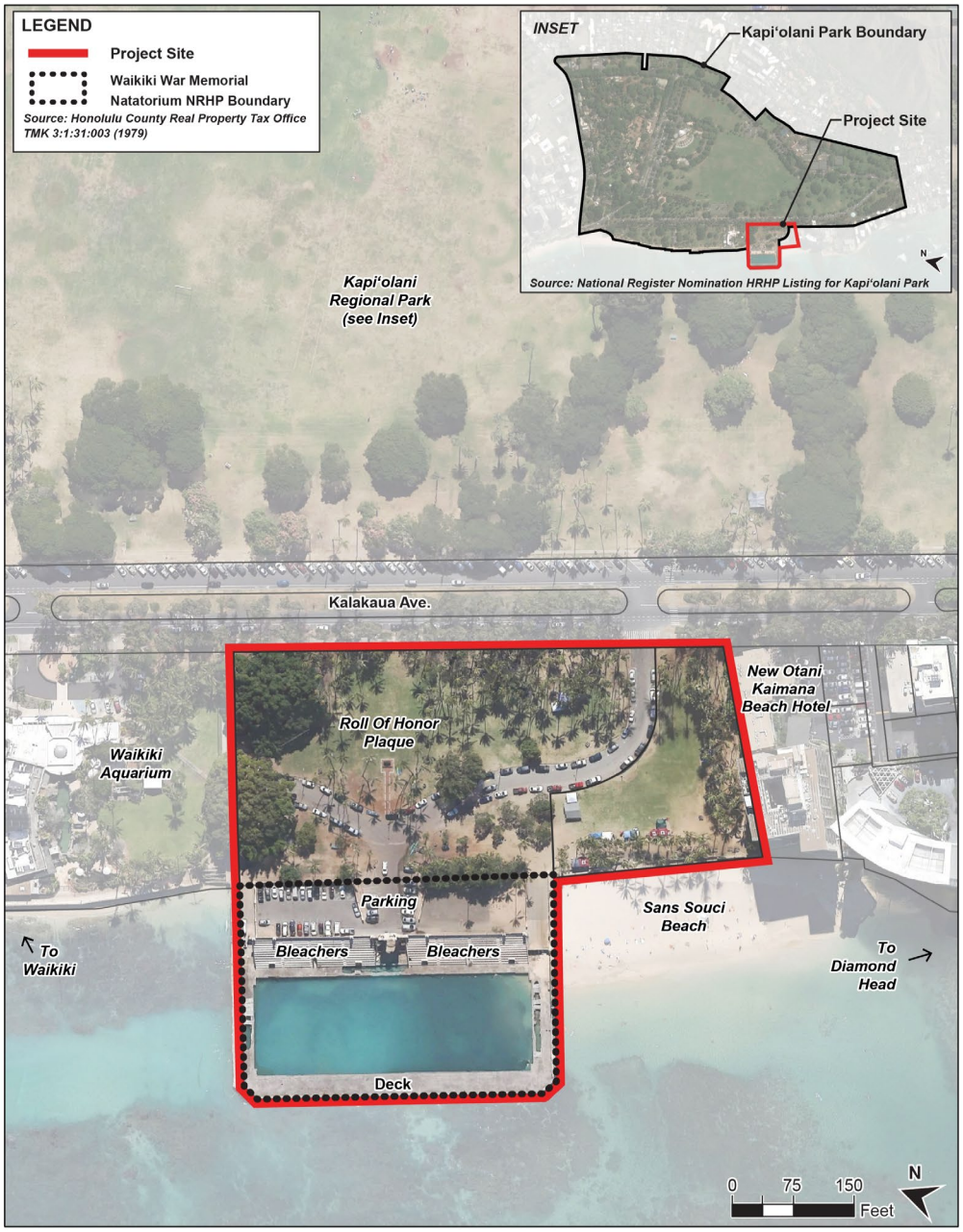


Figure 4-25: Historic Properties – Natatorium and Kapi'olani Regional Park

Source: Aerial Imagery, DigitalGlobe Version 3, October 2015.

From before European contact to the present, Waikiki has been an important locale on O'ahu. In early times, it was known as the seat of the ruling chiefs of O'ahu (Beckwith 1970). The area was continuously well-populated and intensively used over the centuries, during which the area around the WWMC has been a locus of many practices and activities. Based on archival research and community consultations in the 2012 Draft Cultural Impact Assessment (CIA), "several themes that appear to transcend time and across cultural divides have been consistently tied to this area, including: ceremony, communal gathering, subsistence collecting, recreation, and sports. These activities range in scope from large organized

community events, formal spiritual/religious ceremonies, to activities practiced independently" (Mooney, McIntosh, and Cleghorn 2018).

Some traditional Hawaiian cultural practices in the WWMC vicinity have been ongoing for centuries in the area, while others have been recently revived. Where relevant, the sections below note modern uses of the area that are aligned with its traditional cultural use. The historical summary above includes more contextual information. Some other meaningful cultural and spiritual practices in the Natatorium vicinity are based in recent historical times, such as memorialization, and originate with the communities of Waikiki and greater Honolulu.

Surfing. Before European contact, the lands in the general vicinity of the Natatorium were known by the name Kapua and were renowned as a surfing area, with a surf break traditionally used by the ali'i (Thrum 1925; Kamakau, n.d.). Surfing has long been practiced in the area, both in the distant past and in recent years. Today, the popular "Old Man's" surf break is accessed from the Kapua Channel near the Natatorium.

Boating. The area of Kapua is referenced as a channel, boat harbor, and canoe landing. According to the story of the "Sixth Battle" as recounted in Fornander (1917), Kamehameha I landed his fleet of canoes at Kapua before the great battle at Nu'uanu, with the forces lead by Kalaikupule. The name Kapua persisted in descriptions of the boat channel and mooring areas along the shoreline in this area, including in the Outrigger Canoe Club vicinity (Mooney, McIntosh, and Cleghorn 2018). Especially popular in the 1940s and 1950s, paddleboarding was a popular sport along the Waikiki shoreline as well (Lind 2009) (Figure 4-26). Today, small outrigger canoes train and race from this location.

Figure 4-26: Paddleboarders at the Natatorium, 1940

Source: Collection of Ian Lind. File: natatorium1940_oldkineimages_Lind.jpg.

Marine Resource Collection and Fishing. Kapua Channel was historically known as a fishery. Traditional marine resource gathering on the reef areas just makai of the Natatorium and adjacent beaches was a common traditional practice. Notable

resources of the area in the past included limu (seaweed), octopus, and shellfish (Mooney, McIntosh, and Cleghorn 2018). Today, marine resource collection is diminished due to a decline in marine life and to the resulting protection of the area as a Fisheries Management Area. Some fishing, including spear fishing, is allowed in the coastal waters on the Diamond Head side of the Natatorium in even-numbered years; the location is known among fishermen today for striped mullet (‘ama‘ama, *Mugil cephalus*), goatfish (weke, *Mullidae* sp.), and other reef fish.

Hula. While the Natatorium is not known to have a specific connection to the ancient practice of traditional hula, the adjacent park lawn was the site of daytime hula performances from 1937 until 2002 (interview with Dr. Lynette Cruz, in Mooney, McIntosh, and Cleghorn 2018). While these performances were funded by, and used to promote, the Kodak Company (Figure 4-27), they also served as a vehicle to preserve and sustain traditional Hawaiian cultural practices, according to interviews with local cultural practitioners and longtime residents who attended and participated in them. More recently, performances by local halau hula (hula schools) have been an integral part of annual Memorial Day and Veterans Day events at the Natatorium over the past 30 years.

Figure 4-27: Kodak Hula Show c. 1950; performers on the lawn near the Natatorium

Source: Hawaiian Historical Society Photograph Collection. File: HHS_KodakHulaShow_1950s.png.

Memorialization. The War Memorial function of the Natatorium is an important aspect of its significance and role in cultural practices in the community. As a “living memorial,” it has meaning and value in particular to national and state-level veterans’ groups, military service members, and descendants of the Hawai‘i residents who served and sacrificed their lives in World War I. Many of the war dead were never returned to Hawai‘i, and so the Natatorium serves to memorialize them in lieu of graves (interview with Ms. Jill Radke, in Mooney, McIntosh, and Cleghorn 2018). Cultural practices connected to the War Memorial include annual Veterans Day and Memorial Day events. The Veterans Day (originally Armistice Day) events at the Natatorium began in 1954; Memorial Day events have occurred since 1986. The ceremonies take place on the landside area of the property with the participation of many local community groups including the Friends of the

Natatorium, Elks Lodge, and Ka‘ahumanu Society. The events include floral offerings, hula, traditional Hawaiian music and chants, active-duty and retired military participants, a Color Guard, and local families with a history of military service over generations. In 2017, the WWMC was named on the official list of World War I Memorials nationwide by the federal World War One Centennial Commission and the Pritzker Military Museum and Library.

Swimming. The WWMC served as a venue for swimming competitions, lessons, and a center for recreational swimming from its opening in 1927 through its closure to the public in 1979 (Figure 4-28, Figure 4-29). Many of Hawai‘i’s famous swimmers, including numerous Olympians, had connections to the Natatorium and used the facility as competitors, coaches, or students. These swimmers include Coach Soichi Sakamoto, Keo Nakama, Halo Hirose, Bill Smith, Thelma Kalama, Evelyn Kawamoto, and Duke Kahanamoku. One annual swim competition, now known as the Keo Nakama Swimming Invitational, has been held for over 70 years and is believed to be one of the oldest invitational meets in the nation. Named in honor of an Olympian who was one of Hawai‘i’s famed Maui Ditch swimmers (and who swam regularly in competitions at the Natatorium), it was originally held every year at the Natatorium; the event continues at other Honolulu-area pools today (interview with Ms. Bertha Nahoopii, in Wade n.d.; Reardon 1997; Mooney, McIntosh, and Cleghorn 2018).

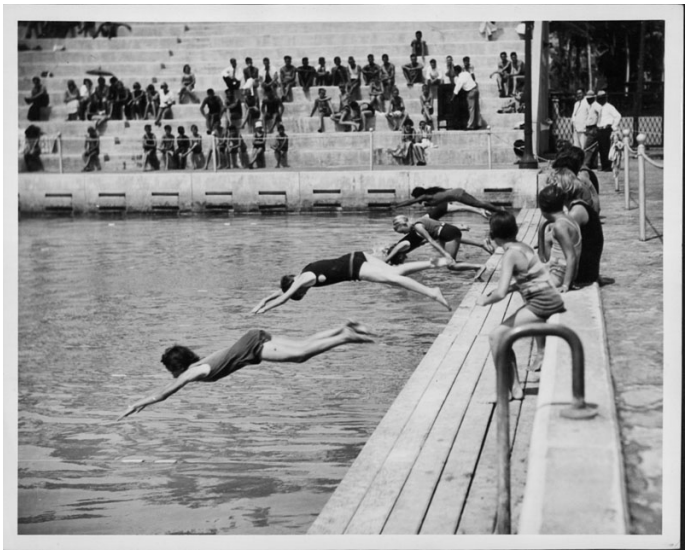


Figure 4-28: Keiki swimming at the Natatorium, undated (c. 1930s)

Source: Hawaiian Historical Society Photograph Collection. File: PP-12-2-015-00001.jpg.

Figure 4-29: Keiki learning to swim at the Natatorium in the 1930s, where teachers suspend them in the water by ropes to teach them to coordinate their arm and leg movements

Source: Honolulu Star-Bulletin File Photo. File: Natatorium_StarBulletin_Archive.jpg.

Swimming and recreational water sport activities continue to occur at Sans Souci Beach, directly beside the Natatorium. Formal ocean swimming events in the adjacent Kapu Channel include the Waikiki Rough Water Swim, Hawaiian Christmas Long Distance Invitational Rough-H20 Swim, and Windsock Swim. The Waikiki Swim Club and other groups use the area regularly.

Other Ceremonial Activities. The Natatorium project area is within a region that once had many heiau and other traditional Hawaiian ceremonial and spiritual sites, although these generally fell into disuse after the ʻAi Noa, or the breaking of the kapu system by Liholiho (Kamehameha II) in 1819, and the arrival of European missionaries in 1820. Ruins of some of the heiau were noted in later accounts, while the locations or remains of others have not been found. Because the area on which the Natatorium stands was built on 20th-century fill, archaeologists do not believe any remains of these sites are present in the project area (McIntosh and Cleghorn 2018).

A traditional Hawaiian solstice ceremony was revived in the mid-1990s in the area of the Natatorium and Waikiki Aquarium, which some cultural practitioners believe was once the vicinity of ceremonial structures related to this ceremonial use in the pre-Contact period. The ceremony takes place during the transition from the rainy season (hoʻoiloho ʻoilo) to the dry season (kau welawela), when the setting sun aligns with Puʻu Kapolei as viewed from this area (interviews with Dr. Lynette Cruz and Dr. Samuel ʻOhukaniʻohiʻa Gon III, in Mooney, McIntosh, and Cleghorn 2018). The first event was held on the northern ramp of the Natatorium, and subsequent ceremonies have been held on the Waikiki Aquarium lawn annually.

4.12.2 Potential Environmental Consequences

The evaluation of environmental consequences considers impacts to the eligibility status of the property, based on the standard historic significance and integrity criteria described under HRS Chapter 6E and the NRHP. Actions that diminish or destroy the integrity of a historic property are considered to have an adverse

impact. Actions that restore, repair, and sustain a historic property are considered to have beneficial impacts.

For historic properties, in addition to considering integrity as noted above, impacts assessments are based on how closely the action complies with the SOI *Standards for the Treatment of Historic Properties*. These standards provide for—and define in detail—four accepted treatment approaches for historic properties: preservation, restoration, reconstruction, and rehabilitation. Effects that would otherwise be considered adverse may be considered not adverse when the action is limited to the rehabilitation of structures and is conducted in a manner that preserves the historical and architectural value of an affected historic property through conformance with the SOI *Standards for the Treatment of Historic Properties.* Rehabilitation allows for repair and preservation of a historic structure while introducing new uses and limited alterations to improve the function and accessibility of the facility, thereby allowing its historical use to be reinstated.

Project impacts on cultural practices, per HRHP Criterion E, consider effects on cultural practitioners' ability to access the locations and resources needed to undertake the cultural practices.

4.12.2.1 Perimeter Deck (Proposed Action)

Significant beneficial impacts to historic and cultural resources would result from construction and operation of the Perimeter Deck. The rehabilitation of the deteriorating Natatorium would significantly benefit the unique historic structure and the historic Kapiʻolani Regional Park. With the HRS Chapter 6E historic review process, consultation, SHPD concurrence, and the provisions of HRS Chapter 6E that protect inadvertent discoveries, no adverse significant impacts would occur during construction.

Operation of the Perimeter Deck would result in significant beneficial impacts as it would reinstate the living memorial, allow uses such as swimming and other cultural practices, and reestablish public access to this portion of the historic Kapiʻolani Regional Park.

Supporting information follows.

Construction

Other than the in-water work, ground disturbance mauka of the Natatorium would be limited to (1) the proposed paved walkway to extend the existing Kapiʻolani Regional Park shoreline promenade from the Waikiki Aquarium to Sans Souci Beach, and (2) restoring the surface leading to the Roll of Honor plaque so that it is level and ADA-compliant. Construction routes and staging would occur on existing paved surfaces of the Project Area, except where ingress/egress is needed between the existing paved access road and the Natatorium. No significant impacts to archaeological sites would occur, as the sole historic property identified in surveys would be avoided and limited ground disturbance is planned. Should archaeological resources or human remains be encountered during construction, work would stop in accordance with State law and rules.

The proposed construction activities in the Perimeter Deck would be significant and beneficial to the historic Natatorium structure. The concept described in the Perimeter Deck concept is aligned with national historic preservation standards for rehabilitation. Dilapidated and damaged portions of the structure on the water side would be removed and replaced to match their original above-water appearance during construction; the structure's character-defining features would be repaired and restored. Therefore, construction under this alternative would retain and enhance the visible character of the historic structure, including the swim basin, deck, bleachers, and arches. Once the HRS Chapter 6E historic preservation review verifies that the SOI *Standards for Rehabilitation* have been met (per 36 CFR 800.5(a)(3)(b)), construction would lead to a determination of "effect, with mitigation" (a "no adverse effect" under NHPA Section 106 is anticipated).

Construction would result in negligible adverse impacts to other historic properties. The periodic noise and access limitations to the construction site would be temporary and would not change the historic character of Kapiʻolani Regional Park.

Construction routes and staging would be managed with plans that limit use of the HRS 6E Project Area and impact on park users. For these reasons, no significant impact on any cultural practices would occur.

Operation

No significant impacts to archaeological resources would occur. No ground disturbance is proposed as part of operations. Ongoing maintenance, as currently allowed, would continue.

The rehabilitation of the Natatorium would reinstate its use as a living memorial and a swimming venue, as well as prevent further deterioration of the structure through regular facility maintenance. Operations would include re-use of the WWMC for its historically intended purpose and compatible modern uses, including public recreation access, swimming, and memorialization; and an appropriate level of maintenance for an active public facility. The result would be significantly beneficial to the historic structure.

The operation of the Perimeter Deck would mean that public access to this portion of the historic Kapiʻolani Regional Park would be reestablished without changing the historic character of the Park.

Public access to the Perimeter Deck would sustain the area's common, important, and cultural practices. The reopening of a historically important swimming venue would enhance the practice of swimming in the area. Memorialization would be enhanced with the availability of the Natatorium as a memorial event venue, and improvements to (and ongoing maintenance of) the historic memorial structure itself. Hula and other ceremonial activities could continue. There would be no noticeable impact to other cultural practices, such as nearby surfing, boating, marine resource collection, and fishing, which would generally occur outside the WWMC boundary and in areas where they currently take place.

Mitigation

The effect on the Natatorium would be mitigated through the process of SHPD review and approval under HRS Chapter 6E, which includes preparation and approval of a detailed mitigation plan. NHPA Section 106 consultation would also be conducted by the lead federal agency, anticipated to be USACE.

If human remains or subsurface archaeological resources are encountered during construction, work would immediately stop, and SHPD would be contacted in accordance with State law and rules.

4.12.2.2 War Memorial Beach

Significant adverse impacts to historic and cultural resources would result from construction and operation of the War Memorial Beach. The demolition of the deteriorating Natatorium has been met with substantial opposition, as evidenced in the EISPN public comment period. Such opposition is expected to result in substantial resources to justify demolition and delays in obtaining required approvals and permits, e.g., USACE permit and HRS Chapter 6E historic preservation review.

Unresolved Issue. The corridors for new electrical duct lines and a new water line to existing main lines along Kalakaua Avenue would need to be identified and reviewed in accordance with HRS Chapter 6E.

Supporting information follows.

Construction

Construction of the War Memorial Beach has the potential to impact the sole archaeological site (Site 50-80-14-7211) in the Project Area due to the excavation of a new parking lot and foundation for a new building, as well as ground disturbance with the removal of the Natatorium and associated walls and courtyards. A portion of these features would overlap Site 7211. Construction routes and staging would occur on existing paved surfaces of the Project Area, except where ingress/egress is needed between the existing paved access road and the Natatorium. No significant impacts on archaeological sites would occur, as the sole site identified in surveys would be addressed with changes in proposed structure locations to avoid the property and/or through mitigation under HRS Chapter 6E. Should archaeological resources or human remains be encountered during construction, work would stop in accordance with State law and rules.

Construction of the War Memorial Beach would include the complete demolition of the NRHP- and HRHP-listed Natatorium. This alternative would result in a determination of “effect, with mitigation” under HRS Chapter 6E and possibly “adverse effect” under NHPA Section 106. These determinations require mitigation measures to be developed (see Mitigation below). With demolition, this alternative is expected to result in opposition from parties with historic preservation interests, as demonstrated in the response to this alternative in the 2014 EISPN (Appendix A-1). The details of such opposition are not known but are expected to

result in substantial resources to justify demolition and delays in obtaining required approvals and permits (e.g., USACE permit approval requires the applicant to meet the USACE's standards for avoidance of adverse impacts to historic properties per 33 CFR 320.4(a)(1) and NHPA Section 106).

Other historic properties would be moderately affected. The removal of the historic Natatorium landmark structure that is part of the park, as well as new construction on the land side of parking, restroom, and arch structure, would diminish the integrity of the historically open-lawn character of the portion of Kapiʻolani Regional Park adjacent to Sans Souci Beach Park.

Construction impacts of the War Memorial Beach on cultural practices would be similar to those of the Perimeter Deck.

Operation

Operations of the War Memorial Beach would not involve ground disturbance, so no impact on archaeological resources would occur.

The operation of the War Memorial Beach would exclude the presence of the Natatorium, which would represent a significant adverse impact to historic properties. Integrity would be lost for the historic structure, and the historic character of the WWMC and Kapiʻolani Regional Park would be irreversibly diminished.

The War Memorial Beach operations would adversely impact some cultural practices. While activities such as swimming, hula, boating, and marine resource collection would be able to continue in the open ocean and land areas of the former Natatorium site, the site's memorialization practices would be permanently diminished with the removal of the "living memorial" and its replacement with a smaller memorial arch.

The new parking lot, restroom, and new memorial arch structure would adversely affect other historic properties, due to the change to a developed use from the historically open lawn character of the area of Kapiʻolani Regional Park adjacent to Sans Souci Beach Park.

Mitigation

Similar to the Perimeter Deck, the "effect" on the Natatorium would be mitigated through the process of SHPD review and approval under HRS Chapter 6E, which includes preparation and approval of a detailed mitigation plan. NHPA Section 106 consultation would also be conducted by the lead federal agency, anticipated to be USACE. With the loss of the historic Natatorium, it is expected that extensive negotiations would occur with SHPD, the U.S. Advisory Council on Historic Preservation (ACHP), USACE, and interested historic preservation consulting parties at both the state and national levels. Lacking ultimate concurrence or agreement by these parties, it is possible that this alternative could fail to secure needed permits or otherwise be unable to proceed with construction.

If human remains or subsurface archaeological resources are encountered during construction, work would immediately stop, and SHPD would be contacted in accordance with State law and rules.

4.12.2.3 CLOSED SYSTEM POOL

Significant beneficial impacts to historic and cultural resources would result from construction and operation of the Closed System Pool. The historic and cultural impacts of the Closed System Pool would be similar to those of the Perimeter Deck. The main difference is the alteration of the naturally ocean-fed swim basin to a closed-system artificially circulating swimming pool. However, while the function of the swim basin interior would be different, the historic character of the Natatorium structure as a whole would not be substantially altered, with similar changes as the Perimeter Deck. The addition of the closed pool would include more non-historic fabric added to the historic structure, but most of this would be below water level, such as the pool liner, or concealed, such as pump equipment.

Unresolved Issue. The corridors for new electrical duct lines, new water line, and any new well would need to be identified and reviewed in accordance with HRS Chapter 6E.

Supporting information follows.

Construction

Construction impacts associated with the Closed System Pool would be similar to those described under the Perimeter Deck. Depending on how the new additions are implemented, this alternative could result in determinations of "effect, with mitigation" under HRS Chapter 6E and "no adverse effect" under NHPA Section 106, if the design and implementation plan meets federal SOI treatment standards for rehabilitation.

Operation

Operation of the Closed System Pool impacts would be similar to those described under the Perimeter Deck. Because no ground disturbance is planned as part of operations, there would be no impact on archaeological resources.

While the addition of a new Closed System Pool is a greater degree of change to the historic Natatorium structure than proposed in the Perimeter Deck, this alternative is also in compliance with the SOI *Standards for the Treatment of Historic Properties* rehabilitation approach and retains the property's integrity. Use and maintenance of the facility as a pool would fulfill its historically intended purpose and constitute a beneficial impact to the historic structure.

The operation of the Closed System Pool would mean that public access to this portion of the historic Kapiʻolani Regional Park would be reestablished without changing the historic character of the Park.

Operations under the Closed System Pool would be beneficial to cultural practices in similar ways to the Perimeter Deck, described above. The reopening of a historically important swimming venue would enhance the practice of swimming in

the area. Memorialization would be enhanced; hula and other ceremonial activities could continue. There would be no discernible impacts to other cultural practices, such as nearby surfing, boating, marine resource collection, and fishing.

Mitigation

Similar to the Perimeter Deck, the "effect" on the Natatorium would be mitigated through the process of SHPD review and approval under HRS Chapter 6E, which includes preparation and approval of a detailed mitigation plan. NHPA Section 106 consultation would also be conducted by the lead federal agency, anticipated to be USACE.

If human remains or subsurface archaeological resources are encountered during construction, work would immediately stop, and SHPD would be contacted in accordance with State law and rules.

4.12.2.4 No Action

No change would occur with No Action. However, the long-term impact of No Action on the Natatorium, Kapiʻolani Regional Park, and certain cultural practices would be significant and adverse. Supporting information follows.

No Action proposes that the Natatorium remain closed and off-limits to the public, with minimal interventions to secure the site against trespassing and to mitigate hazardous conditions. The long-term impacts of No Action would range widely depending on the resource, from no impact (archaeological sites) to significant adverse impact (historic structures).

No Action would result in the continued neglect, which has already led to significant damage to portions of the structure, particularly on the swim basin side. It does not comply with SOI standards for the treatment of historic properties, and would ultimately result in the loss of historical integrity as the structure becomes increasingly dilapidated.

No Action would noticeably alter some cultural practices in the long term. While activities such as swimming, hula, boating, and marine resource collection would be able to continue in the open ocean and land areas around the closed Natatorium structure as they occur today, the site's memorialization practices would be permanently diminished with the continued closure, decay, and loss of the "living memorial."

No Action would result in observable changes to other historic properties, i.e., Kapiʻolani Regional Park, due to the ongoing decay and eventual destruction of the historic resource that contributes to the HRHP-listed park's historic character.

Mitigation

Mitigation measures for the historic structure would be required due to the No Action alternative's lack of compliance with the SOI *Standards for the Treatment of Historic Properties* that apply to this NRHP-listed historic property. Lack of action, which results in a condition of neglect, is not an accepted treatment for historic

properties owned by a state or local government entity, and is contrary to the intents of state law and City ordinance. Mitigation could include actions and treatments to slow and minimize decay and degradation of the structure. This mitigation would follow the SOI treatment standards for the "preservation" approach to treatment, in which a historic building or structure is stabilized and maintained in its current condition and not restored, reconstructed, or rehabilitated.

4.13 VISUAL RESOURCES

The visual resources analysis considers impacts to views within and towards the project site. Ordinances, regulations, and plans governing view protection and used in determining whether the project substantially affects scenic vistas and viewplanes, in accordance with HAR Chapter 11-200-12, are described below.

4.13.1 Affected Environment

4.13.1.1 APPLICABLE REQUIREMENTS

Honolulu Land Use Ordinance (LUO) Section 21, Article 9 (LUO 21-9)

LUO 21-9 provides guidance for Special Districts, including identification of views and guidance for design and visual character permitted in the districts. The WWMC is in the Primary Urban Center (PUC) (i.e., metropolitan Honolulu), where development is governed by the PUC Development Plan that identifies the following panoramic views and vistas (CCH DPP 2004):

- The Koʻolau and Waiʻanae mountain ranges and their foothills
- The Pacific Ocean, Pearl Harbor's East Loch, Ford Island, Honolulu Harbor, Keʻehi Lagoon and Kewalo Basin, and their respective shorelines
- The craters of Leahi (Diamond Head), Puowaina (Punchbowl), and Aliamanu

From the WWMC, the following views are visible: the crater of Leahi (Diamond Head), the Pacific Ocean, and the shoreline along Waikiki (Figure 4-30).

Diamond Head Special District

The WWMC is in the Diamond Head Special District (described in Section 5.0, Consistency with Plans and Policies). The following views are listed in the LUO for protection as part of this special district:

- Public streets: Kalakaua Avenue from Kapahulu Avenue to Coconut Avenue
- Public viewing sites: Kapiʻolani Regional Park and beaches, including Sans Souci Beach

While historic landmarks are also classified as visual resources in many special districts under the Honolulu LUO, they are not identified specifically within the Diamond Head Special District.

State and National Register of Historic Places Listings

Views of the Natatorium are considered a visual resource because of its status as a highly visible, distinctive public landmark and NRHP-listed property; therefore, impacts to the visual character of the Natatorium structure's Beaux-Arts architectural design are considered in the assessment. Character-defining features of the Natatorium are listed in Section 4.12, Cultural and Historic Resources.

4.13.1.2 VIEWS

Views and photo points are illustrated on Figure 4-30.

Figure 4-30: Views and Photo Points

Source: State of Hawai'i, Office of Planning: http://planning.hawaii.gov/gis/download-gis-data/; The Revised Ordinances of Honolulu Exhibits 21-9.5

Table 4-14 summarizes the existing views from and towards the project site.

Table 4-14: Views

View Location	Views	Photo Number
WWMC	Mauka views from WWMC park areas to Kapi'olani Regional Park and distant Leahi crater (Diamond Head).	Photo 4-1, Photo 4-2
	Makai views from WWMC park areas to the Pacific Ocean, Sans Souci Beach, and distant Waikiki shoreline.	Photo 4-3, Photo 4-4
	Makai views to Natatorium façade from within WWMC park areas.	Photo 4-5
	Mauka views from within Natatorium (deck and bleachers) toward Leahi crater (not presently available to public due to closure of the facility).	Photo 4-6
	Makai views from within Natatorium (bleachers and deck) to Pacific Ocean, and Waikiki and south O'ahu shoreline (not presently available to public due to closure of the facility).	Photo 4-7
Outside WWMC, west (mauka) side	Views from Kalakaua Boulevard and Kapi'olani Regional Park to the open lawn areas of WWMC and the Natatorium's mauka façade.	Photo 4-8, Photo 4-9
Outside WWMC, south side	Views from Sans Souci Beach looking from the north to the south side of the Natatorium structure, including views of the bleachers and swim basin wall/seawall; and mauka to the park area of WWMC.	Photo 4-10
Outside WWMC, north side	Views from the shoreline promenade looking from the south to WWMC and to the north side of the Natatorium structure, including views of the bleachers and swim basin wall/seawall.	Photo 4-11
Outside WWMC, east (makai) side	Views from the Pacific Ocean towards the swim basin side of the Natatorium, including views of the bleachers and the Memorial Arch.	n/a

n/a not available

The mauka views from the WWMC include Kapiʻolani Regional Park in the foreground and middle distance, and distant views of Leahi crater (Photo 4-1). In some locations within the WWMC, the mauka views are obscured by trees (Photo 4-2). The visual character of Kapiʻolani Regional Park and Leahi crater are protected as part of the Diamond Head Special District. Makai views from within the WWMC include Sans Souci Beach (Photo 4-3), the Pacific Ocean, and the Waikiki shoreline (Photo 4-4). The Natatorium is visually prominent throughout the WWMC (Photo 4-5). Views from within the Natatorium structure are not presently available to the public due to the facility's closure, but they include mauka views to Leahi crater (Photo 4-6), and makai views to the Pacific Ocean and the shoreline of Waikiki and south Oʻahu (Photo 4-7).

Views into the WWMC are available from nearby areas. These include views from mauka of the project area in Kapiʻolani Regional Park and Kalakaua Avenue, from which the Natatorium's character-defining arch and façade are visible across the open lawn areas of WWMC, although this view is partially obscured by plantings of ironwood and coconut palm trees (Photo 4-8 and Photo 4-9). Views into the WWMC lawn areas and the north side of the Natatorium structure are available from the promenade adjacent to the Waikiki Aquarium (Photo 4-10); similar views from the south are available from Sans Souci Beach (Photo 4-11). However, the scenic value of these views is currently diminished by the presence of wooden fencing and the dilapidated conditions of the Natatorium seawall. Several historic character-defining features of the Natatorium are visible from the north and south sides that cannot be seen from the mauka side, such as portions of the bleachers and concrete deck.

The makai side of the Natatorium, including the bleachers and Memorial Arch, is visible from the ocean.

Photo 4-1: View from the paved walkway near the northeast corner of the WWMC towards Kapiʻolani Regional Park mauka of Kalakaua Avenue, with Leahi crater visible in the distance

Source: Google Street View, 2018.

Photo 4-2: View of Leahi crater from the unpaved walkway at WWMC adjacent to Sans Souci Beach, partially obscured by trees

Source: Google Street View, 2018.

Photo 4-3: View of Sans Souci Beach from the unpaved walkway at WWMC, adjacent to the beach

Source: Google Street View, 2018.

Photo 4-4: View of the Waikiki shoreline and distant city skyline from the end of the ramp at the north side of the WWMC

Source: AECOM 2018.

Photo 4-5: Natatorium façade from within WWMC in the vicinity of the Roll of Honor plaque

Source: AECOM 2018.

Photo 4-6: Mauka view from the Natatorium deck

Source: AECOM 2017.

Photo 4-7: Makai view from the Natatorium bleachers

Source: AECOM 2017.

Photo 4-8: View of the Natatorium façade and open lawn area of WWMC from Kalakaua Avenue

Source: Google Street View, 2018.

Photo 4-9: View of the Natatorium façade and open lawn area of WWMC from the mauka side of Kalakaua Avenue

Source: Google Street View, 2018.

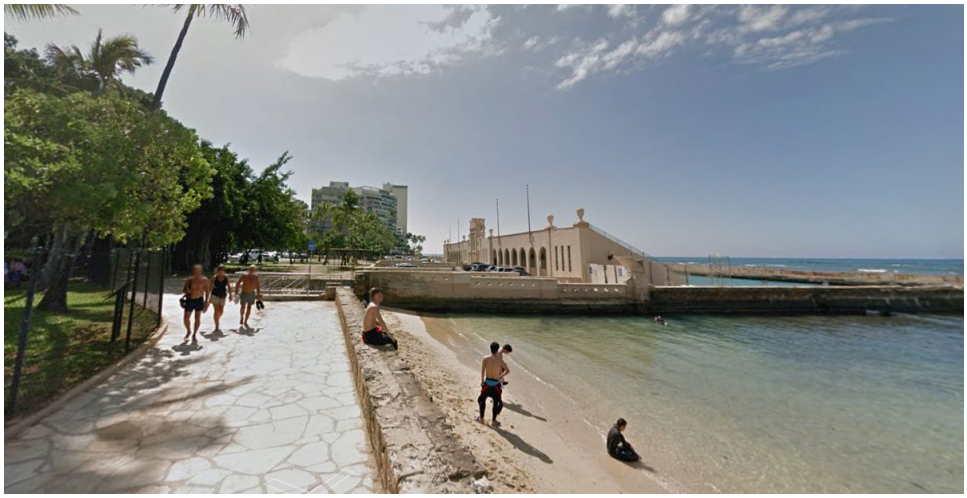


Photo 4-10: View of WWMC from the north, on the shoreline promenade adjacent to the Waikiki Aquarium

Source: Google Street View, 2018.

Photo 4-11: View of WWMC from the southeast at Sans Souci Beach

Source: Google Street View, 2018.

4.13.2 Potential Environmental Consequences

The evaluation of potential impacts to visual resources is based on the effects of the proposed activities described in Section 3.0. A significant impact on views would occur if the views identified in Section 4.13.1.1 and illustrated on Figure 4-30 were either diminished or improved.

4.13.2.1 Perimeter Deck (Proposed Action)

Significant beneficial impacts to visual resources and aesthetics would result from the Perimeter Deck. Construction impacts would be adverse but temporary and not significant.

Significant beneficial impacts would occur from reconstruction and extend during operations as views from the currently closed Natatorium would be available.

Existing views of the Natatorium from the adjacent shoreline promenade and Sans Souci Beach would also improve.

Supporting information follows.

Construction

During construction, the aesthetics and visual impacts of the project site would be temporarily and not significantly impacted. The construction area would be fenced, limiting views of equipment and activities during construction. Throughout construction, much of the intensive work (e.g., demolition) would occur on the water side of the Natatorium, and would be visible from Sans Souci Beach and the shoreline promenade to the north. This alternative would include little change to the mauka façade and distinctive arch, which would still be visible from the WWMC park areas, Kalakaua Avenue, and Kapiʻolani Regional Park. Views of vehicles and equipment entering and exiting along the driveway would be noticeable during construction activities.

Operation

The Perimeter Deck would significantly and beneficially impact views and aesthetics. It would open the Natatorium to the public and allow access to the views identified in the previous section. More opportunities would be provided by the Perimeter Deck for the public to enjoy these views from the swimming area, since it is currently closed to the public.

Existing views of the Natatorium from the adjacent shoreline promenade and Sans Souci Beach would improve. The barrier walls and gates, which currently stand between the Natatorium and Sans Souci Beach, would no longer obscure views of the ocean, Waikiki shoreline, and the Natatorium from Sans Souci Beach.

4.13.2.2 War Memorial Beach

Significant adverse impacts to existing views and aesthetics would result from the War Memorial Beach, as this alternative would include demolition and permanent loss of the historic Natatorium. Construction impacts would be adverse and slightly greater than the Perimeter Deck because construction duration is two months longer; however, they would be temporary and not significant.

Significant adverse impacts would occur from demolition and extend during operations as the view of the memorial arch would be permanently lost and replaced with a less visually prominent replica.

Supporting information follows.

Construction

The impacts to visual resources associated with the construction phase of the War Memorial Beach would be greater than those for the Perimeter Deck. Because the Natatorium would be entirely demolished and new parking and restroom built, the construction process would take longer (estimate of 25–30 weeks) and the area of

disturbance and limited public access would be more extensive. The memorial arch and façade of the Natatorium, which would be taller than the fencing, would be removed during this construction phase, eliminating a visual landmark. Because these construction impacts represent a permanent loss in a structure that contributes to a view, construction-related impacts would be significant and adverse.

Operation

The War Memorial Beach would significantly impact existing views and aesthetics of the area with the demolition and permanent loss of the historic Natatorium as a unique visual resource. The historic view of the memorial arch would be permanently lost and would be replaced with a view of the less prominent, relocated replica.

Scenic ocean views along the shoreline would be expanded by the removal of the structure. The views of the ocean and Waikiki shoreline would be broader from the adjacent shoreline promenade and Sans Souci Beach with the removal of the Natatorium structure.

4.13.2.3 Closed System Pool

Significant beneficial impacts to visual resources and aesthetics would result from the Closed System Pool. The impacts to visual resources from the construction phase and operations of Closed System Pool would be similar to those described in the Perimeter Deck, although construction impacts would be slightly greater with a construction period four month longer than the Perimeter Deck. Supporting information follows.

Construction

The impacts to visual resources from the construction phase of Closed System Pool would be similar to those described in the Perimeter Deck, although the construction period would likely have a longer duration due to the additional work required under this alternative to add the closed system pool elements.

Operation

The impacts to visual resources from the operational phase of the Closed System Pool would be similar to those described in the Perimeter Deck.

4.13.2.4 No Action

No change and therefore no impact to visual and aesthetic resources would result from No Action. Supporting information follows.

Under No Action, the WWMC would remain in its current dilapidated condition and the pool and bleachers would remain closed to the public. Public safety measures would include adding signs to each side of the seawall and at the gates, installing chain link fence along the Sans Souci Beach side of the deck, draping netting over the existing seawall and deck and coating the bleachers. These actions would not

lead to noticeable changes in views looking from or toward the project site in the short term. Over time, the Natatorium would likely become more dilapidated. Views from within the Natatorium would continue to be unavailable as the facility would remain closed.

4.14 PUBLIC SERVICES

4.14.1 Affected Environment

The WWMC is situated just outside the urban, dense and highly developed Waikiki area. The Honolulu Police Department (HPD), the Honolulu Fire Department (HFD) and Emergency Medical Services (EMS) provide various emergency and security services on O‘ahu.

The nearest fire station is the Waikiki station, located about a mile away from the project site at 381 Kapahulu Avenue mauka of the Honolulu Zoo. The Waikiki police sub-station provides the nearest police services located about a mile ‘Ewa of the project site at 2425 Kalakaua Avenue, next to the Moana Surfrider Hotel.

The City DPR would continue to manage the WWMC regardless of the alternative selected, while HPD would continue to enforce laws in the project area. Currently the DPR has numerous regulations pertaining to the operation, behaviors, hours of access, and activities permitted in DPR managed public parks. Specifically, under ROH Section 13-14 closure of parks at night is regulated while ROH 19-10 regulates camping at city parks, respectively. These regulations are enforced by HPD. Currently, Kapi‘olani Regional Park is closed between the hours of midnight and 5:00 a.m. In addition to park closure hours, City and County of Honolulu Administrative Rules (HAR) 19-10 prohibits camping in public parks that are not designated as campgrounds. Kapi‘olani Regional Park and WWMC are not designated campgrounds.

In addition to the above services, the beaches and seashore areas around the WWMC are patrolled and protected by personnel from the HESD Ocean Safety and Lifeguard Services Division. This division maintains offices and storage space under the bleachers of the Natatorium, and supports a lifeguard stand at Sans Souci Beach on the south side of the WWMC.

Non-emergency medical services are provided by various, private walk-in medical clinics in Waikiki. The two clinics located closest to the project site include the Straub Doctors on Call facility at 2255 Kalakaua Avenue in the Sheraton Hotel and the Kuhio Walk-In Medical Clinic located at 2310 Kuhio Avenue. The Kapi‘olani Medical Center is the closest full service hospital and is three miles away from the project site at 1319 Punahou Street at the H-1 freeway.

Solid waste collection on O‘ahu is provided by various private waste hauler companies in contract with the ENV. Currently, O‘ahu Waste Services provides solid waste hauling services to the project site.

4.14.2 Potential Environmental Consequences

A significant impact on a public service would occur if the increase in demand for a public service (evaluated by government jobs) is expected to substantially exceed the available or planned capacity or budget of the public service.

4.14.2.1 Perimeter Deck (Proposed Action)

No significant impacts to public services would result from construction and operation of the Perimeter Deck. Additional City staff and associated budget would be needed to operate the publicly accessible area. With the additional 317 users per day, no significant impacts on HPD, HFD, EMS, or ENV for solid waste are anticipated. Supporting information follows.

Construction

The construction phase of the Perimeter Deck would neither impact nor compromise public services. Contractors and workers at the site would adhere to appropriate safety measures, safety equipment and protocols at the construction site. Any safety or emergency response required at the construction site and during the construction phase would use standard emergency notification via 911 or other appropriate measures.

There may be the need for increased frequency of construction waste hauling during the construction phase. If additional waste hauling is required beyond that regularly scheduled for the project area, alternative arrangements would be required between the City and a waste hauling firm to accommodate the appropriate provision of waste disposal services during the construction phase.

Operation

The rehabilitation of WWMC may result in an additional 317 visitors to the currently closed site (Section 3.2.1.2). The City would need to hire, train, and budget for four additional lifeguards to support the publicly accessible area. This would represent an increase in the City's operating cost that would require additional revenue through property tax or reduction of other services. While not inconsequential, this increase is not considered significant as the estimated salaries for the four additional lifeguards represent less than 2% ($223,740/$14,323,045) of the fiscal year (FY) 2018 appropriated expenditures for Ocean Safety identified in the City's operating program and budget (CCH Department of Budget and Fiscal Services 2018). No significant impacts on HPD, HFD, EMS, or ENV for solid waste are anticipated.

The operation of the Perimeter Deck could present an opportunity for loitering, camping, and vagrancy. Per HAR, signage outlining park hours and other park rules would be posted on or near the WWMC, the Natatorium would be secured at night, and the area would continue to be patrolled by HPD for enforcement of applicable laws and rules at WWMC.

4.14.2.2 War Memorial Beach

No significant impacts to public services would result from construction and operation of the War Memorial Beach. Additional City staff and associated budget would be needed to operate the publicly accessible area, and would be greater than those of the Perimeter Deck. With the additional 317 users per day, no significant effects on HPD, HFD, EMS, or ENV for solid waste is anticipated. Supporting information follows.

Construction

The impacts from the construction phase of the War Memorial Beach would be similar to those described with the Perimeter Deck.

Operation

The impacts from the operational phase of the War Memorial Beach would be greater than those described with the Perimeter Deck, as additional lifeguard services are expected to be needed to support the War Memorial Beach. The City would need to hire, train, and budget for five additional lifeguards to support the publicly accessible area. This would represent an increase in the City's operating cost that would require additional revenue through property tax or reduction of other services. While not inconsequential, this increase is not considered significant as the estimated salaries for the five additional lifeguards represent approximately 2% ($279,675/$14,323,045) of the FY 2018 appropriated expenditures for Ocean Safety identified in the City's operating program and budget (CCH Department of Budget and Fiscal Services 2018). No significant impacts on HPD, HFD, EMS, or ENV for solid waste are anticipated.

4.14.2.3 Closed System Pool

No significant impacts to public services would result from the construction and operation of the Closed System Pool. Additional City staff and associated budget would be needed to operate the publicly accessible area and would be similar to those of the Perimeter Deck. With the additional 317 users per day, no significant impacts on HPD, HFD, EMS, or ENV for solid waste is anticipated. Supporting information follows.

Construction

The impacts from the construction phase of the Closed System Pool would be similar to those described with the Perimeter Deck.

Operation

The impacts from the operational phase of the Closed System Pool would be similar to those described with the Perimeter Deck. The City would need to hire, train, and budget for four additional lifeguards to support the publicly accessible area. This would represent an increase in the City's operating cost that would require additional revenue through property tax or reduction of other services. While not inconsequential, this increase is not considered significant as the estimated salaries for the four additional lifeguards represent less than 2% ($223,740/$14,323,045) of

the FY 2018 appropriated expenditures for Ocean Safety identified in the City's operating program and budget (CCH Department of Budget and Fiscal Services 2018). No significant impacts on HPD, HFD, EMS, or ENV for solid waste are anticipated.

4.14.2.4 NO ACTION

No change and therefore no impact to public services would result from No Action.

4.15 SOCIOECONOMICS AND RECREATION

4.15.1 Affected Environment

4.15.1.1 COMMUNITY CHARACTERISTICS AND RECREATION FACILITIES

While not officially within the traditional geographic jurisdiction of Waikiki, the WWMC, the surrounding Kapiʻolani Regional Park, and the ocean front esplanade, are considered integral and connected features of the Waikiki area. Tourists are commonly seen using the area, however, this area of Waikiki (San Souci Beach and the area surrounding WWMC) are heavily used by residents. The demographics of the local population surrounding and using the area is like the larger island demographic, i.e., a mix of ethnicities and age groups.

San Souci Beach contains a lifeguard stand served by the Honolulu Department of Emergency Services, Ocean Safety and Lifeguard Services Division. Other amenities add to the popularity of the area and include public restrooms/showers under the bleachers of the Natatorium, large grassy areas with scattered trees, parking, and an outdoor shower area. "The off-shore area of Sans Souci Beach consists of relatively smooth waters, sand-covered ocean floors, and aside from weekends and holidays is typically less crowded than other beach areas in the vicinity (e.g., Queen's Surf, Kapiʻolani, and Kuhio Beaches). According to the 2011 Kapiʻolani Regional Park Master Plan, there are also several popular surfing locations, including "Cunha's," "Public's," and "Castles," in the far-shore areas off of Sans Souci Beach which make it a popular surfing location (Miyabara Associates LLC 2011).

In addition to the recreational facilities and amenities described above, Waikiki Beach is just ʻEwa of the WWMC, Kapiʻolani Regional Park is adjacent and mauka of the WWMC and San Souci Beach, and the Waikiki Aquarium is adjacent and ʻEwa. The Honolulu Zoo and Waikiki Shell are situated nearby and abut the ʻEwa end of Kapiʻolani Regional Park.

Residential buildings are located Diamond Head and adjacent to San Souci Beach, including a few nearby restaurants, the Outrigger Canoe Club, and the Elks Lodge.

4.15.1.2 VISITOR ECONOMY

As the center of the State's tourism economy, Waikiki and its related recreational destinations and tourism facilities account for approximately 25% of tourism tax revenue and 9.4% of all indirect and direct taxes generated for the State. There was

an average of 82,000 visitors staying overnight in Waikiki on O‘ahu on any one day in 2016 generating an average of $7 million in direct and indirect visitor-related expenditures annually and representing 40% of statewide tourism (DBEDT 2017).

There are no site-generated revenues as San Souci Beach and the WWMC do not contain any regular, on-site concessionaires or permittees.

4.15.1.3 Recreational Use Levels in the Area

The aforementioned Kapi‘olani Park Carrying Capacity Study of 2013 provides statistics on visits and uses at Kapi‘olani Regional Park and is broken down further into study zones (PBR Hawai‘i and AECOM 2013). One of these study zones consists of the WWMC and Sans Souci Beach and Park area encompassing 11.70 acres and includes the mauka picnic open space, the landside beach area and the off-shore ocean area. The statistics outlined in the report were derived from site assessments and observational interviews over a one year period.

Overall, it was estimated in 2013 Kapi‘olani Regional Park received approximately 1.8 million visitors on an annual basis. Table 4-15 outlines visitor estimates specific to the Sans Souci Beach and park area. There are no statistics for patronage of the Natatorium itself as the inside of the facility has been closed to the public for years.

Table 4-15: Visitor Estimates to the Project Area

People at One Time (PAOT)	205.7 (Average)
Average Visitor Length of Stay	3.9 hours
Estimated Daily Visits	633
Average Daily Visitors per Acre - Estimates	16
Biophysical Capacity Estimate	Below-Approaching Capacity
Expansion Potential	None
Recreation Facility Development Potential	Low

Source:(PBR Hawai‘i and AECOM 2013).

Two fishing restriction areas have been designated contiguous to the WWMC. The area extending north from the ‘Ewa wall of the Natatorium and seaward 500 yards is designated the Waikiki MLCD. MLCDs are designated shorelines at various locations around the state and are designed to conserve and replenish marine resources. Regulations for the Waikiki MLCD prohibit the taking of any marine life or the possession of any device that may be used for the taking of marine life as codified in HAR Title 13, Chapter 36. The other fishing restricted area runs south from the Waikiki MLCD boundary to Diamond Head and extends seaward 500 yards. This area is designated the Waikiki Diamond Head Shoreline Fisheries Management Area. This designation prohibits the taking of any marine life or the possession of any device that may be used for the taking of marine life during odd-numbered years. These two designations are further discussed in Section 4.10, Marine Biological Environment.

There are regular small and large events held at the nearby Kapiʻolani Regional Park and its various venues throughout the year. In addition to the Waikiki Aquarium, there is the Honolulu Zoo, Waikiki Shell, Sunset on the Beach, bandstand concerts and large annual events such as the Honolulu Marathon and various local cultural festivals. Currently there are no organized, large scale events that occur in the Sans Souci Beach area aside from some occasional swim competitions. Most programmed events at Kapiʻolani Regional Park are held at locations and facilities located mauka of Kalakaua Avenue and along the shoreline and park areas north of the Waikiki Aquarium (PBR Hawaiʻi and AECOM 2013).

4.15.2 Potential Environmental Consequences

A significant impact to the socioeconomic environment would occur if anticipated long-term non-governmental job loss/gain would occur and be uncharacteristic for the area. Government jobs associated with public services are addressed in Section 4.14, Public Services. A significant impact to recreation would occur if a substantial increase would be anticipated and affect 2013 RCS capacities.

4.15.2.1 Perimeter Deck (Proposed Action)

There would be no significant impacts to the area socioeconomics or recreation resources from construction and operation of the Perimeter Deck. The additional jobs associated with the 7-month, $25.6 million project would be a beneficial and temporary impact. Depending on timing with other in-water construction projects, such as the approximately $450 million Kapalama wharf and container terminal project, adverse impacts in the form of increased cost and construction delay could result. Supporting information follows.

Construction Phase

The direct effects of the Perimeter Deck on the area socioeconomics are limited principally to construction employment and related business activity during the construction phase. The direct, temporary construction employment and business expenditures would not impact the larger socioeconomic context of the area. Short term adverse impacts would likely affect the recreation resources at San Souci Beach and the surrounding area due to demolition and construction related activities. However, these would be temporary (approximately 7 months) and therefore are considered less than significant.

Operational Phase

Community Characteristics and Recreation Facilities

The surrounding area is mostly built out and primarily consists of public parks and venues and privately-owned residences. The operational phase would re-open the WWMC and afford visitors and locals a renewed experience in this portion of Waikiki, thereby having a beneficial impact on the community character of the area. No demographic changes would be anticipated due to the operations of the WWMC.

Visitor Economy

At this time, the City DPR does not intend to charge admission to the rehabilitated complex, nor does the City intend to allow private entities to operate businesses at the WWMC. If rehabilitation of the WWMC does generate additional visits by the public, nearby businesses may experience some increased patronage. However, this increase in patronage would be expected to be relatively minor as no additional parking is planned. Therefore, there could be minor beneficial impacts to the visitor economy from the Perimeter Deck.

Recreational Use Levels in the Area

The 2013 Recreational Capacity Study defines recreational capacity as the "level of recreation use beyond which impacts exceeds established resources and visitor experience standards". The study goes on to estimate the Biophysical Capacity of the area around the WWMC (primarily Sans Souci Beach) as "Below-Approaching Capacity". The Perimeter Deck would result in additional recreational capacity for the area and provide more open space and recreational options for visitors. There are no specific estimates for how many surfers use the area off-shore from the WWMC. However, the existing convenient parking and public restrooms are popular with surfers to the surf locations near the WWMC.

In the long term, the Perimeter Deck may generate additional visits to the area by both residents and visitors who may wish to use the swim basin, visit the deck and bleachers for sightseeing and passive relaxation, and participate in historical events such as memorial services. The high percentage of military personnel living in and visiting Hawaiʻi may result in increased visitors from that demographic group in particular, especially for memorial events. However, the increase in visitors to the WWMC is expected to be relatively minor with the limitation in parking. Overall, the impacts to socioeconomics and recreation resources from the Perimeter Deck are anticipated to be minor and beneficial, respectively.

4.15.2.2 War Memorial Beach

There would be no significant impacts to the area socioeconomics or recreation resources from construction and operation of the War Memorial Beach. Impacts would be similar to those of the Perimeter Deck. This $28.8 million project is likely to generate additional jobs and be of longer duration than the Perimeter Deck. Supporting information follows.

Construction Phase

The direct effects of the War Memorial Beach on the area socioeconomics and recreation resources are like those described for the Perimeter Deck. The primary difference would be the 9-month construction duration for the War Memorial Beach. However, these would be temporary, and therefore are considered less than significant.

Operational Phase

As previously noted, the 2009 Waikiki War Memorial Natatorium Task Force voted to recommend that the War Memorial Beach be implemented, thus indicating an increased demand for beachfront along this area of Waikiki. The War Memorial Beach would provide that additional need; correspondingly, increased visitation would be anticipated, but limited with the lack of increase in parking stalls. Therefore, long-term impacts during the operational phase would be expected to be beneficial to those desiring additional beach area and facilities.

4.15.2.3 CLOSED SYSTEM POOL

There would be no significant long-term impacts to the area socioeconomics or recreation resources from construction and operation of the Closed System Pool. Impacts would be similar to the Perimeter Deck. However, this $42.7 million project would likely generate more jobs and be of longer construction duration than the Perimeter Deck and War Memorial Beach. Supporting information follows.

Construction Phase

The direct effects of the Closed System Pool on the area socioeconomics and recreation resources are like those described for the Perimeter Deck. The primary difference would be the construction duration. Of all the action alternatives, the Closed System Pool has the longest period of construction at approximately 12 months. However, these would be temporary, and therefore are considered less than significant.

Operational Phase

In the long term, the Closed System Pool may generate additional visits to the area by both residents and visitors who wish to use the pool, visit the deck and bleachers for sightseeing and passive relaxation, and participate in historical events such as memorial services. The high percentage of military personnel living in and visiting Hawai‘i may result in increased visitors from that demographic group in particular, especially for memorial events. However, the increase in visitors to the WWMC is expected to be relatively minor with the limitation in parking. Overall, the impacts to socioeconomics and recreation resources from the Closed System Pool are anticipated to be minor and beneficial, respectively.

4.15.2.4 NO ACTION

No change and therefore no impact would be anticipated on socioeconomics and recreation resources from No Action. Supporting information follows.

By taking no action, the WWMC would continue to deteriorate, posing a continued health and safety issue to those recreating in surrounding area. The deteriorated state also results in visual blight on the surrounding neighborhood and denies the community an active use option of this shoreline area.

4.16 CUMULATIVE IMPACTS

4.16.1 Other Planned or Programmed Projects

Cumulative impacts are defined as the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time (HAR §11-200-2).

Currently, there are few significant public or private developments planned for the area directly adjacent to the WWMC. The project site is located within an established area constrained by further expansion by dedicated public parks, the residentially developed Gold Coast, protected Diamond Head lands, and off-shore waters. Projects anticipated in the foreseeable future primarily involve beach nourishment and shoreline protection projects implemented by the City and County, as well as development by private hotels and property owners. Planned or programmed future developments and projects are discussed below.

1. Queen's Surf Seawall, located directly 'Ewa of the Natatorium protects the Waikiki Aquarium and parts of Kapi'olani Regional Park from ongoing coastal erosion, large waves, and high tides. The seawall is badly damaged and is currently undermined by regular wave overtopping. In 2017, a final EA was published by the City with recommendations for the planning, design, and reconstruction of the Queen's Surf Seawall. The seawall fronts the Waikiki MLCD and is located between the Queen's Surf Beach Center and the Waikiki Aquarium. The seawall consists of approximately 1,270 linear feet contiguous to the Waikiki Promenade. Like the Royal Hawaiian Groin, the Queen's Surf Seawall was constructed in the 1920's to protect shoreline structures from wave-induced erosion. According to City plans, the wall was found to be deteriorated in 1987 and was repaired by the City DPR. The EA describes the project as the planning and design to repair the seawall. Failure of the seawall will result in seawater inundation and damage to the promenade (CCH DDC 2017). To date, there has been no funding for the project; however, reconstruction of the seawall is likely in the near future. It is possible that the future wall design will increase in height to address future SLR. Coastal armoring of this type is known to accelerate erosion along adjacent beaches, such as Queen's Surf Beach. As a consequence of shoreline armoring, future beach nourishment projects are likely at adjacent beaches.
2. The existing Royal Hawaiian Groin, located between the Sheraton and Royal Hawaiian hotels is also planned for reconstruction. The groin was originally constructed in 1927 to create a sandy beach and lengthened to its current 370 foot in 1930. There is no record of any maintenance of the groin since that time. In 2014, due to its deteriorated condition, sand bags were placed on its 'Ewa side to prevent its collapse. An EA was finalized in 2016 by DLNR. The EA proposes groin repairs and replacement with a stable and engineered groin. The EA noted that the failure of the existing groin could result in the loss of 1,730 feet of sandy shoreline located east of the groin. Funding for the

replacement groin stalled in the 2018 Hawai'i legislative session and it appears construction will start no sooner than fall 2020 (*Honolulu Star-Advertiser* 2018; Sea Engineering, Inc. 2016a).

3. A recent pilot project to combat erosion at Kuhio Beach involved the placement of a "sand mattress" at an eroded stretch of the beach. This project was completed in December 2017. Implementation of this technology at other vulnerable locations along Waikiki beaches is currently in the planning stages, and could be implemented in the foreseeable future (Bays 2017). Other various beach nourishment projects (using various techniques) are anticipated in the near future, as coastal erosion remains and ongoing issue in Waikiki. Coastal erosion is anticipated to be exacerbated with SLR.
4. The Waikiki Beach Special Improvement District (WBSID) was recently created by city ordinance as a community and business district in a defined geographical area in which specific property owners pay assessments to fund specific projects within the area. The WBSID geographical area is defined as the beaches and nearshore coastal zone extending from Sans Souci Beach to Fort DeRussy Beach. As of mid-2018, the Waikiki Beach Management District is currently in the process of preparing a Waikiki Beach Management Plan. However, until any plan is vetted publicly, the impacts on, or plans for, the WWMC area will not be known. It is likely that the Plan will focus on popular beach areas that are experiencing severe erosion or beach infrastructure failures located along the Kuhio and Royal Hawaiian beach areas.

   Other efforts underway in Waikiki include the preparation of a transportation management plan, revisions to the Waikiki Special District design guidelines and various ongoing resort redevelopments, all of which are located within Waikiki ('Ewa of Kapahulu Avenue).
5. Biki, Honolulu's bikeshare program, is planning to expand their current bikeshare network into Kapiolani Park. Expansion includes 10 new proposed kiosks in Kapiolani Park, and 3 to 5 new kiosks in the Diamond Head/KCC area. Bikeshare expansion is ongoing and planned into 2019.

These projects would likely lead to cumulative impacts on water quality from increased recreation and transportation (pedestrian and bicycle). Demands on City infrastructure and utilities would require additional ongoing maintenance. Additional cumulative impacts could include decreased water quality and alteration of the nearshore environment from development of the Waikiki shoreline. The proposed action and alternatives could contribute to these cumulative impacts. However, SOPs and BMPs would be implemented throughout project construction to mitigate short-term impacts. Cumulative impacts by resource are discussed below.

4.16.2 Cumulative Impacts by Resource

4.16.2.1 Land Ownership and Management

There are no anticipated cumulative impacts to land ownership and management in the project area, due to established park space and existing land use plans preventing substantial development or changes.

4.16.2.2 Infrastructure and Utilities

Infrastructure and utility maintenance, including utility upgrades are reasonably foreseeable future actions. The operations of the WWMC under the Perimeter Deck and War Memorial Beach are not anticipated to affect maintenance or upgrades. The potential cumulative impacts of the Closed System Pool would be evaluated and designed to prevent significant impacts.

4.16.2.3 Transportation

It is anticipated that alternative forms of transportation would increase in the project vicinity given the expansion of Biki bikeshare network. Increased visitation of Waikiki Beach and surrounding area is also foreseeable into the future; however, growth in traffic volumes has been almost negligible in the vicinity of the WWMC and is likely to remain as such for the foreseeable future. Alternative transit options would help to alleviate existing traffic congestion.

4.16.2.4 Noise

Noise impacts from construction equipment would be anticipated with foreseen projects such as beach maintenance and coastal armoring projects, would be temporary, and would therefore not significantly cumulative noise. Project related operational noise would be from voices of the users and while audible, would not result in significant cumulative noise impacts.

4.16.2.5 Climate and Air Quality

Foreseeable future activities and actions would likely lead to an increase in the requirement for energy during construction and operations, leading to possible increases in GHG emissions. Increases in GHG emissions from energy required to complete beach nourishment activities and coastal armoring projects are similar to those discussed in Section 4.5 and primarily result from use of heavy equipment and transportation. A quantitative GHG emission analysis is outside of this EIS scope of work. In accordance with the State's Renewable Portfolio standards, GHG emissions from the State's non-mobile sources are anticipated to decrease, as the State aims to achieve 100% renewable energy by 2045. GHG emissions from utilities and non-mobile sources are dependent on the energy portfolio of the electricity source (e.g., fossil fuel versus renewables).

4.16.2.6 Topography, Geology, and Soils

No major cumulative impacts to topography, geology, and soils are anticipated with future and ongoing projects in the Waikiki area. Planned projects have minimal

surface disturbance, changes to coastal geological processes are discussed below in Section 4.16.2.8, Nearshore Physical Environment.

4.16.2.7 NATURAL HAZARDS

Cumulative impacts from natural hazards are uncertain and dependent on the severity, intensity, and type of natural hazard that potentially could take place. Proposed and foreseeable future actions are not anticipated to exacerbate the effect of natural hazards in the project area.

4.16.2.8 NEARSHORE PHYSICAL ENVIRONMENT

Projects involving coastal armoring such as the Queen's Surf seawall and the Royal Hawaiian Groin have impacts on the environment similar to that of the proposed action and alternatives. Coastal hardening can lead to the long-term loss of adjacent beaches (Kuhio and Queen's Surf Beaches) and require additional need for ongoing maintenance of both the seawalls and adjacent beaches. The cumulative loss of WOTUS and associated alteration of the physical nearshore features of Waikiki Beach is anticipated in the future. Cumulative impacts may also include impacts to recreation including alteration of surf sites, and temporary impacts to beach access is plausible during ongoing construction activities. However, without maintenance projects substantial beach loss would be anticipated in the future, a result of both ongoing coastal erosion and SLR. Sea level rise is a cumulative impact that involves regional considerations, costs, and subjective trade-offs, including any impact on the historic Natatorium. These subjective trade-offs make decision-making challenging and can result in indecision and lack of action.

4.16.2.9 WATER QUALITY

Cumulative impacts associated with coastal armoring projects, such as the Queen's surf seawall and the Royal Hawaiian groin, potentially impact water quality from construction and ongoing foreseen maintenance activities. Foreseeable future beach nourishment activities (using various techniques), occurring along Waikiki Beach could have similar impacts to water quality as those discussed under War Memorial Beach. Impacts could include increased turbidity and TSS, and temporary increases in nutrient concentration. It is anticipated that water quality would improve following completion of each project; however, if projects were to occur simultaneously and regulatory controls to protect water quality compromised, adverse impacts to water quality could be wider spread across the south shore. This scenario is considered unlikely and therefore cumulative impacts on water quality are not anticipated to be significant.

4.16.2.10 MARINE BIOLOGY

Ongoing impacts to EFH from decreased water quality and alteration of nearshore benthic habitat quantity and quality from coastal armoring projects, such as the Queen's surf seawall and the Royal Hawaiian groin. Beach nourishment activities also result in potential loss of EFH (dependent on the method of sand collection and transport. These activities are anticipated to also result in loss of WOTUS. Effects to marine mammals, sea turtles, and other special status species for

in-water projects would not be significant, as in-water projects would require a USACE permit and consultations with USFWS and NOAA NMFS.

4.16.2.11 TERRESTRIAL BIOLOGY

Cumulative impacts to terrestrial biology are not anticipated as there would be no project related effect on terrestrial biology.

4.16.2.12 HISTORIC AND CULTURAL RESOURCES

No cumulative impact on historic and cultural resources would be expected as only the proposed action is known to have any effect on a historic or cultural resource.

4.16.2.13 VISUAL RESOURCES

Considering the projects identified in Section 4.16.1, no cumulative impacts on visual resources are anticipated.

4.16.2.14 PUBLIC SERVICES

With increased visitation associated with projects considered in this cumulative effects analysis, there is an anticipated need for increased public services, including fire, police, and lifeguard. The effects when considered by the service providers are inherently cumulative and are addressed in the direct impacts evaluation in Section 4.14 and not considered significant.

4.16.2.15 SOCIOECONOMICS AND DEMOGRAPHICS

It is anticipated that general socioeconomic indicators including income and population would follow an increasing trend in the region. The visitor driven economy is anticipated to remain an important and defining characteristic of the area and will continue to drive the State's economy. Recreational use of the area may be impacted by ongoing construction impacting beach access sites, but only temporarily. The action alternatives would cumulatively benefit the demand for recreational use, but probably not significantly.

5.0 CONSISTENCY WITH PLANS AND POLICIES

This section describes all alternatives' consistency with relevant sections of adopted land use guidance, policy, and plans at the state, county, and neighborhood level. This is followed by a full list and short description of permits and permit procedures at the federal, state, and county levels required for implementation of any of the alternatives. A detailed discussion of County zoning permits and procedures specifically related to land use is included in Section 4.1, Land Ownership and Management.

5.1 STATE PLANS AND POLICIES

5.1.1 Hawai'i Environmental Policy Act

The Hawai'i Environmental Policy Act (HEPA) is codified in HRS Chapter 343 and implemented through HAR Chapter 11-200. HEPA, through its guiding statutes and rules, outlines the system of environmental review at the state and county levels which ensures that environmental concerns are given appropriate consideration in decision-making, along with economic and technical considerations. These statutes and rules also define actions that automatically trigger the initiation of the environmental review process. The proposed alternatives in this EIS triggers include:

- The use of state or county lands or funds
- Proposed use within the shoreline area
- Proposed use of a registered historic site

The 2014 filing of the FEA-EISPN for this project was the formal initiation of the HEPA process. This EIS was prepared in accordance with HRS Chapter 343, as implemented by HAR Chapter 11-200.

5.1.2 Hawai'i State Plan

The purpose of the Hawai'i State Plan as described in HRS 226 is to serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State; provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and establish a system for plan formulation and program coordination to for the integration of all major state and county activities.

Below is a discussion of how the proposed action and alternatives would be consistent with the overall themes, goals, objectives, and policies as set forth in HRS Chapter 226 of the Hawai'i State Planning Act and the Hawai'i State Plan.

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

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.

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.

(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.

(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai‘i.

(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.

(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. (L 1978, c 100, pt of §2; am L 1986, c 276, §10)

The Perimeter Deck (proposed action) would result in the adaptation of a land- and shoreline-based memorial structure to a functional and historically accurate condition. It would create a beneficial, multiple-use facility without generating costly and irreparable environmental damage. The proposed design would result in natural flushing and equilibration of the swim basin with those of the surrounding ocean waters and the natural conditions outside, and would improve water quality. See Section 4.10, Marine Biology and Section 4.11, Terrestrial Biology for a full discussion of the existing conditions and environmental consequences on biological resources.

Finally, the new design would remedy a current public safety hazard due to the degradation of the facility and increase accessibility and prudent use of land and shoreline areas for recreation along this busy stretch of the beach area of Waikiki, all consistent with objectives of HRS Section 226-11.

The War Memorial Beach would result in the creation of more shoreline beachfront along this crowded area along popular Waikiki Beach. The new beach area would be compatible with existing beach and shoreline park uses while increasing accessibility for public recreation. The War Memorial Beach would be consistent with objectives of HRS Section 226-11, and specifically with the policy to promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

The Closed System Pool is not consistent with objectives outlined in HRS Section 226-11. The creation of the Closed System Pool would require significant mechanical infrastructure and ongoing, costly maintenance to operate the pool in compliance with DOH water quality and pool standards, primarily outlined in HAR Chapter 11-10. Moreover, the existing marine area would be replaced with an artificial pool and represent a loss of waters of the U.S. The construction cost and annual maintenance cost of this alternative is estimated to be $42.7 million and $406,870, respectively, as identified in Section 3.4. These are the highest costs for any of the alternatives being considered. The Closed System Pool would involve relatively high construction and maintenance costs, and would not represent a prudent use of Hawai‘i's land-based, shoreline, and marine resources or effective protection of Hawai‘i’s unique and fragile environmental resources.

No Action does not comply with the objectives outlined in HRS Section 226-11. Aside from the open public restrooms/showers and the presence of the Ocean Safety and Lifeguard Services Division offices, there is no beneficial use from the WWMC in its current closed state. It is not compatible with land-based and water based activities in the area. No Action would not be a prudent use of Hawaii’s land-based, shoreline, and marine resources.

§226-12 Objective 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 objective, it shall be the policy of this State to:

  (1) Promote the preservation and restoration of significant natural and historic resources.

  (2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.

  (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic 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. (L 1978, c 100, pt of §2; am L 1986, c 276, §11)

The WWMC Natatorium is listed as one of the most threatened sites on the National Register of Historical Places by the NTHP. The site is also listed on the State of Hawai‘i Register of Historic Places. The Natatorium is a valued, unique site whose memorial for those who served in World War I is an important feature to many around Hawai‘i and the world.

The Perimeter Deck (proposed action) would be consistent with the objectives outlined above in HRS Section 226-12 in that it involves planning for the State's physical environment with the objective of enhancement of Hawai‘i's scenic assets, natural beauty, and multi-cultural/historical resources.

The War Memorial Beach would not be consistent with the objectives of HRS 226-12. This alternative results would result in the removal of a historic resource in Hawai‘i. Preservation objectives would not be promoted. The WWMC is an integral part of Hawai‘i’s historic and cultural heritage and its demolition would not be consistent with any of the objectives or policies in HRS 226-12.

The Closed System Pool would be consistent with the objectives of HRS 226-12, for similar reasons as the Perimeter Deck.

No Action is not consistent with the objectives of HRS 226-12. The objectives of preserving or restoring a significant historic resource would not be achieved. The Natatorium, in its current state, does not promote enhanced visual and aesthetic enjoyment of the surrounding natural features, nor does it complement the natural beauty of the islands. In its current state, the Natatorium degrades the visual environment and compromises scenic amenities in the surrounding area.

§226-23 Objective 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.

(5) Ensure opportunities for everyone to use and enjoy Hawai‘i's recreational resources.

(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.

(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai‘i's people.

(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.

(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawai‘i's population to participate in the creative arts.

(10) Assure adequate access to significant natural and cultural resources in public ownership. (L 1978, c 100, pt of §2; am L 1986, c 276, §22)

Waikiki Beach is an internationally known leisure and recreation destination at the center of the State’s tourism industry. The Perimeter Deck (proposed action) would enhance cultural and recreational resources along this busy shoreline. By honoring those who served during World War I, the Perimeter Deck is consistent with the objectives HRS Section 226-23 and the preservation of a cultural resource. The swim basin in a rehabilitated Natatorium, would allow public access and recreation along an increasingly crowded shoreline. Access to the site is available to all via a scenic shoreline walk-and-bike path, a dedicated bicycle lane on Kalakaua Avenue, frequent bus service along Kalakaua, Monsarrat, and Kapahulu Avenues, and nearby free and paid parking. Rehabilitation of the Natatorium would re-introduce scenic views of the shoreline, ocean, and Diamond Head which are currently unavailable due to the closed status of the facility.

The War Memorial Beach would be consistent with the objectives of HRS 226-23. This alternative promotes recreational resources by creating more beachfront along this crowded corridor of Waikiki Beach. Access to a natural resource is provided.

The Closed System Pool would be consistent with the objectives of HRS 226-23, for similar reasons as the Perimeter Deck.

No Action would not comply with the objectives of HRS 226-23. The closed and degraded state of the Natatorium does not promote, foster, or facilitate the

accommodation of diverse cultural, artistic, and recreational needs for present and future generations.

5.1.3 State Functional Plans

The Hawai'i State Plan is implemented through the development of functional plans and county general plans. In conjunction with county general plans, the thirteen State Functional Plans are prepared by various state agencies with community input and focus on specific areas including agriculture, conservation lands, education, employment, energy, health historic preservation, housing, human services, recreation, tourism and transportation, in the short term. They are the primary guideposts for implementing the Hawai'i State Plan.

The proposed action and each alternative are considered with respect to the goals, objectives and policies set forth in relevant State Functional Plans herein.

5.1.3.1 CONSERVATION LANDS FUNCTIONAL PLAN

The objective of the State Conservation Lands Functional Plan is to provide for a management program allowing for judicious use of the State's natural resources balanced with the need to protect these resources to varying degrees.

Policy IIB (2). Intensify protection of important native aquatic ecosystems and species.

Implementing Action IIB (2)a: Establish new MLCDs and monitor existing ones.

The Waikiki MLCD borders the northern side of the project site. Consultation with the DLNR DAR, administrator of the MLCD, would occur as part of the USACE permit process to prevent significant impacts on the MLCD and native aquatic ecosystems and species. With the DLNR DAR consultation and compliance with provisions of the USACE permit process, the proposed action and any of the alternatives would be consistent with Policy IIB (2) Action IIB(2)a of the Conservation Lands Functional Plan.

Policy IID(3). Develop recreational and archaeological resources on the shoreline and mauka areas.

Implementing Action IID(3)a. Acquire and/or develop areas for historic preservation.

The development of recreational resources on the shoreline with the proposed action and alternatives would be done in accordance with HRS Chapter 6E Historic Preservation, which provides for the mitigation of any adverse impacts on archaeological resources. However, no archaeological resources would be affected by the alternatives as identified in the AIS prepared for the project area.

No Action would not be consistent with Policy IID (3) as it would continue to prevent the development of a recreational resource. No Action would not affect archaeological resources.

5.1.3.2 HISTORIC PRESERVATION STATE FUNCTIONAL PLAN

The issues addressed in Historic Preservation State Functional Plan include:

1. The preservation of historic properties.
2. The collection and preservation of historic records, artifacts and oral histories.
3. The provision of public information and education on the ethnic and cultural heritages and history of Hawai‘i.

Issue Area I: Preservation of Historic Properties

B: Protection

C: Management and Treatment of Historic Properties

The Perimeter Deck (proposed action) rehabilitation of this historic property would be consistent with the historic preservation objectives of Issue Area I. The Natatorium is listed on the NTHP as one of its endangered historic sites and is listed on state and national historic registers. The Natatorium has been an integral feature of Waikiki and the State of Hawai‘i since the 1920s. As a living memorial to those who served in World War I, the Natatorium provides an additional historic narrative beyond its physical presence. Many Hawai‘i residents have personal ties to the Natatorium, as the Natatorium was where such residents learned how to swim, engaged in other forms of recreation, or attended memorial events. The Perimeter Deck would result in the funding and implementation of the rehabilitation of a structure historically important at state and national levels.

The War Memorial Beach would not be consistent with Issue Area I. The demolition of this historic property would be contrary to preservation, protection, and management of treatment of historic properties.

The Closed System Pool would be consistent with Issue Area I, for similar reasons as the Perimeter Deck.

No Action would not be consistent with Issue Area I. Preservation and protection of this historic property would not be achieved.

5.1.3.3 STATE RECREATION FUNCTIONAL PLAN

The objective of the Recreation State Functional Plan is to:

- Assess present and potential supply of and demand for outdoor recreation resources.
- Guide State and County agencies in acquiring or protecting lands of recreational value.
- Provide adequate recreation facilities and programs.
- Assure public access to recreation areas.

Issue Area I: Ocean and Shoreline Recreation

- Saturation of beach park capacity
- Water safety
- User conflicts

Issue Area II: Mauka, Urban, and Other Recreation Opportunities

- Special recreation needs
- Urban and community recreation opportunities

The Perimeter Deck (proposed action) would be consistent with Issue Areas I and II. By providing shoreline access and a destination for recreational users, the Perimeter Deck can respond to recreation demand. Swimmers would have an alternative venue to use away from surfers, paddlers, kayakers and others in the open ocean, reducing user conflicts. The rehabilitation of a safe and accessible swim basin compliant with the Americans with Disabilities Act and current building codes would provide access and safety for all users.

The War Memorial Beach would be consistent with Issue Areas I and II. This alternative would result in the creation a new beachfront area. Without additional parking, it may help to curtail saturation of beach capacity. It would provide an additional community recreation opportunity.

The Closed System Pool would be consistent with Issue Areas I and II, for similar reasons as the Perimeter Deck.

No Action would not be consistent with Issue Areas I and II. A potential recreational opportunity would not be realized that could serve to support the issues under the recreational objective.

Issue Area V: Management of Recreation Programs, Facilities and Areas

- Interagency cooperation and coordination
- Alternative funding, acquisition, and management strategies
- Maintenance of existing facilities

The Perimeter Deck (proposed action) would be consistent with Issue Area V. While a commitment of state resources and funding for this, or any other alternative, has not been secured at this time, alternative funding commitments of the rehabilitation and ongoing management of the Natatorium may be available through private/non-governmental organizations. The NTHP as well as other private stakeholder groups have expressed interest in assisting with the funding for the rehabilitation of the Natatorium and the perpetuation of the use of this historic site. Whether or not such alternative funding becomes available, should this alternative be selected, the City would provide for the required maintenance and management.

The War Memorial Beach would be consistent with Issue Area V. The City would provide for the required maintenance and management.

The Closed System Pool would be consistent with Issue Area V, for similar reasons as the Perimeter Deck.

No Action would be consistent with Issue Area V. The City maintains the Natatorium on an as-needed or emergency basis and with No Action, would continue to do so.

5.1.4 Coastal Zone Management Act

Hawai'i's Coastal Zone Management Program, pursuant to the Federal Coastal Zone Management Act of 1972, outlines objectives and policies to guide the use of the State's coastal resources. The entire State of Hawai'i is included in the State's Coastal Zone Management (CZM) Program Area.

As codified in HRS Chapter 205A, each county in the State of Hawai'i provides its own laws and regulations to implement the Coastal Zone Management Program within its respective jurisdiction through the SMA process. The project site is located within the City and County of Honolulu SMA zone as designated in HRS Chapter 205A. Under this designation, the proposed action or any of the action alternatives would require issuance of a SMA permit by the County under provisions of ROH Chapter 25. This permit process is outlined in Section 4.1, *Land Ownership and Management*. Below is a discussion of proposed action and alternatives consistency with the goals, objectives and policies set forth in the Coastal Zone Management Program outlined in HRS Section 205A-2.

Concurrent with the anticipated USACE permit process, a detailed application and certification of Federal Consistency with the Hawai'i Coastal Zone Management Program would be submitted to the State Office of Planning.

5.1.4.1 HRS 205A-2 COASTAL ZONE MANAGEMENT PROGRAM; OBJECTIVES AND POLICIES

Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

1. Improve coordination and funding of coastal recreational planning and management.
2. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
    (a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas.
    (b) Requiring replacement of coastal resources having significant recreational value including, but not limited to surfing sites, fishponds,

and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable.

(c) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.

(d) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation.

(e) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources.

(f) Adopting WQS and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters.

(g) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing.

(h) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of Hawai‘i Revised Statutes, section 46-6. (b) Objectives.

The Perimeter Deck (proposed action) would be consistent with the recreational resource objectives above. It would result in the creation of additional recreational options at this location along the shoreline. The rehabilitated property would be consistent with modern public safety standards whereas the site currently poses a safety risk to the public.

The War Memorial Beach would meet the recreational resource objectives. Creation and dedication of an additional beach area would satisfy the goal to increase public access along the State’s shoreline. The rehabilitated property would be consistent with modern public safety standards whereas the site currently poses a safety risk to the public.

The Closed System Pool would not fully be consistent with the recreational resource objectives, above. A closed system pool’s function could be provided away from the shoreline and does not serve to conserve natural resources.

No Action would not be consistent with the recreational resource objectives as the potential coastal recreational resource would not be realized.

Historic Resources

Objective: Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

1. Identify and analyze significant archaeological resources.
2. Maximize information retention through preservation of remains and artifacts or salvage operations.
3. Support state goals for protection, restoration, interpretation, and display of historic resources.

The Perimeter Deck (proposed action) would be consistent with historic resource objectives. The rehabilitation of this facility using modern materials and techniques would enhance, respect and preserve a structure important to history and reestablish respect for a memorial to the veterans who served in World War I.

The War Memorial Beach would not be consistent with the historic resource objectives. The demolition of this historic property would be contrary to preservation or protection.

The Closed System Pool would be consistent with the recreational resource objectives, for similar reasons as the Perimeter Deck.

No Action would not be consistent with historic resource objectives. Preservation and protection of this historic property would not be achieved.

Scenic and Open Space Resources

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

Policies:

1. Identify valued scenic resources in the coastal zone management area.
2. 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.
3. Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources.
4. Encourage those developments that are not coastal dependent to locate in inland areas.

The proposed action and alternatives would be consistent with scenic and open space resource objectives. The rehabilitation of this facility under the Perimeter Deck (proposed action) and Closed System Pool would result in the re-creation of

shoreline view areas along the extent of the new pier-supported deck currently closed to the public. The War Memorial Beach would open up views and create open space at the new beach.

No Action would not be consistent with scenic and open space resources objectives. The site is degraded with warning signage, a chain link fence, graffiti and crumbling concrete. The view provided to the public is compromised and negatively impacts the surrounding attractive natural surroundings.

Coastal Ecosystems

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

Policies:

1. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources.
2. Improve the technical basis for natural resource management.
3. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance.
4. Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land water uses, recognizing competing water needs.
5. Promote water quantity and quality planning and management practices that reflect the tolerance of freshwater and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

The Perimeter Deck (proposed action) would be consistent with the coastal ecosystems policies. Valuable coastal ecosystems would be protected and no loss of WOTUS would occur. A USACE permit for work in water would be required, which would involve the development of management measures, BMPs, and other controls to minimize impacts on protected resources. These controls would be the result of federal consultations with the federal lead agency, anticipated to be the USACE with the USFWS, NMFS, and others, as required under ESA Section 7 and the MSA.

The War Memorial Beach would generally be consistent with the coastal ecosystems policies. Valuable coastal ecosystems would be protected; however, this alternative involves a loss of 0.9 acres of Waters of the United States (WOTUS). The USACE permit process would apply and result in the development of management measures, BMPs, and other controls to minimize impacts on protected resources.

The Closed System Pool would generally be consistent with the coastal ecosystems policies. Valuable coastal ecosystems would be protected; however, this alternative involves a loss of 1.4 acres of WOTUS, which represents the greatest loss of all the

alternatives. The USACE permit process would apply and result in involve the development of management measures, BMPs, and other controls to minimize impacts on protected resources.

No Action would not be consistent with scenic and open space resources objectives. The site is degraded with warning signage, a chain link fence, graffiti and crumbling concrete. The view provided to the public is compromised and negatively impacts the surrounding attractive natural surroundings.

Coastal Hazards

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

Policies:

1. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards.
2. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards.
3. Ensure that developments comply with requirements of the Federal Flood Insurance Program.
4. Prevent coastal flooding from inland projects.

This project site is subject to tsunami, storm waves, erosion, hurricanes, wind and possibly erosion The Perimeter Deck (proposed action) would be consistent with coastal hazard objectives. The Perimeter Deck would result in a structurally and functionally reinforced Diamond Head groin, more resilient to coastal hazards. This groin would continue to facilitate accretion of sand at Sans Souci Beach, eliminating or reducing the likelihood of erosion of the beach.

Climate change, including sea level rise, would likely exacerbate impacts from coastal hazards. Final design considerations could include a 3.2-foot SLR (Tetra Tech, Inc., State of Hawai‘i, and Department of Land and Natural Resources, Office of Conservation and Coastal Lands 2017). The Perimeter Deck would also be engineered to meet current building code standards designed for anticipated coastal hazards as well as provisions of the Federal Flood Insurance Program.

The War Memorial Beach would also be consistent with coastal hazard objectives. This alternative would be designed to reinforce the Diamond Head groin and construct a new groin on the ‘Ewa side of the beach. As with the Perimeter Deck, the War Memorial Beach would be designed in compliance with building codes and construction practices related to coastal hazards, climate change and the Federal Flood Insurance Program.

The Closed System Pool would be consistent with coastal hazard objectives, for similar reasons as the Perimeter Deck.

No Action would not be consistent with coastal hazard objectives. The current degraded condition of the WWMC could pose a threat to the public, coastal resources and habitats. Coastal hazards such as a tsunami or storm wave event could result in the collapse of the WWMC in its currently degraded state. The WWMC currently does not comply with the Federal Flood Insurance Program.

5.2 COUNTY PLANS AND POLICIES

5.2.1 City and County of Honolulu General Plan

The purpose of the General Plan for the City and County of Honolulu is a statement of the long-range social, economic, environmental and design objectives for the general welfare and prosperity of the people of O‘ahu. The General Plan addresses eleven areas of concern:

1. Population
2. Economic Activity
3. Natural Environment
4. Housing
5. Transportation and Utilities
6. Energy
7. Physical Development and Urban Design
8. Public Safety
9. Health and Education
10. Culture and Recreation
11. Government Operations and Fiscal Management

Of those, the applicable areas of concern for the various alternatives analyzed in this EIS include:

- Natural Environment
- Physical Development and Urban Design
- Public Safety
- Culture and Recreation

All offshore islands and marine waters within three miles of the O‘ahu coastline are considered part of O‘ahu in terms of the applicability of the objectives and policies in the General Plan. The proposed action and each alternative are considered with the applicable goals, objectives and policies set forth the City and County of Honolulu General Plan and discussed herein.

5.2.1.1 NATURAL ENVIRONMENT

Objective A – To protect and preserve the environment

- **Policy 1.** Protect O'ahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.

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

- **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.

The Perimeter Deck (proposed action) would result in the protection of an historic scenic view and the enhancement of the public's opportunities for recreational and educational use and physical contact with O'ahu's natural environment. This action would be consistent with objectives of the natural environment.

The War Memorial Beach would be consistent with natural environment objectives. The creation of a new beach would be considered preservation and provision of recreational opportunities on O'ahu's natural environment.

The Closed System Pool would not be consistent with natural environment objectives, as it would involve the loss of 1.4 acres of WOTUS to be replaced with a closed system pool (artificial feature in the coastal area).

No Action would not be consistent with natural environment objectives. Its degraded, closed status provides no beneficial environmental, scenic, recreational, or education opportunities for the public to enjoy.

5.2.1.2 PHYSICAL DEVELOPMENT AND URBAN DESIGN

Objective A – To coordinate change 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 1.** Plan for the construction of new public facilities and utilities in the various parts of the island according to the following order of priority: first, in the primary urban center; second, in the secondary urban center of Kapolei; and third, in the urban fringe and rural areas.
- **Policy 5.** Provide for more compact development and intensive use of urban lands where compatible with the physical and social character of existing communities.
- **Policy 8.** Locate community facilities on sites that will be convenient to the people they are intended to serve.

The Perimeter Deck (proposed action) would be consistent with physical development and urban design objectives. This action would prioritize the construction of new public facilities in the primary urban center in compact development and intensive use of urban lands where compatible with the physical and social character of existing communities. The Perimeter Deck would continue to blend in its historic social character with this surrounding community and park area. The Perimeter Deck would also result in the creation of a community facility on a site which is accessible to the people and visitors it is intended to serve.

The War Memorial Beach would comply with physical development and urban design objectives. The War Memorial Beach results in the provision of a public beach and infrastructure, is appropriate for the area served and convenient to the public.

The Closed System Pool would be consistent with physical development and urban design objectives, for similar reasons as the Perimeter Deck.

No Action would not be consistent with physical development and urban design objectives. The Natatorium's degraded, closed status with warning signage and chain link fencing compromises its urban design and is inconsistent with the physical and social character of the surrounding neighborhood.

5.2.1.3 PUBLIC SAFETY

Objective B – To protect the people of O'ahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.

- **Policy 2.** Require all developments in areas subject to floods and tsunamis to be located and constructed in a manner that will not create any health or safety hazard.
- **Policy 9.** Design safe and secure public buildings.

The proposed action and the action alternatives would be consistent with public safety objectives and policies. All would be constructed with modern design techniques, consistent with current engineering standards and the use of modern materials.

No Action would not be consistent with objectives of public safety. The existing structural condition of the WWMC Natatorium would pose an increasingly unsafe condition for residents and visitors to the surrounding beach and shoreline areas.

5.2.1.4 CULTURE AND RECREATION

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

- **Policy 2.** Identify, and to the extent possible, preserve and restore buildings, sites, and areas of social, cultural, historic, architectural, and archaeological significance.
- **Policy 5.** Seek public and private funds and public participation and support, to protect social, cultural, historic, architectural and archaeological resources.

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

- **Policy 12.** Provide for safe and secure use of public parks, beaches, and recreation facilities.

The Perimeter Deck (proposed action) would be consistent with the objectives and policies for culture and recreation. This action would result in the creation of a recreational facility readily available and accessible to a large number of residents and visitors. It would also preserve an area of social, cultural, historic and architectural significance to the community, the State of Hawai‘i, historic stakeholder groups around the country, and many veterans groups around the world.

The War Memorial Beach would not comply with objectives and policies for culture and recreation. This alternative would result in the demolition of the WWMC historic property.

The Closed System Pool would be consistent with the culture and recreational resource objectives, for similar reasons as the Perimeter Deck.

No Action would not be consistent with culture and recreation objectives. By taking no action aside from routine maintenance and repairs, the preservation and protection of this historic property is not achieved.

5.2.2 Primary Urban Center Development Plan

The second tier of the system to guide land use and growth on O‘ahu after the General Plan is the Development and Sustainable Community Plans. The Primary Urban Center (PUC) is the development plan area within which the WWMC is located. The WWMC is identified as *Major Parks and Open Space* on map *A.6: Land Use Map PUC – East*. The PUC Development Plan for the City and County of Honolulu was adopted June 2004 and is one of eight community-oriented plans on the Island of O‘ahu intended to help guide public policy, investment, and decision making through the 2020 planning horizon. As of June 2018, the City is in the process of updating the PUC Development Plan. While much of the PUC is focused on urban design, density and development of housing, there are some limited policies related to cultural, historic and scenic resources that are applicable to the

proposed action and alternatives. The proposed action and alternatives are considered with the goals, objectives, and policies set forth the PUC Plan and presented below.

Chapter 3: Land Use and Transportation
3.1 Protecting and Enhancing Natural, Cultural and Scenic Resources

3.1.2 Policies
- Preserve historic and cultural sites
- Provide parks and active recreation areas

3.1.3 Guidelines
Historic and Cultural Sites

Preserve the architectural character, landscape setting and visual context of historic landmarks through appropriate zoning standards and development controls, as necessary, and public outreach programs such as design guidelines for the maintenance, renovation or expansion of older dwellings.

The Perimeter Deck (proposed action) would be consistent with land use and transportation policies. The historic and cultural site would be preserved. The WWMC would provide a parks and recreational area consistent with policies and guidelines to protect and enhance natural, cultural and scenic resources.

The War Memorial Beach would not be consistent with policies and guidelines to protect and enhance natural, cultural and scenic resources. This alternative would result in the destruction of a notable historic and cultural resource.

The Closed System Pool would be consistent with identified policies and guidelines to protect and enhance natural, cultural and scenic resources, for similar reasons as the Perimeter Deck.

No Action would not be consistent with policies and guidelines policies to protect and enhance natural, cultural and scenic resources. Completing no action aside from routine and emergency maintenance to avoid further structural failure at the site does not result in the preservation of the historic site.

5.3 FEDERAL, STATE AND COUNTY PERMITS REQUIRED FOR THE PROPOSED ACTION

The lead agency responsible for authorizing the permit or responsible for meeting the regulatory obligation/consultation is shown in parentheses.

5.3.1 Federal

- NEPA (lead Federal agency, anticipated to be USACE)
- NHPA Section 106 consultation (USACE)
- Rivers and Harbors Act Section 10 permit (USACE)

- CWA Section 404 permit (USACE with USEPA)
- CWA Section 402 NPDES permit (DOH)
- ESA Section 7 consultation (USACE)
- EFH consultation, MSA §305(b) (USACE)
- Fish and Wildlife Coordination Act of 1980 (USACE)

5.3.2 State of Hawai‘i

- HRS Chapter 343 (DDC)
- HRS Chapter 6E Historic Preservation Review (DDC)
- CWA Section 401 WQC (DOH)
- CWA Section 402 NPDES permit (DOH)
- Federal CZM Act, Federal Consistency Certification (USACE)

5.3.3 City and County of Honolulu

- Shoreline Setback Variance and Certified Shoreline (DDC)
- National Flood Insurance Program (DDC)
- SMA Permit (DDC)
- Diamond Head Special District Permit (DDC)
- Building, demolition, and grading permits (DDC)

6.0 OTHER CONSIDERATIONS

6.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction and operation of the proposed action would involve the irreversible and irretrievable commitment of financial resources, labor, construction materials and energy. There would be a permanent commitment of funds and resources to plan, design, construct, operate and maintain the facilities.

6.2 PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Implementation of the proposed action would produce unavoidable effects in the short and long term. Short-term effects are generally associated with construction, and prevail only for the duration of the construction period. Long-term effects generally follow completion of the improvements and relate to net changes to either programs or operations, and are permanent. Effects that can be considered both adverse and unavoidable are discussed below.

6.2.1 Unavoidable Adverse Short-Term Effects

- Temporary increases in soil erosion would result from construction operations, and small amounts of soil and dust may be carried beyond construction sites in surface runoff water.
- Unavoidable, but temporary, noise impacts may occur during the demolition and construction activities within the project area, and particularly during the demolition and excavation activities on the project site.
- Construction activities are expected to generate short-term impacts to air quality primarily from fugitive dust emissions.
- In-water construction is expected to generate increased water turbidity and to stir up sediments in the benthic environment of both the pool basin area and around the groin construction area.
- Traffic impacts from construction activities would be expected to occur as the result of the following types of activities:
  - Increases in truck traffic associated with removal and redistribution of excavation spoil or with imported fill materials and delivery of construction materials
  - Increases in automobile traffic associated with construction workers travelling to and from the site

6.2.2 Unavoidable Adverse Long-Term Impacts

No unavoidable adverse long-term impacts were identified for the Perimeter Deck (proposed action). The following unavoidable adverse long-term effects were identified for the alternatives.

- Significant adverse long-term impact on the nearshore physical environment with the loss of approximately 0.9 acres of WOTUS with the War Memorial Beach and the loss of approximately 1.4 acres of WOTUS with the Closed System Pool.
- Significant adverse long-term impacts on marine biology would occur with the anticipated loss of WOTUS with the War Memorial Beach and Closed System Pool.
- Significant adverse long-term impacts on historic and cultural resources would result with the War Memorial Beach and No Action.
- Significant adverse long-term impacts on visual and aesthetic resources would result with the War Memorial Beach with the loss of the historic Natatorium and its memorial arch.

6.3 UNRESOLVED ISSUES

Sea level rise is an unresolved issue under the proposed action and alternatives. This shoreline issue involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.

The following additional unresolved issues were identified for the War Memorial Beach and Closed System Pool alternatives.

- Marine resources potentially affected by offshore sand harvesting under the War Memorial Beach.
- The corridors for new electrical duct lines and a new water line to existing main lines along Kalakaua Avenue (the utility corridors would need to be identified and reviewed in accordance with HRS Chapter 6E under the War Memorial Beach and Closed System Pool).

7.0 PUBLIC PARTICIPATION

7.1 FEA-EISPN

In accordance with HAR Chapter 11-200-15, the City has consulted with all appropriate agencies in Section 11-200-10(1), other citizen groups, and concerned individuals as noted in section 11-200-9 and 11-200-9.1 Early consultation is described in the FEA-EISPN provided in Appendix A-1. Parties consulted in early consultation are provided in the FEA-EISPN in Appendix A-1. The input received since the FEA-EISPN was published by the OEQC in *The Environmental Notice* on July 23, 2014, has been considered in the development of this EIS.

The publication of the FEA-EISPN in *The Environmental Notice* resulted yielded a total of 35 comment letters. One of the letters from the NTHP and Friends of the Natatorium referenced another 126 customized letters, 1,033 supporters opposing demolition, and a letter from the WWI Memorial Commission. A second letter from the NTHP and Friends of the Natatorium referenced 17 customized letters and 129 supporters opposing demolition. Because many of these referenced letters did not have return addresses, the comments raised were responded to in the letter to the NTHP. The City's responses to comments are presented in Appendix A-2.

Table 7-1 summarizes the comments received. Because many of the comments opposed the demolition of the Natatorium, many of the comments are addressed by the Perimeter Deck, which was developed as a result of initial HRS Chapter 6E consultation and is the City's proposed action.

Table 7-1: 2014 EISPN Comments by Resource/Issue

Resource/Issue	Comment/Concern
Scope and Authority	Confirm who the "accepting authority" is.
Proposed Action and Alternatives	Disservice to Hawai'i's WWI veterans to demolish WWMC.
	Add more alternatives to be studied in the EIS.
	Discuss compliance with ADA.
Estimated Project Costs	Discuss costs of the various options including maintenance.
Construction	Construction to occur during daylight hours only.
	Discuss foreign material and sedimentation entering the water as a result of demolition and construction.
	Discuss clearing, grading and grubbing, excavation, and storage areas.
	Discuss possible assistance from NGOs with the construction and maintenance of the facility.
	Discuss use of modern materials and building techniques that may be incorporated into the engineering of the proposed action.
	Comparison of various technologies, costs, and materials associated with the alternatives analysis.
	Include discussions on impacts during the construction phase (e.g., noise, dust, and debris) on surrounding habitat, marine resources, and residents nearby.
Land Use	DPR maintains areas accessible for public use, including restrooms, parking areas, and existing landscape.
Infrastructure – Water Supply	Discuss on-site fire protection water requirements with the Honolulu Fire Department and the need for a BWS Cross Connection and Backflow prevention system.
	Discuss payment of Water System Facilities Charges.
Infrastructure – Fire Safety and Equipment Access	Discuss access design requirements, distances, and setbacks for fire equipment and vehicles, including vertical clearances.
	Discuss required fire flow requirements.
	Submit civil drawings to HFD for review and approval.

Resource/Issue	Comment/Concern
Transportation	Discuss the need for a State Department of Transportation permit for oversized vehicles, if applicable.
	Discuss inconveniences to users, e.g., the motoring public, bicyclists, pedestrians, and joggers.
	Remove bus stop shown in front of project area on the EISPN figures. A bus stop does not exist there.
	Discuss development of a monitoring program regarding leakage and falling of hauled debris materials from truck loads traveling on highways.
	DEIS should include a Traffic Impact Assessment Report with analysis of traffic impacts on surrounding roadways, including impacts during construction, mitigation measures with an anticipated increase in park users, and during special events.
	Discuss public outreach and planned engagement to address neighborhood concerns for roadways during the construction and operational phases.
	A street usage permit may be required for any closure of roadways during construction.
	Discuss the preparation of a traffic management plan to minimize impacts to pedestrians and traffic on local streets.
	Discuss any proposed or existing bicycle facilities on-site.
	Discuss off-street parking and vehicle circulation.
Flood Zone	Discuss FIRM flood zone categorization, local flood ordinances and applicable development standards in the flood zone.
Sea Level Rise	Review UH SOEST website and, in particular, predictions for SLR.
Water Quality Standards	Review standard comments at the DOH website – Land Use Planning Review program.
	Review Water Quality Standards Map and class of waters in the project area.
	Review HAR Chapter 11-54 and Chapter 11-55 for compliance, including antidegradation policy HAR Chapter 11-54.1.1, designated uses HAR Chapter 11-54-3, and water quality criteria HAR Chapter 11-54-4 through Chapter 11-54-8.
	Discuss the need for and applicability of a NDPES permit from DOH, as well as a 401 permit.
Nearshore Environment	Discuss potential impacts on Sans Souci Beach due to alterations in the near shore environment (removal of walls).
	Discuss potential alteration to current wave currents and impacts to Sans Souci Beach.

Resource/Issue	Comment/Concern
Biological Resources	Discuss impacts on surrounding vegetation, loss of shade trees and views. There are concerns by USFWS over possible impacts to Hawaiian hoary bat (and its roosting in trees and shrubs and the impact on this habitat from site clearing), hawksbill turtle, green turtle, Hawaiian seabirds (e.g., White fairy terns), wedge-tailed shearwater, Hawaiian monk seal.
	Include discussion on resources and impacts on coral reefs near the project site.
	The biological survey should quantify resource densities in numbers/percent coverage and the presence of rare and/or endemic species of concern observed in the project area.
	Review and incorporate USFWS recommended BMPs for sedimentation and erosion in aquatic environments.
	Discuss impacts to sea birds and turtles from artificial lighting – need for a comprehensive lighting plan.
	Consult with NMFS regarding sea turtles.
Cultural-Historical Resources	Discuss concerns over the current status of the Memorial (dishonoring war veterans) and the potential to demolish a living memorial to war veterans.
	Discuss the history, culture and landscape of the Natatorium including veterans concerns and the proposed anniversary events planned for World War I.
	Ensure the accurate use of terms "restoration" and "rehabilitation" and "reconstruction".
	Discuss this project with O'ahu Homestead Associations including Kewalo Hawaiian Homestead Community Association, Papakolea Community Association, Papakolea Community Development Corporation, Kalawahine Streamside Association.
	Discuss the Section 106 consultation status and process.
	Discuss how the Natatorium is tied to Hawaiian history.
Visual Impacts and landscaping	Discuss compliance with Diamond Head Special District design criteria, especially related to landscaping include off street parking area landscaping.
	Discuss the impacts to existing trees.
	Discuss aesthetic impacts.
	Discuss proposed exterior lighting.
	Recommendation to use native, non-invasive plans for any landscaping.

Resource/Issue	Comment/Concern
Socioeconomic-Recreational Resources	Discuss loss of potential future swimming opportunities at a reconstructed beach.
	Discuss perception of better safety inside the swim basin, less wave action.
	Discuss public safety issues.
	Discuss the numerous comments from the public preferring the preservation/rehabilitation of the Natatorium vice demolition.
	Discuss the possible inclusion of the Waikiki Aquarium into the planning process for the Natatorium.
	Discuss possible future competitive swim meets.
Land Use Plans, Policies, & Controls – Coastal Zone Management	Include a discussion of this project's compliance with the objectives and policies of HRS 205A in the "Land Use Plan, Policies and Controls", discussion of Federal Consistency process.
Land Use Plans, Policies, & Controls – Permits	Provide a list of federal, state, and county permits including the applicability of SMA and SSV permits.
	Discuss how federal legal requirements will be satisfied i.e., Corps permits and coordination.
	Discuss the decision-making relationship between the State, the City and the Queen Kapi'olani Trust (if applicable).
Sustainability	Discuss sustainability
Short- and Long-Term Impacts	Discuss details for BMPs and mitigation measures addressing short- and long-term impacts from demolition, removal of materials, measures for preventing material and sediment from entering and impacting aquatic resources and aquatic habitat.

7.2 HRS CHAPTER 6E CONSULTATION

As described in section 1.4, HRS Chapter 6E Historic Preservation consultations for the Natatorium were initiated in 2016. Much of the input resulting from these initial HRS Chapter 6E consultations reflected broad opposition to demolition of the Natatorium under the War Memorial Beach identified in the FEA-EISPN. Meeting information and comments received are provided in Appendix A-3.

An effort was made in early 2017 to refocus the public engagement process and introduce a concept consistent with the intent of the HRS 6E to various stakeholder groups and agencies. In May 2017, the City re-initiated its HRS Chapter 6E consultation process by conducting a meeting with the SHPD. Following SHPD's guidance, a workshop was held in July 2017 with an invited group of knowledgeable parties (constituting the "interested parties" as defined in HRS Chapter 6E). Workshop participants included:

- Friends of the Natatorium
- Historic Hawai'i Foundation

- American Institute of Architects, Honolulu Chapter
- NTHP
- DLNR SHPD

At the July 2017 workshop, historic preservation goals were clarified and confirmed, and an alternative concept was presented with an aim to meet preservation standards while addressing feasibility and functional concerns expressed by the DOH. The meeting attendees agreed that this new concept, the Perimeter Deck, showed promise as an approach to preserving the WWMC and supported its further consideration. This Perimeter Deck is intended to align with NHPA standards (e.g., the SOI's Standards for the Treatment of Historic Properties). Additional information and analysis related to the HRS Chapter 6E process is described in Section 4.12 of this EIS.

In addition to the HRS Chapter 6E consultation discussed above, meetings were held with various agencies during the summer of 2017. These meetings provided agencies with updates on the project and introduced a conceptual plan that better represents historic preservation interests while meeting all applicable laws, regulations, and rules. Agency meetings are summarized in the Pre-EIS Alternatives Technical Evaluation, presented in Appendix A-4.

8.0 SUMMARY OF IMPACTS

Table 8-1 summarizes the potential impacts by alternative.

Table 8-1: Summary of Potential Impacts

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
Land Ownership and Management	No significant impacts to land ownership and management would result from construction or operation of the Perimeter Deck. Land would remain under control of the City and County, and access to the site and surrounding area would be opened to the public following construction commencement.	No significant impacts to land ownership and management would result from construction or operation of the War Memorial Beach. The land ownership and management impacts during construction and operations of the War Memorial Beach would be greater than those of the Perimeter Deck, because the executive order for the area would need to be amended.	The land ownership and management impacts during construction and operations of the Closed System Pool would be similar to those of the Perimeter Deck.	No change and therefore no impact to land ownership and management would result from No Action.
Infrastructure and Utilities	No significant impact to infrastructure and utilities would result from construction or operation of the Perimeter Deck. Designs would identify existing infrastructure and utilities and would therefore not be impacted. No substantial utility upgrades are planned. On-site fire protection water requirements would need to be met through coordination with the Honolulu Fire Department and the BWS. The Honolulu Fire Department has identified the need for a BWS cross connection and backflow prevention system.	No significant impact from construction or operation of the War Memorial Beach would occur. Designs would identify existing infrastructure and utilities, and would therefore not impact existing systems. The War Memorial Beach would include improvements to on-site water, wastewater, electrical/ telecommunication systems, and storm drainage systems. Improvements would include a new pad-mounted transformer (location to be determined). New duct lines for electrical and a new water line to main lines along	No significant impact from construction or operation of the Closed System Pool would occur. The process to plan, design, and implement infrastructure and utilities involve professional engineers and would, therefore, be done in a manner that would not significantly impact infrastructure and utilities. Any impacts would instead be expressed in costs and time. Utility studies would be needed to identify anticipated demand, infrastructure, routing, costs and time for installation. For example,	No change and therefore no impact to infrastructure and utilities would result from the No Action alternative.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
	Operational utilities demand would be similar to the No Action alternative.	Kalakaua Avenue would be needed. Similar to the Perimeter Deck, fire protection water requirements will need to be met. Operational utilities demand from the bath house and lighting would not represent a significant increase in demand and would be comparable to other beach use, but would include lighting on the reconstructed memorial arch.	the Closed System Pool assumes that fresh pool water would be extracted from a dedicated well; however, a well location has not been identified and a well siting study was not conducted for this EIS. Additionally, substantial discussion with professional engineers would be needed to plan for the possible demand on the wastewater system during events when the pool would need to be drained for maintenance or other reasons, e.g., natural hazards. The need for a continuously running pump to maintain circulation and water quality in the Closed System Pool would create the greatest long-term demand for potable water, electricity, and wastewater over all other action alternatives.	
Transportation	No significant impact to transportation would occur from construction or operation of the Perimeter Deck. Best construction practices such as avoiding major truck activity during peak traffic hours and preparing required traffic control plans would be used to minimize temporary construction-related impacts. No significant impacts to transportation during operations	No significant impact to transportation would occur from construction or operation of the War Memorial Beach. The transportation impacts would be similar to those described in the Perimeter Deck. The additional construction vehicular trips for beach sand (4 to 6 truckloads per hour over the course of 20 days in 10-hour work days) would also be managed with best construction practices.	No significant impact to transportation would occur from construction or operation of the Closed System Pool. The transportation impacts would be similar to those described in the Perimeter Deck.	No change and therefore no impact to transportation would result from No Action.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
	of the Perimeter Deck would occur. There would be no change in transportation factors, e.g., no change in parking stalls or growth on this segment of Kalakaua Avenue.			
Noise	No significant impact from construction or operation noise under the Perimeter Deck would occur. Construction would be temporary (approximately 7 months), limited to daytime, and would operate under a State permit in accordance with HAR Chapter 11-46 that will control noise. Operational impacts could include voices from the Perimeter Deck basin and bleachers being audible from neighboring beaches. Such voices are not expected to exceed allowable levels in accordance with HAR Chapter 11-46 and would therefore not be significant. Any large planned gatherings would require a City permit, which will serve to control noise.	No significant impact from construction or operation noise under the War Memorial Beach would occur. The noise impacts of the War Memorial Beach would be similar to those of the Perimeter Deck. Duration of construction would be longer than the Perimeter Deck construction by approximately 2 months, at approximately 9 months, and would involve greater landside activities. These noise impacts are not expected to be significant as they would be temporary, be limited to daytime, and occur under a State permit in accordance with HAR Chapter 11-46 that will control noise.	No significant impact from construction or operation noise under the Closed System Pool would occur. The noise impacts of the Closed System Pool would be greater than those of the Perimeter Deck and War Memorial Beach. Duration of construction would be the longest of all of the action alternatives at approximately 12 months, and longer in duration than the Perimeter Deck by approximately 5 months. These noise impacts are not expected to be significant as they would be temporary, be limited to daytime, and occur under a State permit in accordance with HAR Chapter 11-46 that will control noise. The pool pump would be a source of continuous noise. With acoustic treatment, noise would be minimized, but would contribute to the new background noise.	No change and therefore no impact to and from noise would result from No Action.
Climate and Air Quality	No significant impacts to the climate (as considered through GHGs) or air quality would occur from construction and operation	No significant impact from construction or operation of the War Memorial Beach would occur. Climate and air quality	No significant impact from construction or operation of the Closed System Pool would occur. Climate and air quality impacts	No change and therefore no impacts to the climate and air

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
	of the Perimeter Deck. Construction-related GHG pollutants would be temporary, controlled, and insignificant compared to statewide emissions. Emissions of regulated air pollutants would also be temporary and, in addition, controlled as required under HAR Chapter 11-60.1-33 (fugitive dust). Construction-related vehicular emissions would not significantly impact air quality as they would be temporary, relatively low volume (compared to the volume needed to generate a pollutant "hot spot"), and unlikely to be concentrated with frequent trade wind conditions. Operational emissions of GHG and regulated air pollutants would not be significant. Perimeter Deck users would need to compete for existing parking stalls and use other forms of transportation, e.g., mass transit. Vehicular emissions of GHGs and regulated air pollutants could therefore occur from the use of any additional mass transit that would be needed to support this growth, but would not significantly impact State GHG emissions or air quality.	impacts during construction and operations of the War Memorial Beach would be greater than those of the Perimeter Deck. Additional construction-related GHG and regulated air pollutant emissions would occur from offshore sand recovery and truck hauling from the sand barge to the project site. For the same reasons discussed in the Perimeter Deck, these additional emissions would not significantly impact the State GHG emissions or air quality. Operational maintenance of the beach is expected to involve regular sand replenishment. While these impacts would not significantly impact State GHG emissions and air quality, they represent an additional source of GHG emissions that would indefinitely contribute to the State's GHG emissions. The approximately 525 to 700 truckloads over an estimated 20 days, or 4 to 6 truckloads per hour over a 10-hour work day, would not significantly impact air quality.	during construction and operations would be greater than those of the Perimeter Deck and War Memorial Beach. Operational activities would include the use of a continuously running pool pump to maintain circulation and water quality, along with regular maintenance. While these emissions would occur where electrical generation is occurring, e.g., Kahe power plant, and would be indirect effects, they would not significantly impact State GHG emissions and air quality. These emissions would represent an additional source of GHG emissions that would indefinitely contribute to the State's GHG emissions.	quality would result from No Action.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
Topography, Geology, and Hydrology	No significant impacts to topography, geology, or hydrology would occur from construction and operation of the Perimeter Deck. No substantial changes would occur with the removal of beach quality sand in the pool.	No significant impacts to topography, geology, or hydrology would occur from construction and operation of the War Memorial Beach. Impacts to underwater topography (bathymetry) and geology would be limited to the footprint of the Natatorium pool.	No significant impacts to topography, geology, or hydrology would occur from construction and operation of the Closed System Pool. Impacts to underwater topography (bathymetry) and geology would be limited to the footprint of the Natatorium pool.	No change and therefore no impacts to topography, geology, and hydrology would occur with no action.
Natural Hazards	No significant impact from or to natural hazards from construction or operation of the Perimeter Deck would occur. The Perimeter Deck would not exacerbate effects of natural hazards with BMPs for the project construction site in the event of natural hazards. The Perimeter Deck would improve the structural integrity of the Natatorium, potentially minimizing impacts from natural hazards.	No significant impact from or to natural hazards from construction or operation of the War Memorial Beach would occur. Impacts associated with the War Memorial Beach would be similar to those of the Perimeter Deck.	No significant impact from or to natural hazards from construction or operation of the War Memorial Beach would occur. Impacts associated with the Closed System Pool would be similar to those of the Perimeter Deck. Additionally, during operations, natural hazards could cause waves to overtop the perimeter wall and alter the pool water quality.	Under No Action, the Natatorium would be more vulnerable to the impacts of natural hazards in its dilapidated state. Significant impact to the facility could result from coastal hazards including hurricanes, tsunamis, and storm waves. Impacts resulting in Natatorium debris could also exacerbate the effects of natural hazards with the loose debris, increasing risk to public safety.
Nearshore Physical Environment and Sea Level	No significant impact to the nearshore physical environment is anticipated from construction or operation of the Perimeter	Significant impacts to the nearshore physical environment are anticipated from construction and operation of the War	Significant impacts to the nearshore physical environment are anticipated from construction and operation of the Closed	No change and therefore no impact to the nearshore physical

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
Rise	Deck. The function of the Diamond Head groin—preserving Sans Souci Beach—would be maintained throughout construction and operation. The Perimeter Deck would not result in loss of WOTUS. Designs could consider SLR, structural concerns, historic preservation interest, and costs. Decisions would be made to avoid significant impacts on the nearshore environment. **Unresolved Issue.** Sea level rise is an issue that involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.	Memorial Beach. The function of the Diamond Head groin–preserving Sans Souci Beach—would be maintained throughout construction and operation. The War Memorial Beach would include loss of approximately 0.9 acres of WOTUS. Long-term impacts from SLR would result in beach loss and increased long-term maintenance requirements. **Unresolved Issue.** Sea level rise is an issue that involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.	System Pool. The function of the Diamond Head groin—preserving Sans Souci Beach—would be maintained throughout construction and operation. The Closed System Pool would include loss of WOTUS, as the entire pool area (approximately 1.4 acres) would be lost. Long-term impacts from SLR would result in increased overtopping of the perimeter deck and potential inundation of the pool. Design of the Closed System Pool would incorporate future SLR scenarios. **Unresolved Issue.** Sea level rise is an issue that involves costs and subjective trade-offs, including any impact on the historic structure, to avoid further indecision and lack of action.	environment would occur with no action. The effects of SLR are expected to be evident soonest on the WWMC under this alternative. It is anticipated that SLR would result in more frequent overtopping of perimeter walls, further dilapidation of the structure, and eventual full or partial inundation of the current perimeter deck.
Water Quality	No significant impacts to water quality would occur from construction of the Perimeter Deck. The USACE permit needed for in-water construction activities would require compliance with CWA Section 401 that requires BMPs to prevent adverse effects on water quality from occurring. Long-term beneficial and significant impacts on the water	Significant beneficial long-term impacts on water quality would result from War Memorial Beach as circulation and water quality would improve. The water quality impacts of the War Memorial Beach would be similar to those of the Perimeter Deck.	No significant impacts to water quality would occur from construction and operation of the Closed System Pool. The USACE permit needed for in-water construction activities would require compliance with CWA Section 401 that requires BMPs to prevent adverse effects on water quality from occurring. The water and operations of the Closed System Pool would no	No change and therefore no impact to water quality would result from No Action.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
	quality within the existing basin would occur. However, elevated turbidity is anticipated during an interim post-construction period until equilibrium is reached. Water quality would be monitored, as coordinated with the DOH. Beach closures may be prudent for intermittent periods and as coordinated with neighboring beach stakeholders.		longer be part of marine waters; rather, the water quality would be subject to the WQS set forth in HAR Chapter 11-10, public swimming pools. Treated pool water could spill out into adjacent marine waters during unusual natural hazards such as hurricanes. The impacts would be dependent on the event, but would be considered finite, temporary, and therefore not significant to marine water quality for the purpose of this EIS.	
Marine Biology	No significant impacts to marine biological resources are anticipated from construction and operation of the Perimeter Deck. The USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305(b)), and compliance with CWA Section 401, which would set forth BMPs to prevent adverse effects on protected marine species and EFH from occurring. Further, with the use of appropriate perimeter barriers during construction, impacts from increased turbidity to the surrounding reefs are not anticipated. Any offsets for EFH loss would be identified in the consultation process. No significant impacts on marine	Significant impacts to aquatic resources would occur from construction of the War Memorial Beach with the loss of 0.9 acres of WOTUS. The USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305(b)), and compliance with CWA Section 401, which will set forth BMPs to prevent adverse effects on protected marine species and EFH from occurring during construction. Any offsets for EFH loss would be identified in the consultation process. Additional studies would be needed to evaluate the marine resources potentially affected by offshore sand harvesting and is an	Significant impacts to aquatic resources would occur from construction of the Closed System Pool with the loss of 1.4 acres of WOTUS. The USACE permit needed for in-water construction activities would require, at a minimum, ESA Section 7 consultation, EFH consultation (MSA §305(b)), and compliance with CWA Section 401, which will set forth BMPs to prevent adverse effects on protected marine species and EFH from occurring during construction. With the containment of sediment and use of appropriate perimeter barriers during construction, impacts to surrounding reefs from increased turbidity are not anticipated. Any offsets for EFH loss would be	No change and therefore no impact to marine biological resources would result from No Action. However, the entrapment hazard for monk seals would remain an issue.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
	biological resources from the anticipated operational uses, such as swimming, are anticipated. Beneficial effects would include the loss of an existing marine mammal entrapment hazard.	unresolved issue. No significant impacts on marine biological resources from operational uses, such as swimming, are anticipated. Beneficial effects would include the loss of an existing marine mammal entrapment hazard.	identified in the consultation process. No significant impacts on adjacent marine biological resources from the anticipated operational uses within the enclosed pool, such as swimming, are anticipated. Rather, beneficial effects would include the loss of an existing marine mammal entrapment hazard.	
Terrestrial Biology	No significant impact to terrestrial biological resources would result from construction and operation of the Perimeter Deck. Existing laws and the USACE permit required for in-water construction work would serve to protect regulated species. As exceptional trees may not be part of the federal consultation process, mitigation is recommended for exceptional trees.	No significant impact to terrestrial biological resources would result from construction and operation of the War Memorial Beach. The potential impacts to the terrestrial biological resources during construction and operation of the War Memorial Beach would be greater than those of the Perimeter Deck; however, existing laws and the USACE permit required for in-water construction work would serve to protect regulated species. As exceptional trees may not be part of the federal consultation process, mitigation is recommended for exceptional trees.	No significant impact to terrestrial biological resources would result from construction and operation of the Closed System Pool. The impacts to the terrestrial biological resources during construction and operations of the Closed System Pool would be similar to those of the Perimeter Deck. Similarly, mitigation is recommended for exceptional trees.	No change and therefore no impact to terrestrial biological resources would result from No Action.
Historic and Cultural Resources	Significant beneficial impacts to historic and cultural resources would result from construction and operation of the Perimeter Deck. The rehabilitation of the	Significant adverse impacts to historic and cultural resources would result from construction and operation of the War Memorial Beach. The demolition	Significant beneficial impacts to historic and cultural resources would result from construction and operation of the Closed System Pool. The historic and	No change and therefore no impact to historic and cultural resources would

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
	deteriorating Natatorium would significantly benefit the unique historic structure and the historic Kapi'olani Regional Park. With the HRS Chapter 6E historic review process, consultation, SHPD concurrence, and the provisions of HRS Chapter 6E that protect inadvertent discoveries, no adverse significant impacts would occur during construction. Operation of the Perimeter Deck would result in significant beneficial impacts as it would reinstate the living memorial, allow uses such as swimming and other cultural practices, and reestablish public access to this portion of the historic Kapi'olani Regional Park.	of the Natatorium, due to its status as a National Register of Historic Places listed property, is protected against demolition as part of projects requiring Federal permits. If demolition is selected, the process to gain approvals for it is expected to result in substantial resources to justify demolition and delays in obtaining required approvals and permits, e.g., USACE permit and HRS Chapter 6E historic preservation review. **Unresolved Issue.** The corridors for new electrical duct lines and a new water line to existing main lines along Kalakaua Avenue would need to be identified and reviewed in accordance with HRS Chapter 6E.	cultural impacts of the Closed System Pool would be similar to those of the Perimeter Deck. The main difference is the alteration of the naturally ocean-fed swim basin to a closed-system artificially circulating swimming pool However, while the function of the swim basin interior would be different, the historic character of the Natatorium structure as a whole would not be substantially altered, with the same changes as the Perimeter Deck in terms of the memorial arch, urns, flagpoles, walls, façade, stadium seating structure (bleachers), courtyard walls, lighting, landscape features, concrete deck, and dimensions of the swim basin. The addition of the closed pool would include more non-historic fabric added to the historic structure, but most of this would be below water level, such as the pool liner, or concealed, such as pump equipment. **Unresolved Issue.** The corridors for new electrical duct lines, new water line, and any new well would need to be identified and reviewed in accordance with HRS Chapter 6E.	result from No Action. However, the long-term impact of No Action on the Natatorium, Kapi'olani Regional Park, and certain cultural practices would be significant and adverse.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
Visual Resources	Significant beneficial impacts to visual resources and aesthetics would result from the Perimeter Deck. Construction impacts would be adverse but temporary and not significant. Significant beneficial impacts would occur from reconstruction and extend during operations as significant views from the currently closed Natatorium would be available. Existing views of the Natatorium from the adjacent shoreline promenade and Sans Souci Beach would also improve.	Significant adverse impacts to existing views and aesthetics would result from the War Memorial Beach, as this alternative would include demolition and permanent loss of the historic Natatorium. Construction impacts would be adverse and slightly greater than the Perimeter Deck because construction duration is two months longer; however, they would be temporary and not significant. Significant adverse impacts would occur from demolition and extend during operations as the view of the memorial arch would be permanently lost and replaced with a less visually prominent replica.	Significant beneficial impacts to visual resources and aesthetics would result from the Closed System Pool. The impacts to visual resources from the construction phase and operations of Closed System Pool would be similar to those described in the Perimeter Deck, although construction impacts would be slightly greater with a construction period four month longer than the Perimeter Deck.	No change and therefore no impact to visual and aesthetic resources would result from No Action.
Public Services	No significant impacts to public services would result from construction and operation of the Perimeter Deck. Additional City staff (e.g., a total of 4 lifeguards) and associated budget would be needed to operate the publicly accessible area. With the additional 317 users per day, no significant impacts on HPD, HFD, EMS, or ENV for solid waste are anticipated.	No significant impacts to public services would result from construction and operation of the War Memorial Beach. Additional City staff (e.g., a total of 5 lifeguards) and associated budget would be needed to operate the publicly accessible area and would be greater than those of the Perimeter Deck. With the additional 317 users per day, no significant effects on HPD, HFD, EMS, or ENV for solid waste is anticipated.	No significant impacts to public services would result from the construction and operation of the Closed System Pool. Additional City staff and associated budget would be needed to operate the publicly accessible area and would be similar to those of the Perimeter Deck. With the additional 317 users per day, no significant effects on HPD, HFD, EMS, or ENV for solid waste is anticipated.	No change and therefore no impact to public services would result from No Action.

	Proposed Action Perimeter Deck	War Memorial Beach	Closed System Pool	No Action
Socioeconomics and Recreation	No significant impact to socioeconomic environment would result from construction and operation of the Perimeter Deck. The additional jobs associated with the 7-month, $25.6 million project would be a beneficial and temporary impact. Depending on timing with other in-water construction projects, such as the $450+ million Kapalama wharf and container terminal project, adverse impacts in the form of increased cost and construction delay could result.	No significant impact to socioeconomic environment would result from construction and operation of the War Memorial Beach. Impacts would be similar to those of the Perimeter Deck. This $28.8 million project is likely to generate additional jobs and be of longer duration than the Perimeter Deck.	No significant impact to socioeconomic environment would result from construction and operation of the Closed System Pool. Impacts would be similar to the Perimeter Deck. This $42.7 million project would be substantially greater than the Perimeter Deck and War Memorial Beach.	No change and therefore no impact to public services would result from No Action.
Preliminary Estimated Capital Costs (Construction)	$25.6 million	$28.8 million	$42.7 million	$0 (but could be $1.4 million in emergency repairs)
Preliminary Estimated Operations & Maintenance Costs, annual (Operation)	$341,805	$345,740	$406,870	$0
Estimated Construction Duration	28 weeks (6.5 months)	36 weeks (8.5 months)	49 weeks (11.5 months)	Not applicable

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