

Pearl Harbor Historic Trail MASTER PLAN



**City and County of Honolulu
Jeremy Harris, Mayor**

May 2001

Pearl Harbor Historic Trail MASTER PLAN

ACKNOWLEDGMENTS

Prepared by: Belt Collins Hawai'i

Date: May 2001

Acknowledgments: 'Aiea-Pearl City Community Vision Group
Citizens Advisory Committee for the Pearl Harbor Historic Trail
Hawaiian Railway Society
The Honorable Jeremy Harris, Mayor, City and County of Honolulu
Councilmember Gary Okino (District 8), City and County of Honolulu
Department of Planning and Permitting, City and County of Honolulu

MESSAGE FROM THE MAYOR



Jeremy Harris, Mayor

Office of the Mayor
CITY AND COUNTY OF HONOLULU

530 SOUTH KING STREET, ROOM 300 • HONOLULU, HAWAII 96813
PHONE: (808) 523-4141 • FAX: (808) 527-5552



JEREMY HARRIS
MAYOR

Aloha and E Komo Mai!

As we embark on a new millennium filled with hope and opportunity for the City and County of Honolulu, I am proud to recognize the accomplishments of the 'Aiea-Pearl City Community Vision Group, and the Citizens Advisory Committee for the Pearl Harbor Historic Trail in developing this Master Plan.

The Pearl Harbor Historic Trail is an important element in the unique partnership the City has forged with its citizens, which we call the "21st Century Visioning Process." It is an excellent example of how we can use this new government approach to facilitate positive change in our communities.

With the vision of community leaders and the cooperation of government, private sector, and non-profit stakeholders, the Pearl Harbor Historic Trail promises to fulfill its mission to become a world-class heritage and recreational facility linking Leeward communities from 'Aiea to Nanakuli that will enhance the quality of life for Hawai'i residents and visitors. Bicyclists, joggers, walkers, birdwatchers, schoolchildren, and senior citizens who come to appreciate the unique historic, cultural, and natural resources will all benefit. The Trail also offers Leeward O'ahu regional communities an important opportunity for economic development and revitalization.

From early Hawaiian fishponds and taro patches to its historic railroad linking heritage-rich sugar plantation towns, and from wetlands and natural habitats to popular Pearl Harbor visitor attractions, Leeward O'ahu has much to offer along the Pearl Harbor Historic Trail.

Just as the participants in this landmark project have done, I invite all of you to become an active partner in our *21st Century Oahu Shared Vision for the Future*.

Sincerely,



A SHARED VISION FOR THE FUTURE

The 'Aiea-Pearl City Community Vision Group welcomes you to the Pearl Harbor Historic Trail. This is your community project. We hope you will find this master plan for the Trail informative and engaging, and a valid framework for future development along our shared coastline.

The Pearl Harbor Historic Trail project originated as a grant application under the federal Empowerment Zone for 'Aiea shoreline redevelopment. It quickly blossomed into a regional concept that realizes the importance of Pearl Harbor as a natural asset to all of the communities on O'ahu's Leeward Coast.

The Pearl Harbor Historic Trail will once again link Leeward communities from 'Aiea to Nanakuli, stimulate a renewed appreciation for our almost forgotten shoreline, and acquaint us with Pearl Harbor, a source of strength for our ancestors. As Leeward O'ahu becomes more urbanized, the "rediscovery" of Pearl Harbor affords opportunities for new recreation outlets reconnecting families and friends. New economic engines, in the form of eco-tourism and environmentally sensitive development, will revitalize our communities.

We would like to thank Mayor Harris for the opportunity his 21st Century Visioning Process provides for improving the living environment of our communities. Mahalo to consultants Lisa Reinke and Sue Sakai of Belt Collins Hawai'i for their guidance and expertise, and to the community members who participated in the Citizens Advisory Committee workshops/meetings for providing their recollections and ideas for potential development. Mahalo also to the ancestors who gave us the history to reflect upon and the inspiration to move forward.

We urge you to join us in the journey along the Pearl Harbor Historic Trail. It is our vision that *kama'aina* and *malihini*, young and old, will navigate the Pearl Harbor Historic Trail with renewed respect and appreciation for our unique history, culture, and natural resources for generations to come.

MESSAGE FROM THE 'AIEA-PEARL CITY COMMUNITY VISION GROUP



'Aiea-Pearl City Community Vision Group

A JOURNEY THROUGH TIME

Explore the Pearl Harbor Historic Trail and gain a fresh perspective of Hawai'i's history and culture. Whether you're a visitor or resident, you can travel back in time on a well-worn path. If you're a nostalgic trains-buff, an avid bicyclist, jogger, nature hiker, or just love the outdoors, you'll find the Pearl Harbor Historic Trail to be a link to a variety of activities. The Trail runs along miles of beach parks and harbor shoreline, golf courses, sports complexes, fishponds, and wildlife refuge areas.

The adventure begins at Halawa Landing, where you'll find yourself within the expanse of the Pearl Harbor Naval Complex, a National Historic Landmark. The Complex contains remnants of ancient Hawaiian fishponds amidst solemn reminders of World War II—the USS *Arizona* Memorial, the USS *Bowfin* Submarine Park & Museum, and the Battleship *Missouri* Memorial.

Farther along the Trail, you'll pass through colorful Old Hawai'i plantation towns and agricultural lands that were linked to the docks of Honolulu and Pearl Harbor in the 19th century by the OR&L railroad. Established in 1889 to serve Hawai'i's sugar industry, the railroad circumscribed the coastline of West O'ahu around Ka'ena Point to the lush North Shore, a trip one can only imagine today.

On the 'Ewa Plain, the Trail passes by the new City of Kapolei and historic Kalaeloa (former Barbers Point Naval Air Station), a culturally rich area first settled by ancient Hawaiians between A.D. 1250 and 1450. You'll have a rare glimpse of archaeological treasures, including stone remains of ancient *hale* (house) and *heiau* (place of worship) foundations.

You can ride the Hawaiian Railway's 6-mile-long route between 'Ewa station and Kahe "Tracks" Beach in Nanakuli and imagine living in plantation-era Hawai'i before the first automobiles. After the initial phase of track restoration is completed, you'll be able to ride the train all the way to Waipahu Town to visit Waipahu Cultural Garden Park and Hawai'i's Plantation Village.

You'll learn about the dozens of plant and wildlife species that dwell along the Trail, where you will encounter three major ecosystems: the wetlands of the Pearl Harbor Estuary, the 'Ewa Plain and dry savanna, and the leeward marine coastline. Along the Pearl Harbor Historic Trail, you'll have interpretive opportunities to not only "talk story" about the area's wildlife and natural habitats but also experience them up close.

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

PAGE	
1-1	Vision and Purpose of this Report
1-1	History of the OR&L Railroad
1-7	The Planning Process
1-7	Report Contents

CHAPTER TWO: GOALS AND OBJECTIVES

PAGE	
2-1	Introduction
2-1	Vision Statement
2-1	Goals and Objectives

CHAPTER THREE: LONG-RANGE PLAN

PAGE	
3-1	Introduction
3-1	Projects and Programs
3-1	Recreational Network
3-10	Heritage Corridor
3-11	A Restored Historic Railway
3-13	Feasibility of Railway Expansion
3-13	Opportunities for Community & Economic Revitalization
3-18	Opportunities on Navy Lands
3-20	Environmental Preservation
3-21	Trail Alignment & Constraints
3-22	Trail Access and Connections

CHAPTER FOUR: IMPLEMENTING ACTIONS

PAGE	
4-1	Trail Management
4-1	The City's Role
4-2	Friends of the Pearl Harbor Historic Trail
4-2	Funding Options
4-2	Federal Funds

PAGE	
4-4	State Funds
4-4	City Funds
4-5	Private Funds
4-6	Action Plan
4-6	Trail Protection
4-7	Permits and Approvals
4-9	Priority Projects and Programs 2001-2005
4-15	Future Projects 2006-2025

CHAPTER FIVE: DESIGN GUIDELINES

PAGE	
5-1	Introduction
5-1	Path Design
5-4	Universal Access
5-4	Trail Amenities
5-7	Site Furnishings
5-9	Open Space

CHAPTER SIX: REFERENCES

APPENDICES

Appendix A:	Trail Ownership and Zoning
Appendix B:	Community Participation Summary
Appendix C:	Natural Resources
Appendix D:	Cultural/Interpretive Potential
Appendix E:	Railway Infrastructure

LIST OF TABLES

PAGE	
3-23	Trail Connections: 'Aiea/Pearl City to Waipahu
3-26	Trail Connections: Waipahu to 'Ewa
3-27	Trail Connections: 'Ewa to Kapolei
3-33	Trail Connections: Kapolei to Nanakuli

PAGE	
4-1	Partners Reference List
5-11	Ecosystems in Pearl Harbor, 'Ewa, and Wai'anae

LIST OF FIGURES

PAGE	
1-2	Figure 1-1: OR&L Right-of-Way
1-4	Historic Time Line
1-6	Figure 1-2: OR&L Railroad System on O'ahu
1-8	Figure 1-3: Planning Process
2-3	Figure 2-1: Trail at Nanakuli Shoreline
3-2	Figure 3-1: Long-Range Master Plan: 'Aiea/Pearl City to Waipahu
3-4	Figure 3-2: Long-Range Master Plan: Waipahu to 'Ewa
3-6	Figure 3-3: Long-Range Master Plan: 'Ewa to Kapolei
3-8	Figure 3-4: Long-Range Master Plan: Kapolei to Nanakuli
3-15	Figure 3-5: Waipahu Depot Proposed Redevelopment
3-16	Figure 3-6: Waipahu Junction Proposed Redevelopment
3-17	Figure 3-7: Harbor Center Plan Proposed Redevelopment
3-19	Figure 3-8: Harbor Center Proposed Redevelopment
3-25	Figure 3-9: Trail Connections: 'Aiea/Pearl City to Waipahu
3-29	Figure 3-10: Trail Connections: Waipahu to 'Ewa
3-31	Figure 3-11: Trail Connections: 'Ewa to Kapolei
3-35	Figure 3-12: Trail Connections: Kapolei to Nanakuli
5-2	Figure 5-1: Trail at Wildlife Refuge
5-3	Figure 5-2: Waterfront Promenade
5-5	Figure 5-3: Trail Obstruction Setbacks
5-8	Figure 5-4: Trail Signage Concepts
5-12	Figure 5-5: Trail Through Residential Areas

**Pearl Harbor Historic Trail
MASTER PLAN**

CHAPTER ONE

INTRODUCTION

VISION AND PURPOSE OF THIS REPORT

In 1998, Honolulu Mayor Jeremy Harris empowered citizen “Community Vision Groups” to plan projects and make decisions about improving their neighborhoods, parks, and roads. The ‘Aiea-Pearl City Community Vision Group’s Year 2000 project evolved into a long-range Master Plan for the Pearl Harbor Historic Trail, an 18.6-mile long rail-and-trail system that will link neighborhoods to beach parks and other recreation areas, regional attractions, historic sites, and nature habitats between ‘Aiea and Nanakuli. The project was an offshoot of efforts by the ‘Aiea and Pearl City communities to obtain federal economic empowerment zone grants.

The Community Vision Group saw the old O‘ahu Railway and Land Company (OR&L) right-of-way as a valuable asset within their communities that had the potential, if developed wisely, to meet a number of community needs such as safe bicycle and pedestrian paths for their children, a natural and historic preservation project, a recreation resource, a means of opening up shoreline access, and an opportunity for economic revitalization.

The City & County of Honolulu (City) Department of Planning and Permitting (DPP) and its consultant, Belt Collins Hawai‘i, prepared this Pearl Harbor Historic Trail Master Plan to attain that vision.

The purpose of the Master Plan is to focus attention on enhancements that can be made along the OR&L right-of-way, offer guidance to community groups and other decision-makers by establishing goals and objectives, prioritize short-term and long-term projects, and outline funding.



Above: OR&L train with two locomotives loaded with pineapples leaving Waipahu station, 1945.

PHOTO CREDIT: KENT COCHRANE, BISHOP MUSEUM

The Master Plan can be used to:

- encourage the involvement of community members in planning and implementing projects related to the Trail;
- increase awareness and raise the level of importance of the recreational and economic benefits of the Trail;
- provide design guidelines for future Trail improvements and adjoining development, and
- support efforts to secure project funding.

The Master Plan incorporates a combination shared-use path and railway that extends from ‘Aiea to Nanakuli in West O‘ahu and encourages the development of various associated activities and linkages.

The State of Hawai‘i (State) Department of Transportation (DOT) is currently designing the Leeward Bikeway, a shared-use path from Waipahu to Nanakuli, linking with the City’s existing Pearl Harbor Bike Path. This master plan provides ideas for enhancing this path system. The alignment of the proposed Trail as it links the communities along the corridor is shown in Figure 1-1: OR&L Right-of-Way.

HISTORY OF THE OR&L RAILROAD

The old OR&L right-of-way is the foundation upon which the proposed Pearl Harbor Historic Trail will be built. The railroad right-of-way is not only a physical asset to the community but an historic asset as well.

The story of the railway’s existence begins near the end of the Hawaiian monarchy period, runs through the sugar plantation and World War II eras, and ends with the demise of O‘ahu’s sugar industry. (See Insert: Historic Time Line.)

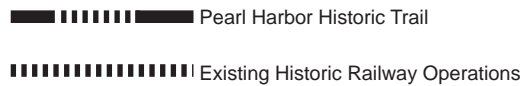
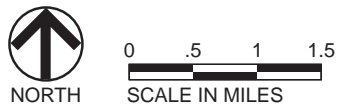
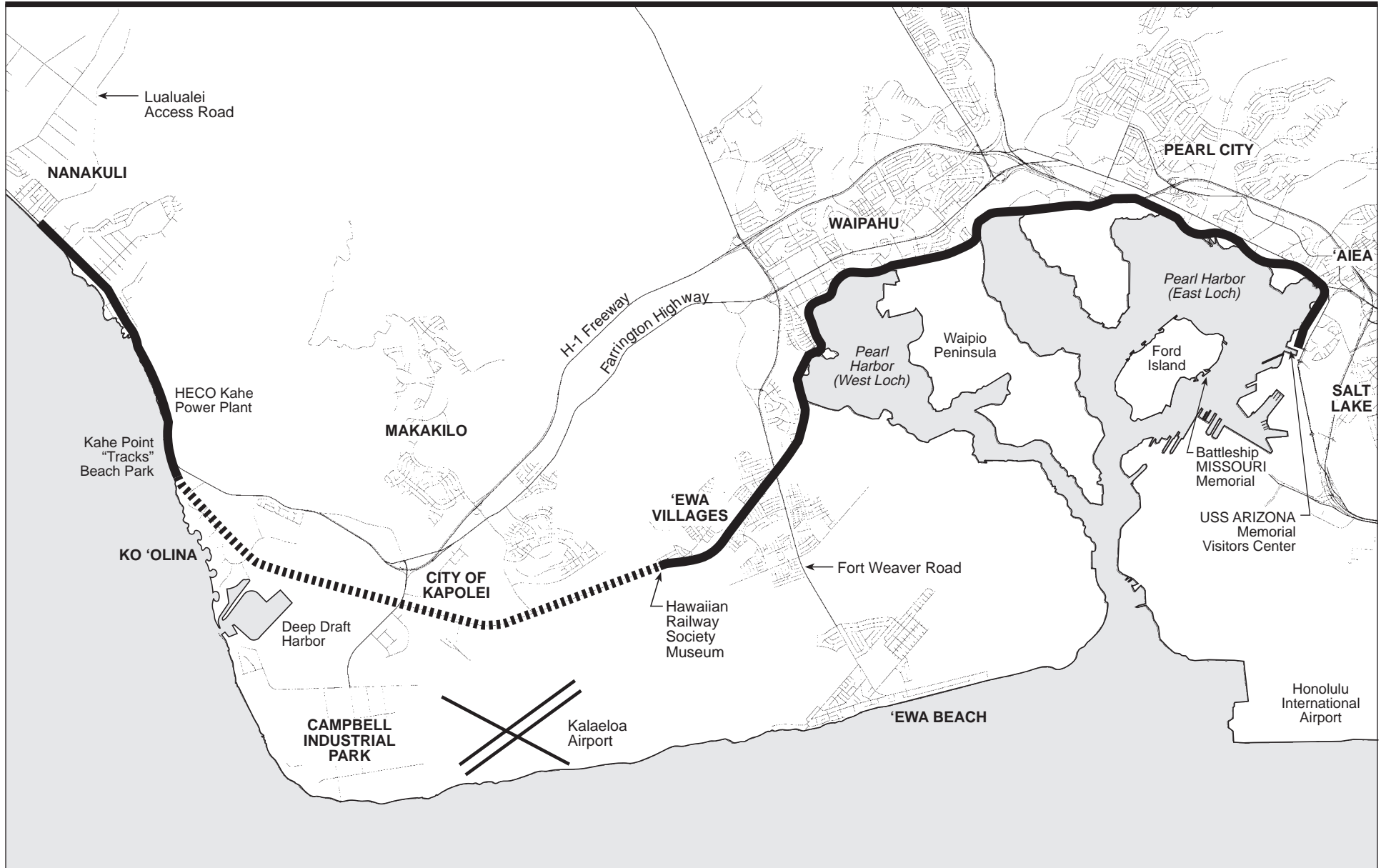


Figure 1-1
OR&L Right-of-Way

The OR&L was established in 1889 by Benjamin F. Dillingham to serve the transportation needs of developing sugar plantations on O‘ahu.

The railway system ran from the docks of Honolulu Harbor, through the Leeward communities of ‘Ewa and Wai‘anae, then around Ka‘ena Point to Hale‘iwa and Kahuku on O‘ahu’s north shore. In addition to the coastal line, a second route ran inland to Central O‘ahu. (See Figure 1-2: OR&L Railroad System on O‘ahu.)

The OR&L was a “common carrier” railway that also generated revenues by transporting passengers and freight. There were major stations at Pearl City, Waipahu, and ‘Ewa Mill, as well as eight other stops between ‘Aiea and Nanakuli. The Waipahu Depot was an important junction for railroad lines going to ‘Ewa-Wai‘anae-Hale‘iwa-Kahuku, as well as to Wahiawa in Central O‘ahu. Spurs from the Waipahu Depot served the Waipahu Sugar Mill. ‘Ewa Station, at the ‘Ewa Sugar Mill, had facilities for storing and maintaining the OR&L’s locomotives.

After the turn of the 20th century, the Hawaiian Pineapple Company (Dole) increased the train’s freight traffic by more than 30 percent. At the same time, the U.S. Navy converted Pearl Harbor Lagoon into a major naval base, and the largest U.S. Army base in the Pacific was established at Schofield Barracks.

Both of these important military bases were linked to Honolulu Harbor and to each other by OR&L lines. During World War I and, more critically, World War II, the railroad served the military by transporting troops and munitions on O‘ahu.

After 1948, when the Navy acquired the section of the OR&L right-of-way between West Loch and Halawa Landing, the tracks were abandoned. The Navy constructed underground fuel lines in the corridor to serve war/defense purposes.

Below: The OR&L train winds through scenic coastal areas in Wai‘anae, O‘ahu, making its way around Ka‘ena Point to the North Shore.

PHOTO CREDIT: BISHOP MUSEUM



The OR&L railway carried more than 2.5 million passengers during 1943, its peak year. But by 1946, after World War II ended, the number of rail passengers decreased by more than one half.

With the changing times, the need for the railroad continued to diminish and OR&L closed some railway routes.

In 1950, the Navy purchased (for one dollar) the main railway line between West Loch and Nanakuli. For the next 20 years, the Navy transported munitions on the old railway. During this period, railway equipment fell into disrepair and large sections of coastal track were washed away by storms.

Since the demise of the railroad, portions of the OR&L right-of-way have been purchased or used by various agencies, businesses, and organizations to meet their own objectives. (Refer to Appendix A: Zoning and Trail Ownership.) The State Energy Corridor, which is within the right-of-way, contains underground oil and gas pipelines. The corridor is also crossed with overhead and underground utility lines and easements to private properties.

In 1971, the Hawaiian Railway Society (HRS) was formed to restore portions of the old railroad system as an educational and historic community resource. In 1975, tracks in the OR&L right-of-way from ‘Ewa to Nanakuli were placed on both the Hawai‘i Register of Historic Places and the National Register of Historic Places (NRHP).

The HRS currently operates a train from its ‘Ewa headquarters to Kahe “Tracks” Beach Park in Nanakuli and back. The HRS is striving to extend the tracks and to replace the current diesel locomotive with a steam locomotive consistent with its historic objective.

- ◆ **500–800 AD** Polynesian voyagers discover Hawaiian Islands sometime during this period.
- ◆ **1000** 'Ewa Plain's forested savannah provides habitat for variety of endemic species including *nene*, *io*, and *pueo*.
Estimated settlement of Pu'uloa (Pearl Harbor area) by native Hawaiians. Honouliuli floodplain area used for taro cultivation.
During Queen Kalaimanui's 65-year reign, aquaculture on O'ahu is highly productive. Queen directs construction of three major fishponds at Pu'uloa: Pa'aiiau, Opu, and Kapa'akea.
- ◆ **1250–1450** Permanent settlement of the 'Ewa Plain occurs, primarily along coastline.
- ◆ **1400–1600** Pu'uloa is a thriving series of fishponds created by Hawaiians.
- ◆ **1778** Arrival of Captain Cook in the Hawaiian Islands.
- ◆ **1779–1819** Reign of Kamehameha I. Ahupua'a system of land ownership in place.



- ◆ **1866** Thirty-two sugar plantations are exporting 17.75 million pounds of sugar a year.
- ◆ **1870** As southern U.S. sugar plantations slowly recover from the Civil War, Hawai'i's stronghold in the sugar industry is greatly diminished.
- ◆ **1870** James Campbell acquires much of the 'Ewa Plain.
- ◆ **1870–1890** Pearl Harbor floodplain taro fields—abandoned due to out-migration, disease, and death among Hawaiian population—are converted to watercress and rice fields.
- ◆ **1876** King Kalakaua signs Reciprocal Treaty allowing Hawai'i plantations to export duty-free sugar to U.S. In exchange, U.S. develops Pearl River Lagoon (Pearl Harbor) as a naval base.
- ◆ **1879** Campbell drills first artesian well at Honouliuli, expanding agricultural use of the 'Ewa Plain.
- ◆ **1888–1889** King Kalakaua signs franchise rights and O'ahu Rail and Land Company (OR&L) begins operations on November 16, 1889, Kalakaua's birthday.
- ◆ **1890** Development of Pearl City, O'ahu's first planned community. Ewa Plantation Co. established by B.F. Dillingham, Castle & Cooke, and associates.

PRE-CONTACT TO KAMEHAMEHA I

WESTERN SETTLEMENT

1800–1861

HAWAI'I'S SUGAR INDUSTRY

500–1819



- ◆ **1835** Sugar Industry established in Hawai'i.
- ◆ **1848** The Great Mahele divides Hawaiian land among the Crown, government, and chiefs.
- ◆ **1849** California Gold Rush opens U.S. market for produce and Hawai'i sugar industry grows rapidly.
- ◆ **1850** Hawai'i's laws allow foreigners to purchase land and expansion of sugar operations begins. Native commoners allowed to claim lands that they live on and use.
- ◆ **1852** First Chinese contract plantation laborers arrive in islands, followed by Japanese (1885), Okinawans (1885), Koreans (1903), Filipinos (1906), and others.
- ◆ **1861** U.S. Civil War and destruction of sugar plantations in Confederacy allow Hawai'i to dominate the U.S. sugar market.

1866–1890



- ◆ **1893** Overthrow of the Hawaiian monarchy.
- ◆ **1898** Republic of Hawai'i formally annexed to the U.S. OR&L extends railroad track around Ka'ena Point to the north shore and Kahuku; another line connects Wahiawa to Honolulu.
- ◆ **1903** Of Pearl Harbor's 43 traditional Hawaiian fishponds, 24 still operating commercially.
- ◆ **1914** By onset of WWI, Pearl Harbor is home to U.S. Navy Pacific Fleet.
- ◆ **1920s** Crab, oysters, shark, *papio*, and other fish caught in Pearl Harbor provide local families with their livelihood.
- ◆ **1930s** Mangrove introduced to Hawai'i, dramatically changing shoreline ecology of Pearl Harbor.
- ◆ **1934** Fort Barrette constructed on 'Ewa Plain with aid of OR&L railroad.
- ◆ **1937** Construction industry maximizes use of railroad for hauling lime from Wai'anae Quarry. HECO breaks ground for a power plant at Wai'au.



- ◆ **1959** Hawai'i becomes 50th State.
- ◆ **1960** Honouliuli fishpond at Pearl Harbor is only fishpond still used for commercial aquaculture. Campbell Industrial Park established on 1,200 acres along 'Ewa shoreline.
- ◆ **1960-1970** Pearl Harbor sustains edible oysters and other seafood products.
- ◆ **1962** With dedication of USS ARIZONA Memorial and Visitors Center, Pearl Harbor becomes major tourist attraction.
- ◆ **1971** OR&L ceases operations.
- ◆ **1975** OR&L railroad tracks from 'Ewa to Nanakuli placed on National Register of Historic Places. City of Kapolei planned as O'ahu's "second city."
- ◆ **1989** Hawaiian Railway Society offers train rides on OR&L alignment. City begins construction of Pearl Harbor Bike Path.
- ◆ **1998** Battleship MISSOURI Memorial established on Ford Island as another major attraction at Pearl Harbor.
- ◆ **1999-2001** Planning begins on Leeward Bike Path. Pearl Harbor Historic Trail Master Plan published.

FALL OF THE MONARCHY AND ANNEXATION

WORLD WAR II

STATEHOOD TO PRESENT

1893-1937

1940-1945

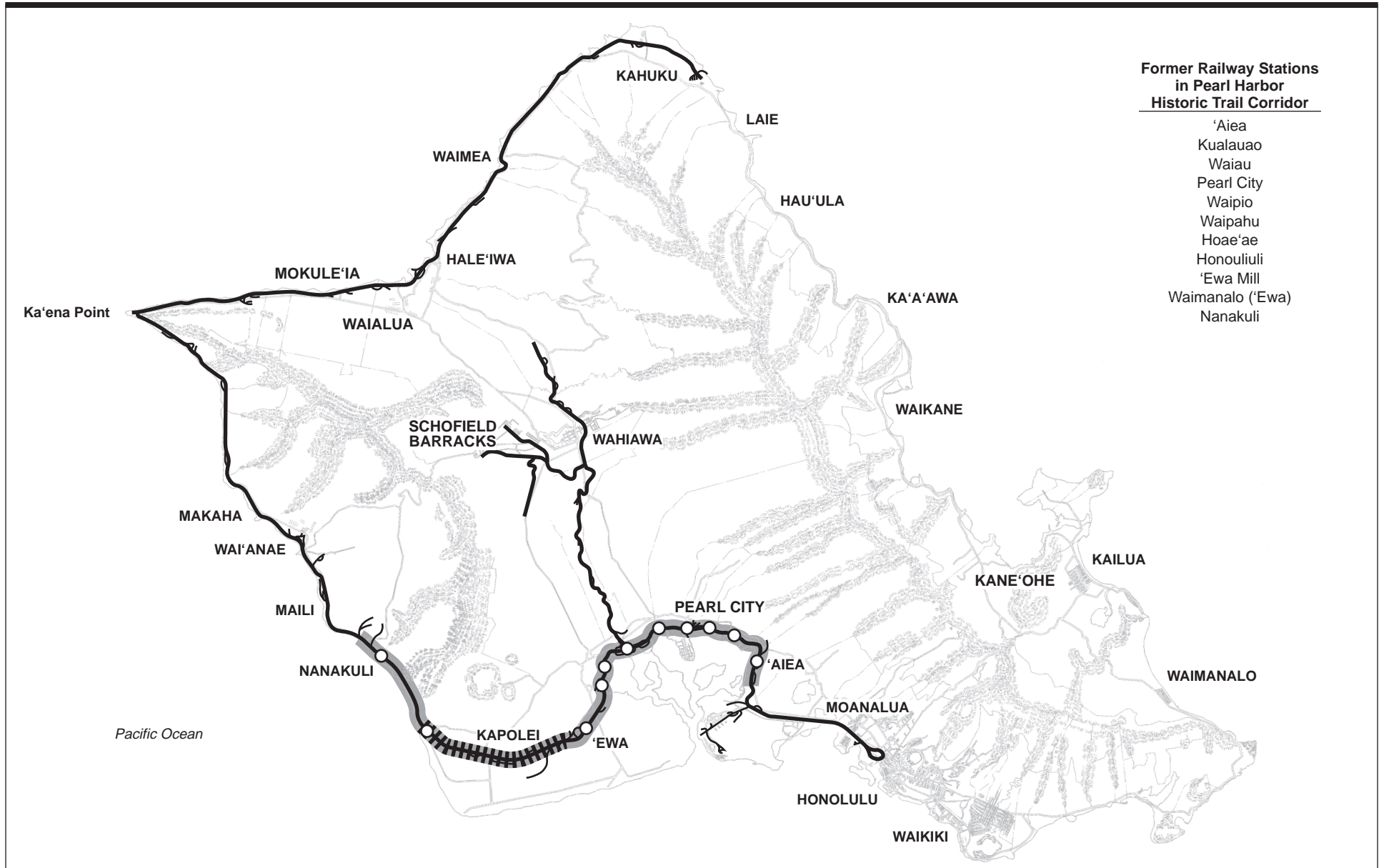
1959-2000



- ◆ **1940** Japan joins Axis powers. In response, U.S. dramatically increases naval presence at Pearl Harbor.
- ◆ **1941 December 7** Japan bombs Pearl Harbor, launching U.S. into war in Pacific. Japanese internment camp established at Honouliuli.
- ◆ **1941-1945** During WWII, OR&L carries troops, munitions, military cargo, fuel oil, and other supplies to O'ahu bases.
- ◆ **1945 August 6, 9** U.S. drops atomic bombs on Japan.
- ◆ **1945 September 2** Historic signing of Japan's unconditional surrender aboard USS MISSOURI.



PHOTO CREDITS: BISHOP MUSEUM AND STEPHEN KUBOTA
BACKGROUND PHOTO: L.E. EDGEWORTH, BISHOP MUSEUM



Source: Best, G.M. (1978), *Railroads of Hawai'i*



LEGEND





-  Former OR&L Railroad System (1945)
-  Existing Historic Railway Operations
-  Pearl Harbor Historic Trail
-  Former Train Stations

Figure 1-2
OR&L Railroad System on O'ahu (1945)

Both the City and the State have included bikeways on and connecting to the OR&L right-of-way in their respective comprehensive bike-way plans: the *State of Hawai'i: Bike Plan Hawai'i* (1994) and the *Honolulu Bicycle Master Plan* (1999). The DOT completed the *Leeward Bikeway Environmental Assessment* (2000) for the Waipahu to Nanakuli segment of the Trail.

As a condition of the Navy's transfer of the leeward section of the OR&L corridor to the State, the State must develop a bikeway on 14 miles of the Trail's leeward segment. The Navy also granted the City an easement for the Pearl Harbor Bike Path in 'Aiea, Pearl City, and Waipahu. In the next two to five years, the Leeward Bikeway segments from Waipahu to Nanakuli will be completed. The trail will then be a continuous 18.6-mile-long paved path.

THE PLANNING PROCESS

Planning of the Pearl Harbor Historic Trail began with gathering and analyzing data about the project area, e.g., land use, ownership, zoning, natural resources, floodways, and other planning constraints.

A Citizens Advisory Committee (CAC) was formed and meetings were held with the CAC, user groups, landowners, and other interested parties to identify constraints, problems, opportunities, issues, and other concerns to consider in formulating the Master Plan.



The Trail will be used by people of all ages who are moving at various speeds including walkers, hikers, joggers, skaters, bicyclists, surfers, school children, birdwatchers, visitors, and residents.

The findings were then used to establish appropriate goals and objectives and to prepare the long-range Master Plan. The plan was then presented to the community and other interested parties to solicit feedback and to guide the refinement of a final Master Plan.

The planning process is described graphically in Figure 1-3: Planning Process. A public scoping meeting, three CAC meetings, and two public workshops were held during the 20-month-long process to ensure community involvement in preparing the long-range Master Plan. (See Appendix B: Community Participation Summary.)

REPORT CONTENTS

The remainder of this report is organized as follows:

Chapter 2 identifies the Goals and Objectives of the Pearl Harbor Historic Trail Master Plan.

Chapter 3 presents the Pearl Harbor Historic Trail Master Plan. The chapter includes a discussion of the overall concept and descriptions of the various components of the plan.

Chapter 4 presents Implementing Actions needed to realize the proposals discussed in Chapter 3.

Chapter 5 presents Design Guidelines to enhance the visual quality of the proposed project and to ensure design continuity of the network from 'Aiea to Nanakuli.

Appendices to the text include trail ownership and zoning information, a list of community meeting attendees, and research conducted on natural/cultural resources, railway requirements, and infrastructure.

Pearl Harbor Historic Trail Community Involvement & the Planning Process

Sept 1999 Nov Dec Mar 2000 Jun Oct Nov Feb 2001 May

Community Involvement

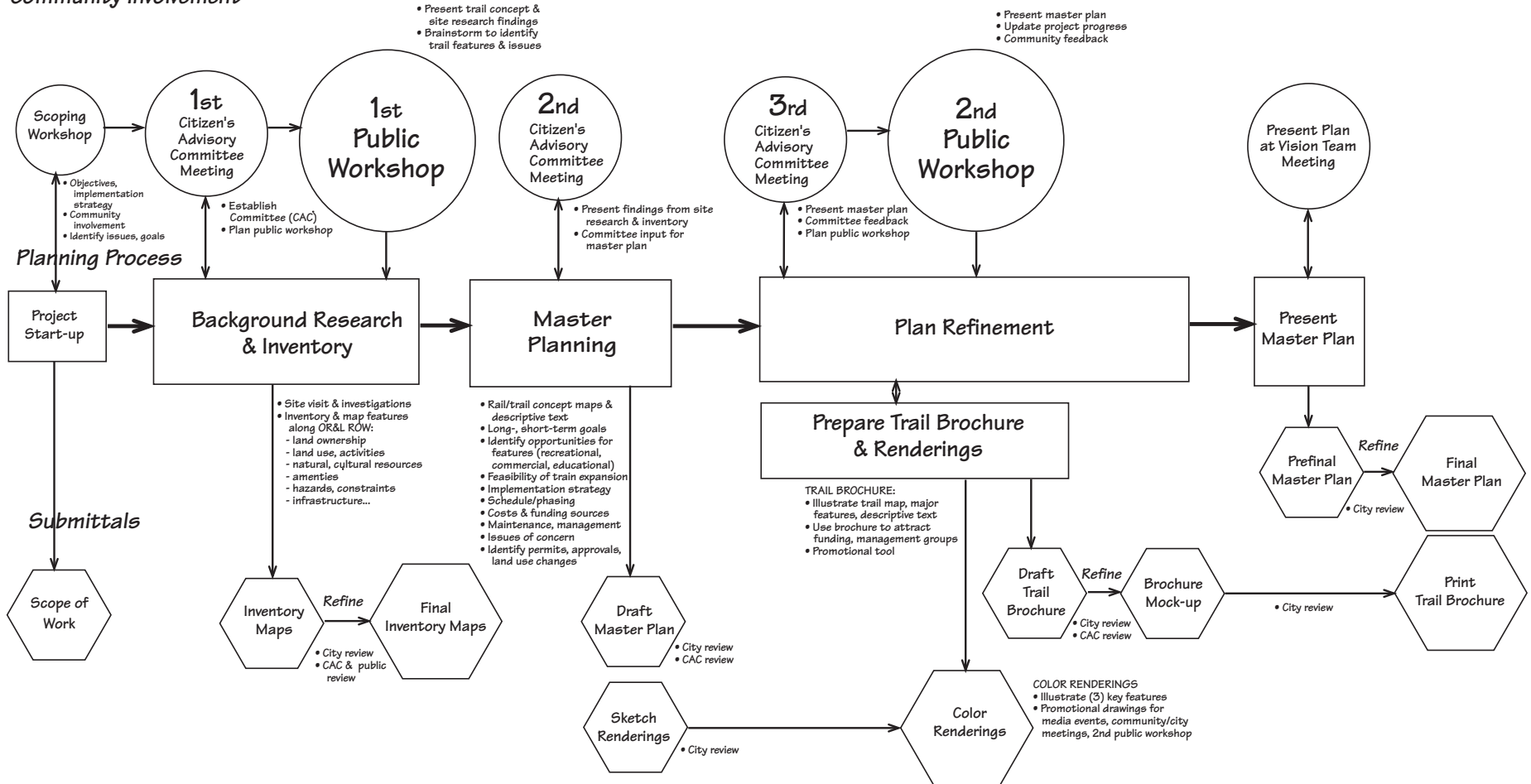


Figure 1-3
Planning Process

**Pearl Harbor Historic Trail
MASTER PLAN**

CHAPTER TWO

GOALS AND OBJECTIVES

INTRODUCTION

The community’s vision is presented here as a single statement of their aspirations for the project. It is followed by Goals and Objectives intended to provide a coordinated direction for the long-range Pearl Harbor Historic Trail Master Plan.

VISION STATEMENT

“Develop the Pearl Harbor Historic Trail as a world-class heritage and recreational corridor that enhances the communities from ‘Aiea to Nanakuli.”

GOALS AND OBJECTIVES

The Goals and Objectives focus on four key characteristics of the community’s vision for the Pearl Harbor Historic Trail:

- Outdoor Recreation/Physical Fitness Network
- Historic Preservation and Education
- Economic Revitalization
- Environmental Preservation and Education

Formulated after analyses of constraints and opportunities, and following meetings with community groups, these Goals and Objectives are aimed at guiding and inspiring future community projects.

Goal #1	<i>Outdoor Recreation, /Physical Fitness, and Transportation Network</i>
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Provide a shared-use path for outdoor recreation, physical fitness, and transportation that:

1. is continuous from ‘Aiea to Nanakuli;
2. is accessible to the community;
3. links important community activity centers and attractions;
4. is fun to use because of its many recreation amenities and opportunities; and
5. is well maintained, safe, and secure.

Discussion: The City and State have built or plan to build segments to complete a continuous 18.6-mile-long bike path within the OR&L corridor from ‘Aiea to Nanakuli. The Pearl Harbor Historic Trail will connect attractions and parks in five communities.

The Community Vision Group and CAC, however, envision a corridor that is more than just a recreational path for jogging and bicycling and have looked beyond the 40-foot-wide OR&L corridor linking their communities. They suggest connecting greenways, bike paths, and pedestrian paths to make the Trail more accessible. Access to the Trail and to communities could be expanded through a larger network of shuttles, trolleys, and ferries.

The Trail will be a fun, safe, scenic, free, and expandable recreation corridor to be appreciated by generations of residents and visitors both now and in the future. (See Figure 2-1.)

Goal #2	<i>Historic Preservation and Education</i>
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Preserve the former OR&L railway alignment as an important historic resource that:

1. expands the HRS’ train operations from ‘Aiea to Nanakuli;
2. teaches about OR&L’s history and elements related to railway history and its link to the community’s cultural past;
3. is accessible to both residents and visitors;
4. preserves and exhibits the area’s history and culture; and
5. provides amenities such as railroad stations that enhance the user experience.

Discussion: Restoring the railway is envisioned as more than an exercise in historic preservation. The Community Vision Group and CAC believe that the restored railway will provide a means for learning about and appreciating the community’s heritage by linking ancient Hawaiian and World War II historic sites at Pearl Harbor with plantation-era structures depicted at Waipahu Cultural Garden Park, Old Waipahu Town, and ‘Ewa Villages. Linkage of these historic areas can add a community perspective to the traditional World War II military story of Pearl Harbor. The restored railway and path would provide continuous transportation access along the Trail.

Segments of the train ride along the estuaries and wetlands of Pearl Harbor and the shorelines of Nanakuli will also provide educational opportunities to experience the fragile natural environment and the cultures of plantation-era communities and early Hawaiian settlers who once depended on the land for sustenance.

Goal #3	<i>Economic Revitalization</i>
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The Pearl Harbor Historic Trail will create economic opportunities that:

1. provide economic support for the Pearl Harbor Historic Trail projects;
2. link important activity centers and visitor attractions; and
3. bring visitors into the Leeward communities;

Discussion: Five communities are linked by the Trail project. In Waipahu, the closing of the Waipahu Sugar Mill and Arakawa’s department store marked the departure of two vital economic enterprises in Waipahu Town.

Implementation of the Waipahu Town Plan (December 1995) and the recent work done by the Waipahu Community Association represent community efforts to revitalize this area.

The idea for the economic enhancement and the Trail project originated in the ‘Aiea community, where shopping centers were half vacant. The Pearl City, ‘Ewa, and Nanakuli communities’ economic revitalization projects would also benefit.

The priorities of the Community Vision Group and CAC include establishing a rail-and-trail corridor and other transit alternatives (ferry, trolley, etc.) that would link Waipahu Town and Waipahu Cultural Garden Park with the popular attractions at Pearl Harbor—the USS *Arizona* Memorial, USS *Bowfin* Submarine Park & Museum, and Battleship *Missouri* Memorial—which attract more than 1.5 million visitors per year.

Goal #4	<i>Environmental Preservation and Education</i>
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The Pearl Harbor Historic Trail will enhance environmental preservation efforts by:

1. encouraging habitat protection, restoration of wetlands and streams, and development of natural resources interpretive facilities along the Trail;
2. providing a green corridor extending beyond the Trail boundaries that is enhanced with a unified landscape featuring indigenous and endemic plant species, where appropriate;
3. restoring areas around ancient Hawaiian fishponds as educational and cultural resources;

4. preserving, restoring, and protecting natural and environmentally sensitive areas along the Trail; and
5. selectively clearing mangrove and other invasive species to open shoreline views and public access to Pearl Harbor.

Discussion: The Pearl Harbor Historic Trail passes through a range of natural environmental settings as it makes its way through the ‘Ewa and Wai‘anae *ahupua‘a*, from the wetlands and estuaries of Pearl Harbor across the dry ‘Ewa Plains to the coastal shores of Nanakuli.

Community Vision Group and CAC members believe that the Trail will provide inviting opportunities for trail users to learn more about leeward O‘ahu’s natural environment. Development of the Trail will be coordinated with preservation efforts by the U.S. Fish and Wildlife Service (USFWS), the State of Hawai‘i Department of Land and Natural Resources (DLNR), The Nature Conservancy, and Leeward Community College.



The OR&L right-of-way in Nanakuli - **EXISTING**



The OR&L right-of-way in Nanakuli—**POTENTIAL IMPROVEMENTS**

Figure 2-1
Pearl Harbor Historic Trail at Nanakuli Shoreline

**Pearl Harbor Historic Trail
MASTER PLAN**

CHAPTER THREE

LONG-RANGE PLAN

INTRODUCTION

This chapter outlines strategies to achieve the goals and objectives set forth by the 'Aiea-Pearl City Community Vision Group and the Citizens Advisory Committee (CAC) for the Pearl Harbor Historic Trail. (See Chapter 2.)

The Master Plan describes government, private, and community-based projects that will be a part of the Trail. The plan is an overview of major components, attractions, and activity centers that will establish the Trail as a world-class heritage and recreation corridor. The Trail will enhance communities from 'Aiea to Nanakuli. (See Figures 3-1 through 3-9: Long-Range Master Plan.)

Below: The USS Arizona Memorial (upper right) at Pearl Harbor is one of Hawai'i's most popular visitor attractions. In the foreground is the Battleship Missouri Memorial.

PHOTO CREDIT: ROMEO COLLADO



Construction of some of these projects, such as the State's Leeward Bikeway, will be completed in the next few years. The completion of more complex projects, however, may take 25 years or longer to achieve. Examples of long-range projects are redevelopment of Waipahu's industrial waterfront to allow public access and higher-value use (which will require thoughtful business relocation) and restoration of the historic railway in 'Aiea.

PROJECTS AND PROGRAMS

Projects and programs to enhance the Trail are characterized by four goals: to provide an outstanding recreational network, stimulate economic activity in surrounding communities, preserve and showcase the area's heritage, and protect natural resources.

Plan ideas originated from community leaders, environmental organizations, landowners, and educators, as well as federal and local agencies. Projects that can be achieved under the City & County's guidance or jurisdiction are ranked for earliest implementation. A number of these priority projects are concentrated in the corridor that runs from Ah Sing Park in 'Ewa and along Pearl Harbor's West Loch shoreline to Waipahu Depot. These serve as model or "demonstration" projects that have great potential to elevate the Trail's visibility and stature, which in turn would encourage future projects from 'Aiea to Nanakuli. For a detailed project list, see Chapter 4: Implementation of Short-Term and Long-Term Projects and Policies.

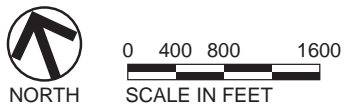
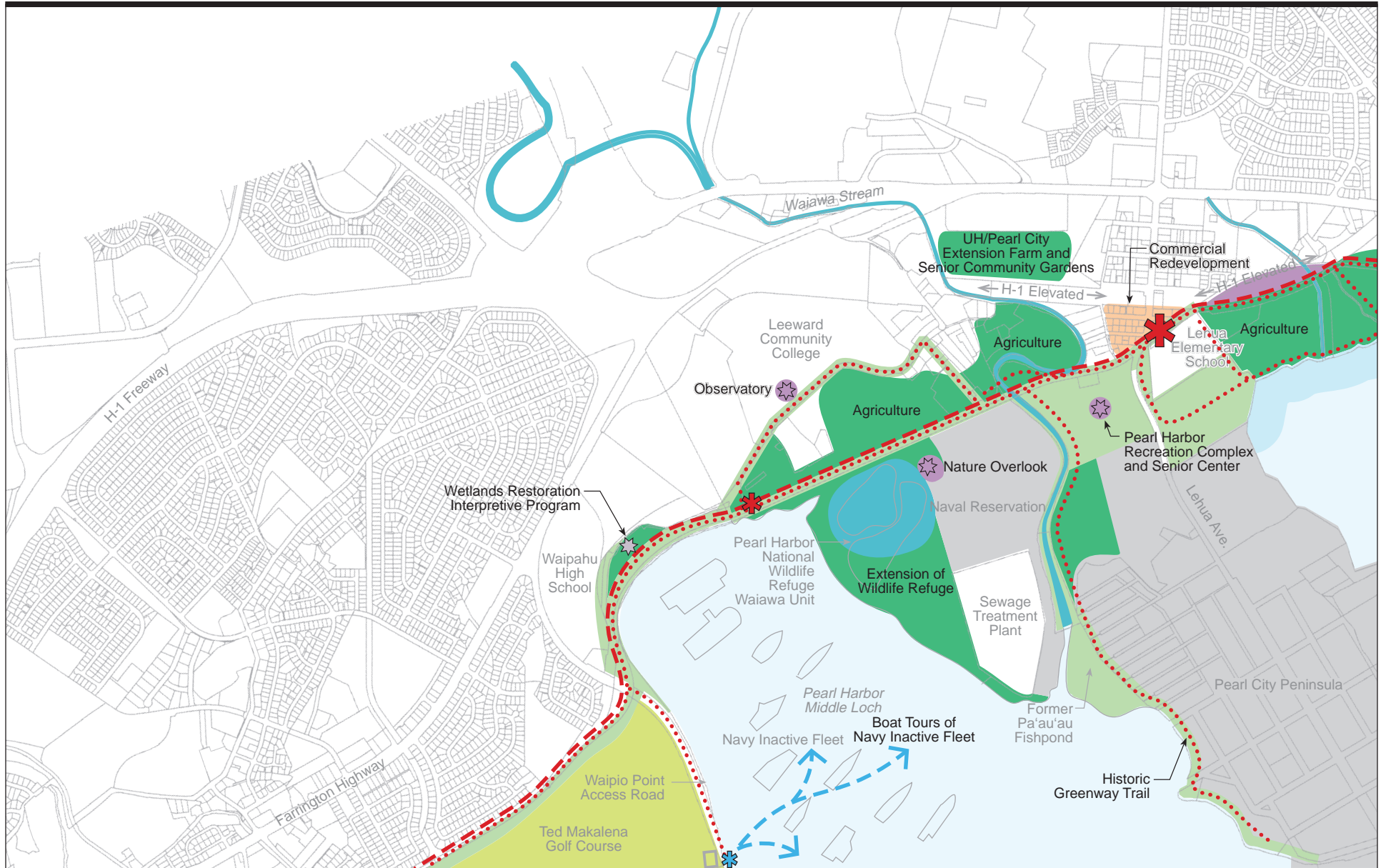
RECREATIONAL NETWORK

More than 1,000 rail-trails travel 11,000 miles across the United States, with individual corridors ranging from one-half mile to over 200 miles in length. The 18.6-mile-long Pearl Harbor Historic Trail will feature a continuous path for bicyclists and pedestrians alongside an historic train. The path will diverge from the OR&L right-of-way where advantageous to take in shoreline views. More than 30 miles of greenway and bikeway connections and gateways to the path are proposed, enhancing access to West O'ahu communities and nearby attractions.

Although the bike path will soon be completed, the Trail will be well used by a variety of individuals only if it is convenient, accessible, and safe. The Trail must be linked to adjacent communities through parks, greenways, paths, and bikeways. Convenient automobile and bicycle parking areas would make the Trail easier and faster to access. A transportation network consisting of the restored railway, shuttle buses, trolleys, and ferries linked to Trail attractions would bring more visitors and residents into the communities.

The community has expressed a desire for more access to the Pearl Harbor shoreline. As the Trail develops and adjacent properties are oriented towards the waterfront, water recreation opportunities should be developed, in consultation with the Navy.

CONTINUED ON PAGE 3-10



LEGEND

-  Railway Station
-  Railway Stop
-  Ferry Landing
-  Historic Railway Operations
-  Shared Use Path (bicycle/pedestrian)
-  Attractions
-  Military

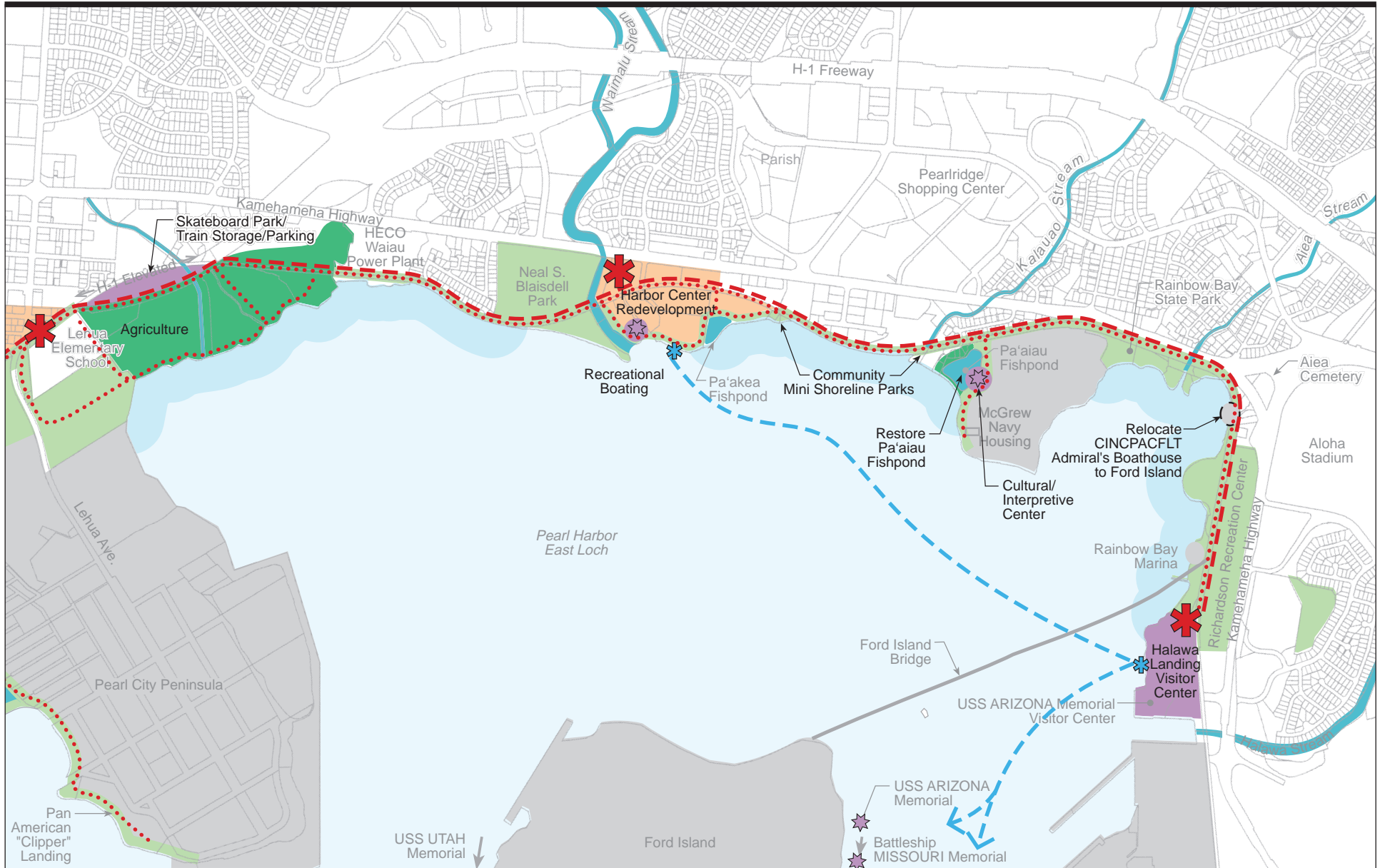


Figure 3-1
Long Range Master Plan
 'Aiea/Pearl City to Waipahu



LEGEND

- | | | | |
|---|-----------------|---|--------------------------------------|
|  | Railway Station |  | Historic Railway Operations |
|  | Railway Stop |  | Shared Use Path (bicycle/pedestrian) |
|  | Ferry Landing |  | Attractions |

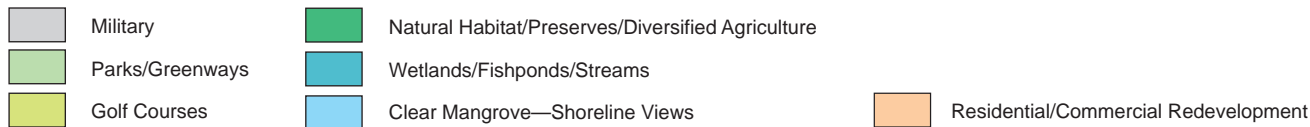
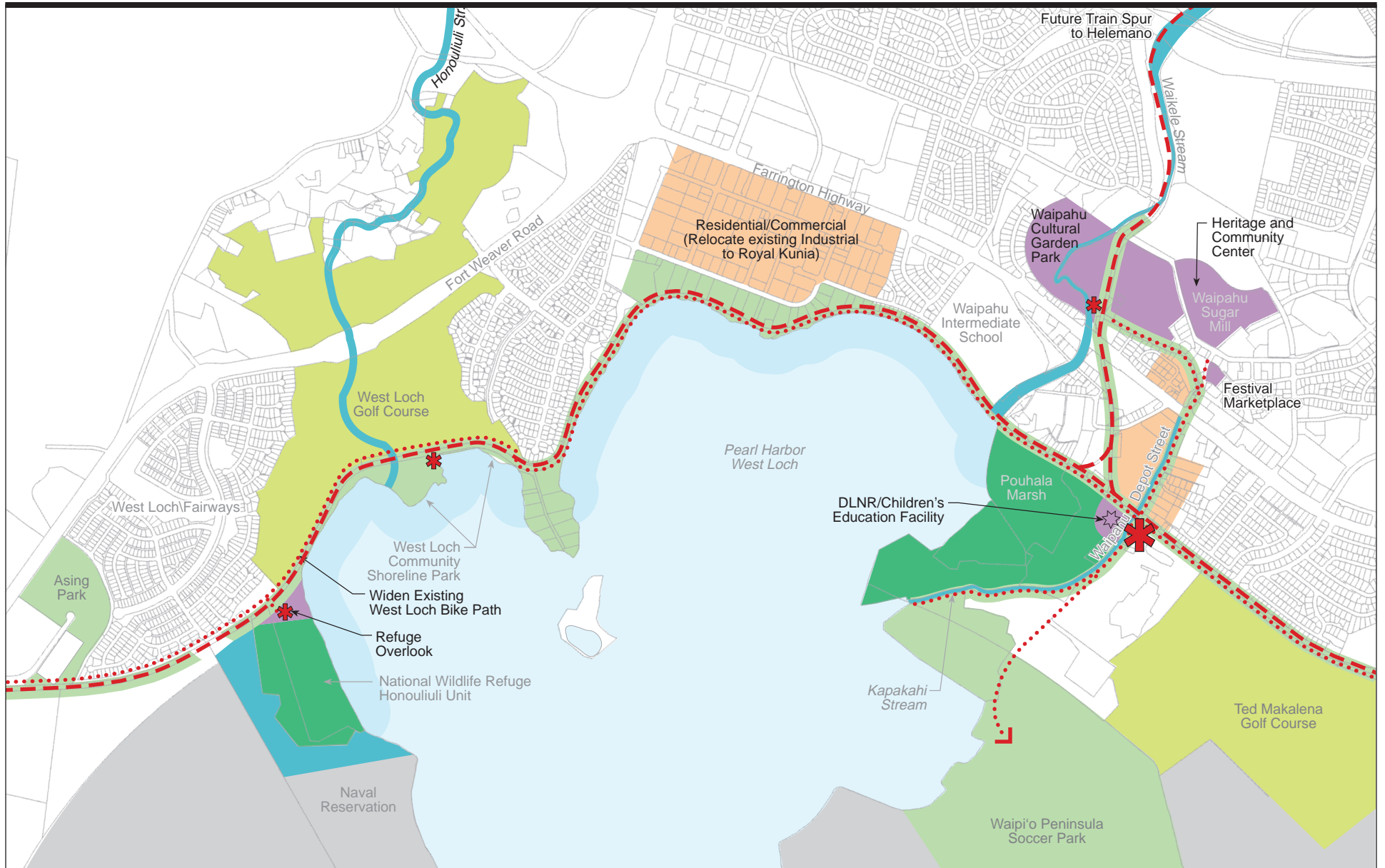


Figure 3-2
Long Range Master Plan
Waipahu to 'Ewa



LEGEND

- Railway Station
- Railway Stop
- Ferry Landing
- Historic Railway Operations
- Shared Use Path (bicycle/pedestrian)
- Attractions

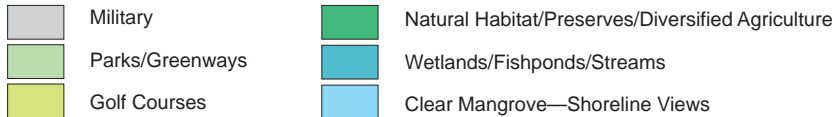
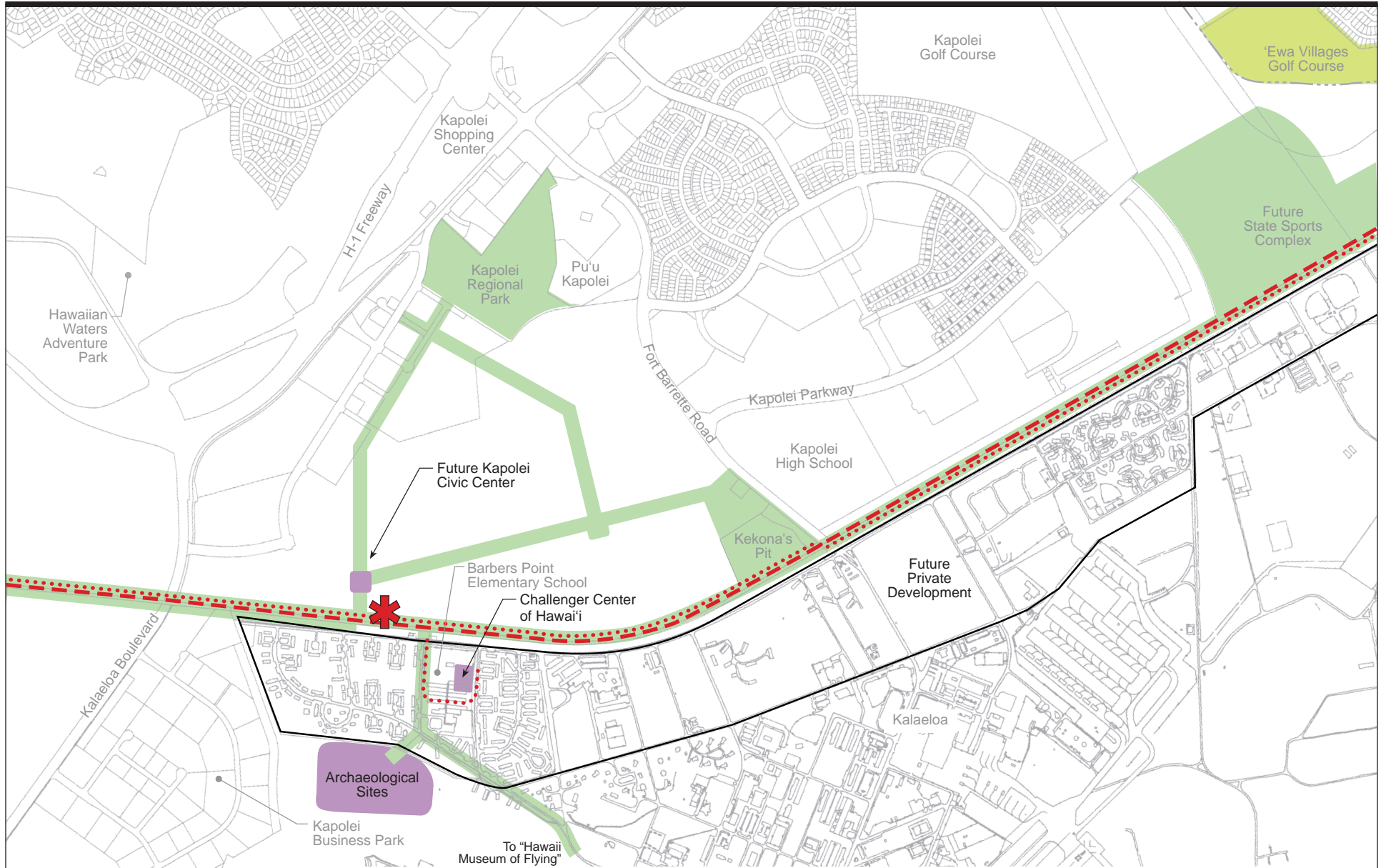


Figure 3-3
Long Range Master Plan
 'Ewa to Kapolei



LEGEND

-  Railway Station
-  Railway Stop
-  Ferry Landing
-  Historic Railway Operations
-  Shared Use Path (bicycle/pedestrian)
-  Attractions

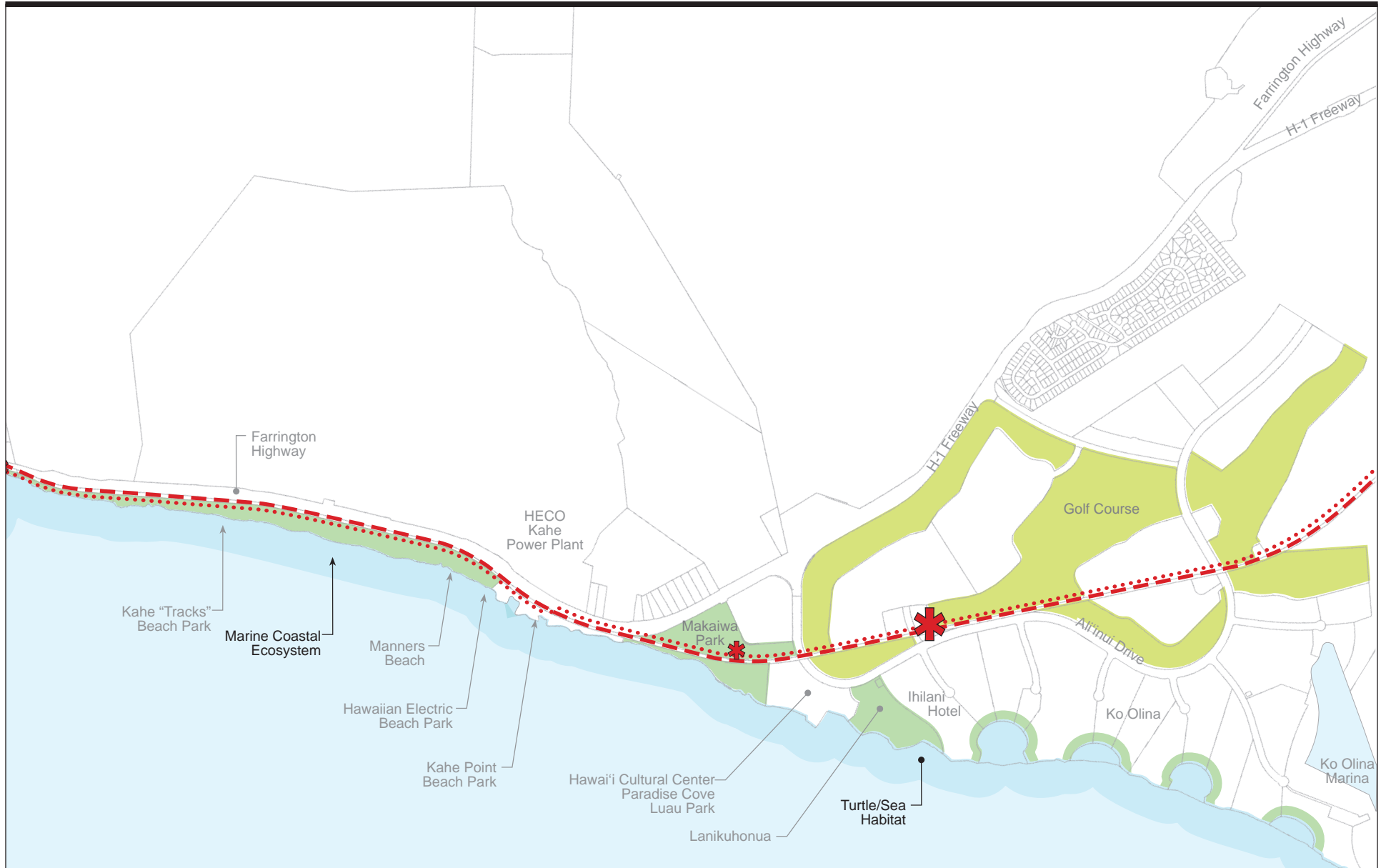


Figure 3-4
Long Range Master Plan
 Kapolei to Nanakuli

RECREATIONAL NETWORK, CONTINUED FROM PAGE 3-1

A unified signage and design theme will reinforce the Trail's "world-class" status (see Chapter 5: Design Guidelines). Priority recreation projects for City, State, and community implementation include:

- designing a Trail logo and installing directional signs, trail mileage markers, benches, bike racks, and water fountains (bicycle staging areas);
- distributing Trail maps keyed to identify locations of nearby amenities (parks and beaches, restrooms, parking, and attractions);
- constructing new pedestrian and bike paths or "gateways" leading to the Trail from nearby schools, parks, sports complexes, work-places, and neighborhoods;
- providing Trail safety "call-boxes" and organizing police bike patrols and a neighborhood watch bike patrol program;
- strictly enforcing a no-motorized-vehicles policy (except for limited agency and private vehicles needing to access their properties or facilities); and
- aggressively maintaining path bollards and gates to prevent unauthorized access.

HERITAGE CORRIDOR

The Pearl Harbor Historic Trail offers opportunities to "talk story" about the many facets of Pearl Harbor, one of O'ahu's defining natural and historical landmarks. These stories will tell about the culture of ancient Hawaiians who lived here for 1,000 years, the multi-ethnic ancestors of present-day residents who came to live here as plantation workers, and the modern history of the area since World War II. (See Appendix D: Cultural/Interpretive Potential.)

The Trail is a network connecting historic themes, such as:

- traditional Hawaiian places (*ahupua'a*), legends, and traditional events;
- the area's three ecosystems;
- the OR&L railway and development of the surrounding plantation communities; and
- modern communities and Hawai'i's immigrant heritage.

Interpretation of these themes can be achieved through signage, trail guides, and guided tours. Oral histories, gathered from people who lived along the OR&L right-of-way and those who were influenced by area activities (e.g., fisherman, military heroes, rail conductors), can be illustrated on the Trail.

A priority project associated with the Trail's heritage is the Hawaiian Railway Society's (HRS's) planned train expansion from a refurbished 'Ewa station/museum to Waipahu Cultural Garden Park.

A RESTORED HISTORIC RAILWAY

Within the trail corridor, the educational, non-profit HRS currently operates a six-mile-long train line between its 'Ewa station museum and Kahe "Tracks" Beach Park in Nanakuli. Since 1989, the HRS has offered narrated railway tours originating from their baseyard near 'Ewa Villages. The five-car, 170-passenger train currently runs out-and-back to Kahe "Tracks" Beach, traveling at average speeds of 10 to 15 miles per hour. The 90-minute tour runs twice daily (12:30 PM and 2:30 PM) on Sundays; a 45-minute ride is available to charter groups on weekdays.

The Community Vision Group and the CAC support re-establishment of the historic railway operation for the entire 18.6 miles of the Pearl Harbor Historic Trail. Train expansion is proposed in four phases over a 25-year period, dependent on funding and community support. Expansion is based on HRS's Master Plan (2000).

The historic railway is a strong, unifying element. Historic train stations and stops would be rebuilt. The railway theme can be highlighted by the tracks, trail markers fashioned as old industrial train signals, and historic stations, many near their original turn-of-the-century locations. These features would serve as reminders of the old railway presence even if it is not feasible to expand the railway due to financial, physical, or landowner constraints.

Phase 1: Hawaiian Railway Society's 'Ewa Station to Waipahu Depot and Waipahu Cultural Garden Park

With completion of the first phase, the Waipahu Depot would once again be a center of activity, providing a point of access to the Waipahu Cultural Garden Park and Plantation Villages, the City's new Waipi'o Peninsula Soccer Park, and the State's proposed Pouhala Marsh Education Center.

New track would be laid along this 3.6-mile-long Ho'ae'ae segment, paralleling the West Loch shoreline and bike path. An historic train station would be built at Waipahu Depot, centered on a revitalized commercial/residential corridor to the north and recreation and natural resources to the south. A railway spur along the old OR&L line would lead to a railway stop and turnaround near the locomotive display at Waipahu Cultural Garden Park.

Historically, the train continued from this point all the way to Wahiawa. The right-of-way remains, which eventually could be used to extend the railway and Trail to Helemano.



**Right: The OR&L's Engine 35
at Pearl City Station, 1945**

PHOTO CREDIT:
KENT COCHRANE, BISHOP MUSEUM

Engineering challenges include construction of seven train bridges over Honouliuli and Waikele Streams and other waterways leading to Pearl Harbor. Soils are poor in this area, and two-thirds of this segment lies in flood zones. The rail spur to Waipahu Cultural Garden Park would cross the westbound lanes of Farrington Highway and would pass through an old train tunnel under Farrington's eastbound lanes.

DOT is proposing to lower the eastbound lanes of Farrington Highway to address erosion near Waipahu Cultural Garden Park. This, in effect, would eliminate the possibility for railway restoration through the existing OR&L train tunnel beneath these eastbound lanes. The City has recommended that the State restudy the proposed highway design to prevent impacts on the railway.

There are many encroachments into the 40-foot-wide OR&L right-of-way: driveways to private properties, underground and overhead utility and fuel lines, and a meandering bike path. Portions of the City's West Loch Bike Path and the State's planned Leeward Bikeway through Waipahu would need to be realigned for the train to fit safely in the right-of-way. More land may need to be acquired.

Phase 1 would take a minimum of five to seven years to be realized. Multiple environmental and construction permits would be required. The path runs alongside sensitive waterways and habitat: the U.S. Fish and Wildlife (USFWS) National Wildlife Refuge, Honouliuli Unit, streams, and West Loch. Fund raising, design, and construction of the railway would take several years, and longer if by volunteer effort. Community input would be required to ensure local consensus and support.

Phase 2: Kahe "Tracks" Beach to Nanakuli

The Hawaiian Railway Society is working to bring the train three miles farther west along the Nanakuli coastline. The Society hopes to open this section by 2005.

The State's planned Leeward Bikeway, extending to Lualualei Access Road in Nanakuli, is designed to safely parallel the train. Visitors could start their discovery of Hawai'i's rail and natural history from a proposed Ko Olina train station. Coordination with the Ko Olina Community Association and landowners would be required to develop the station. Another station is planned near the end of the line in Nanakuli.

The train, passing five beach parks and pristine marine waters, would cross five bridges and end just past Nanaikapono Elementary School.

Phase 3: Waipahu Depot to Lehua Avenue

A separate 2.8-mile-long segment, winding past Middle Loch, the Ted Makalena Golf Course, Waipahu High School, and Leeward Community College, and the Pearl City Peninsula, would lead the train closer to the heart of Pearl City.

A Lehua Avenue train station is proposed, complementing a revitalized commercial center. A smaller train stop is planned near Middle Loch to disembark a limited number of bird-watchers and small, guided tour groups visiting surrounding wetlands and a nature reserve.

To re-establish the railway here, three train bridges would be required. Special attention must be given to track construction, as the entire segment lies in a flood zone. Careful placement and design of the railway and train stop are required to prevent disturbance of nesting waterbirds in the neighboring USFWS National Wildlife Refuge, Waiawa Unit.

Phase 4: Lehua Avenue to Halawa Landing

The last and most technically challenging three-mile segment would link the train to one of O'ahu's most-visited attractions: the USS *Arizona* Memorial Visitors Center. Traveling along East Loch's shoreline, the train would pass watercress farms, parks, restored Hawaiian fishponds, and waterfront commercial centers, terminating at Pearl Harbor Naval Complex, a National Historic Landmark.

The Navy, in partnership with a private developer, plans to convert Halawa Landing into a centralized ticketing and staging area for Ford Island. Visitors would embark from Halawa Landing to tour Ford Island and the Naval Complex's historic ships. An historic train station would complement the Landing. A midpoint station is also planned at Harbor Center, which is proposed for redevelopment as a waterfront commercial/residential complex.

Major infrastructure improvements would be required to reach Halawa Landing: construction of seven train bridges, culverts, eight on-grade street crossings, and two underpasses (including re-tunneling under McGrew Loop), as well as realignment of Pearl Harbor Bike Path segments. The Navy's approval would be required to route the railway along its former Rainbow Bay path, where the corridor travels immediately inland of the CINCPACFLT Admiral's Boathouse.

Existing Railway Improvements: Kalaeloa Station

With expansion, concurrent renovations to the railway's exiting infrastructure will be necessary. HRS is planning a roundhouse and a new 'Ewa Station museum, modeled after one of the historic OR&L station structures. The HRS leases the 'Ewa Station site from The Estate of James Campbell. The Estate has requested that HRS purchase the land.

Construction of a Kalaeloa train station is recommended near the proposed Kapolei Civic Center. Within walking distance of this station are the Challenger Center of Hawai'i at Barbers Point Elementary School and an extraordinary complex of well-preserved early Hawaiian habitation sites at Kalaeloa.

FEASIBILITY OF RAILWAY EXPANSION

This ambitious project's total cost for all four phases—estimated at between \$65 and \$80 million—includes expenditures for reconstruction of tracks and construction of the 'Ewa museum, train stations, and bridges, as well as restoration or purchase of three train engines and cars. (See Appendix E: Railway Infrastructure, for a breakdown of preliminary costs.)

HRS's restoration projects have thus far been accomplished through volunteer labor, donated materials, and funding with monetary donations. Meeting this enormous project cost (compared to HRS's current \$200,000 to \$400,000 operating budget) would require federal transportation enhancement funds, corporate sponsorships, and increased volunteer efforts.

By comparison, other world-class educational and recreational attractions such as the Battleship *Missouri* Memorial, aquariums, Hawaiian Waters aquatic park, and the City's Waipi'o Peninsula Soccer Park range in construction costs from \$15 to \$100 million.

It is recommended that HRS conduct a market/feasibility study to assess potential ridership, promotional opportunities, partnerships with transit providers to link regional attractions, and funding strategies. In terms of potential riders, Waipahu Cultural Garden Park and Hawai'i's Plantation Village draw 30,000 visitors annually. Visitor counts are estimated at 8,000 per event at the Soccer Park and at more than 500,000 annually at the Battleship *Missouri* Memorial.

As a part of this market assessment, it should be noted that the mission of HRS, as well as Navy deed restrictions placed on the OR&L corridor when it was sold to the State, require HRS to remain a non-profit educational organization. For-profit and commuter train travel are not allowed on the railway.

OPPORTUNITIES FOR COMMUNITY & ECONOMIC REVITALIZATION

A 1992 National Park Service and Rails-to-Trails Conservancy study found that construction of rail-trails resulted in average revenues of \$1.5 million annually for local communities. Direct expenditures along rail-trails averaged \$430,000 annually. Property values went up slightly along the trail and increased an average of six percent for properties situated one block from the trail.

Both existing and new businesses benefit, the study found. After a trail is established, storefront occupancy rates increase and businesses are able to remodel. Visitors are exposed to new areas.

Beyond economic benefits, successful rail-trails occur where the community takes "ownership" of the trail. Trail development tends to increase activity and discourage crime in comparison to an abandoned rail corridor. Residents and trail users serve as community guardians.

The Pearl Harbor Historic Trail is well situated in that it connects popular attractions and busy educational/recreational centers that will stimulate its use. These include the USS *Arizona* Memorial, Neal S. Blaisdell Park, Leeward Community College, Waipi'o Peninsula Soccer Park, Waipahu Cultural Garden Park, West Loch Shoreline Park, Historic 'Ewa Villages, and Ko Olina Resort. The Master Plan offers ideas for future private, community, and government capital improvement projects. New attractions along the corridor are urged, including:

- waterfront-oriented residential and commercial complexes,
- a skateboard park and ball fields,
- stream greenways,
- historic tours of cultural areas at Kalaeloa and on the Pearl City Peninsula,
- nature reserve overlooks,
- fishpond discovery tours, and
- cultural centers.

COMMUNITY REVITALIZATION

The community has identified several areas along the trail for redevelopment, including revitalization of Waipahu Town and Waipahu Depot as priority projects. The City’s Waipahu Town Plan (1995) suggested people-friendly redevelopment and guidelines for re-capturing historic storefront appeal. The Waipahu Community Association recently re-started efforts to advance the Plan.

Construction of a railway spur into Waipahu Town and an historic Waipahu Depot train station and rest stops would complement the Waipahu Town Plan. Greenways, or landscaped paths, would lead past revitalized commercial and residential complexes to the proposed Festival Marketplace in Waipahu Town and along Waikele Stream. The walking distance from the proposed Depot adjacent the Trail into Waipahu Town would be less than one mile.

The greenways would link two schools and the Filipino Community Center to Waipahu Cultural Garden Park. A greenway would also wander the length of Kapakahi Stream, branching off to the City’s new Waipi’o Peninsula Soccer Park. (See Figures 3-5 and 3-6.)

The City, in cooperation with the Waipahu community, would need to survey the area, acquire or swap land on which to build the station along the Trail at Waipahu Depot Street, and contract consultants for engineering, environmental reports, and building design.

The City could consult with other organizations to coordinate station requirements, such as the HRS, DLNR’s Historic Preservation Division, and Historic Hawai’i Foundation. Stream restoration projects could involve Community Vision Groups, environmental groups, and the University of Hawai’i School of Architecture and Urban and Regional Planning.

Below: The dilapidated Waipahu Depot bridge at Kapakahi Stream will be replaced by a new bikeway bridge. The State is planning a nature education facility for children at Pouhala Marsh.

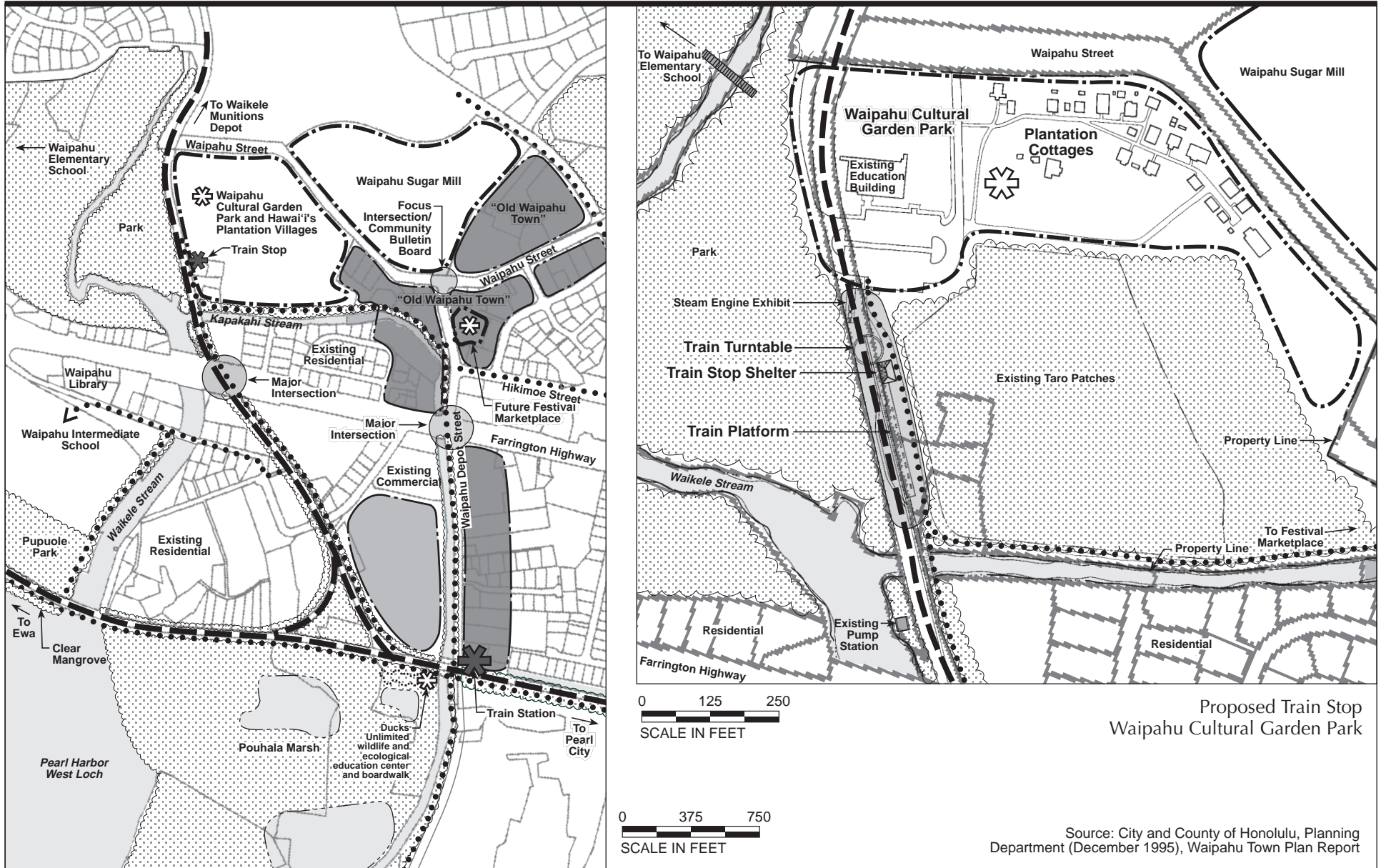


Waipahu Depot - **EXISTING**



Waipahu Depot—POTENTIAL IMPROVEMENTS

Figure 3-5
Waipahu Depot Proposed Redevelopment

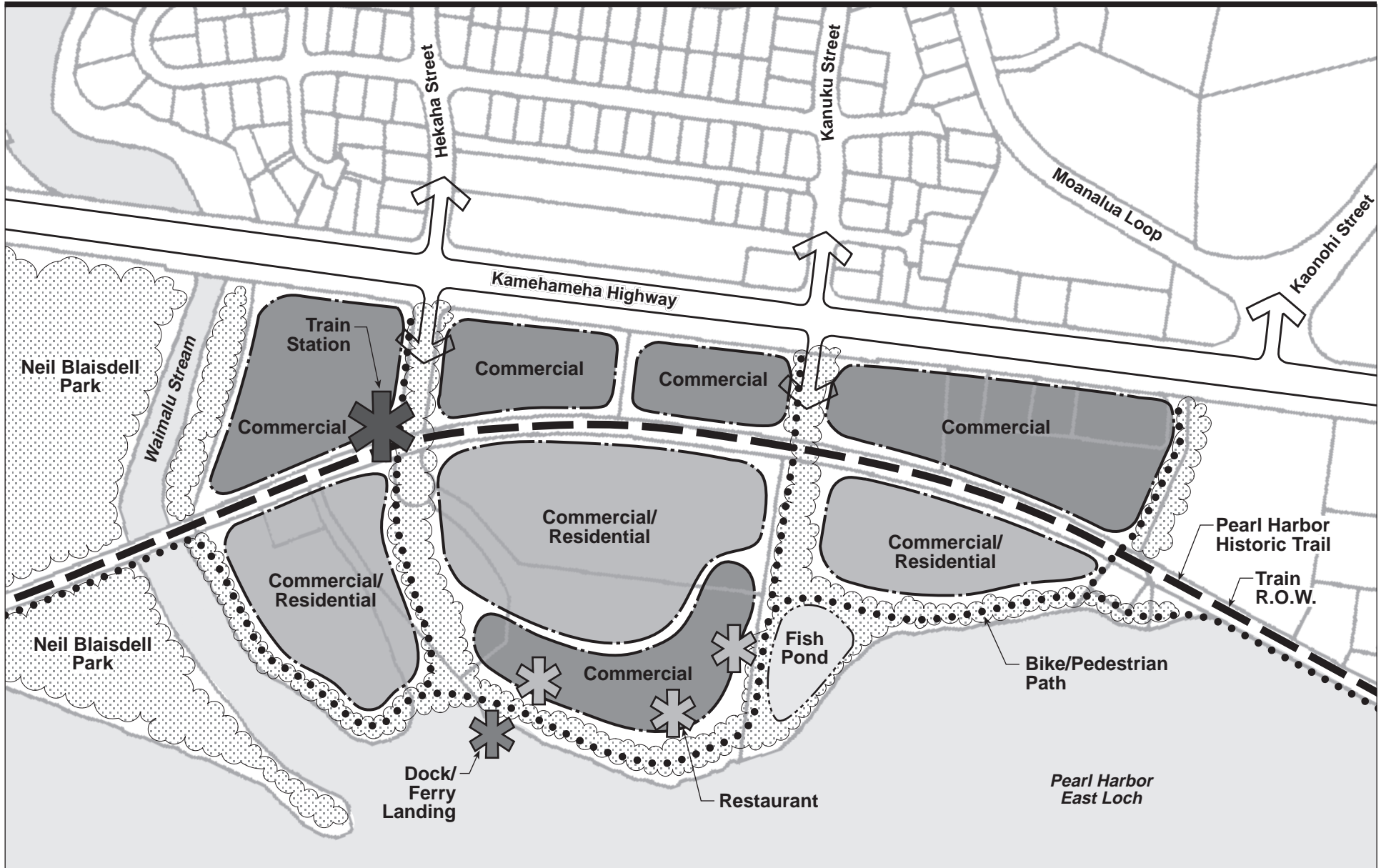


LEGEND

	Park/Conservation		Attractions
	Residential		Pearl Harbor Historic Trail
	Commercial/Residential		Proposed Bike/Pedestrian Path

Figure 3-6
Waipahu Junction Plan Proposed Redevelopment

Source: City and County of Honolulu, Planning Department (December 1995), Waipahu Town Plan Report



Note: Preliminary study for discussion purposes.

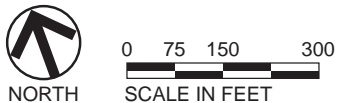


Figure 3-7
Harbor Center Plan Proposed Redevelopment

Other areas for future redevelopment are Harbor Center, Lehua Avenue, and Waipahu Industrial Area. (See Figure 3-7 and Figure 3-8.) The impetus is to return the waterfront to the public, open views and access to the water, relocate industrial use, clean up streams and harbor waters, and create opportunities for waterfront residential and commercial centers.

The proposed Harbor Center and Waipahu Industrial redevelopment projects are long-term objectives that would involve rezoning and incentives for business cooperation and relocation.

OPPORTUNITIES ON NAVY LANDS

A number of opportunities that the City may wish to pursue to implement parts of the Master Plan are related to actions being taken by the U.S. Navy. The Navy owns the majority of the OR&L right-of-way from Halawa Landing to Waipahu Depot Road. However, the Navy has provided easements to private owners for access and facilities within the right-of-way. In the future, the Navy may be in the position to “excess” the property, having no further use of the corridor. In the absence of federal requests, the property could be offered for sale to the City, the State, or other qualified parties, such as the Hawaiian Railway Society. The Navy could also consider selling or leasing other areas adjacent to the Trail for park or open space.

Ford Island Development. The Navy is pursuing a public/private partnership to redevelop Ford Island. This offers several opportunities. Plans call for lease of a 6.6-acre parcel at Halawa Landing as a centralized ticketing, parking, and transportation staging area to support private development on Ford Island.

It would be advantageous for the City to work with the Navy and the selected Ford Island developer to incorporate a railway station into plans for the Halawa Landing parcel. In the near future—and if railway expansion is not feasible—the station could accommodate a trolley shuttle service (similar to the trolley that transports Ford Island visitors over the new Admiral Clarey Bridge to the Battleship *Missouri* Memorial) to other stations along the Trail.

Development of Ford Island may also provide an alternative site for the CINCPACFLT Admiral’s Boathouse, located a short distance from Halawa Landing. The Navy has expressed concern about the proximity of the City’s Pearl Harbor Bike Path to the Boathouse. Unfortunately, this area is narrow, constrained by a steep hillside. Realigning the bike path may be possible, but may not allow for future train expansion. With its ample waterfront, however, Ford Island is likely to have several sites suitable for relocation of the Boathouse.

Another aspect of the Ford Island development that could have a positive effect on the Trail is the Navy’s intent to offer to sell retained lands at the former Naval Air Station Barbers Point, now known as Kalaeloa, to the Ford Island developer.

Planned development of Harbor Center would return the waterfront to the public by relocating industrial land uses to make way for waterfront residential and commercial centers.



Industrial land use at Harbor Center - **EXISTING**



Harbor Center—Potential Improvements

Figure 3-8
Harbor Center Proposed Redevelopment

This property is located along the northern boundary of the former base, adjacent to the OR&L corridor. Again, the City should initiate discussions with the Navy and the selected developer to work together to enhance and not turn future development away from this vital section of the Trail.

Integrated Natural and Cultural Resources Management Plans. The Navy is preparing an Integrated Natural Resources Management Plan and Integrated Cultural Resources Management Plan for the Pearl Harbor Naval Complex. Proposed actions in these plans could help to enhance the Trail. For example, the Navy may agree to allow the selective clearing of mangrove along the Pearl Harbor shoreline. This would greatly enhance Trail views and increase visibility and safety.

ENVIRONMENTAL PRESERVATION

Dozens of important plant and wildlife species inhabit the three main ecosystems along the Trail: the wetlands of the Pearl Harbor Estuary, the ʻEwa Plain and dry savanna, and the leeward marine coastline. The Trail presents interpretive opportunities to educate residents and visitors about area wildlife and natural habitats from Pearl Harbor—where USFWS plans to expand its National Wildlife Refuge, Waiawa Unit, and build an overlook to view Hawaiian waterbirds at its Honouliuli Unit—to ocean education on the Waiʻanae Coast. Leeward Community College is actively involved as a partner, and with 39 public schools located in the vicinity of the Trail, there are ample outdoor learning opportunities for young and old alike.

The City, State, and Community Vision Groups can activate projects for Trail enhancement. The number one project that would provide immediate benefit is selective clearing of mangrove along Pearl Harbor. Opening up these dark vegetated corridors will improve harbor visibility and increase public safety, similar to the City's clearing of West Loch Shoreline Park. The Navy has agreed to mangrove clearing by USFWS at their wildlife refuges. The City must obtain permission from the Navy and possibly from the U.S. Army Corps for Engineers and the State to assess potential impacts on water quality from clearing. State approval may also be required for areas in the Shoreline Management Area.

Associated with this landscape improvement, the City's could adopt protective land use policy, as drafted in the *Central Oʻahu Sustainable Communities Plan* (Draft, September 1999). The Plan outlines provisions for a greenway buffer, stating that "new development should be set back a minimum of 50 feet on either side of the OR&L right-of-way, unless it is directly related to the operation of the railroad, is the reconstruction of an historic use, or is consistent with the use of the right-of-way for open space and bikeway purposes in stretches where railroad operation is not feasible, or is otherwise specified in existing land use approvals". The Plan calls for landscaping and occasional rest stops with seating and amenities adjacent the bikeway.

Botanical and faunal surveys and native landscape revegetation projects are encouraged through the University of Hawai'i, Leeward Community College, and Community Vision Group projects. Landscaping and any subsurface improvements, repairs, or maintenance must be coordinated with DOT Harbors Division (State Energy Corridor), where applicable. Other Trail enhancements are discussed in Chapter 5: Design Guidelines.

Communities wanting to improve their environment are encouraged to partner with ongoing educational/interpretive programs. Groups already working along the Trail include Leeward Community College, Ahupuaʻa Action Alliance, Ducks Unlimited, The Nature Conservancy, Hawai'i Nature Center, USFWS, NPS, DLNR, and the Navy. Other interested groups include the UH Sea Grant College Program and local school administrators.

Other programs, as listed in Chapter 4, include: Bike-to-Work Days and Walk/Bike-to-School Programs, the use of recycled building materials (e.g., benches, walkways), and expedited hazardous waste remediation of former Navy activities.

TRAIL ALIGNMENT & CONSTRAINTS

The Pearl Harbor Historic Trail would generally follow the alignment of the former railway within the 40-foot-wide OR&L right-of-way. Rising less than 100 feet over a length of approximately 18.6-miles, the off-road, paved trail is an ideal venue for pedestrians and for beginner or family-oriented bicycling. It traverses seven communities: ‘Aiea, Pearl City, Waipahu, ‘Ewa, Kapolei, Kalaeloa, and Nanakuli. There are opportunities for Trail extensions, diverging from the OR&L alignment, to improve shoreline views at the following sites:

Harbor Center, ‘Aiea: The historic railway alignment would be preserved on the inland OR&L; a new, wider, shared-use path would be constructed along the waterfront and a restored fishpond. Coordination with the landowner, The Harry and Jeanette Weinberg Foundation Inc., is necessary.

HECO Wai‘au Power Plant to Lehua Elementary School, Pearl City: Construction of a new path along the shoreline and watercress farms, through Lehua Park, away from the industrial power plant would require coordination with HECO, the Navy, and agricultural tenants. The inland OR&L alignment would be reserved for future railway expansion (current bike path location).

Other locations: The Trail may also require uphill and inland realignment at Rainbow Bay, where the Navy and State have security concerns for the CINCPACFLT Admiral’s Boathouse.

The City and State bike paths may also need to be realigned to avoid infrastructure or land use conflicts. Existing underground pipelines and overhead utility lines parallel the Trail. The State Energy Corridor runs within the OR&L right-of-way. Multiple public road crossings and easements across the Trail have been granted for residential and commercial driveways.

Cooperation is required between all parties, including the HRS, to ensure that future utilities allowed in the corridor do not restrict or place undue burden on recreational use or future train expansion. HECO currently has no plans for constructing additional overhead utilities. Future lines should be prohibited in the right-of-way.

There may be areas where residential fences, landscaping, and walls inadvertently encroach the Trail. Surveys will be required for trailside improvements, and overhead and under-ground fuel, water, and electrical lines running along the corridor. As part of the Leeward Bikeway project, the State will acquire land adjacent to the Trail where the right-of-way is constricted. The City may also need to acquire additional right-of-way or propose a land-swap to improve the Trail segment between ‘Aiea and ‘Ewa. (See Appendix E: Railway Infrastructure).

Waterfront development at Harbor Center could borrow some ideas from the highly successful River Walk in San Antonio, Texas.



TRAIL ACCESS AND CONNECTIONS

The Trail will link communities along the route, from 'Aiea to Nanakuli. Safe and easily identified bicycle, pedestrian, and transit links must connect the Trail to populated neighborhood streets, schools, and attractions. See the accompanying tables and Figures 3-9 through 3-12: Trail Connections, which display possible bikeway, shared-use path (bike and pedestrian), and greenway connections. These linear paths generally use existing City street corridors. It is recommended that the City and Community Vision Groups initiate these trail connection projects to be phased in over the next one to five years. More than 30 miles of trail connections are proposed, which would involve City designation of the bikeway segments, installation of signs, pavement markings, and, in some cases, widening of bike shoulders or sidewalks.

The connections are based on priority bikeway projects listed in the *City and County of Honolulu Bicycle Master Plan* (1999). These projects could be listed in a future island-wide O'ahu bicycle master plan to analyze bikeway needs on City streets and roads.

Community members, Community Vision Groups, and bicycle groups recommended other connections. The types of bicycle/pedestrian trail connections are defined as follows:

Bike route. A shared roadway designated by bicycle route. The route could be a widened street curb lane or a paved shoulder.

Bike lane. A shared roadway where a portion the roadway is designated by striping, signs, and pavement markings for the exclusive use of bicycles.

Shared-use path. An off-road paved path located away from streets for bicyclists, walkers, joggers, skaters, persons in wheelchairs, etc. The City's Pearl Harbor Bike Path and the State's planned Leeward Bikeway are examples of shared-use paths along an old railway right-of-way. A shared-use path is different from a sidewalk, which is generally not acceptable for bicycling.

Greenway. A path, paved or unpaved, as wide as a watershed or as narrow as a trail. Greenways typically follow rivers, wetlands, the coast, through landscape and open spaces and help maintain delineations between urban and conservation lands.

Trail connections are not limited to bicycle and pedestrian links. Other transportation networks, such as shuttles, trolleys, buses, and ferries, are feasible and could reinforce Trail access.

The State DOT is testing ferry links between Honolulu Harbor and Pearl Harbor's Middle Loch and Kalaeloa Harbor. Bicycles are allowed on the ferries, and all City buses are equipped with bicycle racks. A trolley shuttle, similar to those serving the Battleship *Missouri* Memorial over Admiral Clarey Bridge to Ford Island, for example, could run from Halawa Landing to Waipahu Cultural Garden Park.

Private landowners, the Navy, and wildlife managers have privacy and security concerns. Fencing around nature reserves and wetlands or landscape buffers for homes immediately adjacent to the Trail may be appropriate by mutual agreement. Trail rules should urge "Please respect private property by staying on the Trail."

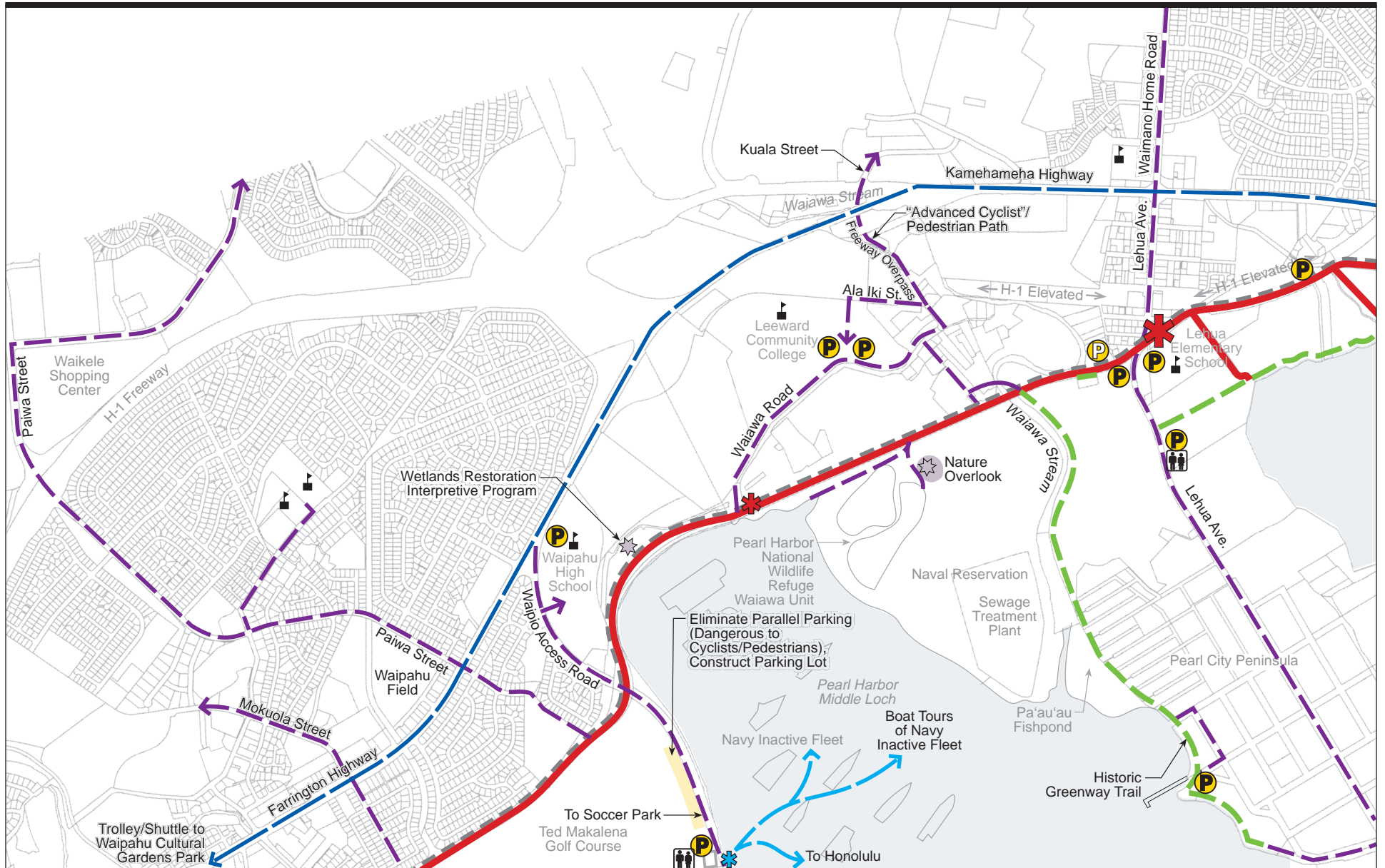
Most Trail access points are located on government property. Any access from private property should be discussed first with willing landowners. To ensure a quality experience, the number, size, and days allowed for Trail commercial use should be controlled and user fees assessed, similar to DLNR's rules governing commercial use of Manoa Falls Trail and Makapu'u Lighthouse trails.

Motorized vehicles are not allowed on the Trail. A limited number of private parties are allowed vehicular trail access to their properties. The Navy, City, and State should look for alternative routes and a better vehicular control system. Barriers, gates, and a master-key system could be used to allow limited access to commercial operators, wildlife preserve managers, the railway, those granted easements, utility companies, emergency access vehicles and City and State maintenance vehicles. Utility maintenance schedules must be coordinated with the City and State and public notice given of Trail closure dates.

The State's *Leeward Bikeway Environmental Impact Assessment* outlines strategies and rules that will govern trail use and responses to landowner concerns regarding trespassing and liability. The CAC also expressed concern for improved trail safety and security, addressed in priority projects, Chapter 3. Trail design guidelines are outlined in Chapter 5.

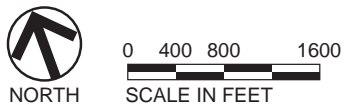
Trail Connections: 'Aiea-Pearl City to Waipahu

Street	Facility	Type	Length (miles)
Proposed Bicycle / Pedestrian Link			
Laulima	'Aiea Elementary School	route	0.50
Honomanu to Ka'amilo	Alvah A. Scott Elementary School and 'Aiea High School	route	0.75
McGrew Loop	McGrew Point, Pa'aiau Fishpond, future Cultural Center	shared-use path	0.25
Stream Easement	Kalauao Stream	greenway	1.50
Pali Momi	Pearl Kai and Pearl Ridge Shopping Centers	shared-use path	0.50
Kanuku	Redeveloped Harbor Center	shared-use path	< 0.25
Stream Easement	Waimalu Stream	greenway	0.75
Ka'ahumanu	To Neal S. Blaisdell Park	route	0.75
Park Path	Neal S. Blaisdell Park	shared-use path	< 0.25
Lehua Avenue	North to Waimano Home Road, south to Pearl City Peninsula	route	North 0.25 South 1.00
Waiawa Stream Loop	Historic Trail-Pearl City Peninsula	greenway	0.50
Waiawa Road Loop	Leeward Community College	shared-use path	0.75
Ala Iki to Kuala	Leeward Community College link over H1 to Pearl Highlands	Lane and sidewalk (advanced riders)	0.25
Waipi'o Access Road	North to Waipahu High School, south to Soccer Park	shared-use path	North 0.25 South 2.00
New Link to Awanui and Paiwa	Lanakila Elementary School, August Ahrens Elementary School, Waikele Shopping Center	lane	0.25
Existing Bikeway			
Arizona Memorial Dr	To Pearl Harbor Naval Shipyard	shared-use path	
Water Link (Ferry)			
Wiki Wiki Ferry	Halawa Landing		
Recreational Ferry	Harbor Center		
Wiki Wiki Ferry	Waipi'o Access Road near Ted Makalena Golf Course		
Recreational Ferry	Historic tours of Navy Inactive Fleet		
Shuttle Link (Trolley)			
USS Arizona Memorial & Visitors Center	To Harbor Center and Waipahu Cultural Garden Park		



LEGEND

- Historic Railway Operations
- Pearl Harbor Historic Trail
- Existing City-Pearl Harbor Bike Path
- Proposed Bikeways
- Trolley/Shuttle
- Proposed Shared Use Path
- Ferry Route





- Existing Parking
- Proposed Parking
- Comfort Stations (Restrooms)
- Railway Station
- Railway Stop
- Ferry Landing
- Schools

Figure 3-9
Trail Connections
 'Aiea/Pearl City to Waipahu

TRAIL CONNECTIONS: WAIPAHU TO ‘EWA

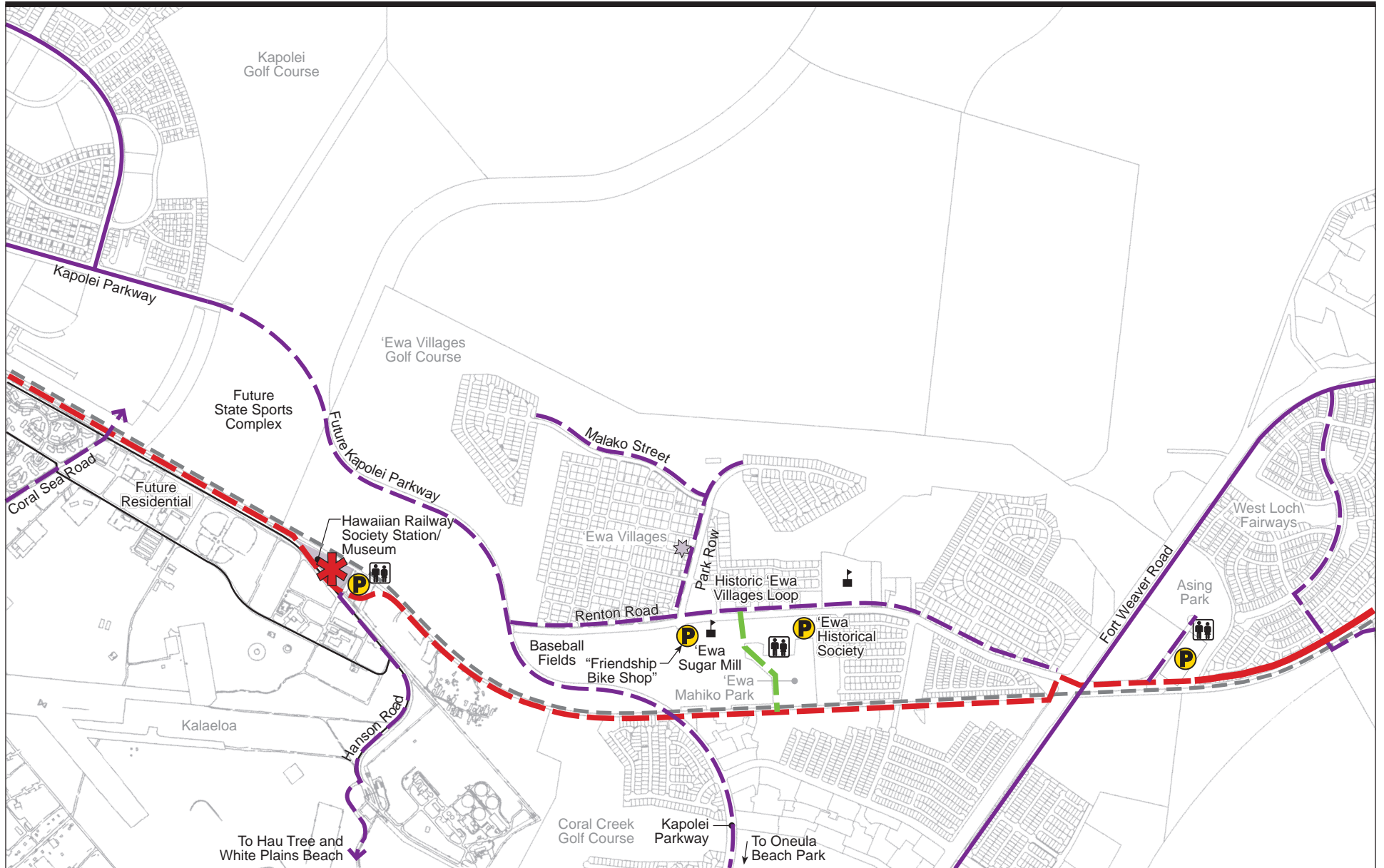
Street	Facility	Type	Length (miles)
<i>Proposed Bicycle / Pedestrian Link</i>			
Waipahu Depot Road	North to Festival Marketplace, Waipahu Sugar Mill, Waipahu Cultural Garden Park; South to Soccer Park	route	North 0.5 South 0.75
Stream Easement	Waipahu Cultural Garden Park	greenway	0.5
Gateways	Future residential/commercial redevelopment in Waipahu	route	< 0.25
Kaihuopala'ai	North to Fort Weaver Road, West Loch Community	route	0.5
Aawa Drive	North to West Loch Fairways, Fort Weaver Road, Kunia Road; South to National Wildlife Refuge, Honouliuli Unit	route	North 0.5 South < .25
Renton Road	Historic ‘Ewa Villages	route	1.25
‘Ewa Mahiko Park	Link to historic ‘Ewa Villages	shared-use path	0.25
Future Kapolei Parkway	North to future State Sports Complex; South to Oneula Beach Park	route	North 1.25 South > 1.0
Hanson Road	Hawaiian Railway Society Station / Museum; South to Hau Tree and White Plains Beach	route	North < 0.25 South > 1.0
Coral Sea Road	North to future State Sports Complex	route	0.25
<i>Existing Bikeway</i>			
Kapapapuhi Street	West Loch Community, Fort Weaver Road	route	
Fort Weaver Road	Commuter route linking ‘Ewa and Waipahu	lane	
West Loch Shoreline Peninsula	Park	shared-use path	
Okupe Street	West Loch Community Shoreline Park	route	
<i>Shuttle Link: Trolley</i>			
Waipahu Cultural Garden Park and Festival Marketplace	To USS <i>Arizona</i> Memorial & Visitors Center		



Above: A bicyclist stops to greet the Hawaiian Railway Society's train at Kapolei.

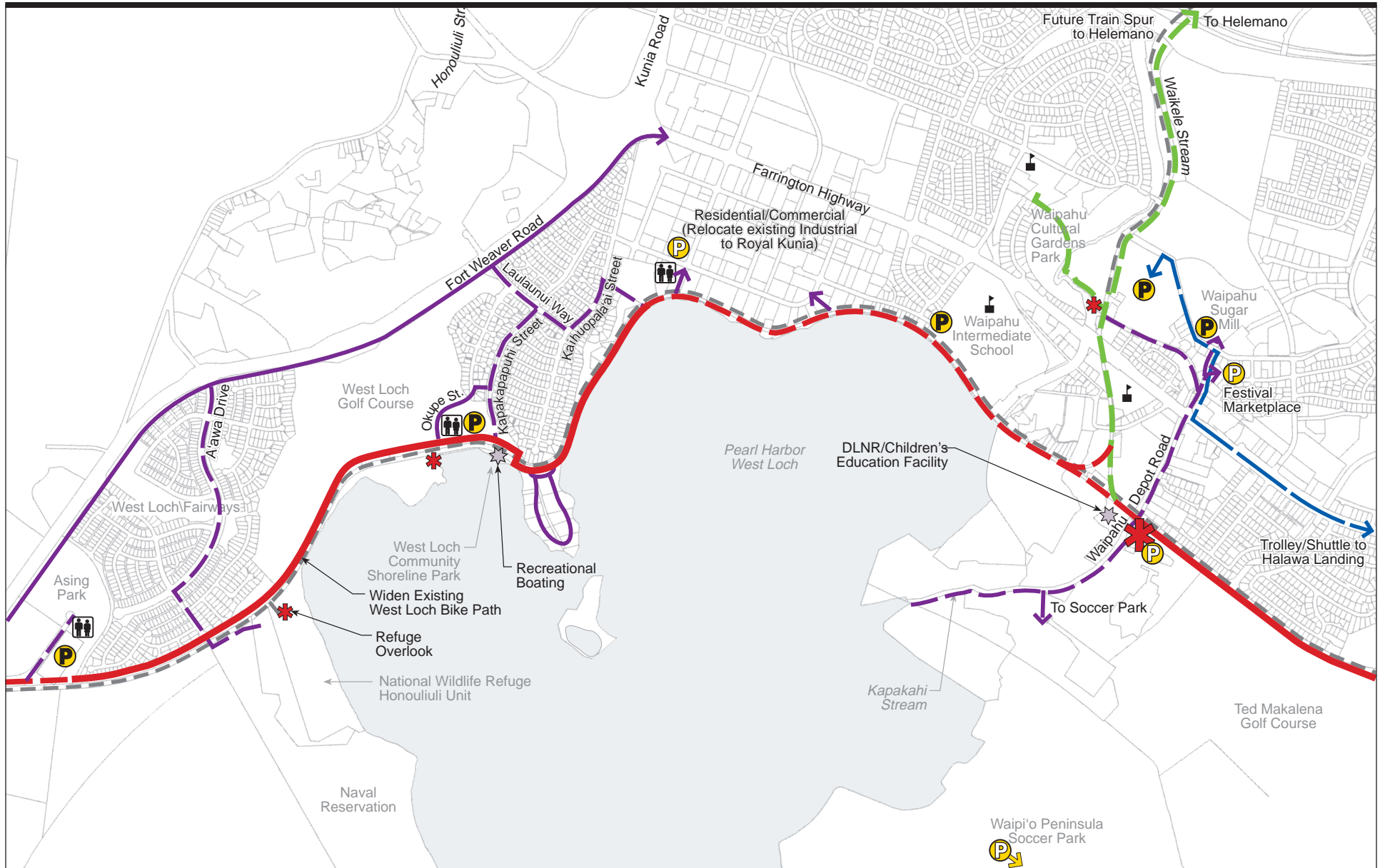
TRAIL CONNECTIONS: 'EWA TO KAPOLEI

Street	Facility	Type	Length (miles)
Proposed Bicycle / Pedestrian Link			
Coral Sea Road	North to future residential/commercial, South to beach parks	route	North < 0.25 South >1.0
New Road	Kapolei residential	route	< 0.25
Fort Barrette Road	North to Kapolei High School, City of Kapolei; South to future Kalaeloa residential	lane/route	North 1.25 South 0.25
Tulagi	Challenge Center of Hawai'i, future Kalaeloa Airfield Museum	route	0.25
Copahee Avenue	Barbers Point Elementary School, archaeological sites	route	0.25
New Road	Future Kapolei Civic Center	route	< 0.25
Kalaeloa Boulevard	North to City of Kapolei; South to Wiki Wiki Ferry, Barbers Point Beach Park	route	North 0.25 South >1.0
New Roads	Future residential	route	< 0.25
Existing Bikeway			
Kamokila Boulevard	Kapolei Regional Park, Kapolei Shopping Center	route	1.25
Ali'inui Drive	Ko Olina Marina and beach parks	lane	1.25
Water Link (Ferry)			
Wiki Wiki Ferry	Ferry Landing at Kalaeloa Harbor		



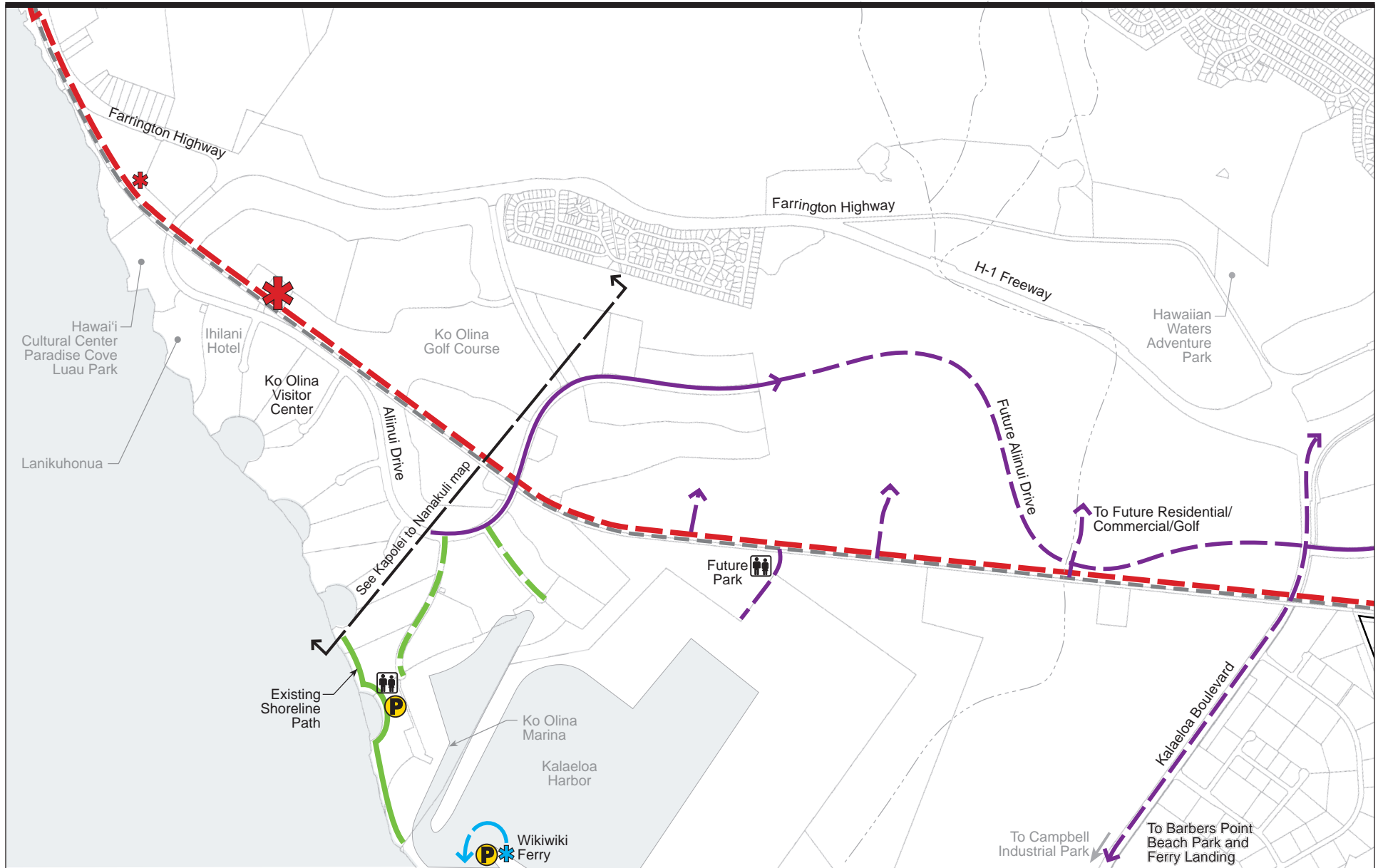
LEGEND

- Historic Railway Operations
- Existing Bike Lane or Route
- Proposed Bike Lane or Route
- Existing City-Pearl Harbor Bike Path
- Proposed Leeward Bikeway
- Proposed Scenic Shared Use Path
- Trolley/Shuttle
- Ferry Route












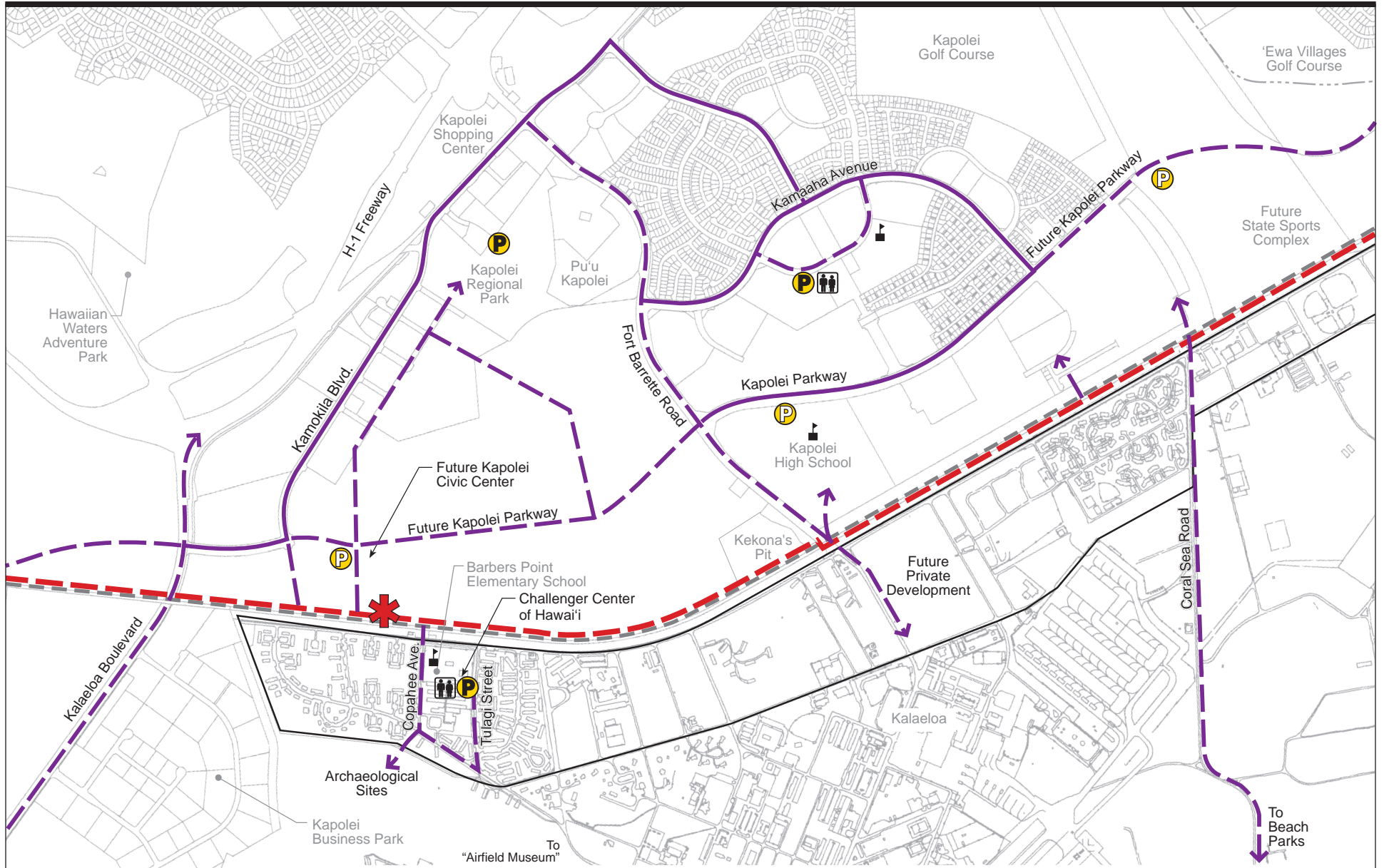
-  Existing Parking
-  Proposed Parking
-  Comfort Stations (Restrooms)
-  Railway Station
-  Railway Stop
-  Ferry Landing
-  Schools

Figure 3-10
Trail Connections
 Waipahu to 'Ewa



LEGEND

-  Historic Railway Operations
-  Pearl Harbor Historic Trail
-  Existing City-Pearl Harbor Bike Path
-  Proposed Leeward Bikeway
-  Proposed Scenic Shared Use Path
-  Existing Bikeways
-  Proposed Bikeways
-  Trolley/Shuttle
-  Ferry Route



-  Existing Parking
-  Proposed Parking
-  Comfort Stations (Restrooms)
-  Railway Station
-  Railway Stop
-  Ferry Landing
-  Schools

Figure 3-11
Trail Connections
 'Ewa to Kapolei

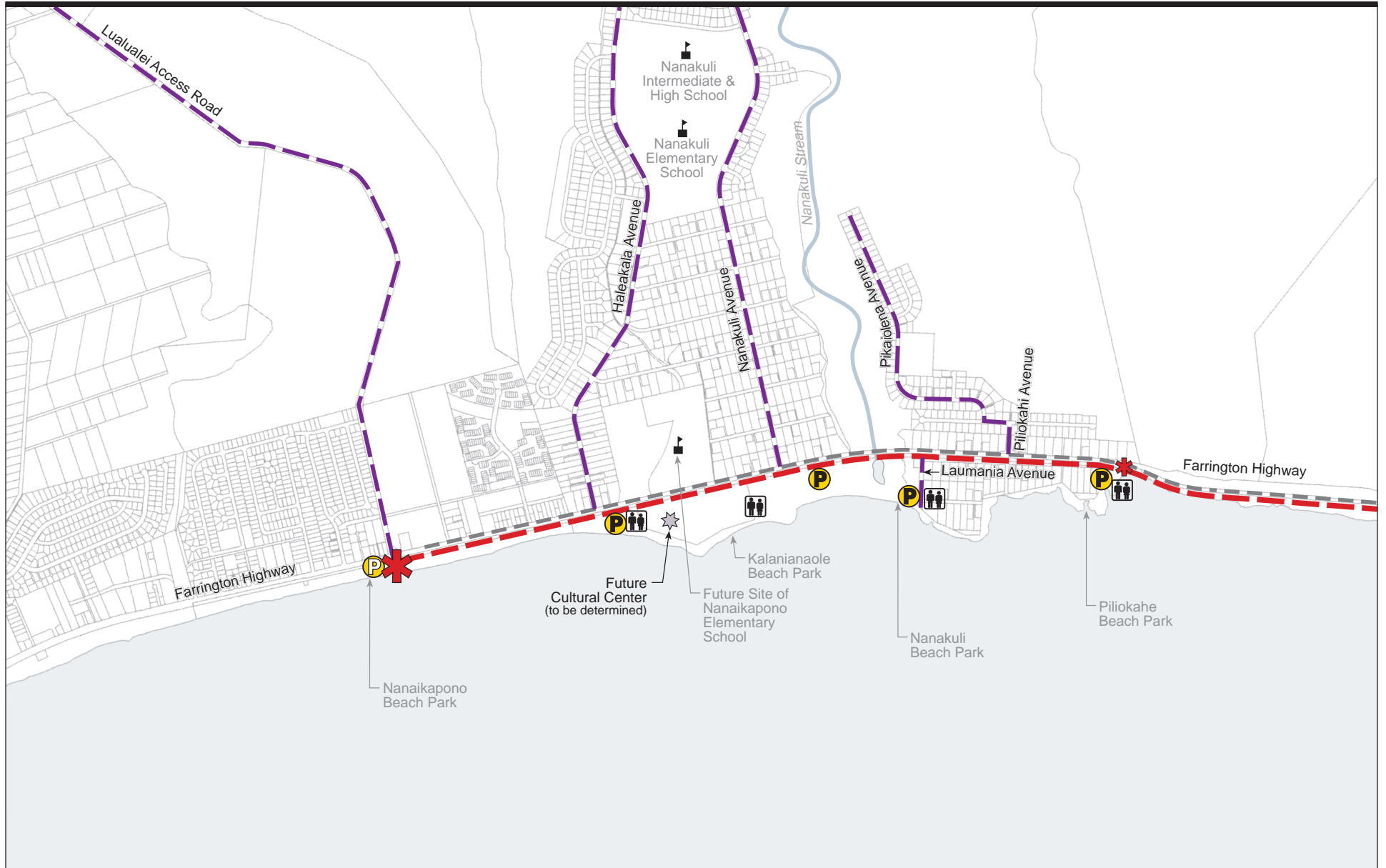
TRAIL CONNECTIONS: KAPOLEI TO NANAKULI



Above and Below: As shown in these examples, joggers can get their exercise on the Trail while pushing baby strollers and walking their dogs all at the same time, or enjoy solitude in a natural setting.

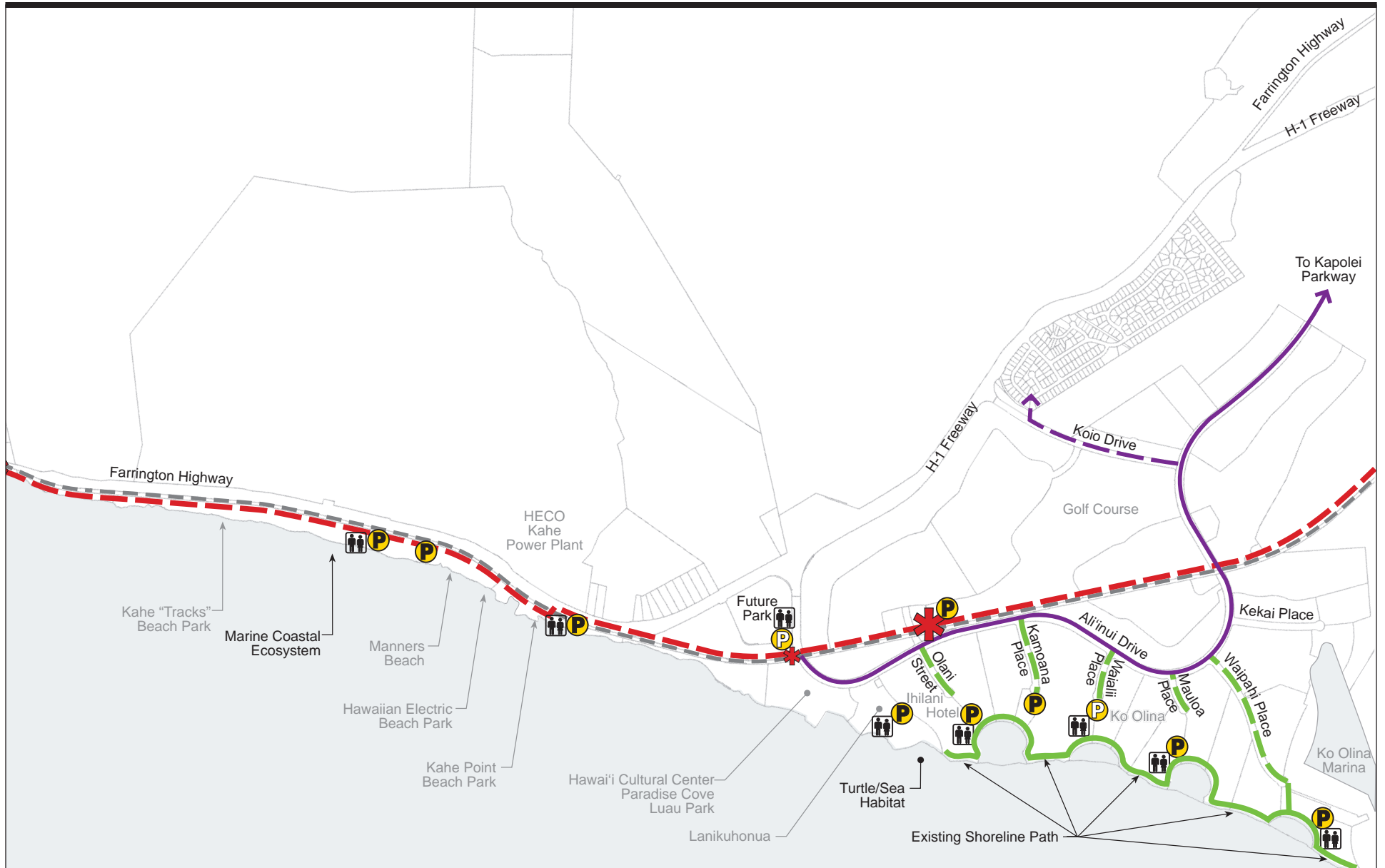


Street	Facility	Type	Length (miles)
Proposed Bicycle / Pedestrian Link			
Ko'i'o Drive	To Nanakuli Gardens Residential	route	0.25
Kekai Place	To future residential	sidewalk/ route	< 0.25
Waipahi Place	Ko Olina Marina	sidewalk/ route	0.5
Mauloa Place	To Ko Olina Beach Parks	sidewalk/ route	< 0.25
Waiali'i Place	To Ko Olina Beach Parks	sidewalk/ route	< 0.25
Kamoana Place	To Ko Olina Beach Parks	sidewalk/ route	0.25
Olani	To Ko Olina Beach Parks	sidewalk/ route	< 0.25
Piliokahi Avenue	Residential	route	0.75
Laumania	Nanakuli Beach Park	route	< 0.25
Nanakuli Avenue	Nanakuli Intermediate & High School	route	0.75
Haleakala Avenue	Nanakuli Intermediate & High School	route	0.1
Lualualei Access Road	Residential	lane	1.25
Existing Bikeway			
Ali'inui Drive	Ko Olina Resort, Lanikuhonua, Paradise Cove Luau Park, Makaiwa Park	lane	1.25



LEGEND

- Historic Railway Operations
- Pearl Harbor Historic Trail
- Existing City-Pearl Harbor Bike Path
- Proposed Leeward Bikeway
- Proposed Scenic Shared Use Path
- Existing Bikeways
- Proposed Bikeways
- Trolley/Shuttle
- Ferry Route



-  Existing Parking
-  Proposed Parking
-  Comfort Stations (Restrooms)
-  Railway Station
-  Railway Stop
-  Ferry Landing
-  Schools

Figure 3-12
Trail Connections
 Kapolei to Nanakuli

**Pearl Harbor Historic Trail
MASTER PLAN**

CHAPTER FOUR

IMPLEMENTING ACTIONS

TRAIL MANAGEMENT

The proposed Pearl Harbor Historic Trail provides a unifying framework to support community initiatives along the Trail corridor and promote interagency trail activities. The Trail links transportation components—bikeways, the historic railway, trolleys, and ferries—as well as the various scenic, recreational, educational, ecological, cultural, and commercial features and attractions found along the Trail.

The following transportation elements of the Trail will most likely be directly managed and maintained by the agencies named below:

- **Pearl Harbor Bike Path**, Halawa Landing to West Loch: Maintenance by the City and County of Honolulu (City) Department of Parks & Recreation (DPR), Management (rules and regulations on use) by the City Department of Transportation Service (DTS).
- **Leeward Bikeway**, West Loch to Nanakuli: Management and maintenance by the State of Hawai‘i Department of Transportation (DOT) Highways Division.
- **Historic Railway**: Management and maintenance by the Hawaii Railway Society (HRS).

These agencies will set the Trail rules and regulations, post signs notifying users of those rules, and regulate concessions. The City’s HPD enforcement of laws (such as littering, vandalism, etc.) could be supplemented by Neighborhood Watch volunteers and Trail bicycle patrols.

THE CITY’S ROLE

Because of multiple jurisdictions and landowners and diverse community interests, an institutional arrangement is needed to coordinate the efforts of numerous public and private entities during implementation of the Pearl Harbor Historic Trail Master Plan. This coordinating role has been assumed during the planning process by the City’s DPP, its planning consultant, and the Citizen’s Advisory Committee (CAC), which was established by the City and the ‘Aiea-Pearl City Community Vision Group.

There is an equal need for an entity with adequate legal authority—as well as staff and financial resources—to carry out a substantial number of the projects that are proposed in the Master Plan for the Trail corridor.

DPP is committed to remaining the City’s point of contact for the Pearl Harbor Historic Trail. Until such time that community project champions form a trail organization, DPP will (1) serve as a resource on Trail activities related to planning and improvements; (2) serve as an ex-officio member of a steering committee that will provide guidance in implementing those Trail projects that are within the City’s jurisdiction.

PARTNERS REFERENCE LIST

Common acronyms. List is not all-inclusive of potential Trail Partners.

CAC	Citizen’s Advisory Committee
CINCPACFLT	Commander in Chief, Pacific Fleet
DBEDT	Department of Business, Economic Development, and Tourism, State of Hawai‘i
DDC	Department of Design & Construction, City & County of Honolulu
DFM	Department of Facilities Maintenance, City & County of Honolulu
DHHL	Department of Hawaiian Home Lands, State of Hawai‘i
DLNR	Department of Land & Natural Resources, State of Hawai‘i
DOE	Department of Education, State of Hawai‘i
DOH	Department of Health, State of Hawai‘i
DOT	Department of Transportation, State of Hawai‘i
DTS	Department of Transportation Services, City & County of Honolulu
DPP	Department of Planning & Permitting, City & County of Honolulu
DPR	Department of Parks & Recreation, City & County of Honolulu
HBL	Hawai‘i Cycling League
HCVB	Hawai‘i Convention & Visitors Bureau
HPD	Honolulu Police Department, City & County of Honolulu
HRS	Hawaiian Railway Society
LCC	Leeward Community College
NPS	National Park Service, US DOI
OMPO	O‘ahu Metropolitan Planning Organization
RC&D	Resource Conservation & Development, USDA
RTC	Rails-to-Trails Conservancy
UH	University of Hawai‘i at Manoa
USDA	U.S. Department of Agriculture
US DOI	U.S. Department of the Interior
US DOT	U.S. Department of Transportation
USFWS	U.S. Fish & Wildlife Service, US DOI

FRIENDS OF THE PEARL HARBOR HISTORIC TRAIL

Establishment of a “Friends of the Pearl Harbor Historic Trail” or a “Pearl Harbor Historic Trail Steering Committee” is recommended to fulfill several functions, as follows:

- Serve as a Trail advocate or champion within the community and before decision-making bodies.
- Assure coordination among interested parties.
- Assist in setting priorities.
- Facilitate the resolution of specific issues or problems.
- Provide technical expertise.
- Cooperate on Trail activities jointly sponsored by member organizations.
- Cooperate in drafting legislation.
- Cooperate in obtaining project funding.
- Provide comments on proposed actions that may have an impact on the Trail.

The “Friends” could be established through a Memorandum of Understanding between DPP and key parties that agree to sustain the group. At a minimum, DOT should be a member due to its current work on the Leeward Bikeway. Other members may include HRS, DTS and DPR, O‘ahu Metropolitan Planning Organization (OMPO), Waipahu Cultural Garden Park, U.S. Navy, USFWS, NPS, The Estate of James Campbell, Hawaiian Electric Company (HECO), and representatives from Neighborhood Boards, Community Vision Groups, and community and business associations along the Trail corridor.

A special effort should be made to ensure representation from each of the affected communities in the region. Those areas surrounding Pearl Harbor (‘Aiea, Pearl City, and Waipahu) are well represented on the CAC, reflecting the fact that the Pearl Harbor Historic Trail originated as a project of the ‘Aiea-Pearl City Community Vision Group. However, proactive outreach is recommended to increase involvement by individuals and organizations in ‘Ewa, Kapolei, and Nanakuli.

As with the existing CAC, the “Friends” should be inclusive rather than exclusive in terms of membership. New members may be invited to provide special expertise as needed.

The importance of forming a “Friends” organization was studied by the Rails-to-Trails Conservancy (RTC). RTC found that trails that do not have a “Friends” groups or other active champions can stagnate and eventually fail.

FUNDING OPTIONS

Numerous sources of federal, State, City, and private funds are available for projects proposed in this Master Plan. Considering the number of users served, rail-trails are relatively inexpensive public facilities. Rail-trail land acquisition and construction costs, on average, are less than 20 percent of those for City roads and less than two percent of the cost of highway construction. The economic and alternative transportation benefits to surrounding communities often outweigh project costs. Several of the more significant funding options are listed below.

FEDERAL FUNDS

U.S. Department of Transportation (US DOT). Among the most important sources of financial support for bikeways and other alternative modes of transportation are funds available from the US DOT, Federal Highway Administration. In Hawai‘i, these funds are administered through the State DOT.

Funding priorities for surface transportation projects on O‘ahu are established through a process managed by OMPO, the membership of which is composed of representatives of State and City agencies and the private sector.

The result of the OMPO planning process is a list of priority projects that are incorporated into the biennial Statewide Transportation Improvement Program (STIP). The Leeward Bikeway is a priority project that is listed in the STIP. The bikeway will be financed to a large extent with federal funds. To obtain federal transportation funds for the Trail, the City needs to develop strategies for working within the process defined by OMPO and the DOT.

The Transportation Equity Act for the 21st Century (TEA-21), signed into law in 1998, updates the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The element of TEA-21 relevant to the Pearl Harbor Historic Trail is the Transportation Enhancement (TE) program initiated under ISTEA, which specifies that transportation enhancements must be considered for programming as part of the metropolitan and statewide planning processes.

Twelve qualifying TE activities are specifically defined in TEA-21. Out of the list of 12, the following nine qualifying activities apply to the Pearl Harbor Historic Trail:

- Provision of facilities for pedestrians and bicycles.
- Provision of safety and educational activities for pedestrians and bicyclists.
- Acquisition of scenic easements and scenic or historic sites.
- Landscaping and other scenic beautification.
- Historic preservation.
- Rehabilitation and operation of historic transportation buildings, structures, or facilities (including historic railroad facilities and canals).
- Preservation of abandoned railway corridors (including their conversion and use for pedestrian or bicycle trails).
- Archaeological planning and research.
- Establishment of transportation museums.

Two particularly noteworthy aspects of the TE activities are:

- TEA-21 requires the State to develop and maintain a meaningful and inclusive public involvement process to select TE activities. There is strong competition for TE funding, and the proposed “Friends” could be powerful advocates for priority Trail projects.
- Language included in TEA-21 provides an important exemption regarding matching funds on TE projects. It allows states to use TE funds for up to 100 percent of the cost of individual projects without a corresponding match in prescribed cases.

U.S. Department of the Interior (US DOI). Two agencies within US DOI—the National Park Service (NPS) and USFWS—manage prominent resources located in the Trail corridor: the USS *Arizona* Memorial and the Pearl Harbor National Wildlife Refuge, with sites at Honouliuli and Waiau. Both NPS and USFWS are represented on the CAC.

Technical assistance is available through the NPS Rivers, Trails, and Conservation Assistance Program. The Hawai‘i Field Office of NPS will provide assistance in 2001 to “jump-start” implementation of projects and a management framework.

The NPS also administers funds to states and counties for eligible outdoor recreation projects authorized under the Land and Water Conservation Fund Act. Grants are available for recreation planning, land acquisition, and facility development. Applications for funding are processed by the State Parks Division of the DLNR.



Cyclists can enjoy a scenic outing on the Trail far from street traffic, city noises, and automobile exhaust fumes.

Most appropriations in recent years have been awarded to federal agencies for land acquisition, with no State grants received between FY1995 and FY1999. However, a total of \$41 million was enacted in FY2000 for State grants, and this has been increased in the proposed FY2001 budget to \$150 million. The USFWS refuge staff is currently working with the community on an interpretive project at Honouliuli. There is an opportunity for future cooperative efforts with the USFWS, particularly regarding programs to interpret natural resources found along the Trail.

On a more ambitious scale, the “Friends” could seek designation of the Trail as a “National Heritage Area.” This is defined by NPS as “a place designated by Congress where natural, cultural, historic, and scenic resources combine to form a cohesive, nationally distinctive landscape arising from human activity shaped by geography.” The focus is on protection of critical resources through local initiative. To achieve this designation, the public must be involved in a feasibility study that shows widespread support among residents for the designation, and a commitment from private and public stakeholders. There is a potential for obtaining federal matching funds for authorized projects within the designated heritage area.

U.S. Department of Agriculture. The purpose of the Resource Conservation and Development Program (RC&D) of the U.S. Department of Agriculture (USDA) is to accelerate the conservation, development, and utilization of natural resources to improve the general level of economic activity and to enhance the environment in authorized RC&D areas. O’ahu is an authorized RC&D area.

The O’ahu RC&D Council, Inc., a nonprofit organization, helps community groups to identify, plan, and work on projects. A staff representative of the Natural Resources Conservation Service, based in the agency’s ‘Aiea Field Office, is a member of the CAC. Through the RC&D, community members may apply for technical assistance and grants for Pearl Harbor Historic Trail economic development and natural resource management projects.

U.S. Department of Defense. In 1991, Congress enacted a bill to establish and fund the Legacy Resource Management Program. The purpose of the program is to “promote, manage, research, conserve, and restore the priceless biological, geophysical, and historical resources which exist on public lands, facilities, or property held by the Department of Defense.” The Legacy program emphasizes an integrated approach to managing natural and cultural resources.



From the overlook at the National Wildlife Refuge, Waiawa Unit, Trail users can view Hawaiian waterbirds in their natural habitat.

Examples of Legacy-funded projects include an interpretive brochure for a self-guided tour of historic sites on Pearl Harbor Naval Complex and a brochure prepared by the State Historic Preservation Officer of DLNR to describe the cultural landscape of Pearl Harbor. A proposal could be submitted to the Navy for a Legacy project to enhance the Pearl Harbor Historic Trail. Projects that involve partnerships and both natural and cultural resources have a higher likelihood of being funded. One suggested project is the restoration of one of the Pearl Harbor fishponds.

STATE FUNDS

Many of the projects identified in this document are within the jurisdiction of the State of Hawai‘i. For example, six public schools are located directly along the Trail alignment, while another 33 are within a few miles, suggesting a potential for Trail-related educational programs. Leeward Community College (LCC) is a significant presence in the region and has actively participated on the CAC.

DOT and divisions of the DLNR, including the State Parks Division and the Division of Forestry and Wildlife, are either managing facilities or are involved in new projects along the Trail corridor. In addition, Trail projects related to public health education may be eligible for grants arising from Tobacco Settlement Funds, which are administered by the State Department of Health (DOH). Coordination with these agencies and the Hawai‘i State Legislature is needed to promote the inclusion of Trail-related projects in the State budget.

CITY FUNDS

Typically, community leaders and Community Vision Groups would identify appropriate projects to enhance the Trail in their neighborhoods. DPP and DDC will provide guidance for developing projects for inclusion in the City’s Capital Improvement Program (CIP) budget.

PRIVATE FUNDS

For success in implementing Trail projects, the “Friends” must identify funding sources other than those allocated through the State and City or through federal TE funds. Private donations and endowments must also be pursued. Funds are available from many sources in the private sector, including businesses and nonprofit organizations. The intent here is not to provide an exhaustive list of funding sources but to suggest approaches for leveraging “grassroots” involvement into financial support for projects.

The “Friends” must:

- Actively seek funding from corporations, local institutions, foundations, and businesses.
- Explore development opportunities, encouraging businesses to redevelop or locate along the Trail.
- Ask neighborhood and related nonprofit groups for donations and assistance with Trail adoption programs and patrols.
- Seek land donations from individuals and corporations. Land donations offer tax advantages to the landowner through tax deductions and conservation or agricultural easement benefits.

Some of the projects listed in this Master Plan are quite modest and can be accomplished in the short term with limited funds and generous “sweat equity.” For example, the Hawai‘i Community Foundation provides nearly \$10 million in grants each year to support nonprofit groups in the state. The Foundation recently announced that it is accepting grant applications from O‘ahu community groups for neighborhood improvement projects. Award amounts range from \$1,000 to \$3,000.

Citizens Advisory Committee members for the Pearl Harbor Historic Trail (left to right): Bill Roome (U.S. Navy), Joe Chernisky (Leeward Community College), Donna Stovall (USFWS), Councilmember Gary Okino (City and County of Honolulu), and Margo Stahl (USFWS) visit the National Wildlife Refuge, Waiawa Unit.



The “Friends” could accept funding, technical assistance, and volunteer teaming from organizations that support environmental and cultural resource protection and education, such as: Ahupua‘a Action Alliance, The Conservation Fund, American Greenways, National Trust for Historic Preservation, The Nature Conservancy, Hawai‘i Nature Center, Power Bar D.I.R.T. Grant Program, “Save Pearl Harbor,” UH Sea Grant College Program, Rails-to-Trails Conservancy, Tides Foundation, Trust for Public Lands, and Youth Conservation Corps.

The “Friends” could serve as a clearinghouse for funding strategies. One approach is for the “Friends” to register as a 501c(3) nonprofit organization in order to receive monetary contributions and obtain liability insurance to protect its members. Another option is for the “Friends” to partner with a foundation that would provide administrative assistance (e.g., grant writing and reporting), which would assure donors that funds are properly spent. This would allow more time for the “Friends” to work directly on Trail activities. These organizations typically charge 8 to 9 percent of the total grant amount for administrative support.

ACTION PLAN

In the next phase of implementing the Master Plan, the City, the “Friends,” and other supporters need to carry out the following administrative steps:

- Form the “Friends of the Pearl Harbor Historic Trail” or Steering Committee.
- Identify and prioritize short-term and long-term actions.
- Designate a City agency responsible for coordinating City activities related to the Master Plan. DDC would conduct capital improvement planning and construction. DPP would remain engaged to serve as a resource to the wider community on planning and urban design issues, as well as land use regulations.
- Introduce a resolution for the Honolulu City Council to adopt the Pearl Harbor Historic Trail Master Plan.
- Seek assistance from the NPS Rivers, Trails, and Conservation Assistance Program on individual project plans.
- Develop and fund individual projects. For the Trail to become a “world-class” recreational destination, enhancements must proceed along its entire length in a unified manner. Success in funding projects will be the ultimate factor in determining the time needed to complete projects.
- For a general timetable, refer to “Priority Projects and Programs: Years 2001 to 2005” and “Future Projects: Years 2006 to 2025” at the end of this chapter.
- Potential project partners, interested parties, and agencies to be contacted are listed under these Projects as “partners” (in alphabetical order). Other partners are welcome and should not be excluded.

- Construct a key demonstration project within two to three years to depict the Trail’s positive community and economic benefits. This demonstration project should be feasible, highly visible, well used, and a community priority. The success of a demonstration project can be publicized to rally support and attract future funding.

An outstanding demonstration project would be to improve one section of the Trail. An ideal location would be the one-mile stretch from Lehua Avenue to Waipi’o Point Access Road. Residents already walk, jog, and bicycle here; LCC is located directly inland, and the City’s Waipi’o Peninsula Soccer Park recently opened at the western end of this segment.

The City has had difficulty maintaining this section of the Pearl Harbor Bike Path. Cars illegally access the corridor from Lehua Avenue, Waiawa Road, and Waipahu High School; trash dumping and derelict automobile abandonment are common; and personal safety is a concern.

The City and LCC will soon connect a bike path from the college campus to the Pearl Harbor Historic Trail. Several partners are already organizing projects in this area, including Navy, USFWS, Kamehameha Schools, LCC, and the Lions Club. A variety of improvements to this segment of the Trail that would assure its greater use and enjoyment are necessary. These include the following actions:

- Clear shoreline mangrove to improve visibility and Harbor views.
- Landscape with native plants.
- Design a Pearl Harbor Historic Trail theme logo for unique Trail signs and markers.
- Organize volunteer cleanup and trash removal through Adopt-a-Trail and Adopt-a-Stream contracts.
- Restore Waiawa Stream.
- Work with the Navy to realign sharp bike path turns around the Lehua Sewage Pump Station, or study feasibility of relocating the station.
- Install effective vehicle barriers and enforcing a no-vehicle trespassing rule.
- Organize bicycle security patrols.
- Link paths to a new overlook at the USFWS National Wildlife Refuge, Waiawa Unit.
- Establish wetlands interpretive programs.

TRAIL PROTECTION

The major landowners of the Trail right-of-way are the Navy and the State. HECO owns four parcels of the right-of-way near their Waiawa Power Plant and Isobe Enterprises owns a small section near the Pearl City Peninsula. (See Trail Ownership Map in Appendix A.) The Navy permitted the City to construct the existing Pearl Harbor Bike Path in the right-of-way near Halawa Landing to Waipahu Depot Street. The Navy has also granted easements to private owners and utility companies for access to their properties and facilities. The Navy transferred the remaining section of the Trail from Waipahu to Nanakuli to the State for development of the Leeward Bikeway.

In order to protect the Trail in perpetuity from encroachment and to meet the community's goal to develop the Trail as a world-class heritage and recreational facility, the City and State should consider implementing various land use policies and controls. These controls would reach beyond those currently outlined in the City's Development and Sustainable Community Plans. Options may include, but are not limited to, rezoning the Trail right-of-way, designating the entire Trail on the National Register of Historic Places (NRHP), creation of a special district, or acquiring the right-of-way.

The Trail is currently zoned under various designations, from Military (M) to Preservation (P-2), Agriculture (Ag-1), Residential (R-5), Apartment (A-1, A-2), and Industrial (I-2), often reflecting the zoning of adjacent parcels. (Refer to the Zoning Map in Appendix A). Rezoning the entire right-of-way as an outdoor recreation facility to Preservation (P-2) would protect the Trail by reducing the range of permitted uses under current zoning while still allowing appropriate Trail uses, e.g. outdoor recreation facilities, use of historic structures, public uses and structures and game preserves. DPP would need to determine if the historic railway is an allowed use under the P-2 designation.

The OR&L railroad tracks in 'Ewa and Kapolei are listed on the NRHP under the National Historic Preservation Act. The City or State could apply for the Trail right-of-way to be designated on the NRHP. If so designated, any projects proposed within the right-of-way would need to be reviewed by DLNR's Historic Preservation Division.

The City could seek easements along the Navy- and State-owned sections of the Trail for pedestrian, bikeway, historic railroad and related uses. Historic, recreational, educational, and environmental activities and improvements should be included in the definition of "related uses."

The City is in negotiations with HECO for easements within the right-of-way on four HECO parcels for the Pearl Harbor Bike Path. Clarification or renegotiations of these easement agreements may be necessary to allow for planned uses. The City should also engage in discussions with DOT Harbors regarding the State Energy Corridor within the Trail.

The City may also consider designating the corridor as a special district. However, as the Trail stretches across a large geographic area within a multitude of districts with different development standards, administration of a special district could be difficult. Extending a special district beyond the existing 40-foot-wide right-of-way to either side may involve land acquisition for, and coordination with, various landowners, as well as a review of existing land use in these adjacent parcels. The City should review, on a case-by-case basis, redevelopment and protection of areas surrounding the Trail, such as Waipahu Depot. Alternative options, such as designation of improvement districts, may be more appropriate.

Although the City is satisfied with leasing the right-of-way for the existing Pearl Harbor Bike Path in 'Aiea and Pearl City, if the Navy decides to "excess" or sell the OR&L right-of-way, the City may consider acquiring the land. Renegotiations of existing private and utility easement would be required.

PERMITS AND APPROVALS

Federal, State, and City laws strictly control development along O'ahu's coastline. Government policies call for protecting, preserving, and where desirable, restoring the quality of coastal resources and scenic open spaces. The beauty and appeal of the Trail, passing shorelines, wetlands, and streams demand protection of these fragile environments. Outlined below are the most common environmental and land use approvals that may be required for major Trail projects. Community members are entitled to comment during the permit process. Other approvals related to project construction include grading and building permits. For each of the following subsections, one example of where Trail project approval may be required is noted, if applicable.

Environmental Impact Documentation. Projects on public land or using government funding, as well as other conditions, may trigger the State (Hawai'i Revised Statutes [HRS], Chapter 343) and/or federal (National Environmental Policy Act [NEPA]) requirement to prepare an Environmental Impact Statement (EIS) or Environmental Assessment (EA). A planning consultant—with assistance from specialists in archaeology, cultural practices, flora and fauna, marine biology, market demand and economic impacts, hydrology, traffic, noise, or air quality—may be required to prepare the documents. Restoration of a Pearl Harbor fishpond is an example of a project that would trigger both federal and State requirements for an EA or EIS.

State Land Use Districts. An owner who proposes to develop property (outside of the Urban District) must verify that proposed land uses conform with the State’s regulations for the State Land Use district where the property is located (for example: Conservation, or Agriculture).

City and County General Plan, Development Plans (DPs), and Sustainable Community Plans. The City’s DPP administers these Plans. The Trail is noted in the draft Primary Urban Center DP and Central O’ahu Sustainable Community Plan. From West Loch to Kahe “Tracks” Beach Park, the OR&L corridor is designated as an historic railway/bikeway in the ‘Ewa DP, which also requires a 50-foot setback on either side of the right-of-way. Proposed projects should conform to the DPs and Sustainable Community Plans.

City and County Zoning. Property owners must verify allowed land uses against the zoning code. If a property is zoned industrial or industrial-mixed use, as is the case for Harbor Center, and should the owner wish to redevelop the property for waterfront commercial and residential use, the property’s existing zoning must be amended and approved by the DPP and City Council. A variance would also allow limited exceptions to the zoning regulation.

Special Management Area. Under HRS Chapter 205A, the City has designated a protective area around the island’s coast. Proposed development, such as extension of the railway, would require approval of a SMA permit by the City’s DPP or the Honolulu City Council. Coastal portions of the Trail—from Halawa Landing to West Loch, and from Kahe “Tracks” Beach Park through Nanakuli—are subject to Special Management Area (SMA) controls for development within the shoreline.

Shoreline Certification and Shoreline Setback Variance. To develop property in the immediate vicinity of the shoreline, a project applicant must first have the exact location of the shoreline certified, as the shoreline changes seasonally. No development is permitted within 40 feet of the certified shoreline without first obtaining a setback variance from the City.

Use of State Land Authorization. If a private landowner proposes to acquire State-owned land (all land seaward of the certified shoreline) for commercial purposes (e.g., a marina), the landowner must obtain a lease agreement from the State DLNR, and must also obtain approval by DOT and a joint resolution from the State House of Representatives and State Senate. Leases typically run 55 to 99 years.

Conservation District Use. Lands seaward of the certified shoreline setback are State property and are in the State Conservation District. Therefore, use of these areas may require a Conservation District Use Permit.

Army Corps of Engineers – Federal Permits. Any alteration of wetlands, in-water clearing of mangrove at Pearl Harbor, discharges of fill, or other modifications (such as bridge construction) to “navigable waters of the U.S.” requires a Department of the Army permit under the Clean Water Act (Section 404) and Rivers and Harbors Act (Section 10). A companion Department of Health (DOH) Water Quality Certification may also be required (Section 401 of the Clean Water Act).

Coastal Zone Management (CZM) Certification. A development that requires a federal permit would also require concurrence from the State Office of Planning that the action is consistent with the objectives of the State’s CZM program.

Federal Agency Consultation. As part of the NEPA and Department of the Army processes, federal agencies are required to discuss the project with the State Historic Preservation Officer (SHPO) in DLNR regarding historic properties, and with the USFWS and National Marine Fisheries Service (NMFS) regarding threatened or endangered species.

National Pollutant Discharge Elimination System (NPDES). Development along the Trail would likely require NPDES permit coverage issued by DOH. Examples of projects that may need NPDES permit coverage include future redevelopment of Waipahu’s industrial area as a shoreline park and new residential/commercial uses, and bridge reconstruction. Developers should contact the City if discharges to the City’s storm drain system are anticipated. The City issues separate permits for discharges to its system to conform with its NPDES permit, which is issued by the State.

Stream Channel Alteration Permit. New railway bridges over streams that would alter existing stream channels (dry or wet) must be approved by DLNR’s Commission on Water Resource Management.

PRIORITY PROJECTS AND PROGRAMS – YEARS 2001-2005

RECREATION	
Project:	Complete Leeward Bikeway

Description: Support DOT’s efforts to complete design and construction of the Leeward Bikeway from Waipahu to Nanakuli along the OR&L corridor. Contact OMPO and community representatives to offer support for the bikeway and its designation for top-priority federal transportation enhancement funding.

Related Projects: HRS’ renovated train museum in ‘Ewa, Trail connection bikeway projects, and Trail signs and markers.

Partners: DOT, HRS, Navy, Neighborhood Boards, OMPO, and State Legislators.

Timeframe: Construction planned for 2003.

Estimated Cost: Matching State and federal transportation enhancement funds. Refer to DOT’s Environmental Assessment: Leeward Bikeway.

Project:	Pearl Harbor Historic Trail Map
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Description: Create a color user map to highlight Trail attractions and locate bikeway links and gateways, parks, restrooms, water fountains, mile markers, transit links, and parking along 18.6-mile corridor; include Trail and general safety rules. Link map to web sites: City, State, Hawai’i Bicycling League (HBL), and HCVB. Distribute maps for sale at bicycle shops, hotels, and nearby attractions to raise Trail funds.

Related Projects: Community and resource-specific maps (e.g., Nature Center map for West Loch Shoreline Park).

Partners: DBEDT, DOH Physical Activity Branch, DOT, DTS, HBL, HVCB, students, and corporate sponsors.

Timeframe: 6 months to 1 year.

Estimated Cost: Design and printing: less than \$5,000 for first 1,000 copies. Additional copies: approximately \$1 each.

Project:	Trail Signs and Markers
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Description: Design and install Trail identification and directional signs and mileage markers. In character with Trail’s historic railway design theme, the signs could be in the vernacular of train traffic control signs seen on the OR&L railway in the late 19th and early 20th centuries. Announce a contest to design the “Pearl Harbor Historic Trail” logo to be used on all signs, maps, and Trail information. Install signs at gateways leading to the Trail, on the Trail at least every mile, at street and railway crossings, and pointing to key destinations. (See Chapter 5: Design Guidelines.) The City and State should take inventory and coordinate the design and installation of existing and proposed signs on the Pearl Harbor Bike Path and proposed Leeward Bikeway. A coordinated and consistent sign system will prevent trail-user confusion.

Related Projects: Interpretive signs focused on natural and cultural resources, heritage, and oral histories. Phased installation of other site amenities (e.g., bike racks, trash receptacles, benches, water fountains, landscaping).

Partners: DDC, DFM, DOT, DPP, DTS, HRS, Historic Hawai’i Foundation, Mayor’s Advisory Committee on Bicycling, OHA, RTC, and UH Sea Grant College Program.

Timeframe: 1 to 5 years; install segments in phases.

Estimated Cost: \$10,000 to \$100,000.

PRIORITY PROJECTS AND PROGRAMS – YEARS 2001-2005 *(continued)*

Project:	Bike Patrols
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Description: Establish Bicycle Police duty and Neighborhood Watch “bicycle patrols.” Focus on community-identified safety-risk areas (Waipahu, Lehua Avenue, Harbor Center, and LCC).

Related Projects: Install emergency call boxes (photovoltaic-powered, vandal-resistant call boxes ring directly to 911) to be placed at quarter-mile intervals along Trail and near schools. Locate/construct police substations along Trail (perhaps incorporated as part of historic railway stations).

Partners: HPD, LCC Security, and Neighborhood Boards.

Timeframe: Less than 1 year.

Cost: Volunteer effort; increased police budget for additional bicycle duty.

Project:	Trail Connections
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Description: Plan, construct, and identify bikeways and paths joining the Trail to increase public access and links to attractions, neighborhoods, and schools. Priority locations: Pearl Kai Shopping Center, McGrew Point, Kanuku Street, Neal S. Blaisdell Park, Lehua Avenue, Waipi’o Access Road, LCC, Waipahu Depot Street, ‘Ewa Mahiko Park, Coral Sea Road, Fort Barrette Road, Kalaeloa Boulevard, and Nanakuli at Haleakala Avenue.

Related Projects: Realign Pearl Harbor Bike Path towards the shoreline at Harbor Center and east of Lehua Avenue. Plan and construct stream greenways linking to the Trail.

Partners: DDC, DHHL, DOE, DOT, DPR, DTS, HBL, Mayor’s Advisory Committee on Bicycles, Neighborhood Boards and Community Vision Groups.

Timeframe: Sign and stripe existing roads and paths in parks: 1 to 2 years. New bikeways and greenways: 2 to 5 years

Estimated Cost: Varies widely from \$40,000 to \$150,000 (signing and striping) to over \$500,000 per mile (new bike path construction, bikeways).

Project:	Special Events
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Description: Plan special public events on the Trail: train tours, fun runs/walks, Mayor’s Sunday-on-Wheels, scooter races, parades, bike “rodeos,” military events, Marathon Readiness Series, nature tours, stream and shoreline cleanups, Bike-to-Work-and-School Days. Event coordinators must obtain City Traffic Control Branch or State event permits, provide adequate water, notify public, obtain insurance and bonding, etc. MidPac RoadRunner’s Pearl Harbor Bike Path 10K foot race is an example of a successful event on the Trail.

Partners: Corporate sponsors, DOT, DTS, HBL, HRS, The Nature Center, and The Nature Conservancy.

Timeframe: Immediate.

Estimated Cost: Minimal, volunteer effort.

COMMUNITY & ECONOMIC REVITALIZATION	
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Project:	Waipahu Junction
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Description: Study market feasibility and plan redevelopment of areas between Old Waipahu Town Center and the Trail along Waipahu Depot Road to promote greater Trail use and economic development. Projects would be achieved through public/private partnerships. Design an historic railway station at Waipahu Depot to serve both an expanded Hawaiian Railway and as a “community substation.” Determine land ownership and adjoining parcel acquisition opportunities. Redevelop commercial and residential areas along a beautified Waipahu Depot Road “greenway” spur from Farrington Highway to the Trail.

PRIORITY PROJECTS AND PROGRAMS – YEARS 2001-2005 *(continued)*

Related Projects: Pouhala Marsh Children’s Education Center, Waipahu Festival Market, secondary access road/bike path to Waipi’o Peninsula Soccer Park, Kapakahi Stream Restoration. Future redevelopment opportunities: Harbor Center, Lehua Avenue, Waipahu Industrial area.

Partners: Adjacent landowners and tenants, DLNR, DOT, DPP, DTS, Ducks Unlimited, Filipino Community Center, Honolulu Fire Department (HFD), HPD, HRS, neighboring schools, UH Department of Urban and Regional Planning, UH School of Architecture, Waipahu Community Association, Waipahu Cultural Garden Park, and Waipahu Festival Marketplace.

Timeframe: Long-term for land use changes; however, planning has already begun on the Waipahu Town Plan and Festival Market. Partner with DLNR, HRS, and Waipahu Community Association, to further Waipahu Junction concept.

Estimated Cost: Detailed planning study and land use permits dependent on project scale.

Project:	Trolley System
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Description: Provide trolley or shuttle systems on public roadways between future railway stations/attractions in addition to or absence of an expanded historic railway. The trolleys could provide an alternate and efficient link between community and visitor attractions.

Related Projects: Historic railway expansion, railway stations, ferry service.

Partners: Community associations, DOT, DTS, Hawaiian Railway Society, HCVB, LOTMA, private trolley services, NPS (USS *Arizona*).

Timeframe: 2 to 5 years.

Estimated Costs: Private enterprise.

Project:	Pearl Harbor Recreation Complex and Senior Center
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Description: Support ‘Aiea-Pearl City Community Vision Group’s project to develop a new recreation complex at Lehua Avenue. The complex will include a Senior Recreation Center, swimming pool, and ball fields and would complement the planned railway station at Lehua Avenue.

Related Projects: Lehua Avenue Railway Station, Lehua Skateboard Park and parking area, relocation of Lehua Sewer Pump Station.

Partners: ‘Aiea-Pearl City Community Vision Group. DDC, DPP, DPW, HRS, Lehua Elementary School, and Navy.

Timeframe: Planning and Design: 1 to 2 years.

Estimated Cost: To be determined by the Community Vision Group during planning study.

Project:	Trail Protection in Perpetuity
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Description: The City (and State) could consider rezoning the Trail right-of-way, designating the entire Trail as an historic corridor, creation of a special district, or acquiring the right-of-way.

Work with developers of new neighborhoods to acquire easements alongside the Trail and to provide Trail access points.

Related Projects: Designation of greenway buffers in City Development and Sustainable Community Plans.

Partners: DDC, DPP, DOT Highways and Harbors Divisions, Navy, and landowners.

Timeframe: *Year 1:* City to strategize Trail protection land use policy and begin discussions with landowners. *Years 2 to 5:* Implement Trail protection land use policies.

Estimated Cost: If land must be acquired, cost will be based upon current property values. Navy-owned corridor may be eligible for future public benefit transfer to City or State.

PRIORITY PROJECTS AND PROGRAMS – YEARS 2001-2005 *(continued)*

Project:	Landowner & Community Support & Involvement
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Description: Arrange discussions with Trail and adjacent landowners and hire a specialty consultant to conduct a Trail user, door-to-door survey along adjacent properties. The survey would identify concerns, opportunities, and access issues. Promote survey findings and the potential for higher property values and business revenue on the Trail. Compile results and periodically update database.

Related Projects: Survey baseline Trail user count. Periodically update counts (2 to 5 years).

Partners: Community associations, HBL, LCC, Lions Club, NPS, real estate associations, Rotary Club, RTC, and UH.

Timeframe: Periodically (every 2 to 5 years): Trail user baseline survey. Bi-annually: Trail user and adjacent landowner surveys.

Cost: Minimal. Recruit volunteers from service organizations and UH/LCC. Seek mini-grants for technical and administrative assistance and for conducting a survey by a specialty consultant.

HISTORIC PRESERVATION	
Project:	Historic Railway Expansion

Description: *Phase 1:* New route from ‘Ewa Station/Train Museum to Waipahu Depot and Waipahu Cultural Garden Park; *Phase 2:* Kahe “Tracks” Beach to Nanakuli; *Phase 3:* Waipahu Depot to Lehua Avenue; *Phase 4:* Lehua Avenue to Halawa Landing.

Related Projects: Train stations, historic signs, and trolley shuttles.

Partners: Corporate sponsors, DOT, HRS, and OMPO.

Timeframe: *Phase 1:* 5 to 7 years (‘Ewa to Waipahu).

Estimated Cost: See Appendix E.

Project:	Train Stations
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Description: Construct train stations as community “substations” to unify the Trail’s historic train theme.

Related Projects: Waipahu Junction and Harbor Center Redevelopment. Provide alternate transportation (trolleys, buses) on public roadways to supplement access to stations and attractions.

Partners: Community associations, DOT, Historic Hawai‘i Foundation, HRS, OMPO, and UH School of Architecture.

Timeframe: *Priority Stations:* Waipahu Depot, Lehua Avenue, ‘Ewa Station.

Estimated Cost: See Appendix E.

Project:	Heritage Corridor Designation
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Description: Prepare National Park Service (NPS) application for consideration of the Pearl Harbor Historic Trail to be nominated as a National Heritage Corridor. Lobby Hawai‘i’s Congressional delegation for support of formal designation by the U.S. Congress. See page 4-4 for more information.

Related Projects: Trail interpretive signs and cultural/historic programs.

Partners: NPS, Rivers, Trails, and Conservation Assistance Program; Community Vision Groups, Neighborhood Boards, community associations and businesses, schools.

Timeframe: 1 to 2 years.

Estimated Cost: Considerable volunteer effort to prepare application.

PRIORITY PROJECTS AND PROGRAMS – YEARS 2001-2005 *(continued)*

Project:	Interpretive Exhibits
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Description: Design and install interpretive Trail exhibits at key nodes such as parks, schools, and fishponds. Exhibits can explain the importance of changes in the natural environment, *ahupua'a*, shark legends, fishing activities, plantation life, early Hawaiian times, and the historic railway.

Related Projects: DLNR’s Pouhala Marsh Interpretive Center, and refer to Appendix D: Cultural/Interpretive Potential

Partners: Ahupua’a Action Alliance, DLNR Historic Preservation Division, Historic Hawai’i Foundation, HRS, LCC, OHA, State Parks Division, UH Sea Grant College Program, and Waipahu Cultural Garden Park.

Timeframe: Install exhibits in phases.

Estimated Cost: \$20,000 to \$100,000.

Project:	Oral History Project
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Description: Conduct interviews and research materials. Compile cultural practice stories in a database for use in interpretive exhibits, signs, programs, and tours.

Related Projects: Interpretive signs, exhibits, and tours.

Partners: DOE, LCC, neighborhood residents, and UH.

Timeframe: Ongoing.

Estimated Cost: Volunteer effort, mini-grants to fund administration and production.

Project:	Kalaeloa Interpretive Trail Loop
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Description: Plan and construct an interpretive trail at Kalaeloa near the Barbers Point Elementary School (State site 1718). Topics for interpretation include the ‘Ewa Plain ecosystem and Hawaiian adaptation to the environment.

Related Projects: Refer to Appendix D: Cultural/Interpretive Potential.

Partners: Barbers Point Elementary School, DHHL, DLNR Historic Preservation Division, Na Ala Hele, and the Navy.

Timeframe: 1 to 2 years.

Estimated Cost: \$30,000 plus labor for clearing, construction, and sign installation.

ENVIRONMENTAL PRESERVATION	
Project:	Open Shoreline Views

Description: Selectively clear mangrove at Pearl Harbor. Key locations include: east of Harbor Center, east of Lehua Avenue, Waiawa Stream; Middle Loch at Waipahu High School; West Loch at Waipahu Intermediate School, Waipahu Industrial area, and Waikele Stream.

Related Projects: USFWS National Wildlife Refuge (Waiawa and Honouliuli Units) – mangrove clearing.

Partners: Army Corps of Engineers (ACOE), businesses adjacent to the shoreline, DFM, DOE, DPR, Navy, and USFWS.

Timeframe: Ongoing maintenance.

Estimated Cost: Consult with USFWS, Navy, and DPR.

Project:	Nature Reserve Overlooks
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Description: Support and assist current efforts to construct reserve overlooks for educational programs at Pouhala Marsh and USFWS Honouliuli Unit. Identify best location for overlook of USFWS Waiawa Unit. Provide links to Trail and develop interpretive programs/exhibits connecting the three overlooks.

Related Projects: Wetlands restoration and interpretive program (near Waipahu High School), Hawai’i Nature Center West Loch Shoreline Bicycle/Nature Tour (annually in September).

PRIORITY PROJECTS AND PROGRAMS – YEARS 2001-2005 *(continued)*

Partners: DLNR, Ducks Unlimited, Hawai'i Nature Center, LCC, The Nature Conservancy, UH Sea Grant College Program, and USFWS.

Timeframe: 2 to 3 years.

Estimated Cost: Minimal for unpaved Trail. Paved path or viewing platform boardwalk costs vary.

Project:	Trail Landscaping
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Description: Upgrade landscaping along the Trail and at gateways and spurs. Within City jurisdiction areas, develop a landscape concept plan in association with DPR to prioritize areas for improvements. Implement a Memorandum of Understanding (MOU) between DPR and the "Friends of Pearl Harbor Historic Trail." Temporary irrigation may be required until landscape is established. (Refer to Chapter 5: Design Guidelines.)

Related Projects: Clearing shoreline mangrove, trash removal, stream restoration and beautification.

Partners: Board of Water Supply (BWS), businesses and community organizations along the Trail, Chevron USA and utility companies with lines in the Trail corridor, DOT, DPR, Navy, Neighborhood Boards, NPS, Outdoor Circle, USFWS, and Community Vision Groups.

Timeframe: Improve sections in phases: *Year one:* demonstration project from Lehua Avenue to Waipi'o Point Access Road

Estimated Cost: Consult with DPR to develop project and maintenance budgets and funding strategy.

Project:	Fishpond Restoration
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Description: Develop Pearl Harbor fishponds (Pa'aiiau, Pa'akea, Pa'au'au) restoration plan and identify feasible improvements. Partial restoration may be possible in conjunction with interpretive exhibits.

Related Projects: Clearing mangrove, interpretive exhibits and signs.

Partners: Ahupua'a Action Alliance, DBEDT Aquaculture Program, DLNR, Harry & Jeanette Weinberg Foundation (Harbor Center), Navy, OHA, UH Sea Grant College Program, USFWS, and Community Vision Groups.

Timeframe: 2 years for Restoration Plan and initial funding.

Estimated Cost: Planning Report, Permit Investigation: \$40,000 to \$100,000.

Project:	Reintroduce Natural Beach Vegetation
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Description: Restore Nanakuli coastal dunes and plant native coastal species. (Refer to Chapter 5: Design Guidelines.)

Related Projects: Marine ecosystem interpretive signs.

Partners: DLNR State Parks, DPR, and UH Sea Grant College Program.

Timeframe: 1 to 2 years.

Estimated Cost: Consult with State DLNR.

FUTURE PROJECTS – YEARS 2006-2025

Recreation

Construct remaining Trail public access links, gateways, and spurs. (Refer to Chapter Three: Trail Connections.)

Realign Trail bicycle/pedestrian path to Harbor Center shoreline and closer to shoreline east of Lehua Avenue (near HECO's Waiawa power plant). (Refer to Chapter 3: Trail Connections.)

Add more Trail amenities: benches, water fountains, landscaping, and signage.

Realign bike path behind CINCPACFLT Admiral's Boathouse. Investigate relocation of Boathouse to Ford Island.

Refurbish stream bridges that are aging or showing signs of wear. Widen and enhance bridges to accommodate multiple users.

Discuss with Navy the possibility of limited recreational boating in East Loch from Neal S. Blaisdell Park or a redeveloped Harbor Center commercial seaside village.

Continue cleanup of Pupuloe Street Mini Park, Waipahu.

Traffic calming: Add raised crosswalks to act as wide speed bumps where Trail interests roadways (Harbor Center, Waipi'o Point Access Road, Waipahu Depot Road, Fort Barrette Road, Kapolei Parkway).

Maintain, update, and replace Trail sections and amenities that age and show signs of wear.

Community and Economic Revitalization

Establish public adoption and stewardship programs for Trail segments to assist with maintenance, security, user surveys, and public relations.

Increase efforts for Trail protection through land use policy strategies, donations, purchase, easements, and greenway buffer setbacks.

Explore redevelopment of incompatible land uses along the Pearl Harbor shoreline with landowners: Waipahu Junction, Harbor Center, Waipahu Industrial area, junkyards, and tire and car maintenance businesses.

Incorporate recommendations of this Master Plan into City plans as they are updated (General Plan, Development Plans, Sustainable Community Plans, Special Area Plans), as well as the O'ahu Regional Transportation Plan and the State's Bike Plan Hawai'i.

Historic Preservation

Expand historic railway to Halawa Landing and to Nanakuli (Lualualei Access Road). Aggressively pursue funding and prepare detailed studies for expanding the railway. Poll public support for the expansion.

Construct additional train stations and stops and expand railway theme (signage, exhibits, programs) along entire length of Trail.

Work with Navy to gain permission to launch historic boat tours of Navy's Inactive Fleet (mothball fleet) in Middle Loch.

Environmental Preservation

Actively pursue State Department of Education and colleges to initiate public education programs along the Trail.

Implement fishpond restoration plans.

Restore marsh adjacent to the Trail at Pearl Kai Shopping Center (former Opu Fishpond site/Kalua'oa Springs).

Extend path spur to University of Hawai'i Pearl City Extension Farm.

Stream restoration: clean up streams flowing into Pearl Harbor and create greenway paths and features (nature park, overlooks, children's education centers).

Prepare water resources conservation plan for landscape and development improvements along the Trail. Address Pearl Harbor region (*ahupua'a*) water quality issues and long-term flooding and climatic change impacts on trailside developments.

**Pearl Harbor Historic Trail
MASTER PLAN**

CHAPTER FIVE

DESIGN GUIDELINES

INTRODUCTION

These design guidelines serve to direct the overall theme and image of the Pearl Harbor Historic Trail as a world-class, recreational facility. The intent is to provide baseline design standards for implementation of Trail elements in order to: (1) achieve a high quality of appearance, (2) maximize safety to the greatest extent possible, and (3) direct the character and form of development. These guidelines represent the community's position and desire for the Trail. Adjacent landowners and developers should apply these standards to properties lining the Trail, where feasible.

Although safety and function are the principal considerations, attention to aesthetic details and creative design of various elements within and adjacent to the Trail that generate a sense of uniqueness are also crucial. These guidelines suggest developing a trail theme that is based on the historic OR&L railway.

Below: Shared-use paths are paved trails for a variety of recreationalists - walkers, joggers, skaters, and bicyclists.



PATH DESIGN

The following points and illustrations are guidelines for maintaining a safe and user-friendly trail and for construction of new paths linked to the Trail.

Shared-Use Path (Bikeway) and the Historic Railway

- Trail components should adhere to or exceed minimum design dimensions and criteria set forth by the American Association of State Highways and Transportation Officials (AASHTO) for safe use of the Trail.
- The edge of the shared-use path should be no closer than 13 feet from the railway centerline (per State DOT, *Leeward Bikeway Final EA*). A shared-use path is defined as a paved path in parks or scenic areas, usually removed from a road, that is used by multiple users—walkers, joggers, skaters, and bicyclists.
- The minimum path width should be 10 to 12 feet. In rare instances, the width may be reduced to 8 feet where physical obstructions or slopes constrict the overall right-of-way (AASHTO).
- Natural barriers—landscaping or rockwork—are preferred between the railway and path and adjacent wetlands or other sensitive ecological features, and to screen private residences, if desired. For aesthetic reasons, the use of guardrails, walls, and exposed fences is discouraged. (See Figure 5-1: Trail at Wildlife Refuge.)

Spur Trails and Promenades

- Public paths and promenades connected to the Trail should be designed for shared use and “universal” or disabled-user access.
- Waterfront paths or promenades must respect shoreline setback requirements. (Refer to Chapter 4: Permits.)
- Promenades or heavily used trail segments should be of adequate width to accommodate anticipated traffic. In some instances, it may be necessary to increase the path width beyond 12 feet (near heavily visited attractions, cafes, etc.)
- Commercial activities, such as cafes or restaurants, situated adjacent to heavily used trail segments should physically separate people spaces from trail traffic while carefully providing for safe and identifiable access points. (See Figure 5-2: Waterfront Promenade.)



Above: Natural rock barriers such as this one are more aesthetic alternatives to less desirable fences, guardrails, or walls.

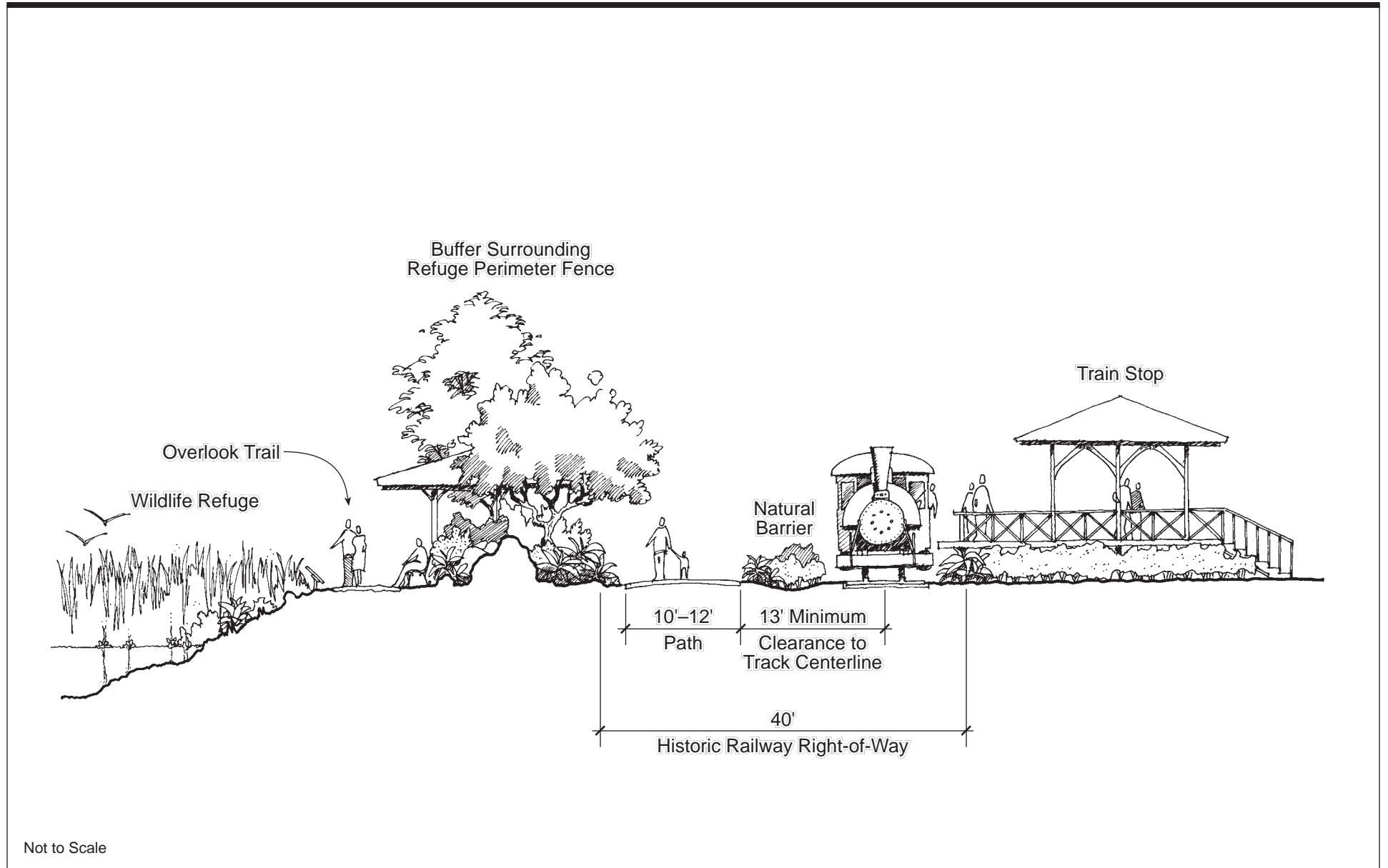


Figure 5-1
Trail at Wildlife Refuge

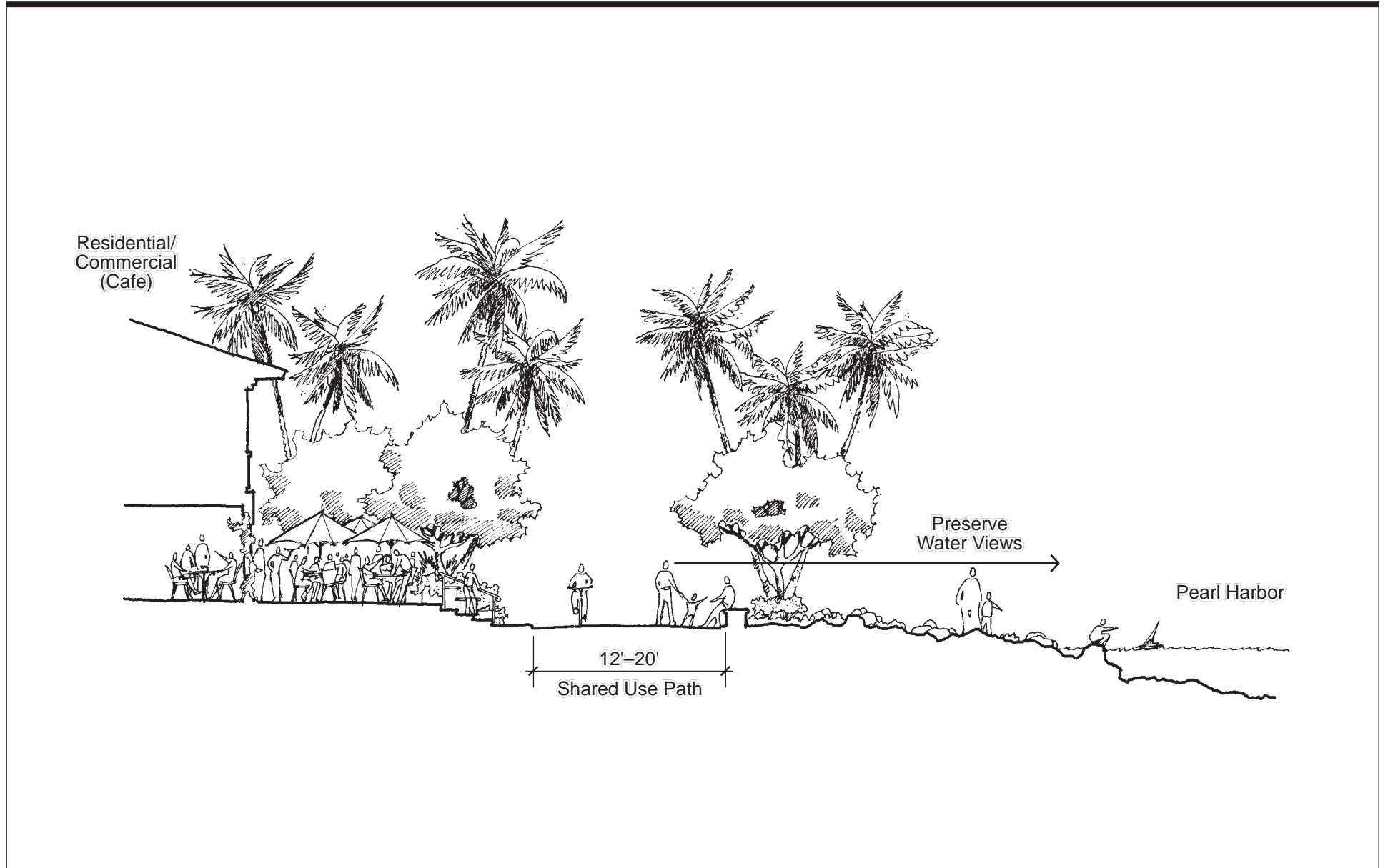


Figure 5-2
Waterfront Promenade

Universal Access

Designers of the Trail and its facilities should employ a “universal design” approach. Accessibility for many different types of users and their varying ability levels, from children to the elderly, should be carefully considered during the Trail’s physical development.

Facilities should be designed to permit safe recreational use for a variety of people, ranging from those with wheelchairs, walkers, or canes; and the visually or hearing impaired; to pedestrians; bicyclists; and skaters. In general, the facilities should be designed for the maximum number of potential user-types without excluding anyone.

Below: Trail facilities should be designed in compliance with ADA Accessibility Guidelines to accommodate people with a variety of physical challenges.



ADA Accessibility Guidelines. The Americans with Disabilities Act (ADA) outlines requirements for trail corridor accessibility. Newly proposed ADA Accessibility Guidelines (ADAAG), when approved, affecting trails, outdoor access routes, beach access, and access to picnic and camping facilities will be applicable to the Pearl Harbor Historic Trail.

The final report of the Regulatory Negotiation Committee on *Accessibility Guidelines for Outdoor Developed Areas* is available at: www.access-board.gov/PUBS/outdoor-rec-rpt.html.

Trail Constrictions

- A minimum of 3 feet (6 feet preferred) should be maintained between the path and or permanent lateral obstructions. Signs, poles, bollards, fences, trees, and other obstructions within the right-of-way should be relocated, if possible. (See Figure 5-3: Trail Obstruction Setbacks.)
- A minimum 3-foot (5-foot preferred) separation should be maintained between the path and ditches, canals, or down-slopes greater than 3:1.
- Hillside cuts may be required for future railway expansion paralleling the path. Terraced and landscaped retaining walls would also reduce unsightly visual impacts.
- As the path approaches narrow bridges, adequate space should be provided on either side to view and safely negotiate the constriction. Turnouts may be needed for users to pause during moments of heavy bridge traffic. Signage and pavement markings should also be used.

TRAIL AMENITIES

Historic Railway Theme

The following illustrations serve to establish the historical character and themes for railway stations, pavilions and shade structures, site furnishings, and markers along the Pearl Harbor Historic Trail. Adjacent developers are also encouraged to incorporate historic design motifs into buildings along the Trail. The intent is to create a sense of continuity and harmony among built forms that contribute to establishing the Trail as a heritage corridor.

Train Stations and Stops

Railway station buildings are proposed for Halawa Landing, Harbor Center, Lehua Avenue, Waipahu Depot, Kapolei, Ko Olina Resort, and a new museum at the Hawaiian Railway Society’s ‘Ewa Station.

Below: Railway station at ‘Ewa Mill, 1909



PHOTO CREDIT:
RAY JEROME BAKER, BISHOP MUSEUM ARCHIVES

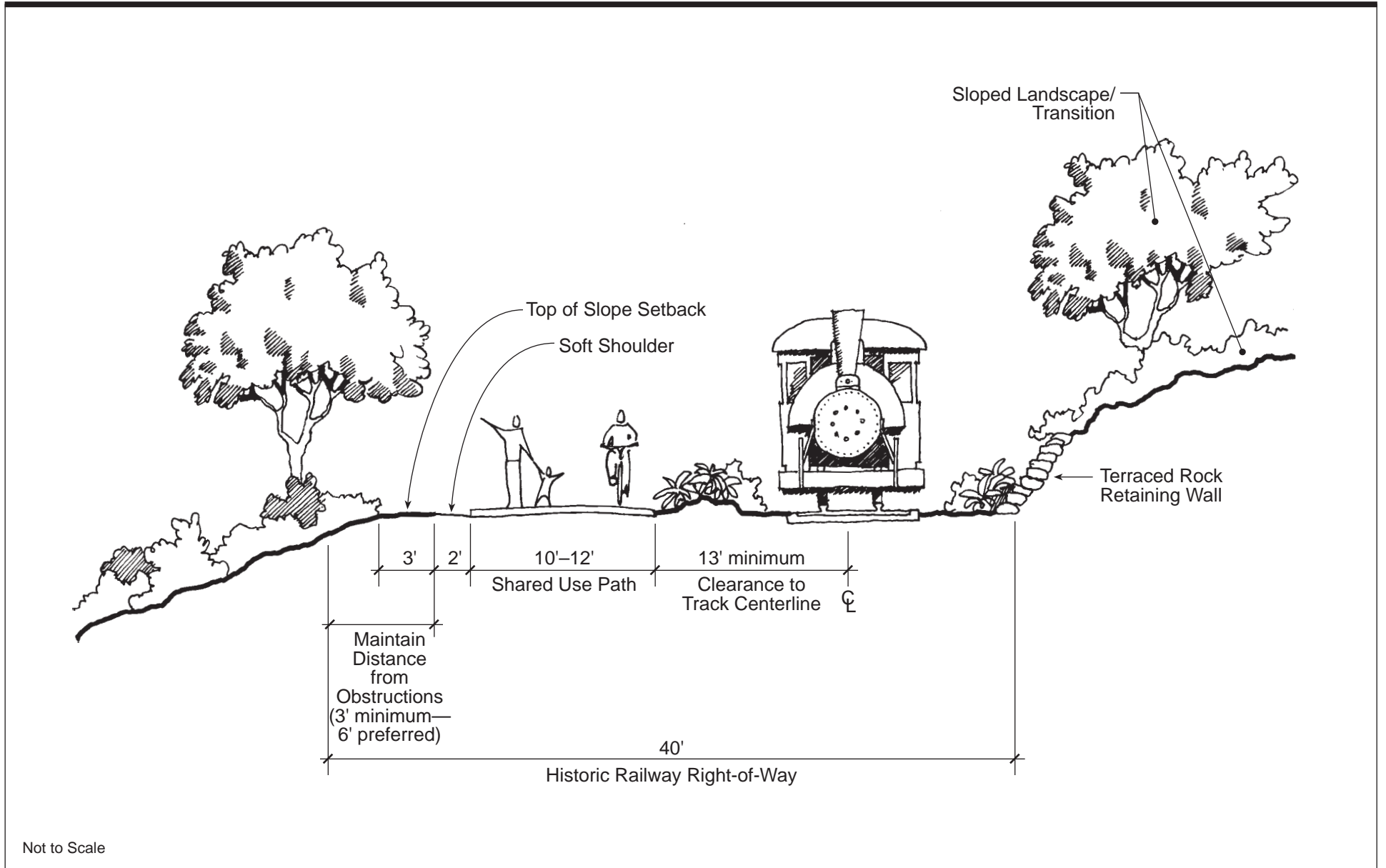


Figure 5-3
Trail Obstruction Setbacks

Other train stops requiring smaller platforms are proposed at destinations between stations: near Leeward Community College, Waipahu Cultural Garden Park, West Loch Shoreline Park, and Piliokahe Beach Park. With the exception of train stations and stops, no other buildings and ancillary structures should be built within the Trail's 40-foot-wide right-of-way.

Below: Temporary train stop at Ko Olina



Signs and Markers

Typical Trail signage, signals, and pavement markings for pedestrians and bicyclists serve a few basic purposes. They regulate use, communicate warnings, give directions to pre-established routes or destinations, and provide information.

Regulating safe and orderly Trail use is the primary function of a traffic sign, signal, and pavement marking system and follows pre-established design standards, while directional and informational signs can be designed to convey the Trail's significance.

To meet the above purposes, two separate signage standards should be designed for the entire length of the Trail, as follows:

Functional Signs. Signage must meet the Manual on Uniform Traffic Control Devices Standard (MUTCD) for sight distance and other requirements. Trail signs and pavement markings are similar to those for roadways. Because the MUTCD signage standards are easily recognizable as common road signs, they tend to command respect from users.

Due to the variety of anticipated users and their varying traveling speeds, careful consideration should be given to the placement and readability of signs, signals, and pavement markings. Typical signs described in the MUTCD that may be appropriate on the Trail include "No Motor Vehicles," "Speed Limit 15 mph," "Bike Route," "Stop Ahead," "Stop," and "Railroad Crossing."



Above: This is an example of a bike trail marker utilizing a unifying theme logo and indicating the direction to a geographic point of interest.

Right: This example of a directional sign indicates the route to an attraction. It also makes use of a unifying logo.



At a minimum, pavement markings for shared-use paths should include a centerline stripe, traffic direction indications, crossing definitions (railroad and roadways), intersection stop signs, and hazard striping.

Signs should be durable and vandal-resistant. Care should be given not to install too many signs along the Trail, particularly at any one location. Pavement markings are preferred to a myriad of vertical signposts. Areas cluttered with signs tend to diminish the uniqueness and beauty of the landscape.

Informational Signs. A network of coordinated and complementary informational signs that incorporate a "Pearl Harbor Historic Trail" logo should be designed to identify the Trail as a distinct heritage corridor. Locations, sizes, shapes, and materials for each sign type should be consistent throughout the length of the Trail.



Above: Signs and logos can convey a strong sense of place and history. An example is the Hawaii Convention and Visitors Bureau's historic site markers.

Trail “heritage” markers could be created to convey storylines or oral histories of the area and attractions. Unique markers of etched stone, embossed paving, photo-screened monuments or plaques, sculpture, and artwork would be appropriate to memorialize remembrances and special places. (See Appendix D: Cultural/ Interpretive Potential.)

Figure 5-4: Trail Signage Concepts illustrates possible concepts for a series of signs that would function as directional, informational, educational (history, ecology, geology, etc.), and identification signs (mile/feature markers). The overall concept borrows from the vernacular of train traffic control signs frequently seen along Hawaii railways during the late 19th century and early 20th century. These forms re-establish a visual connection to the railroad era and communicate a contemporary, yet appropriate, industrial aesthetic through use of illustrative style, color, materials, and typography.

SITE FURNISHINGS

All improvements, including outdoor furniture, should be compatible with the established architectural and historic rail themes. Site furnishings should share common design uniformity that projects an image of integrity and permanence. Materials selected should be high quality, durable, natural, widely available, and vandal-resistant. Benches and other furnishings are available in recycled materials.

Seating. Benches or seat walls should be provided at train stations and stops, near bicycle staging areas, at trail heads, and at designated viewing areas and scenic attractions. To reduce maintenance, picnic tables are generally restricted to the public parks along the Trail.

Trash Receptacles and Water Fountains. Trash receptacles should be placed along the Trail to promote public upkeep. Locations for receptacles include train stations and stops, bicycle rack areas, and parks. Water fountains should be installed at quarter-mile intervals between public parks.

Emergency Telephones. Emergency call boxes should be installed at quarter-mile intervals and in areas identified as problematic by community groups with assistance from the Honolulu Police Department. These vandal-resistant photovoltaic battery-powered call boxes ring directly to 911.

Night Lighting: Due to security concerns, regulations should prohibit use of the Trail at night, near residential areas. Waterfront commercial areas or other attractions should include vandal-resistant lighting at areas used for evening activities.

Right: Park benches like this one in Waikiki Beach are made from recycled plastic products. They are nearly impervious to damage from wear, weather, and vandalism. The composite plastic bench slats do not need regular maintenance, such as refinishing and lacquering required by wood materials, and have a much longer lifespan than standard wood benches, saving replacement costs.



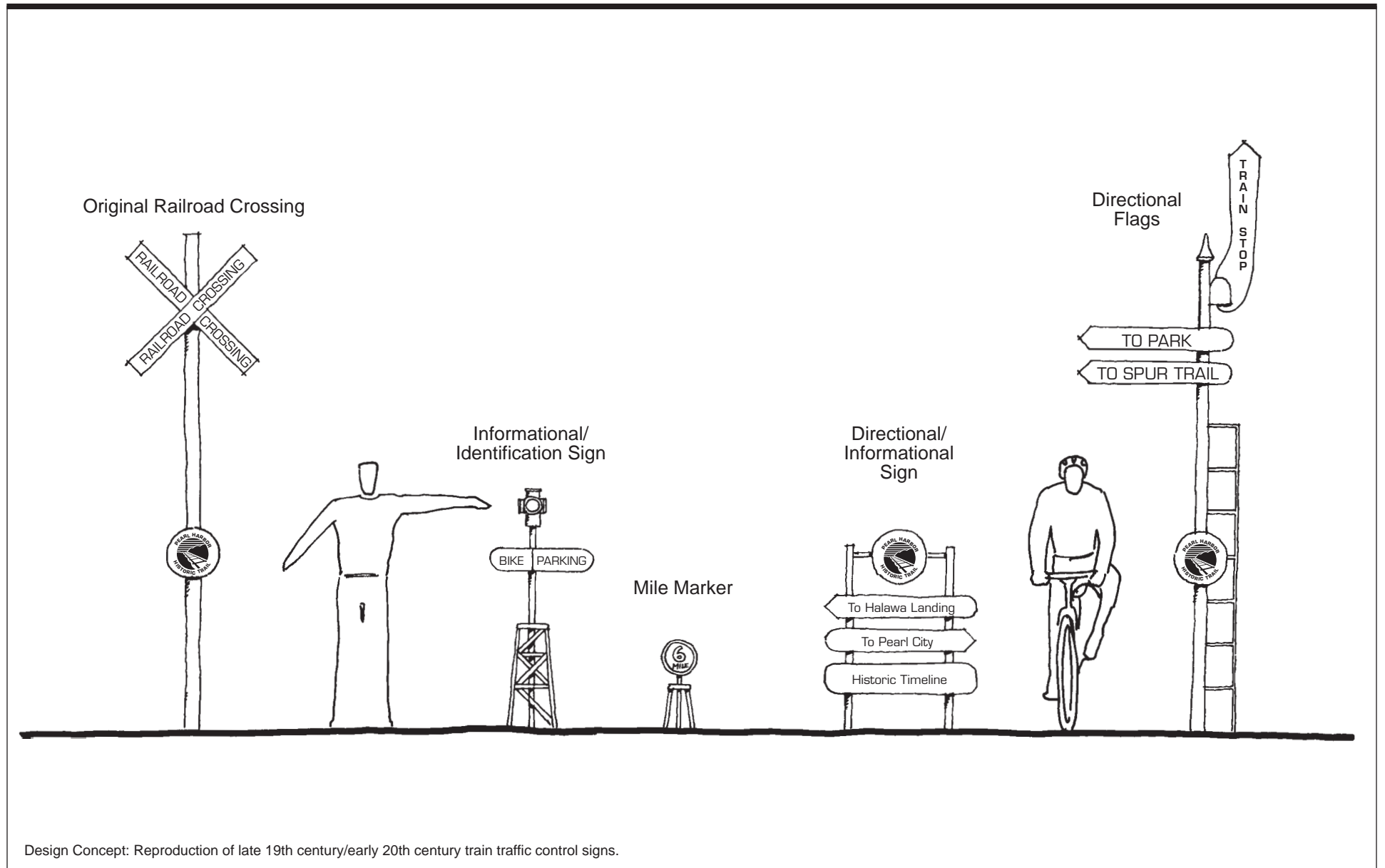


Figure 5-4
Trail Signage Concepts

Bicycle Parking. Bicycle racks should be provided directly adjacent to key Trail destinations: train stations and train stops, parks and viewing areas, commercial/recreational venues, trail heads, and transit stations. The racks should be highly visible and conveniently located close to the Trail.

Bicycle parking areas should be designed for short-term use only, with the exception of racks near schools or multifamily buildings. The design of the bicycle racks should allow users to lock the frame and both wheels.

OPEN SPACE

Greenway

The Trail’s 40-foot-wide corridor preserves a narrow ribbon of open space through urbanized O’ahu. Parks, wildlife refuges, golf courses, and beaches linked by the Trail form a contiguous system envisioned by the City’s “Lei of Green” concept. Protection of the remaining open spaces and natural habitat surrounding the Trail is critical for the Trail to remain an urban oasis. The City is encouraged to work with landowners to preserve and create additional greenway setbacks along the Trail. (Refer to pp. 3-20, 4-7, and 4-10).

Right: One style of bike rack, shown here, is a metal sculpture in the shape of a bicycle. These racks can accommodate up to four bicycles each.



Below: In heavy traffic areas, for example around attractions and beach parks, the ribbon-style bike rack is more practical.



Landscape Improvements

Due to the Trail’s extensive length and linear alignment, the treatment of landscape and open spaces should strive to create visual interest and dimension. To enhance the Trail experience, vegetation should be selectively cleared where pleasant views dictate and closed or screened where views are not so scenic. Views of Pearl Harbor and the Nanakuli shoreline should be maximized.

Landscaping will play a critical role in conveying first impressions upon entering the Trail. Initial Trail enhancement may involve minimal (if any) landscape improvements. “Naturalized” landscaping consistent with the environment is preferred. Permanent landscape and irrigation along the Trail may be implemented over time as resources and priorities dictate.

Some priorities that should be considered in the planning stage include the following:

- Hire a qualified landscape architect to propose designs that seek not only to enhance scenic quality and adjacent property values, but also to improve any poor conditions that exist, such as lack of potable irrigation water resources, screening unsightly views, ensuring proper drainage, creating natural barriers for safety, forming wind breaks, and providing shade. (See Figure 5-5: Trail Corridor Through Residential Areas.)



Above and Above Right: The overgrowth of mangrove (above) can be removed to improve safety and to open up shoreline visibility (above right) in some areas along the Trail.



- Open the shoreline view by selectively clearing mangrove around Pearl Harbor, in cooperation with the Navy.
- Use erosion control measures on slopes greater than 2:1. Develop a water resources conservation plan for proposed landscape and development improvements. Potable water is a scarce resource on the ‘Ewa Plain. Investigate feasibility of using nonpotable water for irrigation.
- Select plants based on their appropriateness to the climatic conditions, low maintenance, and proven survival rate. Reintroduce indigenous and endemic species where possible. Trees with large, aggressive surface root structures should not be planted in close proximity to the path or other paved areas. Other inappropriate plants include poisonous, bee attracting, and thorny species.

Temporary irrigation may be necessary until new plantings are well established (approximately six months). Aboveground piping could be connected to potable or non-potable water sources.

The following tables present partial lists of plant species that could be considered for the Trail. Each is well adapted to seasonal and annual variations in rainfall. A plant palette based only on native endemic species is not practical. Species may not be ornamentally appropriate nor easy to maintain. Native species may prove to have difficult survival rates in the Trail’s climate zones. A comprehensive reference, the *Master Guidelines for Landscaping and Maintenance of the Highways in Hawaii* (DOT, December 1999) is a useful resource for plant design, selection, maintenance, and irrigation.

Ecosystems at Pearl Harbor, ‘Ewa, and Wai‘anae

Pearl Harbor Estuary Ecosystem (Kona ahupua‘a)			
The section of the Trail between Halawa Landing and West Loch falls within the Pearl Harbor Estuary Ecosystem, which receives 20 to 40 inches of rainfall annually. Existing alien plants, such as mangrove along Pearl Harbor’s shoreline, should be selectively thinned or removed and, in some instances, replaced with more suitable species.			
Plant Type	Common Name	*	Botanic Name
Grasses	St. Augustine	--	<i>Stenotaphrum secundatum</i>
	Kikuyu	--	<i>Pennisetum clandestinum</i>
Ground-cover	Cormandel	--	<i>Asystasi gangetica</i>
	Nehe	I	<i>Lipochaeta integrifolia</i>
Shrubs	Spider lily	--	<i>Crinum asiaticum</i>
	Allamanda	--	<i>Allmanda cathartica</i>
	Beach naupaka	I	<i>Scaevola sericea</i>
	Naio	I	<i>Myoporum sandwicense</i>
	White hibiscus	E	<i>Hibiscus arnottianus</i>
Palms	Ti	PI	<i>Cordyline terminalis</i>
	Loulu	E	<i>Pritchardia</i> spp.
Other Trees	Coconut	PI	<i>Cocos nucifera</i>
	Monkeypod	--	<i>Samanea saman</i>
	True kamani	PI	<i>Calophyllum inophyllum</i>
	Silver buttonwood	--	<i>Conorayus erectus val argentens</i>
	Kou	PI	<i>Cordia subcordata</i>
	Milo	PI	<i>Thespesia populnea</i>
	Hau	I	<i>Hibiscus tiliaceus</i>
Hala	I	<i>Pandanus tectorius</i>	

Dry Savanna Ecosystem (Wai‘anae ahupua‘a)			
This portion of the Trail extends from ‘Ewa to the Nanakuli shoreline. Rainfall averages 20 to 30 inches annually in this region.			
Plant Type	Common Name	*	Botanic Name
Grasses	Buffel	--	<i>Cenchus ciliaris</i>
	Common bermuda	--	<i>Cynodon dactylon</i>
Ground-cover	Trailing lantana	--	<i>Lantana montevidensis</i>
	Coromandel	--	<i>Asystasia gangetica</i>
	Golden glory	--	<i>Arachis pintoi</i>
	Ilima papa	I	<i>Sida fallax</i>
	‘Ilie‘e	I	<i>Plumbago zeylanica</i>
Shrubs	Ulei	I	<i>Osteomeles anthyllidifolia</i>
	Alamanda	--	<i>Allamanda cathartica</i>
	Plumbago	--	<i>Plumbago capensis</i>
	Beach naupaka	I	<i>Scaevola sericea</i>
	Pohinahina	I	<i>Vitex rotundifolia</i>
	‘A‘ali‘i	I	<i>Podonaea viscosa</i>
	Ma‘o	E	<i>Gossypium tomentosum</i>
Palms	Ma‘ohau hele	E	<i>Hibiscus brackenridgei</i>
	Areca palm	--	<i>Chrysalido carpus lutescens</i>
	Chinese fan	--	<i>Livistona chinensis</i>
Other Trees	Manila palm	--	<i>Veitchia merrilli</i>
	Royal poinciana	--	<i>Delouex regia</i>
	Kou	PI	<i>Cordia subcordata</i>
	Wiliwili	E	<i>Erythrina sandwicensis</i>
	Mamane	E	<i>Sophora chrysophylla</i>
	Monkey pod	--	<i>Samanea saman</i>
Rainbow shower	--	<i>Cassia javanica x C. fistula</i>	

Coastal Strand Ecosystem (Wai‘anae ahupua‘a)			
The westernmost end of the Trail extends roughly 3 miles beyond Nanakuli. Rainfall averages 20 to 30 inches annually in this area.			
Plant Type	Common Name	*	Botanic Name
Grasses	Common bermuda	--	<i>Cynodon dactylon</i>
	Seashore paspalum	--	<i>Paspalum vaginatum</i>
Ground-cover	Beach morning glory	--	<i>Ipomoea pes-caprae</i>
	Ilima papa	--	<i>Sida fallax</i>
	Nanea	--	<i>Vigna marina</i>
Shrubs	Beach naupaka	--	<i>Scaevola sericea</i>
	Pohinahina	--	<i>Vitex rotundi folia</i>
	Ma‘o	--	<i>Gossypium tomentosum</i>
Palms	Coconut	PI	<i>Cocos nucifera</i>
Other Trees	Sea grape	--	<i>Coccoloba uvifera</i>
	Silver buttonwood	--	<i>Conocrpus erectus var. argenteus</i>
	Autograph tree	--	<i>Clusia rosea</i>
	Madagasea olive	--	<i>Noronhia emarginata</i>
	Milo	PI	<i>Thespesia populnea</i>
Beach heliotrope	--	<i>Messerschmidia</i>	

* CLASSIFICATIONS	PI = Polynesian introduction
	I = Indigenous
	E = Endemic
	-- = Other

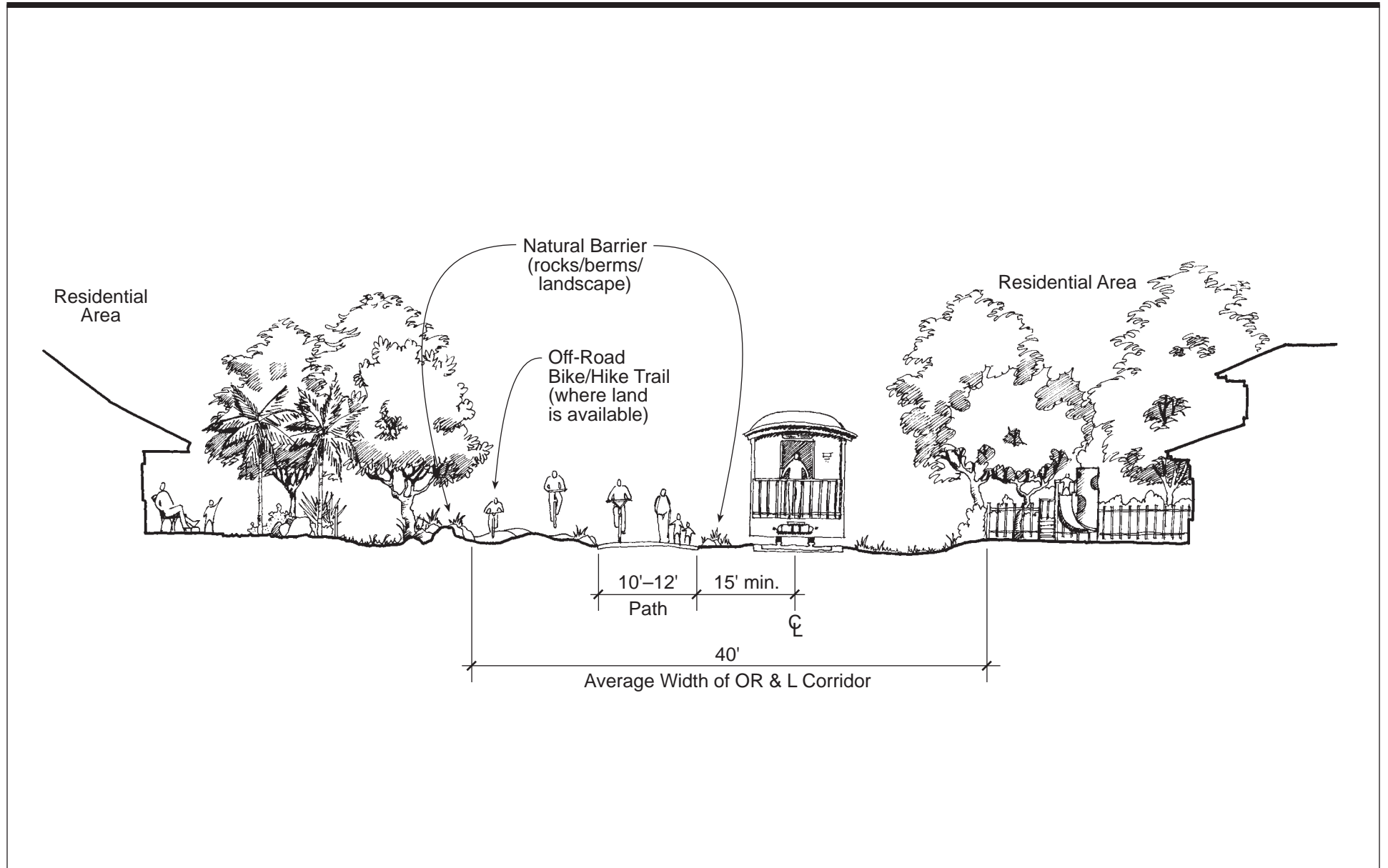


Figure 5-5
Trail Through Residential Areas

**Pearl Harbor Historic Trail
MASTER PLAN**

CHAPTER SIX

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